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The Heart of the Matter

57th Congress of the Italian Association of Hospital Cardiologists (ANMCO) Rimini, 7th-9th May 2026 and ANMCO Position Papers

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Guest Editor

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on behalf of the ANMCO Executive Board

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Introduction

The advent of artificial intelligence in recent years has significantly accelerated knowledge and diagnostic and therapeutic capabilities in the cardiovascular field. However, technological and cognitive advances, while enabling improvements and significant time savings in many diagnostic and therapeutic processes, can never replace the empathetic relationship that develops between doctor and patient, which is one of the greatest sources of satisfaction for the medical profession. Discharge certainly represents an important opportunity to strengthen the doctor-patient relationship. In this supplement, we present an article on hospital discharge that analyzes the key steps of this important moment, which will be crucial for the patient's future trajectory. This supplement contains other interesting papers on the management of chronic conditions in cardiology and on the impact of e-health in the management of patients with cardiovascular diseases. Of great interest is the paper on, often underestimated, risks deriving from the use of ionizing radiation in interventional cardiology labs. Finally, the volume is enriched by the abstracts presented during the 57th National Congress of the Association of Italian Hospital Cardiologists (ANMCO), held in Rimini from May 7 to 9, 2026. The large number of abstracts received and the high quality of those accepted and published here, clearly demonstrate the current brilliance in the Italian cardiology community.

I hope you find the articles and abstracts interesting and find them useful for the endless cultural growth of the cardiology community.

I wish everyone a pleasant and productive attendance at the 57th ANMCO Congress!

Massimo Grimaldi, ANMCO President

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European Heart Journal Supplements (2026) **28** (Supplement 6), vi1–vi248
The Heart of the Matter
https://doi.org/10.1093/eurheartjsupp/suag058

Abstracts

Oral Comunication

Arrhythmias & Ablation Techniques

Abstract citation ID: suag058.001

EFFICACY AND SAFETY OF PULSED FIELD ABLATION FOR ATRIAL FIBRILLATION ABLATION: A SINGLE–CENTER REL WORLD EXPERIENCE

L. Fini, M. Casula, M. Porcu, B. Noli, E. Agus, A. Setzu, E. Ceserano, B. Schintu, G. Tola, and M. Corda
Cardiologia; Arnas Brotzu; Arnas Brotzu; Policlinico Universitario Monserrato

Pulsed Field Ablation (PFA) is a mainly non–thermal energy source capable of creating myocardial–selective lesions. This study evaluated efficacy and safety of its introduction into real–world clinical practice for atrial fibrillation (AF) ablation. A retrospective analysis was conducted on all consecutive patients treated with AF ablation between January 2022 and September 2024 at our center, evaluated according to the energy source used (i.e. PFA vs thermal ablation). The primary efficacy endpoint was one–year recurrence of any sustained atrial tachyarrhythmia; major procedural complications represented the safety endpoint. Predictors of recurrence were studied using logistic regression analysis. A total of 117 patients (70 thermal and 47 PFA; 96 first procedure and 21 redo) were included in our analysis. Mean age was 61±9 years, and 82% were male. Persistent AF was present in 44 patients (38%) and 25 had structural heart disease (21%). Median left ventricle ejection fraction (LVEF) was 60% (IQR 54–65%), and medial left atrial volume index (LAVI) was 40 ml/m 2 (IQR 33–50). Twelve–month follow–up was completed in 91 patients (53 thermal and 38 PFA), while the follow–up analysis of first procedures included 74 patients (43 thermal and 31 PFA). One–year recurrence rates were not significantly different between groups (28.3% in the thermal cohort vs 18.4% in the PFA cohort, p=0.242). When only first procedures were considered, recurrence remained comparable (25.6% vs 16.1% p= 0,303 – Figure 1). Safety outcomes were similarly consistent, with no significant difference in major complications between groups (5.7% vs 4.3% in thermal and PFA group, respectively p=1,000), mainly driven by vascular access complications (3.4% vs 5.4%, p=0,414). Logistic regression identified LAVI (OR 1.06, 95% CI 1.01–1.11, p=0.013), structural heart disease (OR 4.86, 95% CI 1.4–16.8, p=0.012), and a history of diabetes mellitus (OR 6.14, 95% CI 1.4–26.6, p=0.015) as predictors of arrhythmic recurrence after a first ablation procedure (Table 1). This single–center real–world experience confirms the favourable efficacy and safety profile of PFA for AF ablation, which was overall comparable to that of traditional thermal modalities. Left atrial enlargement, structural heart disease and diabetes emerged as the strongest predictors of AF recurrence at one–year follow–up.

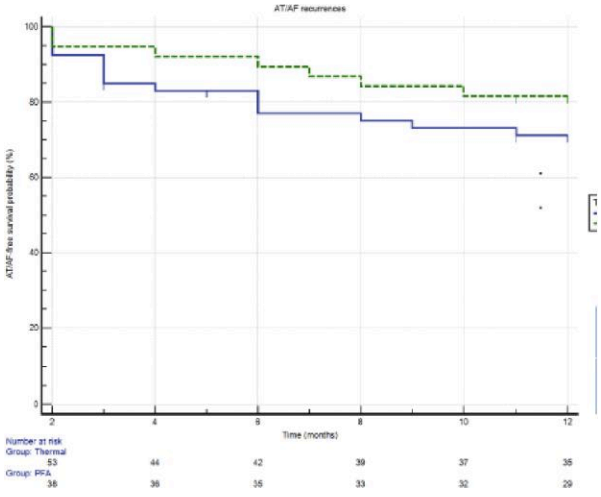

Figure 1

Arrhythmic recurrence predictors			
	OR	95% CI	P
Age	1,02	0,96 to 1,09	0,520
Height	0,98	0,92 to 1,05	0,570
Weight	1,01	0,97 to 1,04	0,705
Body Mass Index	1,03	0,94 to 1,13	0,544
LVEF	1,00	0,95 to 1,05	0,983
LAVi	**1,06**	**1,01 to 1,11**	**0,013**
Female Gender	0,78	0,15 to 4,02	0,764
Persistent AF	1,45	0,45 to 4,61	0,532
Structural heart disease	**4,86**	**1,41 to 16,76**	**0,012**
Coronary artery disease	1,51	0,27 to 8,65	0,641
Heart Failure	1,81	0,48 to 6,91	0,382
Diabetes	**6,14**	**1,42 to 26,58**	**0,015**
Hypertension	2,54	0,81 to 7,94	0,110
Procedural target (vs. PVI only)	Extra-PVI	1,26	0,30 to 5,32	0,757
PFA vs thermal		0,56	0,17 to 1,82	0,333

Table 1

Abstract citation ID: suag058.002

RECURRENCE AFTER FIRST–TIME ABLATION FOR PERSISTENT ATRIAL FIBRILLATION A TRIAL–LEVEL NETWORK EVIDENCE SYNTHESIS OF CONTEMPORARY STRATEGIES

M. Meco, E. Agosteo, and F. Zuffada
Clinica San Carlo

Background: Pulmonary vein isolation (PVI) remains the cornerstone of catheter ablation in persistent atrial fibrillation (PersAF), yet recurrence is frequent. Multiple adjunctive strategies have been tested with heterogeneous results.
Methods: We performed a focused synthesis of major randomized controlled trials (RCTs) in PersAF comparing PVI–based catheter ablation with adjunctive or alternative strategies. The primary endpoint was atrial tachyarrhythmia recurrence/failure at ~12 months after a 90–day blanking period.

Effects are presented as risk ratios (RR) for recurrence/failure (RR‹1 favours intervention). A sensitivity analysis included STAR AF II (18–month follow–up).
Results: Nine randomized comparisons were included (CAPLA, VENUS, DECAAF II, ERASE–AF, SUPPRESS–AF, CONVERGE, CRRF–PeAF, and two STAR AF II arms), encompassing ›3,000 patients overall (Figure 1). Routine posterior wall isolation did not reduce recurrence vs PVI (52.4% vs 53.6% free; HR≈0.99). MRI–guided fibrosis ablation also showed no benefit and increased safety events (43.0% vs 46.1% recurrence; HR≈0.95). In contrast, strategies targeting non–PV substrate showed favourable signals: vein of Marshall ethanol improved freedom from arrhythmia (49% vs 38%). Low–voltage substrate modification reduced recurrence (35% vs 50%). LVA–guided ablation improved 1–year arrhythmia–free survival (61% vs 50%; HR≈0.78). Hybrid Convergent outperformed endocardial catheter ablation (67.7% vs 50.0% effectiveness). Cryoballoon was non–inferior to radiofrequency. CFAE/linear lesions did not improve outcomes (Figure 2).
Conclusions: In PersAF, empiric anatomic lesion sets (posterior wall, CFAE/lines) and MRI–guided fibrosis ablation do not meaningfully reduce recurrence, whereas mechanistic substrate approaches (VOM ethanol, low–voltage targeting) and hybrid epicardial–endocardial ablation show the most consistent signals toward lower recurrence, warranting further head–to–head trials.

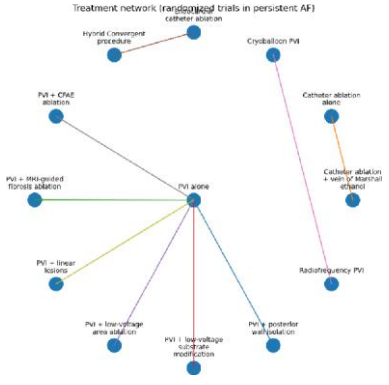

Figure 1

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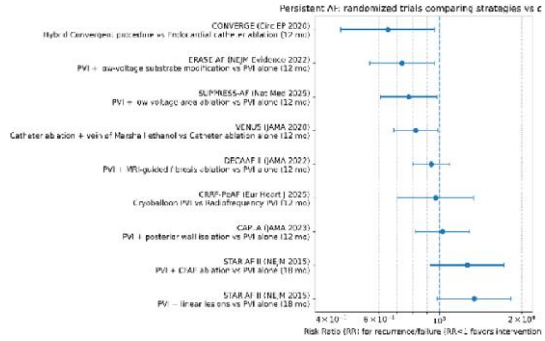

Figure 2

Abstract citation ID: suag058.003

LONG–TERM IMPACT OF VEIN OF MARSHALL ALCOHOL INFUSION COMBINED WITH AN ANATOMICAL ABLATION SETUP FOR REPEATED ABLATION IN PERSISTENT ATRIAL FIBRILLATION

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Background: The optimal ablation strategy for patients undergoing repeat catheter ablation (CA) for atrial fibrillation (AF) remains debated. Vein of Marshall ethanol infusion (VOM–EI) has been proposed to enhance substrate modification and improve long–term rhythm control, particularly in persistent AF, but its role in repeated ablations is poorly investigated.
Purpose: To evaluate whether adding VOM–EI to a standardized ablation setup during repeat AF ablation improves long–term rhythm outcomes compared with standard redo strategies.
Methods: In this retrospective, multicenter observational study, consecutive patients undergoing repeat CA for AF were included. The VOM–EI approach consisted of ethanol infusion followed by systematic completion of a predefined ablation setup (verification of PV isolation and assessment of conduction block across lateral mitral isthmus, left atrial dome and cavotricuspid isthmus). Patients were first analysed as VOM–EI vs non–VOM redo procedures. Propensity score matching was conducted using demographic and arrhythmia–related covariates. The primary endpoint was recurrence of atrial tachyarrhythmias ›30 seconds. Time–to–event outcomes were evaluated with Kaplan–Meier analysis and Cox regression. Secondary analysis stratified patients into three strategies—PVI–only, PVI plus substrate modification, and VOM–EI setup—comparing outcomes using inverse probability of treatment weighting (IPTW).
Results: A total of 263 patients undergoing repeat ablation were included (28% long–lasting persistent AF). Of these, 121 underwent VOM–EI and 142 standard redo strategies (60 PVI–only, 82 PVI plus substrate modification). After matching, 111 VOM–EI patients were compared with 111 controls. Atrial arrhythmia recurrence occurred in 42% of controls vs 20% of VOM–EI patients. In multivariate Cox regression, the VOM–EI+anatomical strategy was associated with a significantly lower risk of recurrence (HR 0.32, p=0.0001), independent of age, AF duration, and previous procedures. In IPTW analysis, VOM–EI +anatomical strategy showed favourable outcomes compared with both PVI–only and PVI plus substrate modification, with greatest benefit in patients with long–lasting AF (Figure 1).
Conclusions: This observational multicenter study using matched cohorts shows that VOM–EI combined with a specific predefined anatomical ablation setup is associated with improved long–term outcomes compared with standard redo strategies in a large persistent AF population.

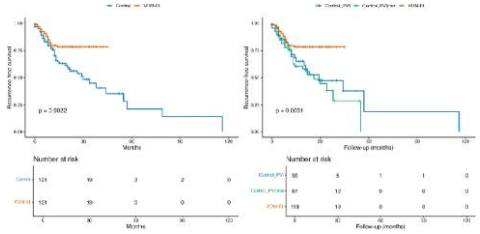

Figure 1

Abstract citation ID: suag058.004

BILATERAL LEFT LATERAL RIDGE ABLATION IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION: STUDY RATIONALE AND PRELIMINARY RESULTS

D. Ciliberti, A. Di Monaco, F. Quadrini, F. Troisi, N. Vitulano, L. Sgarra, V. Perniciaro, R. Caruso, V. Anzelmo, and M. Grimaldi
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Background: Left lateral atrial ridge (LLR) is a crossroads of different tissues, known as a substrate for atrial fibrillation (AF) triggers, but also as a challenging ablation site. We previously proposed the bilateral ablation approach.
Purpose: The aim of this study is to assess the feasibility, safety and efficacy of adding bilateral ablation of the left lateral ridge (BLLRA) to pulmonary vein isolation (PVI) in preventing AF recurrences.
Methods: We designed a 1:1 randomized, single–blinded, superiority trial enrolling consecutive patients undergoing first paroxysmal AF ablation. Patients were randomized to BLLRA plus PVI (fig.1) or to PVI only, performed using a variable loop pulsed field ablation catheter. The primary endpoint is freedom from atrial tachyarrhythmias 12 months after ablation. The secondary endpoint is a safety outcome. The sample size was calculated 121 patients per group. A structured follow up at 2, 6 and 12 months was settled. This is an interim analysis of the preliminary results.
Results: In this preliminary analysis, a total of 41 patients (mean age 61,5±8,4; male 61%) were enrolled from October 2024 to September 2025. 21 patients (mean age 61,5±6,8; male 76,2%) were randomized in BLLRA plus PVI group, whilst 20 patients in the PVI group (mean age 61,5±10; male 45%). Baseline characteristics were balanced between groups (fig.2). Two patients did not start the follow up. No differences were documented between groups about procedural data nor times (fig.2 and 3). After 7,3±3,1 months of follow up, freedom from recurrent atrial arrhythmia (fig.3), without the use of antiarrhythmic drugs and after 8 weeks of blanking period, was present in 18 of 20 patients (90%) assigned to BLLRA plus PVI, compared with 15 of 19 (78,9%) assigned to PVI alone (between–group difference, –11,9%; hazard ratio [HR], 0.52 [95% CI, 0.10–2,59]; log rank p = 0,43). Evaluating the type of arrhythmia, freedom from AF was documented in 90% of patients of the intervention group and 84,3% of the control group (log rank p = 0,69); whereas freedom from atrial flutter occurred in 100% of BLLRA plus PVI group and 94,8% in PVI only group (log rank p = 0,31). No events of the safety outcome occurred, except for two vascular minor complications.
Conclusions: BLLRA plus PVI is a feasible and safe treatment for paroxysmal AF. There is a favourable trend toward efficacy when compared to PVI only, but more data, patients and time are needed.

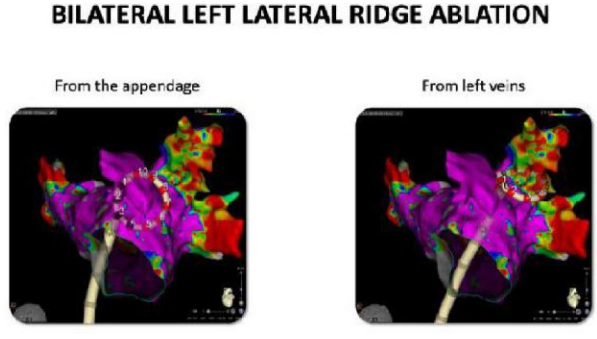

Fig.1: following the bilateral left lateral ridge approach, this area was ablated using a variable loop pulsed field ablation catheter. From the pulmonary veins and, on the other side, from the ostium of the left atrial appendage mirroring previous lesions.

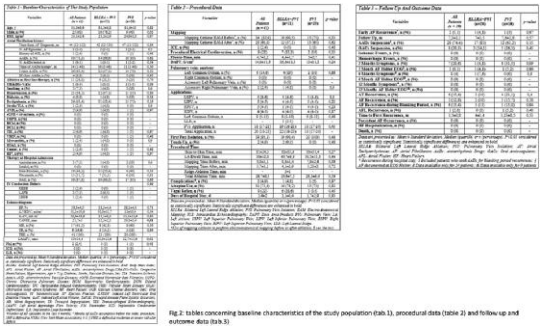

Fig.2: tables concerning baseline characteristics of the study population (tab.1), procedural data (table 2) and follow-up and outcome data (tab.3)

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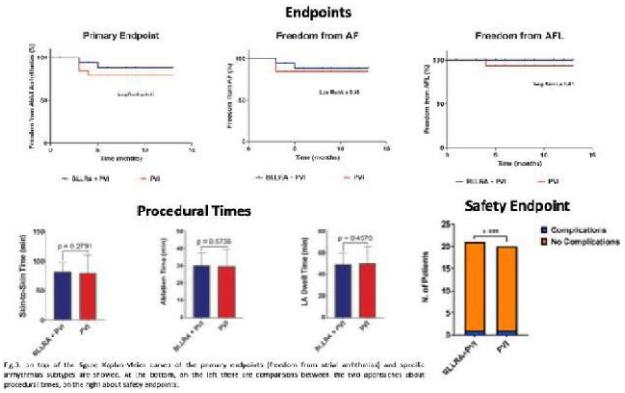

Abstract citation ID: suag058.005

PULMONARY VEIN RECONNECTION PATTERNS AT REDO ATRIAL FIBRILLATION ABLATION: A COMPARISON BETWEEN RADIOFREQUENCY AND PULSED FIELD ABLATION

M. Porcu, M. Casula, B. Noli, L. Fini, E. Agus, A. Setzu, A. Scalone, E. Cesarano, A. Salito, V. Schillaci, E. Mura, G. Tola, M. Corda, and F. Solimene
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Introduction: Pulmonary vein (PV) isolation durability is a major determinant of long–term success after atrial fibrillation (AF) ablation. Pulsed field ablation (PFA) has emerged as an alternative to radiofrequency (RF), potentially offering more homogeneous and durable lesions. However, real–world data comparing PV reconnection rates between these technologies at repeat procedures are still limited.
Methods: We performed a multicenter retrospective analysis of patients undergoing a repeat ablation procedure for arrhythmic recurrence after a first AF ablation performed with RF or PFA. High–density electroanatomical mapping was systematically used to assess PV reconnection. The primary endpoint was the presence of at least one reconnected PV. Secondary analyses included the number and distribution of reconnected PVs and the identification of predictors of PV reconnection.
Results: A total of 114 patients were included; 87 (76%) had undergone RF ablation and 27 (24%) PFA at the index procedure. Overall, 101 patients (89%) showed at least one reconnected PV at redo. PV reconnection was significantly more frequent in the RF group compared with PFA (94% vs 70%, p ‹ 0.001), and reconnection of all four PVs occurred predominantly after RF ablation (54% vs 15%, p ‹ 0.001). For each individual PV, reconnection rates were consistently lower in the PFA group (Table 1). Use of PFA at the index procedure was associated with a significantly lower rate of PV reconnection at univariate analysis (OR 0,15; 95% CI 0.04–0.50; p = 0.002). Nonetheless, energy source lost significance in multivariate analysis (p=0,09 – Table 2). On the other hand, redo ablation performed within 12 months from the index procedure (OR 0.1, 95% CI 0.01–0.76; p = 0.026) and presentation with atrial flutter at admission for redo (OR 0.09, 95% CI 0.01–0.92; p = 0.043) were independently associated with a lower risk of PV reconnection, and a higher body mass index (BMI) emerged as an independent predictor of PV reconnection (OR 1.52, 95% CI 1.1–2.1; p = 0.010).
Conclusion: In this multicenter real–world cohort of redo AF ablation procedures, PFA showed high rates of durable PV isolation over time. However, the multivariate analysis suggests that the time to redo procedure significantly impacts reconnection rates; therefore, further studies with longer follow–up are required to evaluate its definitive superiority over RF and clarify the mechanisms underlying lesion durability with different energy sources.

Variable	OR (Univariate) 95% CI		p	OR (Multivariate) 95% CI		p
Female sex	0.74	0.21–2.61	‹ 0.640	–	–	–
Persistent AF	0.90	0.21–3.11	‹ 0.967	–	–	–
Hypertension	0.95	0.29–3.12	‹ 0.937			
Dyslipidemia	0.48	0.15–1.58	‹ 0.228			
AAD discontinued after blanking period	1.62	0.19–28.68	‹ 0.668	–	–	–
Primary procedure with PFA	0.14	0.04–0.49	‹ 0.002	0.12	0.02–1.09	0.060
Age of first procedure (per year)	0.97	0.91–1.02	‹ 0.220	–	–	–
Age at redo (per year)	0.98	0.93–1.03	‹ 0.399	–	–	–
Body mass index (kg/m²)	1.24	1.03–1.51	‹ 0.026	1.52	1.02–1.51	0.010
Left ventricular ejection fraction	0.95	0.79–1.16	‹ 0.574	–	–	–
Chronic kidney disease ≥ stage 3	1.12	0.26–17.51	‹ 0.886	–	–	–
Redo within 12 months	0.13	0.04–0.46	‹ 0.002	0.13	0.04–0.46	0.026
Organized arrhythmia after first procedure	0.30	0.09–0.97	‹ 0.044	1.49	0.20–11.1	0.686
Rhythm at redo: atrial flutter	0.13	0.03–0.52	‹ 0.004	0.13	0.02–0.92	0.043

	Total (n = 114)	RF (n = 87)	PFA (n = 27)	p
No reconnected PVs	14 (12.3%)	6 (6.9%)	8 (29.6%)	0.0007
At least one reconnected PV	101 (88.6%)	82 (94.3%)	19 (70.4%)	
All four PVs reconnected	51 (44.7%)	47 (54.0%)	4 (14.8%)	0.0007
LSPV reconnection	81 (71.1%)	68 (78.2%)	13 (48.1%)	0.0028
LIPV reconnection	72 (63.2%)	61 (70.1%)	11 (40.7%)	0.0059
RSPV reconnection	68 (59.6%)	60 (69.0%)	8 (29.6%)	0.0003
RIPV reconnection	76 (66.7%)	66 (75.9%)	10 (37.0%)	0.0002

Abstract citation ID: suag058.006

LESION CHARACTERISTICS AFTER ATRIAL FIBRILLATION ABLATION USING PULSED FIELD ABLATION

M. Foti, L. Bianchini, V. De Sanctis, A. Sanzo, M. Casula, G. Zingarini, R. Maggio, L. Rossi, F. Tundo, A. Dello Russo, S. Bianchi, S. Themistoclakis, S. Iacopino, C. Tondo, and R. Rordorf
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Pulsed–field ablation (PFA) is a non–thermal ablation technology potentially more selective and safer than traditional techniques; however, the extent of lesion formation and the unintentional involvement of the left atrial (LA) posterior wall (PW) remain unclear. This study aimed to characterize PFA lesion formation after pulmonary vein isolation (PVI) in real–world atrial fibrillation (AF) patients using high–density (HD) voltage mapping, and to evaluate whether unintentional PW involvement is associated with arrhythmia recurrence. A total of 113 patients were prospectively enrolled and underwent PVI using the Farapulse PFA system at 14 centers. Protocol–directed PVI was delivered at 2 kV with eight applications per vein, with additional applications at the operator's discretion. After PVI, an HD three–dimensional LA map was acquired using Rhythmia/Orion (31%), Carto/Pentaray (29.2%) or NavX/HD Grid (39.8%) systems. Bipolar voltage maps were displayed using a ‹0.5 mV threshold to identify low–voltage areas zones as either acute lesion formation or chronic scarring. Pulmonary veins were segmented into seven sectors for regional analysis. To quantify PW lesion extension, nine predefined PW sectors were grouped into upper, intermediate and lower segments (Figure 1). Unintentional PW involvement was defined as involvement of at least one PW sector; PW narrowing as involvement of two sectors within the same segment, and PW closure as involvement of all three sectors within a segment. Patients were followed for a median of 280 days. PVI was successfully achieved in all patients, with complete antral isolation in 100% of cases. The mean ablated area around PVs was 34.3±5 cm2: 10.0±4 cm2 at the anterior portion of the PVs, 9.2±2 cm2 at the posterior site, 4.2±1 cm2 in the superior area, 3.9±1 cm2 in the inferior area and 5.3±2 cm2 at the carina region. Unintentional PW involvement occurred in 63 patients (55.8%), including PW narrowing in 31 (27%) and PW closure in 8 (7%). During follow–up, 10.4% experienced AF recurrence and 8.1% developed atrial tachycardia or flutter. No significant association was found between PW involvement and arrhythmia recurrence (Figure 2). PW involvement after PFA–based PVI is frequent but does not appear to increase arrhythmia recurrence risk. Larger prospective studies with longer follow–up are needed to clarify its clinical relevance.

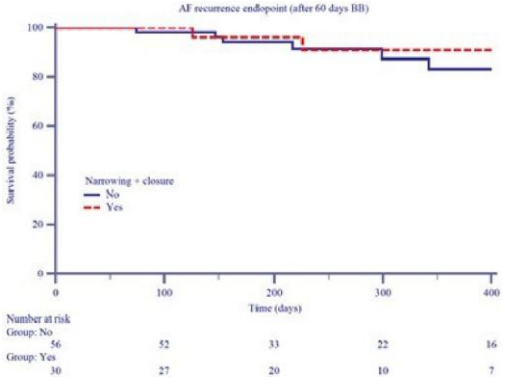

Figure 1

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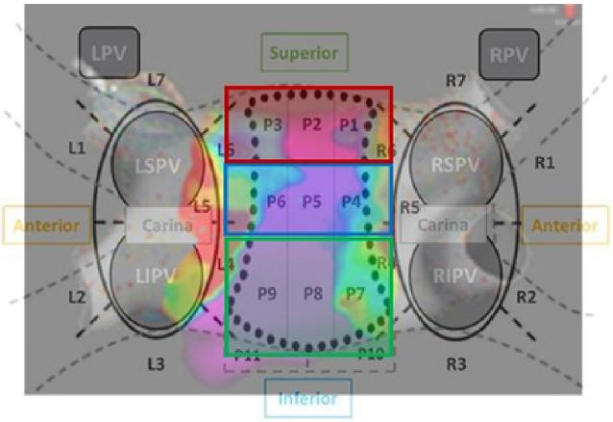

Figure 2

Arrhythmias & Electrostimulation

Abstract citation ID: suag058.007

LONG–TERM FOLLOW–UP OF DEFIBRILLATOR IMPLANTATION IN PEDIATRIC AGE: A SINGLE TERTIARY CENTER EXPERIENCE

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Background: Despite sudden cardiac death (SCD) is a rare phenomenon in pediatric age, the use of the implantable defibrillator (ICD) is progressively increasing in consideration of its life–saving role both in primary and in secondary prevention. The aim of this study is to assess the long–term follow–up of pediatric patients undergoing ICD implantation at our tertiary center.
Methods: The retrospective study includes 70 patients with a mean age 14 years (range 2.8–18) underwent ICD implantation between 2010 and 2025. We used three different implantation technique (endocavitary, subcutaneous and hybrid technique) depending on heart disease, size of the patient and the cardiac anatomy. All device has been programmed in a personalized way based on age and cardiac pathology. During follow up appropriate shocks, acute and chronic complications, in particular inappropriate shocks, were evaluated.
Results: Of the 70 implanted patients, 57% had cardiomyopathy, 24% had a primary electrical disease, and 19% had congenital heart disease. The implants were performed in 55% of cases for primary prevention and 45% for secondary prevention. CHD and CM are mostly implanted in primary prevention. The study shows that 26 patients (37%) were correctly treated by the device with appropriate shock or ATP with an average Shock/patient of 2.6. Of the 26 treated patients, 12 (46.2%) were implanted as primary prevention of which one third (33.3%) were HCM. Seventeen (24.6%) patients underwent heart transplantation listing and 65% had appropriate discharges with an average shocks/patient of 2.2. There were no acute complications related to ICD implantation. During follow–up (mean follow–up time 9±5 years; range 1–15 yeas), two patients (2.8%) experienced epicardial lead rupture in hybrid ICD implants without episodes of inappropriate shocks. No endocavitary lead ruptures occurred. Eight (11.6%) subjects experienced inappropriate discharges, seven of which were due to high–rate supraventricular tachycardias and one due to T–wave over sensing.
Conclusions: The study confirmed the protective role of the device, in terms of prevention of sudden cardiac death, and its relevance as bridge to heart transplantation in pediatric age. Appropriate device programming significantly reduced inappropriate shocks in our patients. Lead failure was greater in hybrid implants than in traditional ones.

Abstract citation ID: suag058.008

A COMPLEX CASE OF 43 YO MALE WITH CHD AND CIED

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UOC Apuane, Massa

A 43–year–old man was referred to our center for complete exposure of ICD pocket. The generator was fully exposed in the right prepectoral–axillary region, with total exposure of the lead electrodes up to the fixation sleeves. The patient had a history of double–outlet right ventricle surgically corrected in 1981, with residual ventricular septal defect and mild left–to–right shunt atrial septal defect (ASD). In 1982, due to complete atrioventricular block, a dual–chamber pacemaker was implanted in the left prepectoral region. Because of recurrent sustained ventricular tachycardias an ICD was subsequently implanted in the right prepectoral region, with removal of the left–sided pacemaker and abandonment of the ventricular pacing lead. In July 2019, the patient was admitted for pocket erosion and underwent generator repositioning in the right subpectoral region. In October 2019, recurrence of pocket erosion occurred, the TEE showing vegetations on both atrial and ventricular leads. Device extraction was proposed but declined. In May 2023, the patient presented with ICD shock during ventricular tachycardia, associated with electrode exposure and purulent discharge, and was referred to our institution. TTE revealed an ejection fraction of 38%. TEE and intracardiac echocardiography confirmed lead–related endocarditis with multiple vegetations. Venography demonstrated left–sided venous patency and right subclavian vein occlusion. Cardiac CT confirmed VSD, ASD (ostium secundum), and subclavian vein strictures. After heart team discussion, transvenous lead extraction was attempted on September 12, 2023. Due to an unresolvable adhesion at the superior vena cava, surgical extraction was subsequently required. A CRT–P device was implanted with epicardial leads in the left prepectoral region, along with reconstruction of the right atrioventricular junction and ASD closure. On October 4, a subcutaneous ICD was implanted. The patient was discharged afebrile but was readmitted in November 2023 with CRT–P pocket erosion and fever. Given the high infectious risk, a leadless VDD pacemaker was implanted after electroanatomic mapping of the right ventricle because of a dacron patch on IVS, and the CRT–P generator was removed and an S–ICD implanted. This case highlights the complexity of device–related complications in young patients and emphasizes the importance of a multidisciplinary, integrated approach to optimize outcomes

Abstract citation ID: suag058.009

SINGLE LEAD ATRIOVENTRICULAR SEQUENTIAL PACING AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT: A SAFE AND EFFECTIVE ALTERNATIVE TO DUAL LEAD SYSTEMS

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Background: Pacemaker implantation following transcatheter aortic valve replacement (TAVR) has been linked to increased mortality. Evidence on the efficacy and safety of single–lead atrioventricular sequential (VDD) pacing in this patient population is currently limited.
Purpose: We sought to assess whether TAVR patients implanted with VDD had significantly different electrical parameters compared to TAVR patients implanted with dual lead pacemakers (DDD). Moreover, we investigated whether VDD pacing resulted in significantly different acute complications and long–term mortality rates than DDD pacing.
Methods: We conducted a retrospective analysis on patients implanted either with a VDD or a DDD after TAVR. We compared PM procedural data and electrical parameters at 1 month, at 1 year and at 2–3 years. Acute complications were considered as procedure or device–related complications occurring up to 7 days after PM implant. Long–term mortality included both cardiovascular and all–cause mortality during the follow–up period.
Results: 111 patients were included in the study, of which 27 VDD (24%) and 84 DDD (76%). All clinical characteristics were homogeneous between the two groups, except for VDD being significantly older than DDD (85.0 [interquartile range, 81.5–88.0] vs. DDD 82 [78.8–85.0] years, p=0.01). PM implantation was performed after a median of 1 [0–2] day following TAVR in VDD and a median of 2 [0–4] days in DDD. The implantation site of the VDD was apical–septal, whereas the implantation site of the DDD was septal. Implant duration was significantly shorter for VDD as compared to DDD (70.0 [60.5–82.5] vs. 85.0 [70.0–103.5] mins, respectively; p=0.02), as well as median fluoroscopy time (5.3 [3.9–6.9] vs. 9.8 [6.7–16.0] minutes; p‹0.001). The electrical parameters during follow–up are summarized in Figure 1. Median follow–up time in the whole cohort was 1120.0 [823.0–1302.0] days (VDD 1034.5 [895.3–1428.5] vs. DDD 1123.5 [796.3–1277.0] days; p=0.87). Mortality analysis was carried out on all VDD and 79 DDD (5 excluded due to missing data). There were no differences among groups regarding periprocedural complications and long–term mortality (Figure 2). Notably, no VDD required upgrading with an atrial lead.
Conclusions: In this retrospective, single–centre study, VDD pacemakers in post–TAVR patients had similar long–term electrical parameters, acute complications and long–term mortality compared to DDD, while requiring less procedure time.

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		VDD	DDD	p-value
1st month	Atrial sensing, mV [IQR]	0.6 [0.36-1.1]	2.7 [2.2-5.0]	<0.001
	Ventricular sensing, mV [IQR]	6.8 [2.4-11.7]	12.0 [7.0-14.6]	0.005
	Ventricular threshold, V [IQR]	0.7 [0.5-1.1]	0.6 [0.5-0.8]	0.91
1st year	Atrial sensing, mV [IQR]	0.6 [0.3-1.1]	3.0 [2.2-4.7]	<0.001
	Ventricular sensing, mV [IQR]	8.0 [5.9-12.0]	11.6 [5.4-15.1]	0.13
	Ventricular threshold, V [IQR]	0.6 [0.5-0.9]	0.8 [0.7-1.0]	0.12
2nd-3rd year	Atrial sensing, mV [IQR]	0.9 [0.7-2.8]	2.5 [1.4-3.9]	0.08
	Ventricular sensing, mV [IQR]	6.9 [6.8-8.0]	10.3 [5.2-12.0]	0.28
	Ventricular threshold, V [IQR]	0.7 [0.5-0.7]	0.8 [0.6-0.9]	0.21

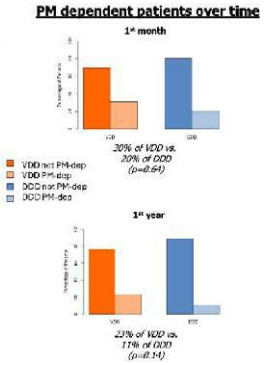

Figure 1

	VDD (n =27)	DDD (n=84)	Total (n=111)
Cardiovascular death [%]	1 [3.7]	2 [2.4]	3 [2.7]
All-cause mortality [%]	3 [11.1]	16 [19.0]	19 [17.1]
Heart failure [%]	2 [7.4] (1 of which periprocedural)	6 [7.1]	8 [7.2]
Ventricular catheter dislocation [%]	0	1 [1.2] (periprocedural)	1 [0.9]
Atrial catheter malfunctioning [%]	0	1 [1.2]	1 [0.9]
Other non-PM related cardiovascular complications [%]	1 [3.7]	8 [9.5]	9 [8.1]

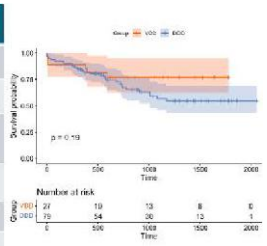

Figure 2

Abstract citation ID: suag058.010

VAGAL INFLUENCE ON ATRIAL ELECTROGRAMS: DIFFERENTIATING STRUCTURAL VS. FUNCTIONAL FRAGMENTATION IN GANGLIONATED PLEXI REGIONS

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Background and aims: Ganglionated plexi (GPs) are the primary target of ablative therapies for neurally mediated syncope (NMS); however, the optimal method for their endocardial localization remains unclear. This study analyzed bipolar atrial electrograms (EGMs) and their response to a vagolytic agent to elucidate their relationship with the parasympathetic network.
Methods: High–density right atrial mapping was performed before and after 2 mg atropine in healthy patients without structural heart disease undergoing electrophysiological study for standard indications. Offline analysis compared pre– and post–atropine maps, focusing on fragmentation patterns and spectral analysis.
Results: The study included 13 patients (mean age: 34±12 years, 9 males). Baseline maps exhibited a consistent fragmentation pattern in the posterior–septal wall, reflecting anatomical right GPs distribution. No difference in density of points between the pre–post atropine map was detected (p=0.97). Three primary areas were identified in the supero–(A), mid–(B), and infero–posterior–(C) regions. Fragmentation of EGMs was found to increase from the periphery toward the core of each area. In fact, the fragmentation pattern was consistent across all analyzed GPs areas: a centrally located, rounded high–fragmentation area (≥6 deflections) was surrounded by a low–fragmentation area (≥4 deflections), with a transition zone (≥5 deflections) in between (Figure 1). Atropine significantly reduced fractionated areas (p‹0.001 for A and C, p‹0.05 for B, Figure 1, Figure 2). External areas exhibited “functional“ fragmentation, sensitive to vagal output, whereas central cores displayed " structural" fragmentation, resistant to vagolysis.
Conclusion: Fragmentation of atrial EGMs is a dynamic property, related to parasympathetic output. Standard fragmentation criteria may overestimate GPs areas. These results could suggest a more selective approach on central core of GPs during Cardioneuroablation procedure, potentially reducing procedural risks and improving long–term outcomes.

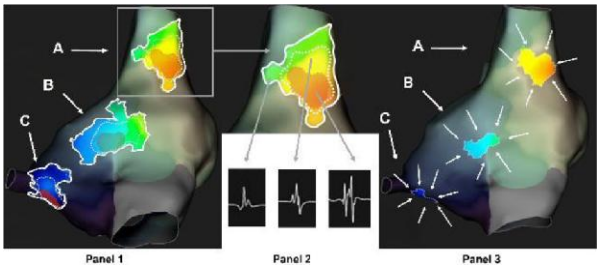

Figure 1

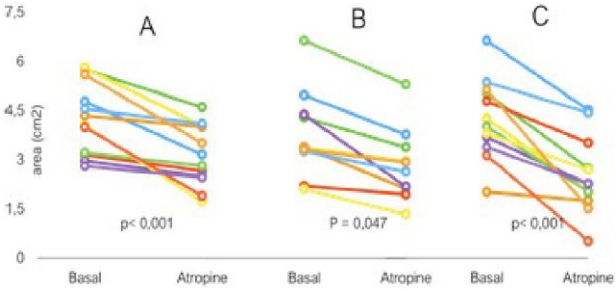

Figure 2

Abstract citation ID: suag058.011

CARDIOPULMONARY SUPPORT DURING CATHETER ABLATION OF VENTRICULAR ARRHYTHMIAS: LONG TERM RESULTS FROM A SINGLE CENTER EXPERIENCE

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Background: Catheter ablation is a treatment option for sustained ventricular tachycardias (VTs) that are refractory to pharmacological treatment; however, patients with fast VT and electrical storm (ES) are at risk for cardiogenic shock. Extracorporeal membranes oxygenation (ECMO) has been proposed as a useful tool for managing these procedures and facilitate the accurate mapping and ablation of unstable VAs.
Purpose: The aim of this study is to assess the clinical outcome of cardiopulmonary support during a long–term follow–up.
Methods: In this retrospective study, we analysed patients who underwent ventricular arrhythmias catheter ablation supported by ECMO, under deep sedation, in our center, between 2016 and 2024. The primary endpoint was overall survival from cardiovascular death. The secondary endpoint was death due to heart failure or arrhythmias and arrhythmic recurrences. Survival analysis was performed using Kaplan–Meier curves and Cox proportional hazard model as multivariate analysis. Then, mortality was stratified according to the type of underlying heart disease.
Results: A total of 41 patients (mean age 66,5±9,6 years; 90.2% males) were included in this study. Baseline clinical characteristics are reported in fig.1. 58,5% of patients were affected by ischemic heart disease; medium PAINESD score was 17 (14–23). Procedural data are shown in fig.1: mean procedural time was 235,3±86,7 minutes, fluoro–time was 12,4±9 minutes and dose area product was 54,6±50 G/cm2. After a median follow–up of 74.2 ± 29.5 months, overall cardiovascular mortality was 19.5%, (fig.1 and fig.2). Concerning the secondary outcome, 6 (14,6%) died due to heart failure, 2 (4,9%) because of arrhythmic death. 32 patients (78%) were free from arrhythmic recurrences. Three patients underwent heart transplantation. No differences were observed between ischemic and non–ischemic heart disease regarding mortality incidence (fig.2). After univariate analysis, only ejection fraction remained a predictor of mortality in multivariate analysis (fig.1). Two complications were documented: one femoral artery stenosis and one haemorrhagic shock.
Conclusion: ECMO is a safe and effective tool to support ventricular arrhythmia ablations, showing good procedural and long–term clinical outcomes. There are no significant differences in mortality considering the type of underlying heart disease. Higher ejection fraction is a protective factor from mortality.

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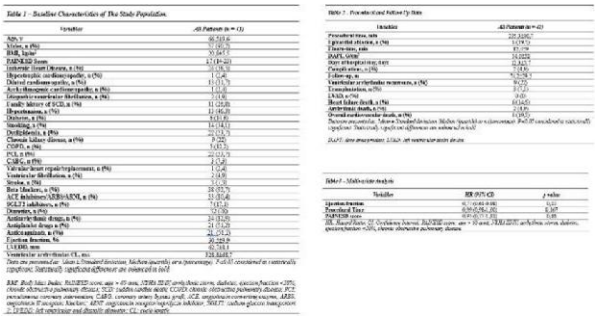

Figure 1

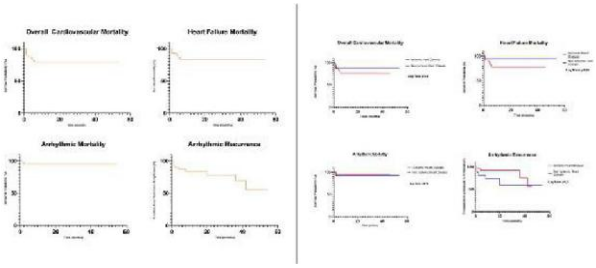

Figure 2

Abstract citation ID: suag058.012

ZERO–FLUOROSCOPY CATHETER ABLATION FOR THE TREATMENT OF VENTRICULAR PRE–EXCITATION IN PEDIATRIC PATIENTS. A LONG TERM MONOCENTRIC EXPERIENCE

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Background: Ventricular pre–excitation, affecting 0.1–0.3% of the general population. This condition can lead to re–entrant tachyarrhythmias and, in rare cases, sudden cardiac death, even in asymptomatic individuals. Catheter ablation of accessory pathway is often the resolutive treatment, however, in the pediatric population, it must be performed at highly experienced centers. Long–term outcome data of zero–fluoroscopy catheter ablation of accessory pathway in children is less robust due to fewer systematic studies compared to the adult population.
Methods: This retrospective study evaluates the long–term efficacy of zero–fluoroscopy catheter ablation for ventricular pre–excitation in 143 patients with an average age of 12+/–3 years who underwent radiofrequency ablation at a single tertiary center. Before the procedure, all patients underwent a comprehensive echocardiographic assessment.
Results: The acute success rate was 83% (119/143) for the first ablation attempts reaching 88% (127/143) after the second procedure. Right–sided pathways were associated with higher acute failure hazard (HR 3.41, 95% CI 1.41–8.22; p=0.006), particularly right antero–midseptal sites carried a large increment of acute failure (HR 9.55, 4.22–21.60; p‹0.001). The left–sided pathways were associated with lower acute failure hazard (HR 0.29, 0.12–0.71; p=0.006). Congenital heart disease was also associated with increased acute failure risk (HR 4.01, 1.20–13.47; p=0.025). No major mid– or long–term complications were reported. After a successful ablation, during a median follow–up of 52 months, 15 patients out of 127 (12%) experienced a relapse of AP conduction. Recurrences were more frequent within the first month post–procedure and showed a border–line association with right–sided pathways (HR 2.73, 0.97–7.69; p=0.057) and a significative association with multiple accessory pathways (HR 4.45, 1.41–13.98; p=0.011). Late recurrences (beyond one year) were rare and located on the left side. All fifteen patients underwent a re–do ablation procedure with a 50% success rate.
Conclusions: Long–term freedom from accessory pathway conduction was achieved in 88% of cases. Zero–fluoroscopy catheter ablation of accessory pathways is a safe and effective in pediatric patients. While the right location of the accessory pathway and the presence of congenital heart diseases can affect the success of the initial ablation, long–term outcomes are generally favourable.

Cardiac Surgery - Heart Valve Surgery

Abstract citation ID: suag058.013

RIGHT–VENTRICULAR TRAJECTORIES AFTER VALVE SURGERY: IDENTIFYING A HIGH–RISK UNCOUPLING PHENOTYPE AND ITS IMPACT ON EARLY OUTCOMES

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Background: Right–ventricular (RV) dysfunction is frequent after valve surgery, but static postoperative measurements provide a limited understanding of RV adaptation. We aimed to characterise 6–month RV functional trajectories and assess their prognostic relevance, integrating RV–pulmonary arterial (PA) coupling with clinical outcomes.
Methods: Prospective single–centre study including 147 adults undergoing elective valve surgery (aortic, mitral or combined±tricuspid); isolated CABG was excluded. Echocardiography was performed at baseline, predischarge, 3 and 6 months. RV assessment included TAPSE, S', RV free–wall longitudinal strain(RV–LS) and TAPSE/PASP (RV–PA coupling). Perioperative pharmacological management followed an institutional protocol and was included as covariates; intraoperative parameters (bypass and cross–clamp times) were recorded. Outcomes were prolonged mechanical ventilation, ICU stay, acute right–sided HF and 6–month HF readmissions. Longitudinal RV patterns were identified using latent trajectory modelling; predictors and outcomes were analysed with multivariable regression
Result: 3 trajectories were identified:(a) Rapid–recovery(34%):early TAPSE decline predischarge with recovery at 6 months, stable RV–LS and preserved coupling;(b)Delayed–recovery (26%): marked early impairment with partial improvement and transient TAPSE/PASP‹0.35; (c) Persistent–dysfunction (40%):sustained TAPSE≤13 mm and RV–LS≥−14% with RV–PA uncoupling (TAPSE/PASP≤0.30). Baseline pulmonary hypertension and pre–operative RV–LS impairment independently predicted allocation to the persistent–dysfunction trajectory (p‹0.01), whereas bypass and cross–clamp times were not independently associated with trajectories or outcomes. The persistent–dysfunction group showed higher rates of prolonged ventilation, acute right–sided HF, longer ICU stay and more 6–month HF readmissions (p≤0.02). Predischarge RV–PA uncoupling (TAPSE/PASP‹0.35) independently predicted HF readmission, offering incremental prognostic value over TAPSE
Conclusion: RV function after valve surgery does not follow a uniform postoperative course. 3 trajectory–based phenotypes were identified, and persistent RV dysfunction with RV–PA uncoupling defined a high–risk subgroup associated with early adverse outcomes. A trajectory–based assessment integrating TAPSE, RV–LS and TAPSE/PASP may enhance postoperative risk stratification and guide structured follow–up in vulnerable patients. This approach may help target closer clinical surveillance and follow–up strategies

Abstract citation ID: suag058.014

HERITABLE THORACIC AORTIC DISEASE: TRANSLATING SURGICAL EVIDENCE INTO CLINICAL PRACTICE. A SYSTEMATIC REVIEW

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Background: Heritable thoracic aortic diseases (HTADs), including Marfan syndrome, Loeys–Dietz syndrome, vascular Ehlers–Danlos syndrome, and familial aortopathies, manifest genotype–specific patterns of aortic involvement, tissue fragility, and progression. These molecular determinants influence surgical risk, durability of repair, and likelihood of distal disease evolution. Consequently, surgical management has progressively moved from uniform diameter–based thresholds toward a genotype–informed, tailored strategy, in which operative timing and technique selection vary according to the underlying aortopathy.
Methods: We performed a PRISMA 2020 systematic review of studies (2005–2025) reporting surgical outcomes in genetically or clinically established HTAD. Eligible procedures included aortic root, arch surgery, and descending or thoracoabdominal interventions. Data were synthesized narratively by anatomical segment with emphasis on genotype–specific behaviour, durability of proximal repair, and patterns of distal progression.
Results: A total of 104 studies (9,427patients) were included. Aortic root surgery was the most extensively studied. Valve–sparing root replacement, showed excellent early mortality (0–1% in most Marfan cohorts) and strong long–term durability (›90% 5–year survival). Composite graft replacement achieved similarly robust proximal results. Genotype strongly influenced long–term behaviour: Marfan patients demonstrated stable proximal repair with distal progression as the predominant late event, whereas Loeys–Dietz cohorts exhibited earlier, diffuse, multisegment involvement despite low perioperative risk. Arch procedures were effective in elective settings but associated with substantial late distal reinterventions in chronic dissection. Descending and

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thoracoabdominal repairs displayed the greatest variability: TEVAR yielded low perioperative mortality in selected HTAD but consistently high reintervention rates (25–55%), whereas open thoracoabdominal repair provided superior durability at the cost of higher early morbidity.
Conclusions: Across two decades of evidence, surgical treatment of HTAD appears safe and durable proximally, yet long–term outcomes are driven primarily by genotype–dependent distal disease progression. Integrating genotype, arterial phenotype, and expected disease trajectory is essential to individualize surgical timing, technique selection, and lifelong surveillance in HTAD.

Abstract citation ID: suag058.015

AORTIC RISK INDEX CALCULATION BASED ON BODY SURFACE AREA AND SURGICAL INDICATIONS FOR THE TREATMENT OF ASCENDING AORTA EXPANSIVE ANEURYSMS

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Policlinico Tor Vergata

Background and Aim: Surgical indications to aorta repair is based mainly on diameter of expansive aneurysm that correlates with aortic risk index calculated for patients' body surface area (BSA) (Roman–Table). However, given that BSA takes into consideration patient weight, it can represent a limit for a lower estimation of the real risk index for aortic complications, due to overweight or obesity. We thought to verify whether the aortic risk index and its severity, i.e., low, moderate, high, severe, turns out to be different when compared to patient's real BSA at in–hospital admission, or to ideal BSA expected for that specific patient.
Methods: Fifty consecutive patients (mean age 67.9±9.1 years, 40 males 10 females) affected by expansive ascending aorta aneurysm (mean diameter 5.2 ±0.6 cm) in the last year and half underwent ascending aorta repair. We considered patient's weight, height, real BSA, ideal BSA in relation to the expected weight, and the aortic risk index and its severity calculated for real and ideal BSA.
Results: Significant differences were found for BSA (real value 1.92±0.15 m2 vs ideal value 1.78±0.13 m2; P‹0,001), weight (real 79.3±11 kg vs ideal 65.5±7 kg; P‹0,001), and aortic risk index (real value 2.73±0.38 vs ideal value 2.95±0.39; P‹0,01). Differences in the severity degree of the aortic risk index are reported in Table 1.
Conclusions: Aortic risk index calculated for BSA at admission may be significantly underestimated, due to excess weight. Estimating the risk with the ideal BSA value, we observe an increase of approximately double of patients at moderate–high risk. This aspect should be carefully evaluated for correct surgical indications.

Severity	Real (at admission) BSA	Ideal (expected) BSA	P-value
Low, % (N.pts)	24 (12)	2 (1)	<0,0000
Moderate,% (N.pts)	36 (18)	58 (29)	<0,001
High, % (N.pts)	18 (9)	36 (18)	0,001
Severe, % (N.pts)	2 (1)	4 (2)	0,2

Table 1

Abstract citation ID: suag058.016

PLASMA BIOMARKERS OF CEREBRAL MALPERFUSION IN TYPE A AORTIC DISSECTION: A PILOT STUDY

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Introduction: Acute type A aortic dissection is a life–threatening condition with high postoperative mortality. Organ malperfusion is a major independent predictor of poor outcomes, with cerebral malperfusion (CM) being the most frequent and clinically relevant manifestation, affecting up to 39% of patients and associated with a twofold increase in mortality and persistent neurological deficits. Early diagnosis is challenging, as conventional computed tomography may be insensitive in the early ischemic phase and advanced cerebral perfusion imaging is often unavailable in emergency settings. While plasma biomarkers are promising in ischemic stroke, their application in aortic dissection is limited by systemic inflammation and vascular injury. This pilot study aims to identify organ–specific biomarkers associated with preoperative CM in acute type A aortic dissection.
Methods: This is a multicenter, biobank–based, case–control pilot study using samples and clinical data from European biobanks participating in the German Biobank Node. Fifty age– and sex–matched patients will be included: 5 with acute type A aortic dissection and confirmed preoperative CM based on neurological deficits and imaging findings, and 25 without evidence of malperfusion. Plasma samples will undergo targeted discovery proteomic analysis using liquid chromatography–tandem mass spectrometry, focusing on proteins related to neuronal injury. Multivariate LASSO regression will be applied to identify discriminative protein signatures. Selected candidates will be validated using enzyme–linked immunosorbent assay and correlated with neurological outcomes.
Results: The analysis is expected to identify a panel of plasma proteins significantly associated with the presence of CM, differentiating affected patients from those without malperfusion. Identified protein signatures are anticipated to reflect key pathophysiological mechanisms of cerebral ischemia. Validated biomarkers are expected to demonstrate discriminatory performance and correlate with the severity of neurological injury.
Conclusions: This pilot study evaluates the feasibility of a plasma proteomic approach for the early detection of cerebral malperfusion in acute type A aortic dissection. Identification of CM–specific biomarkers may support improved risk stratification, optimization of surgical, and personalization of neuroprotective management, providing a foundation for future large–scale prospective and interventional studies.

Abstract citation ID: suag058.017

NT–PROBNP AS PREDICTOR OF MORTALITY IN PATIENTS UNDERGOING MITRAL VALVE SURGERY

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Background: NT–proBNP is widely recognized as a prognostic marker in congestive heart failure. However, evidence regarding its role in patients with valvular heart disease, particularly in those undergoing cardiac surgery, remains limited.
Objective: To analyse the association between NT–proBNP levels and mortality and peri–operative outcome in patients undergoing mitral valve surgery.
Methods: NT–proBNP levels were measured before, at five days, at three months and during follow–up after surgery in patients from 2020 to 2025. Primary endpoint was the prognostic value of NT–proBNP on 90–day mortality. Secondary outcomes included major post–operative complications and length of stay. Associations were assessed using univariate and stepwise multivariate logistic regression analysis. Due to their skewed distribution, NT–proBNP values were logarithmically transformed. Values that best discriminated patients outcome were identified by evaluating the ROC curves: the selected cut-off was the one that maximized sensitivity and specificity (Youden index). The statistical significance level was set at p‹0.05. Statistical analysis was performed using SAS® 9.4 software (SAS Institute Inc, Cary N.C. USA).
Results: 797 patients were enrolled, with a mean age of 67 years; 361 patients (45.3%) were female and 137 (17.2%) had previous cardiac surgery. In–hospital and 90–day mortality rates were 1.6% e 3.5%, respectively. Stroke rate was 1.3%, acute kidney injury was 7% and LCOS 1.8%. Median ICU and in–hospital length of stay was 1 and 7 days, respectively. At univariate analysis, NT–proBNP was significantly associated with 90–day mortality (OR 1.906, 95% CI 1.456–2.495), ICU stay › 24 hours (OR 1.821, 95% CI 1.602– 2.071) and LCOS (OR 1.620, 95% CI 1.149–2.283). ROC curve analysis (Figure 1) identified a logNTproBNP level of 6.99 as the threshold with the best discriminative ability for 90–day mortality, and a level of 6.86 for an ICU length of stay › 24 hours. In the multivariable model, independent predictors of 90–day mortality included NT–proBNP levels (OR 1.674, 95% CI 1.230–2.277), age (OR 1.080, 95% CI 1.020–1.143) and cardiopulmonary bypass time (OR 1.016, 95% CI 1.008–1.025). After adjustment for the selected covariates, NT–proBNP remained significant.
Conclusions: NT–proBNP is an important independent predictor for peri–operative outcomes and early mortality in patients undergoing mitral valve surgery, supporting its potential role in pre–operative risk stratification.

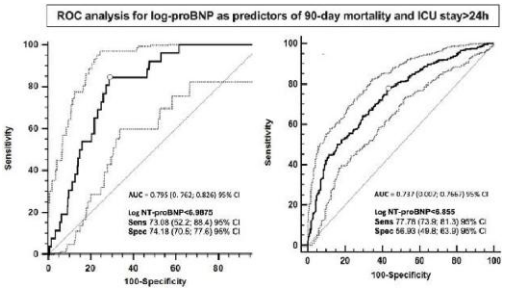

Figure 1

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Abstract citation ID: suag058.018

IS THERE STILL A CHANCE FOR DIRECT SURGICAL VALVE–IN–MAC? A SINGLE–CENTER EXPERIENCE

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Background: A clear standard for the treatment of mitral annular calcification (MAC) has yet to be established. Conventional surgical strategies continue to be associated with high mortality rates, whereas percutaneous Valve–in–MAC (ViM) procedures have shown promising results (Figure 1), although still limited by the risks of LVOT obstruction, embolization, and apical perforation. In recent years, several reports have described hybrid surgical "off–label" implantation of an aortic transcatheter heart valve (THV), proposed ad a way to mitigate these risks through more controlled device deployment. Here, we present our single–center experience of transatrial direct surgical Valve–in–MAC (TADS–ViM).
Methods: Between July 2022 and October 2024, n=16 patients affected by severe mitral valve steno–regurgitation underwent TADS–ViM. A mini–thoractotomy access was performed in one subject. On CPB, the anterior leaflet was removed and single– or bi–commissural sutures were applied in all cases to reduce valve area and circularize the annulus. After pre–dilatation, a SAPIEN 3 Ultra THV was inflated ~30/70% atrio–ventricular, commissurally aligned. Four–to–nine single atrial U–stitches were placed to avoid embolization. An eventual post–dilatation was performed to improve stent frame expansion after knot tying.
Results: Procedural success rate was 100%. CT–scan analyses confirmed severe MAC (Figure 2, score: 8.5 [7,9]; area: 607±97 mm2, predicted neo–LVOT: 205 [165, 283] mm2, n=2 complete obstruction). Median clamp time was 89 [68, 125] min. A 26 and 29 mm devices were implanted in n=5 and n=11 patients, respectively. 50% of the patients underwent concomitant procedures (n=6 AVR; n=4 CABG; n=2 aortic surgery). No cases of LVOT obstruction were reported, but one patient required revision for major bleeding due to apex lesion during balloon inflation. 30–day mortality rate was 18.8% (n=3), mainly due to sepsis. At a median follow–up of 1 year, survival rate was 75% (n=12). One patient required percutaneous closure of bi–commissural leaks at 2.5 years.
Conclusions: TADS–ViM may represent a valid alternative to complex surgical decalcification strategies or challenging ViMAC procedures. Concomitant targets may also be surgically addressed and small anatomies –not amenable of percutaneous approach– treated as well. However, mortality rate of these fragile and comorbid patients remains high. The implementation of less invasive and durable solutions to treat MAC is mandatory.

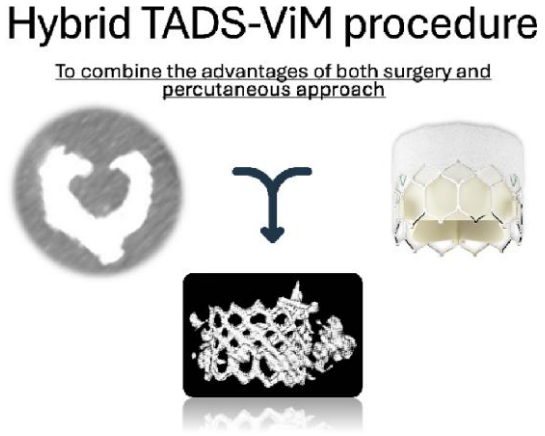

Figure 1

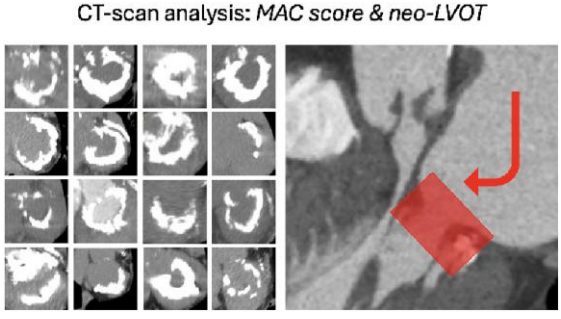

Figure 2

Cardiac Surgery

Abstract citation ID: suag058.019

SMALLER ATRIUM, BETTER RHYTHM: LEFT ATRIAL VOLUME REDUCTION AFTER HOCM SURGERY

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Introduction: Atrial fibrillation (AF) in hypertrophic obstructive cardiomyopathy (HOCM) is a negative prognostic factor in patients undergoing surgical correction. A precursor sign of AF is an increase in indexed left atrial volume (iLAVol, ml/m3). We aimed to analyse the impact of HOCM surgery on iLAVol and the presence of AF at follow–up.
Methods: This retrospective study included patients who underwent surgical correction of HOCM between 2013 and 2024. Only patients who had follow up echocardiography at our center were included. Patients were stratified into two groups based on preoperative rhythm: AF or sinus rhythm (SR). Changes in iLAVol between baseline and follow up were assessed using ANOVA. The association between the presence of AF at follow–up and predictive factors (preoperative AF and iLAVol) was assessed using multivariate logistic regression.
Results: A total of 952 patients underwent surgical correction between 2013 and 2024, and 318 (33.4%) patients met the inclusion criteria. Among them, 244 patients (76.7%) were in the SR group and 74 (23.3%) in the AF group. Patients in the SR group were younger than AF patients (52.85±14.39 vs 61.31±10.58, $p<0.05$) and had a smaller pre–operative iLAVol (46.03±15.83 vs 56.72±24.64, $p<0.05$). There were no other significant differences. Mean follow up was 29.5±19.9 months. At follow–up, 9 patients (3.7%) in the SR group developed AF, while 56 (75.7%) in the AF group were in SR. HOCM surgery caused a significant overall reduction of iLAVol (from 48.52±41.19 to 41.19 ±15.55, $p<0.001$). Reduction was statistically significant in the SR group (postop:38.03±12.49 vs preop:46.03±15.83; $p<0.001$). In the AF group, iLAVol was reduced without reaching statistical significance (post–operative: 51.59 ±19.71; pre–operative: 56.72±24.64; p=0.15), possibly due to low sample size. In multivariable logistic regression, pre–operative AF (OR=4.47, p=0.002) and iLAVol at follow–up (OR per mL/m² increase=1.05, $p<0.001$) were independently associated with the presence of AF at follow up.
Conclusion: Surgical correction of HOCM promotes favorable left atrial remodeling, which is associated with a higher rate of sinus rhythm maintenance after surgery and, therefore, improved long–term prognosis. Further studies with larger sample size are needed to confirm the result also in patients with pre–operative AF.

Abstract citation ID: suag058.020

CONTEMPORARY RESULTS OF HM3 LVAD FOR ADVANCED HEART FAILURE: A MULTICENTER ITALIAN EXPERIENCE

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Background: Research and expert consensus indicate that durable mechanical circulatory support (dMCS) with Left Ventricular Assist Device (LVAD) therapy is significantly underestimated and underutilized in Italy compared to other European countries and North America. Our retrospective multicenter experience aims to describe the current state of art in HM3 LVAD activity, reporting real world and contemporary outcomes in complex cohoorts of patients treated by centers with both Heart Transplantation (HTX) and MCS facilities.
Methods: Seven italian centers reported their experience with HM3 LVAD implantation from 2016 to 2025. Out of 674 patients receiving a dMCS, 336 (49.9%) were HM3 (297 males, 39 females, mean age 59.2y). Three centers performed more than 60 implantations while 4 less/equal than 40. Yearly distribution is shown in fig. 1. Ischemic CMP was present in 173 pts vs. 136 with an idiopathic disease. Ninety–two pts (27.4%) were in INTERMACS Class I–II; of these, all had IABP, 20 were under VA–ECMO and 14 with mAFP

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Impella. 27 patients had a previous sternotomy. HM3 was implanted as BTT in 134 patients, BTC in 71 pts and DT in 131. Mean LV EF was 21.1%. 105 patients had severe pulmonary hypertension.
Results: Full sternotomy was performed in 330 cases. In 33 patients implantation occurred on arrested heart. Associated procedures were performed in 71 cases (21.1%), with 19 left appendage closure and 17 aortic valve replacements. 27 pts required a temporary RVAD; of these, 10 died (37%). Mean ICU stay was 17.6 days. Eighty–four patients needed CVVH. There were 65 rethoracotomy for bleeding. In –hospital mortality was 15.2%. Twelve, 24 and 60 months survival was 77.9, 66.6 and 41.2%. At FU, 54 pts underwent HTX. One–hundredheightyseven pts were re–admitted; 127 had a driveline infection while pump thrombosis was observed in 4 patients (4.2%). Freedom from Stroke and gastro–intestinal bleeding at 5 years were respectively 78.4% and 82.2% (fig. 2).
Conclusions: Absolute numbers of HM3 LVAD implantation are still low in Italy with increasing trends in the last years. Despite a very compromised population, our multicenter experience shows excellent outcomes with low rates of major complications and a previously unimaginable medium–longterm survival. Due to the great reliability of this unique available device, we advocate an expansion of knowledge about LVAD to implement national referral and the number of implantations with the aim to bridge the gap.

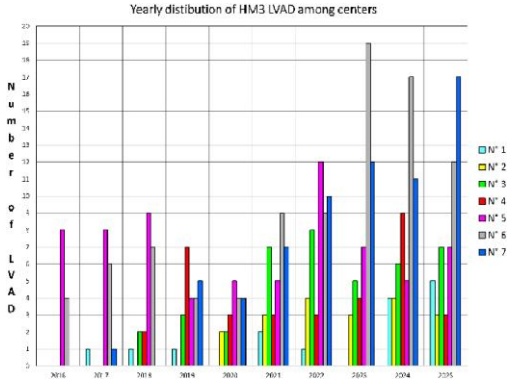


Figure 1

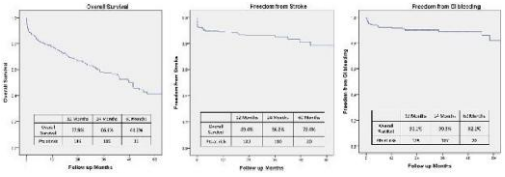


Figure 2

Abstract citation ID: suag058.021

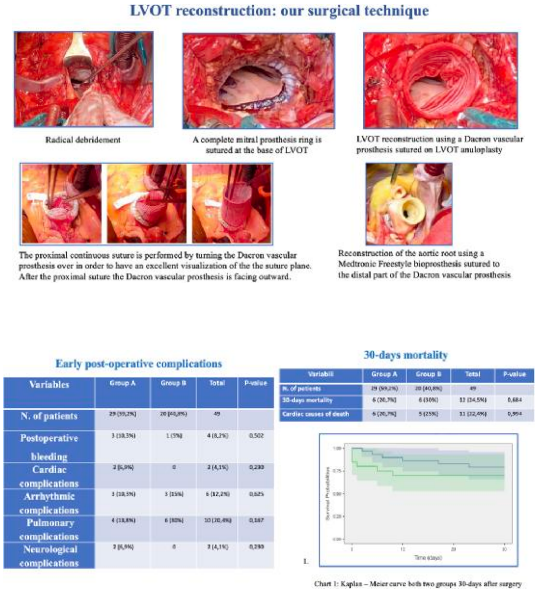
SURGERY OF COMPLEX INFECTIVE ENDOCARDITIS: TECHNIQUES AND MEDIUM–TERM RESULTS

A. Sbrigata, G. Raffa, A. Segreto, E. Amoncelli, G. Giarratana, V. Argano, and C. Pisano
Policlinico Paolo Giaccone

Background: Complex aortic valve endocarditis is one of the most feared complications of infectious endocarditis and, despite early diagnosis and treatment, it is still associated with a high rates of mortality and morbidity. Multicenter studies report 15–20% of in–hospital mortality and 40% of one–year mortality rate after surgery. It is characterized by the uncontrolled extension of the infectious process to the aortic root, perivalvular and sub–valvular structures, such as the left ventricular outflow tract, the mitro–aortic continuity zone and the fibrous skeleton of the heart. If the anatomical picture has not been excessively altered by the inflammatory–infectious process, aortic valve replacement represents the first–choice intervention and the one most performed throughout the world. In cases of locally invasive and destructive endocarditis, such as in the presence of extensive abscesses, it is necessary to replace the aortic root and, sometimes, associate a reconstruction of the partial or complete left ventricular outflow tract (LVOT). Despite the complexity of the operation, there are no detailed guidelines.

The aim of our study was to evaluate the medium–term clinical results obtained in the group of patients undergoing complex surgical treatment using our specific technique and compare them with those obtained in the group of patients undergoing simpler surgical treatments, carrying out an evaluation according to international literature data.

Methods: 49 patients underwent cardiac surgery for infective endocarditis (IE) divided into two groups: group A – Simple IE (29 patients) in which we performed valve replacement, valve repair and aortic root surgery; group B – Complex IE (20 patients), instead, in which we performed extensive surgical treatment with aortic root replacement, associated in 12 cases to the LVOT reconstruction (figure 1), using a complete mitral prosthesis ring and a Dacron vascular prosthesis.
Results: No statistically significant differences were found in terms of postoperative comorbidity, 30–day mortality, or follow–up mortality between patients with simple and complex endocarditis (figure 2).
Conclusion: Surgical treatment of complex endocarditis represents a difficult challenge for the cardiac surgeon, in relation to the extent of the infectious process and the consequent difficulty in standardizing a surgical technique, these data demonstrate that the surgical technique that we used is safe and reproducible.



Abstract citation ID: suag058.022

IMPROVING MORTALITY PREDICTION IN CARDIAC SURGERY: A BAYESIAN ENSEMBLE APPROACH BEYOND EUROSCORE II

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University Hospital Halle Germany; St Joseph Hospital Bochum Germany

Background: Risk stratification in cardiac surgery is of utmost importance for informed consent and for the heart team decision. While EuroSCORE II is widely used, it overlooks intraoperative factors such as ischemic and reperfusion times that can substantially affect outcomes. This study evaluates a Bayesian ensemble approach that integrates operative duration variables to refine perioperative risk assessment.
Methods: We retrospectively analysed over 12,000 adult cardiac surgery patients undergoing cardiopulmonary bypass. The model incorporated EuroSCORE II alongside aortic cross–clamp time and cardiopulmonary bypass time, providing risk estimates that adapt dynamically to intraoperative conditions. Performance was assessed through discrimination (area under the receiver operating characteristic curve), calibration (expected–to–observed ratios), and clinical utility (decision curve analysis). Risk visualization employed stratified surface plots across EuroSCORE II quartiles.
Results: Overall mortality was 4.8% (n = 594). The Bayesian ensemble achieved superior discrimination (AUC 0.815, 95% CI: 0.795–0.835) compared to both a simple GAM (0.805, 95% CI: 0.784–0.825) and EuroSCORE II alone (0.760, 95% CI: 0.740– 0.780). The ensemble demonstrated excellent calibration (expected–to–observed ratio = 1.000) and superior net benefit across all clinically relevant risk thresholds. For patients already at high risk (based on EuroSCORE II), longer operative times had a much stronger negative impact on outcomes than for low–risk patients. The operative time affected patients differently depending on their baseline risk.
Conclusion: By integrating operative time factors into established risk prediction, the Bayesian ensemble approach provides a clinically meaningful refinement of mortality estimation in cardiac surgery. This enables surgeons to better anticipate risk during complex or prolonged procedures, tailor intraoperative strategies, and enhance discussions within heart teams. The framework is readily applicable to daily practice, using routinely collected surgical variables.

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Abstract citation ID: suag058.023

TWO HANDS, ONE HEART: A JOINT PATIENT–CAREGIVER MULTIMEDIA EDUCATION PROGRAM AND EARLY OUTCOMES AFTER CARDIAC SURGERY — A PROSPECTIVE CONTROLLED STUDY

A. Carrozzo, F. Andreani, S. Tomasino, M. Gucciardo, D. Corsi, F. Cavalla, V. Bolcato, P. Tronconi, and L. Martinelli
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Background: The perioperative phase of cardiac surgery is a highly vulnerable period for patients and caregivers, frequently marked by anxiety, emotional distress and uncertainty regarding the intra– and postoperative course. These factors may negatively affect treatment adherence, symptom appraisal and the management of early post–discharge events, contributing to unplanned Emergency Department (ED) presentations and readmissions. Most educational strategies are patient–centred and do not consider the patient–caregiver dyad as the true unit of care. We evaluated the impact of a structured, multimedia joint education program on clinically relevant outcomes.
Methods: Prospective controlled study in elective valvular/CABG patients. The intervention group attended a standardized joint patient–caregiver meeting delivered by a dedicated cardio–thoracic team and focused on the intra–/postoperative pathway (ICU course, tubes and drains, pain control, mobilization, therapy management, lifestyle recommendations and warning signs). The session was supported by uniform video material and printed pathway brochures to ensure reproducibility and coherence of information. Controls received usual preoperative information. Primary endpoints were unplanned ED visits and 30–day readmissions; unplanned visits were additionally classified, according to predefined clinical criteria, as appropriate or potentially inappropriate. Medication adherence was assessed at first follow–up. Secondary endpoints included anxiety (STAI–Y), a standardized education knowledge score, perceived informational coherence and caregiver satisfaction.
Results: A total of 240 patients were enrolled (120 interventions, 120 control), with balanced baseline characteristics. The program reduced unplanned ED visits (8.3% vs 21.7%; p‹0.01), with a marked decrease in visits classified as potentially inappropriate, and lowered 30–day readmissions (6.0% vs 12.5%; p=0.04). Medication adherence improved (94% vs 76%; p‹0.01), while anxiety decreased and knowledge increased in the intervention group (both p‹0.001).Benefits were consistent across educational strata, with the greatest gains in lower–education dyads.
Conclusions: A reproducible multimedia dyad–centred education program reduces perioperative anxiety and improves early post–discharge management, adherence and use of emergency resources after cardiac surgery, supporting its integration into routine preoperative pathways as a low–cost, high–impact component of quality of care

Abstract citation ID: suag058.024

STANDALONE THORACOSCOPIC EPICARDIAL LEFT ATRIAL APPENDAGE EXCLUSION WITHOUT ANY ANTITHROMBOTIC THERAPY IN A MULTIDISCIPLINARY PRACTICE: LONG TERM CLINICAL OUTCOMES

S. Branzoli, D. Catanzariti, M. Marini, M. Fantinel, S. Casagranda, M. Venturini, F. Corsini, G. Spadacini, R. Rordorf, and F. Onorati
Ospedale Santa Chiara; Ospedale Santa Maria Del Carmine; Ospedale Santa Maria A Prato; Osepdale Mater Domini; Irccs San Matteo

Introduction: According to 2024 ESC AF Guidelines with Doacs having similar bleeding risk of aspirin the role of endovascular left atrial appendage occlusion with the mandatory post procedure antithrombotic therapy for stroke prevention is defined "unclear". Thoracoscopic epicardial closure does not require any post procedure antiplatelet therapy due to the extravascular position of the device.
Objective: To investigate safety efficacy of standalone thoracoscopic epicardial left atrial appendage exclusion without any antiplatelet therapy for stroke and bleeding prevention in patients with atrial fibrillation and contraindication/poor tolerance to anticoagulants.
Methods: Between 2017–2024, 342 patients with atrial fibrillation and contraindication/poor tolerance to anticoagulants (male 68%; mean age 78 ±7.7, CHA2DS2VA4.2±1.3, HASBLED3.1±1.6) underwent multidisciplinary evaluation for standalone totally thoracoscopic appendage exclusion. No anticoagulant/antiplatelet therapy was prescribed post procedure and for entire follow up. Follow up was at 3,6,12 months and yearly thereafter. EQ5D 5L questionnaire was used for quality of life evaluation at pre procedure and art 12 months.
Results: 337 patients underwent epicardial closure, mean follow up 36.3±18.7. Stroke, cumulative stroke/TIA/periferal embolism o bleeding were 0.45 (95% CI:0.12–1.14) (RRR93%), 0.78 (0.32–1.62) (RRR92%) e 0.44 (0.12–1.15) (RRR92%), respectively. EQ5D5L score increate from median 50(IQR 40–60) to 72(IQR 70–78) (p‹0.001) at 12 months.
Conclusion: Standalone epicardial appendage occlusion without any antithrombotic therapy is safe and effective for cardioembolic and bleeding prevention in patients with atrial fibrillation and contraindication/poor tolerance to anticoagulants and is associated with improved quality of life.

Cardioimaging

Abstract citation ID: suag058.025

ECHOCARDIOGRAPHIC ASSESSMENT OF ARRHYTHMIC RISK IN YOUNG ATHLETES WITH MITRAL VALVE PROLAPSE: THE ROLE OF MITRAL ANNULAR DISJUNCTION, PSEUDO–MITRAL ANNULAR DISJUNCTION, AND THE PICKELHAUBE SIGN

F. Cariello, F. Marrese, G. Ventura, and G. Bencardino
Cardiologia Casa Di Cura Tirrenia Hospital

Aim of the study: To evaluate arrhythmic risk in a group of young athletes with Mitral Valve Prolapse (MVP) by analysing the correlation between arrhythmic events and specific echocardiographic markers, particularly Mitral Annular Disjunction (MAD), pseudo Mitral Annular Disjunction (PMAD), and the Pickelhaube sign (PS).
Methods: Eleven athletes aged 15 to 28 years (6 males, 5 females) with a diagnosis of MVP were studied. All subjects underwent echocardiography (Echo), ECG Holter monitoring, and exercise testing. The echocardiogram specifically assessed: MAD, defined as an abnormal systolic–diastolic separation between the mitral annulus and the left ventricular myocardium, typically located in the posterior wall (Figure 1 A-B-C); PMAD, showing separation limited to the systolic phase, and therefore appearing due to the juxtaposition of the posterior leaflet to the atrial wall (Figure 1 D-E-F), whereas MAD results from an actual atrial insertion of the annulus; PS, a systolic peak velocity ›16 cm/s on Tissue Doppler Imaging (TDI) at the lateral mitral annulus (Figure G-H); Speckle tracking (ST) with assessment of Post–Systolic Shortening (PSS), defined as systolic shortening occurring after aortic valve closure. Arrhythmic burden was evaluated through ECG Holter monitoring and exercise testing.
Results: The PS was observed in 4 athletes: 2 with PMAD, 1 with MAD, and 1 with isolated MVP. Athletes positive for PS showed a higher incidence of arrhythmic events compared to those without PS. Although MAD and PMAD were associated with abnormal mechanical patterns of the mitral annulus, the PS emerged as the marker most strongly correlated with arrhythmic burden. Moreover, athletes with PS showed PSS localized in the infero–posterolateral segments.
Discussion: The observed correlation between arrhythmic burden and PS may be attributed to PSS. It is known that PSS is a marker strongly associated with adverse clinical events, as widely documented in ischemic heart disease. This parallel suggests that PSS may be one of the mechanisms through which PS contributes to increased arrhythmic vulnerability in subjects with MVP.
Conclusions: In our cohort of young athletes with MVP, the presence of the Pickelhaube sign represents the main echocardiographic indicator associated with an increased arrhythmic risk. Including its assessment in the screening protocol for athletes with MVP may improve risk stratification and guide clinical follow–up.

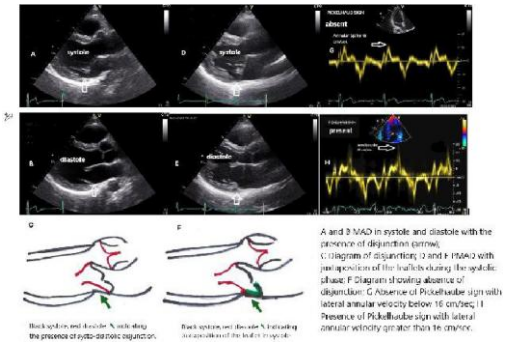

Figure 1

Abstract citation ID: suag058.026

SPECKLE TRACKING ECHOCARDIOGRAPHY HELPS TO DIFFERENTIATE LEFT HEART OR LUNG DISEASES IN PATIENTS WITH DYSPNEA AND PULMONARY HYPERTENSION

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University of Siena

Background: Pulmonary hypertension (PH) has a complex diagnostic pathway. Differential diagnosis between left heart disease (LHD) (group 2) and lung diseases (group 3) PH is also challenging. A comprehensive echocardiographic evaluation for suspected PH is recommended to assess cardiac etiology.

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The aim of this study was to assess the potential value of speckle tracking echocardiography (STE), as a sensitive marker of myocardial performance, to predict LHD in patients presenting with dyspnoea and PH.
Methods: Consecutive outpatients with dyspnoea on exertion and subsequent diagnosis of PH were retrospectively enrolled. Inclusion criteria were NYHA class ≥ II, left ventricular (LV) ejection fraction ≥ 50%, echocardiographic evidence of tricuspid regurgitation (TR) velocity › 2.8 ms, confirmed diagnosis of PH with relative etiology (heart failure with preserved ejection fraction (HFpEF) or lung disease). Patients underwent clinical, biohumoral and advanced echocardiographic evaluation. Primary endpoint was the prediction of HFpEF.
Results: Overall, 145 patients were enrolled (80 with HFpEF, 65 with lung disease). Mean age was 75±12 years, 53% were female. Patients with HFpEF were older (77±10 vs. 68±14 years, p ‹ 0.0001) and had higher LA volume (p ‹ 0.0001), E/e' (p ‹ 0.0001). Regarding STE parameters, patients with HFpEF had lower left atrial reservoir strain (LASr) (15±8 vs. 24±11%, p ‹ 0.0001) and worse LV global longitudinal strain (GLS) (–13±9 vs. –17 ± 6%, p = 0.009) compared to patients with lung diseases. LA stiffness, an index of LA dysfunction and fibrosis calculated as the ratio between E/e' and LASr, was higher in patients with HFpEF (median LA stiffness = 1.09 [confidence interval (CI) = 0.64 – 1.73] vs 0.35 [CI = 0.20 – 0.59], p ‹ 0.0001). With receiver operating characteristic curves, both E/e' and LASr provided a good prediction for HFpEF (AUC 0.73 and 0.79 respectively), but LA stiffness significantly enhanced the predictive power (AUC = 0.83) with an optimal cutoff value ≥ 0.53. With multivariate analysis including age, LA volume, LV GLS, LA stiffness, mitral and TR grade, LA stiffness ≥ 0.53 (RR = 19.14, [CI 5.86 – 62.55]) was the only independent predictor of HFpEF in our cohort of patients with PH (Fig.1).
Conclusions: STE may aid differential diagnosis of etiology between LHD and lung diseases in patients with PH. The combination of E/e' and LASr to calculate LA stiffness offers the most accurate prediction of PH with cardiac etiology.

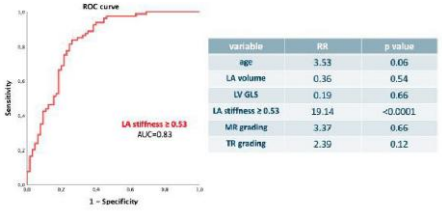

Fig. 1. Receiver Operating Characteristic (ROC) curves for LA stiffness and multivariable regression analyses. AUC = area under the curve; LA = left atrial; LV = left ventricular; GLS = global longitudinal strain; MR = mitral regurgitation; TR = tricuspid regurgitation; RR = risk ratio.

Abstract citation ID: suag058.027

SPECKLE–TRACKING–BASED STAGING OF EXTRA–VALVULAR CARDIAC DAMAGE IN DEGENERATIVE MITRAL REGURGITATION: PROGNOSTIC IMPLICATIONS

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Aims: In asymptomatic patients with severe primary mitral regurgitation (MR), surgical referral is based on two–dimensional echocardiographic indices that often identify advanced myocardial injury. Speckle–tracking echocardiography (STE) may detect earlier, reversible dysfunction. This study evaluated whether a novel multi–chamber STE–based staging system of extra–valvular cardiac damage improves risk stratification in patients with severe degenerative MR undergoing surgery.
Methods: Retrospective multicenter cohort study of patients with degenerative MR undergoing surgery: derivation cohort (n = 208; mean age 64 ± 13 years; 59.7% men) and validation cohort (n = 92; mean age 63 ± 12 years; 53.3% men). Receiver operating characteristic curve analysis identified optimal strain cut–offs associated with adverse outcomes: left ventricular global longitudinal strain (LVGLS) ‹ 20%, peak atrial longitudinal strain (PALS) ‹ 25%, and right ventricular free–wall longitudinal strain (RVFWLS) ‹ 17%. Patients were classified into four stages: Stage 0, no damage; Stage 1, left atrial damage (PALS ‹ 25%); Stage 2, left ventricular damage (LVGLS ‹ 20%); Stage 3, right ventricular damage (RVFWLS ‹ 17%) (Figure 1).
Results: The STE–based staging system was independently associated with the composite of periprocedural adverse events (mortality, stroke, myocardial infarction, acute kidney injury, life–threatening bleeding or sepsis/wound infection requiring reintervention, complete atrioventricular block requiring pacemaker implantation): odds ratio 1.68 per stage increase (CI 1.24–2.32; p = 0.001) (Figure 2, 3). Predictive accuracy was higher compared with clinical and echocardiographic data, with consistent results in the validation cohort.
Conclusions: The multi–chamber STE staging system provides incremental prognostic information beyond conventional parameters, improving perioperative risk stratification.

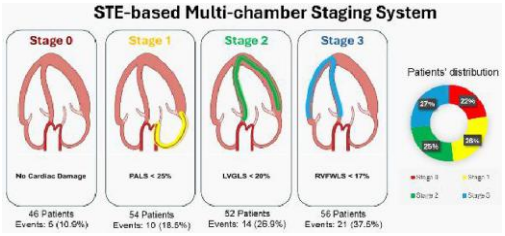

Figure 1

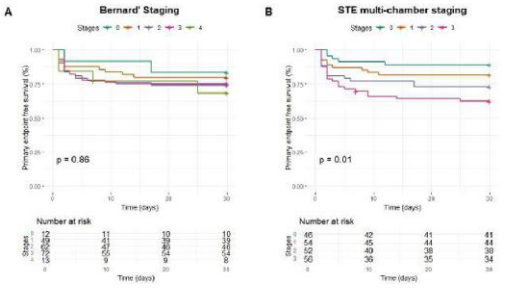

Figure 2

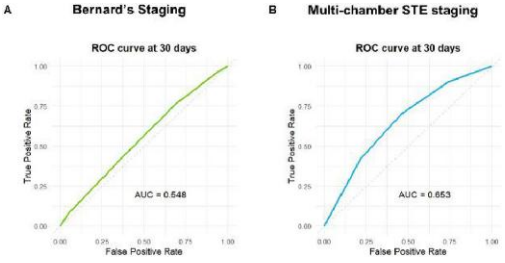

Figure 3

Abstract citation ID: suag058.028

LEFT ATRIAL STIFFNESS, EXERCISE INTOLERANCE, NATRIURETIC PEPTIDES AND OUTCOMES IN PATIENTS WITH HEART FAILURE WITH PRESERVED EJECTION FRACTION

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Background: Heart failure with preserved ejection fraction (HFpEF) is a complex condition associated with high morbidity and mortality. Key pathophysiological contributors include exercise intolerance, left atrial stiffness (LAS) reflecting atrial remodelling and diastolic dysfunction, and natriuretic peptides, established markers of cardiac stress. Exercise intolerance is a hallmark of HFpEF but remains poorly linked to structural and biochemical markers.
Objective: To investigate the interrelationship and prognostic significance of LAS, exercise intolerance, and natriuretic peptide levels in HFpEF patients.
Methods: We retrospectively studied 80 patients (mean age 72.8 years) with HFpEF. Left atrial (LAS was estimated by the ratio of E/e'/peak LA longitudinal strain (PALS) (% –1) measured by 2D speckle tracking echocardiography. N–terminal pro–brain–type natriuretic peptide (NTproBNP) was measured. Patients also completed a six–minute walking test (6MWT). Associations between these parameters and clinical outcomes were analysed, with the primary outcome being death from any cause. The H2FPEF score was also calculated.
Results: Higher LAS was positively correlated with elevated NTproBNP (r = 0.25, p ‹ 0.05) (Figure 1) and inversely correlated with 6MWT (r = –0.39, p ‹ 0.001) (Figure 3). Over a mean follow–up of 48.5 months, 45 patients died. At univariable analysis, LAS (HR 1.92, 95%CI 1.28 – 2.87) and 6MWT (HR 0.99, 95%CI 0.98 – 0.99) were significantly associated with the outcome (P‹0.01 for both) (Figure 2). Patients with combined high LAS, low exercise tolerance, and elevated natriuretic peptides had the highest incidence of adverse outcomes (20.3 per 100 patients/year). LAS added incremental prognostic value beyond a model containing age, gender and H2FPEF score (Likelihood–ratio test = 9.18, p = 0.0024).

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Conclusion: LAS, exercise intolerance, and natriuretic peptides are interconnected markers of disease severity in HFpEF. Their combined evaluation may enhance risk stratification and guide targeted therapeutic interventions.

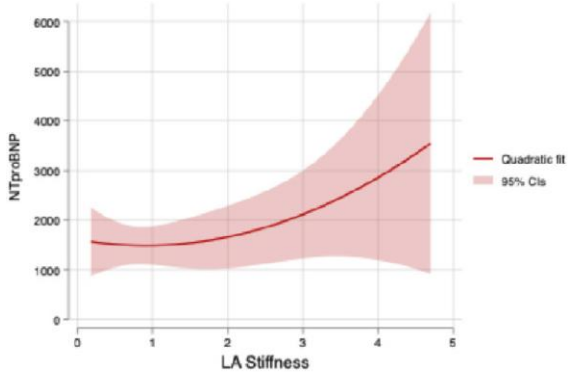
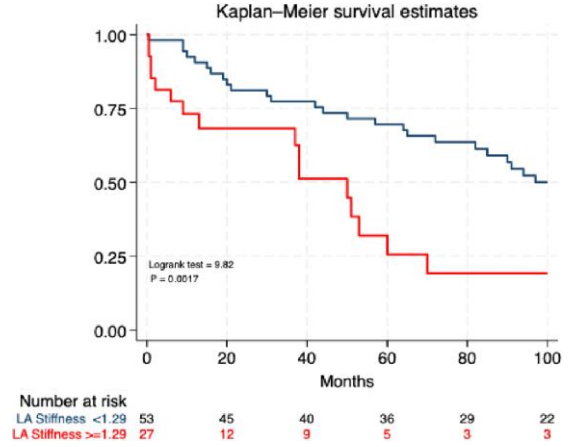


Figure 1



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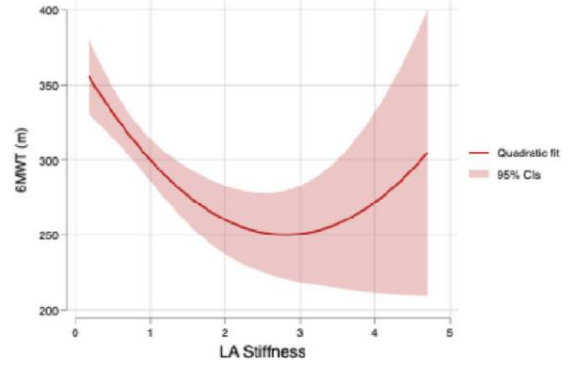

Figure 3

Abstract citation ID: suag058.029

ROLE OF CARDIAC CT WITH LATE IODINE ENHANCEMENT IN THE DIAGNOSIS OF ACUTE MYOCARDITIS

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Asl Salerno – Po Sarno

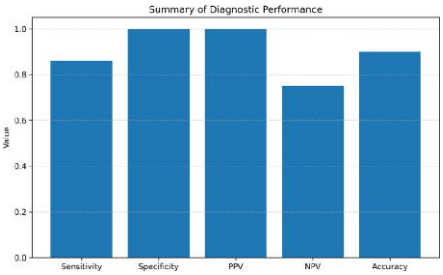
Background: Cardiac Magnetic Resonance (CMR) is the gold standard for the diagnosis of acute myocarditis. However, its limited availability, particularly in smaller centers, restricts its clinical use. The role of cardiac Computed Tomography (CT) in myocardial tissue characterization has been poorly investigated.

Purpose: To evaluate the diagnostic accuracy of cardiac CT with Late Iodine Enhancement (LIE) compared with CMR for the diagnosis of acute myocarditis, especially in centers with limited access to CMR.

Methods: Seven patients with uncomplicated acute myocarditis were enrolled. Within 4–7 days from clinical diagnosis, all patients underwent cardiac CT including coronary artery assessment and myocardial tissue characterization using LIE. CMR was subsequently performed within 12–40 days to confirm the diagnosis. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy were calculated. Agreement between CT and CMR was assessed using Cohen's kappa coefficient. Statistical analysis was performed both on a per–patient (global) and per–segment basis.

Results: All patients showed normal coronary arteries. CT demonstrated myocardial tissue abnormalities consistent with edema in 6 patients, all of which were confirmed by CMR. One patient showed no pathological segments on CT, a finding confirmed by CMR. Global analysis showed a sensitivity of 86%, specificity of 100%, PPV of 100%, NPV of 75% (Figure 1), and an overall diagnostic accuracy of 90%. Segmental analysis revealed perfect agreement between CT and CMR in 4 patients (67%), while in 2 patients (33%) CMR demonstrated a greater extent of myocardial edema. On a per–segment basis, CT showed a sensitivity of 69%, specificity of 86%, PPV of 75%, NPV of 83%, and an accuracy of 80% (Figure 2). Cohen's kappa value was 0.565, indicating moderate agreement. ROC curve analysis showed an area under the curve (AUC) of 0.78 (Figure 3), indicating good discriminatory ability of CT for detecting pathological myocardial segments.

Conclusions: Cardiac CT with LIE is a promising and complementary imaging modality to CMR in the diagnosis of acute myocarditis. CT allows an integrated evaluation by excluding ischemic causes through coronary angiography and assessing myocardial edema using LIE. It may represent a valid alternative in centers where CMR is not available or in patients with contraindications to CMR.



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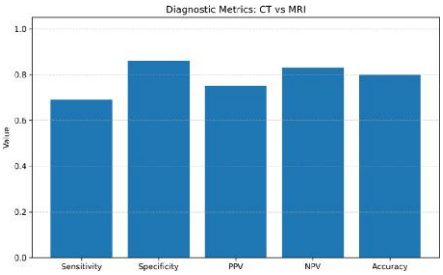

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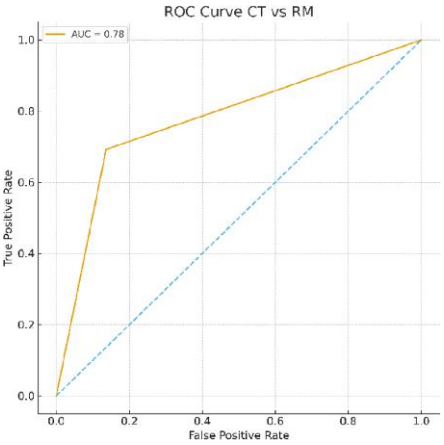

Figure 3

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Abstract citation ID: suag058.030

PHOTON–COUNTING COMPUTED TOMOGRAPHY FOR TISSUE CHARACTERIZATION IN PATIENTS WITH A LEFT VENTRICULAR HYPERTROPHIC PHENOTYPE

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Fondazione Toscana Gabriele Monasterio; Ospedale Careggi; Ospedale Meyer

Background: Photon–counting computed tomography (PCCT) combines high spatial resolution with spectral imaging, and can thus provide a morphologic, functional and tissue assessment of hypertrophic hearts. We investigated whether PCCT can characterize left ventricular hypertrophy (LVH) as accurately as cardiac magnetic resonance (CMR) in the whole cohort and across hypertrophic phenotypes.
Methods: Consecutive patients with LVH (n=123; 48 with hypertrophic cardiomyopathy [HCM], 36 with transthyretin cardiac amyloidosis (ATTR–CM) and 39 with secondary LVH) were referred to PCCT; 49 (40%) also underwent CMR within 12 months (median –31 days).
Results: PCCT differentiated the three etiologies through distinctive tissue patterns. ATTR–CM showed the highest LV mass index (LVMI; median 105 g/m²), late iodine enhancement (LIE) extent (17 segments), extracellular volume (ECV; 45%) and iodine density (2.2 g/mL); secondary LVH displayed minimal fibrosis and the lowest ECV, while HCM had the greatest wall thickness but intermediate fibrosis burden (Figure 1). Morpho–functional indices from PCCT correlated closely with CMR (LVMI: beta=0.95, wall thickness: beta=0.98, LVEF: beta=0.91; all p‹0.001). PCCT–ECV correlated with CMR–ECV in the overall cohort (beta=0.88, p‹0.001) (Figure 3), and segment–by–segment concordance for LIE versus late gadolinium enhancement was 98–100%. Iodine density correlated with CMR–ECV in ATTR–CM (beta=0.99, p=0.002) but not in HCM. Coronary assessment revealed ≥50% stenosis in 23%, and ≥70% in 10%.
Conclusions: PCCT provides CMR–level accuracy for ventricular geometry, function and fibrosis while simultaneously visualizing coronary anatomy (Figure 2). Its ability to delineate distinctive tissue signatures (particularly the diffuse infiltration of ATTR–CM) suggests PCCT as an alternative when CMR is contraindicated or not available.

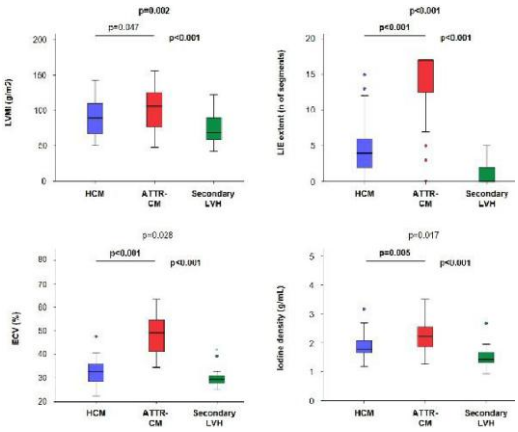

Figure 1

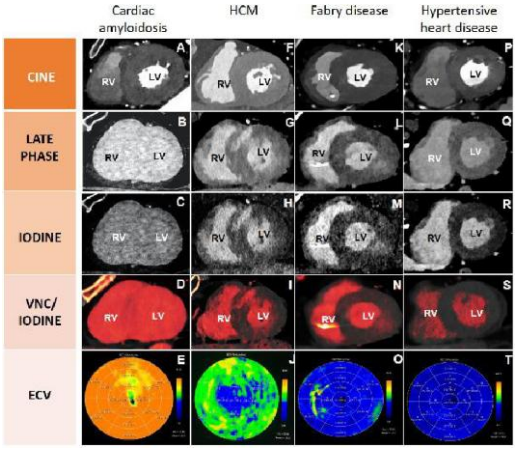

Figure 2

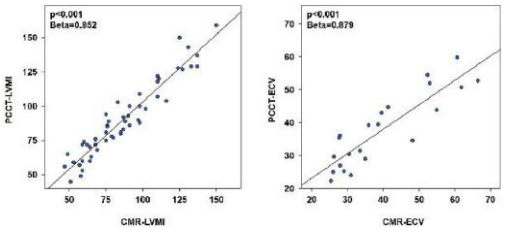

Figure 3

Interventional Cardiology

Abstract citation ID: suag058.031

MINICRUSH VS T–STENTING AND MINIMAL PROTRUSION FOR TREATMENT OF COMPLEX CORONARY BIFURCATION LESIONS: THE TREX REGISTRY STUDY

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Ospedale Degli Infermi; Ospedale Degli Infermi; Policlinico Unoiversitario G. Rodolico–San Marco; Presidio Ospedaliero Di Ciriè–Lanzo; Policlinico Universitario Gaetano Martino

Background: Optimal percutaneous coronary intervention (PCI) techniques for complex bifurcation lesions remain a subject of debate. Intentional two–stent strategies are widely employed, but comparative clinical effectiveness between different methods requires further investigation.

This study aimed to compare the clinical efficacy of two prevalent two–stent techniques: The Minicrush and the T–stenting and Small Protrusion (TAP) methods, focusing on target lesion failure (TLF) and major adverse cardiac events (MACE) in patients undergoing complex bifurcation PCI.
Methods: This observational, multicenter study analysed data from a total of 469 patients with intentional two–stent treatment strategies identified from 601 screened procedures. Patients were divided into two cohorts: The Minicrush group (n=257) and the TAP group (n=212). Procedural details and clinical outcomes were meticulously collected and compared, utilizing both standard statistical and Bayesian analyses for long–term data.
Results: Technical and procedural success rates were high and comparable between the groups (98.5% and 95%, respectively). In–hospital MACE occurred in 3.8% of patients, with only two cases of acute stent thrombosis recorded, both in the TAP group. The primary outcome, TLF, occurred in 49 patients (10.4%) overall, with no statistically significant differences observed between the groups during the follow–up period using traditional statistical methods (8.2% in Minicrush vs. 13.2% in TAP; p=0.08). The odds ratios consistently showed a trend towards higher TLF in the TAP group, but without reaching statistical significance (e.g., 5 years: OR 1.67, 95% CI 0.86–3.32, p=0.113). However, Bayesian analysis provided strong evidence (posterior probabilities of 94% at 1 year and 98% at 5 and 10 years) suggesting a consistently higher long–term hazard of TLF in the TAP method compared to the Minicrush method. Secondary outcomes (MACE) were nearly identical between the groups at all time points (23% vs. 23.6%, p=0.87).
Conclusions: In patients undergoing complex bifurcation PCI, both the Minicrush and TAP techniques demonstrated high success rates and comparable MACE outcomes. While standard statistical analysis did not show a significant difference in TLF rates, Bayesian analysis suggests a strong probability that the TAP technique is associated with a higher long–term risk of target lesion failure compared to the Minicrush technique.

Abstract citation ID: suag058.032

PREDICTORS OF LEFT ATRIAL APPENDAGE THROMBUS

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Ospedale San Filippo Neri

Introduction: Transesophageal echocardiography (TEE) is currently performed for detecting left atrial appendage thrombus (LAAT). CHA2DS2–VASc scale is an established tool for determining the thromboembolic risk and initiation of anticoagulation treatment in patients with atrial fibrillation (AF). We aimed to identify whether any clinical findings and transthoracic echocardiography (TTE) parameters could predict LAAT.
Methods: This is a retrospective study which enrolled 1076 consecutive patients with AF referred for transesophageal echocardiography (TEE) before cardioversion. Clinical parameters evaluated in this study included age, gender, body mass index, smoke, estimated glomerular filtration rate, CHA2DS2–VASc

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total score and single items. Echocardiographic variables included for analysis were left ventricular ejection fraction (LVEF), left atrial antero–posterior diameter, left atrial diameter index (LADi), left atrial volume, left atrial volume index (LAVi), mitral stenosis and mitral regurgitation and valvular prosthesis. All the above variables were analysed using univariate e multivariate logistic regression to identify predictors of LAAT diagnosed on TEE.
Results: LAAT was diagnosed in 7.25% of patients. The univariate logistic regression analysis identified age (OR 1.03, CI 1.00–1.05, p=0.018), congestive heart failure (OR 13.50, CI 5.26–34.66, p=0.0001), hypertension (OR 9.98, CI 2.40–41.46, p=0.0001), diabetes (OR 3.26, CI 1.57–6.78, p=0.003), stroke (OR 3.87, CI 1.41–10.068, p=0.02), vascular disease (OR 6.90, CI 3.38–14.09, p=0.0001), CHA2DS2–VASc total score (OR 1.88, CI 1.51–2.32, p=0.0001), left atrial antero–posterior diameter (OR 1.10, CI 1.06–1.14, p=0.0001), LADi (OR 1.08, CI 1.02–1.14, p=0.006), valvular prosthesis (OR 2.1, CI 1.01–4.37, p=0.04) and mitral stenosis (OR 12.57, CI 4.70–33.55, p=0.0001) as significant predictors of LAAT. In a multivariate logistic regression analysis mitral stenosis, CHA2DS2–VASc total score and left atrial antero–posterior diameter maintained statistical significance.
Conclusion: The presence of LAAT is related to both clinical and echocardiographic variables. Gender was not a predictor of LAAT, as already indicated in the latest ESC guidelines for atrial fibrillation which suggest the use of the CHA2DS2–VA instead of the CHA2DS2–VASc score for initation of anticoagulation therapy. A score that includes clinical and echocardiographic parameters could be useful for predicting the presence of LAAT.

Abstract citation ID: suag058.033

DURATION OF DUAL ANTIPLATELET THERAPY IN PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION FOR BIFURCATION LESIONS: INSIGHTS FROM THE ULTRA–BIFURCAT REGISTRY

D. Tuttolomondo, F. D'Ascenzo, R. Piccolo, and O. De Filippo
Azienda Ospedaliero–Universitaria Di Parma; Cardiovascular and Thoracic Department, "Citta Della Salute E Della Scienza" Hospital; Department of Advanced Biomedical Sciences, Division of Cardiology, University of Naples Federico Ii; Division of Cardiology, Cardiovascular and Thoracic Department, "Citta Della Salute E Della Scienza" Hospital

Background: The optimal duration of dual antiplatelet therapy (DAPT) after percutaneous coronary intervention (PCI) remains debated, particularly for bifurcation lesions, which are associated with increased thrombotic risk. Shorter DAPT regimens may reduce bleeding but could compromise ischemic protection.
Methods: This study analysed data from the ULTRA and BIFURCAT registries, including patients treated with PCI for bifurcation lesions. Patients requiring oral anticoagulation were excluded. DAPT duration was categorized as ≤6 months, 6–12 months and › 12 months. The primary endpoint was major adverse cardiac events (MACE), a composite of all–cause death, myocardial infarction, target lesion revascularization, and stent thrombosis. Cox regression analysis was used to assess the association between DAPT duration and MACE.
Results: Among 6729 patients, 425 (6 %) received DAPT ≤6 months, 3446 (51 %) for 6–12 months and 2858 (42 %) for ›12 months. At 800–day follow–up, MACE rates were higher with shorter DAPT (19.5 % vs. 10 % vs. 5.9 %, p ‹ 0.001). Adjusted hazard ratios for MACE were significantly higher for DAPT ≤6 months (HR 4.8, 95 % CI 1.8–12.7) and 6–12 months (HR 2.7, 95 % CI:1.5–4.7) compared to ›12 months. This trend was consistent in acute coronary syndrome (ACS) patients but not in stable patients. The figure 1 shows adjusted survival analysis for freedom from MACE according to stenting strategy (provisional strategy, left vs upfront 2-stent strategy, right) (purple line: DAPT shorter than 6 months, dark green line: DAPT between 6 and 12 months, red line: DAPT longer than 12 months).
Conclusion: In PCI–treated bifurcation lesions, particularly in ACS patients, shorter DAPT duration (≤6 months) is associated with a higher risk of adverse events.

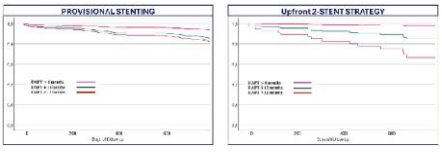

Figure 1

Abstract citation ID: suag058.034

IMPACT OF CHARLSON COMORBIDITY INDEX ON CLINICAL AND PROCEDURAL OUTCOMES IN LEFT ATRIAL APPENDAGE CLOSURE: A SINGLE–CENTER RETROSPECTIVE STUDY

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Background: Left atrial appendage closure (LAAC) has emerged as an effective alternative to oral anticoagulation for stroke prevention in patients with atrial fibrillation. However, the impact of baseline comorbidity burden on procedural and clinical outcomes remains incompletely characterized. The Charlson Comorbidity Index (CCI) is a validated tool for quantifying patient comorbidity load and predicting mortality risk.
Aims: This study aimed to evaluate the impact of the CCI on clinical and procedural outcomes in patients undergoing percutaneous LAAC.
Methods: This single–center retrospective study enrolled 169 consecutive patients who underwent LAAC procedures in our Institute, between January 2022 and June 2025. Patients were stratified into 2 groups based on the mean CCI score (≤4.80 vs ›4.80). Primary endpoints included major complications, any bleeding events and procedural complications.
Results: Of 169 patients analysed, 92 (54.4%) had CCI ≤4.80 and 77 (45.6%) had CCI ›4.80. Patients with higher CCI were older (79.9±5.7 vs 77.0±7.1 years, p=0.006) and with higher prevalence of hypertension (75% vs 60%, p=0.048). Patients with CCI ›4.80 demonstrated significantly higher rates of any bleeding events (13.0% vs 2.2%, p=0.013; OR=6.72, 95%CI: 1.42–31.67) and procedural complications (13.0% vs 3.3%, p=0.022; OR=4.43, 95%CI: 1.17–16.72). A trend toward increased major complications was observed (31.2% vs 19.6%, p=0.119; OR=1.86, 95%CI: 0.92–3.77). Individual outcomes showed higher rates in the high CCI group for stroke (25.0% vs 18.5%), major bleeding (3.9% vs 0.0%), cardiac tamponade (5.2% vs 1.1%) and blood transfusion (9.3% vs 5.3%). Procedural parameters revealed a trend toward longer procedure times in the high CCI group (77.9±28.2 vs 70.3±24.2 minutes, p=0.065) and increased length of stay (3.9±4.4 vs 3.1±1.8 days, p=0.111). Procedural success rates remained high in both groups (97.4% vs 100%, p=0.209).
Conclusions: The CCI significantly impacts clinical outcomes in patients undergoing LAAC procedures. Patients with CCI ›4.80 demonstrate a 6.7–fold increased risk of bleeding events and a 4.4–fold increased risk of procedural complications. Despite higher comorbidity burden, procedural success rates remain excellent (›97%). These findings suggest that CCI can serve as a valuable risk stratification tool for patient selection, procedural planning and post–procedural monitoring in LAAC procedures.

Abstract citation ID: suag058.035

ACUTE DEVICE EMBOLIZATION AFTER LEFT ATRIAL APPENDAGE CLOSURE

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A male patient in his seventies was admitted for percutaneous left atrial appendage closure (LAAc). The indication for the procedure was paroxysmal atrial fibrillation in the setting of a previous haemorrhagic stroke that occurred during treatment with a non–vitamin K antagonist oral anticoagulant (NOAC), making long–term anticoagulation contraindicated. The procedure was performed under transesophageal echocardiography (TEE) guidance. A meticulous pre–procedural assessment of left atrial appendage anatomy was carried out, including evaluation of the ostium, depth, and landing zone. Device sizing was considered appropriate, and stability was confirmed intra–procedurally by standard tug (pull–and–release) manoeuvres. Final angiographic and echocardiographic assessments suggested correct positioning and adequate sealing, and the procedure was concluded without immediate complications. Following the intervention, the patient was transferred to the intensive care unit for routine post–procedural monitoring. Shortly after admission, he developed recurrent episodes of non–sustained ventricular tachycardia. Given the abrupt onset of ventricular arrhythmias, an urgent bedside transthoracic echocardiogram was performed. This revealed the presence of a mobile, hyperechoic structure within the left ventricular cavity, highly suggestive of device embolization (Figure 1 – 2). Emergency cardiac surgery was immediately consulted, and the patient was transferred to the operating room without delay. Surgical exploration confirmed embolization of the LAA occlusion device into the left ventricle. The device was successfully retrieved, and definitive exclusion of the left atrial appendage was achieved surgically using a single suture. The postoperative course was uneventful, with resolution of ventricular arrhythmias and hemodynamic stabilization. This case highlights device embolization as a rare but potentially catastrophic complication of percutaneous LAA closure. Even when optimal sizing, imaging guidance, and stability testing are performed, late embolization can occur. Sudden ventricular arrhythmias in the early post–procedural period should raise immediate suspicion for device migration, and prompt echocardiographic evaluation is crucial. Rapid multidisciplinary collaboration is essential to ensure timely diagnosis and life–saving intervention.

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Figure 1

Figure 2

Abstract citation ID: suag058.036

ABLATE AND PACE IN CARDIOGENIC SHOCK: A RESCUE STRATEGY COMBINING AV NODE ABLATION AND CRT FOR REFRACTORY ATRIAL FIBRILLATION

D. Bonadies, A. Carbone, G. Del Giorno, D. Ferraioli, and M. Capasso
Po Maria Ss Addolorata

Atrioventricular node ablation (AVNA) combined with biventricular pacing (CRT) is a guideline-recommended (Class IIA) therapy for rate control in patients with atrial fibrillation (AF) and high ventricular rates refractory to medical therapy. This study evaluates the efficacy of the "ablate and pace" strategy in patients with cardiogenic shock (CS), where uncontrolled tachycardia exacerbates hemodynamic deterioration.

From September 2018 to September 2023, 25 patients with cardiogenic shock were admitted to our CCU. All patients had dilated cardiomyopathy (60% ischemic, 40% non-ischemic), a mean age of 74 years, and were predominantly male (77%). They were already on optimized medical therapy, including inotropes, to maintain adequate blood pressure. All patients had an implantable cardioverter-defibrillator (ICD) and permanent AF, with high ventricular rates (mean heart rate at admission: 128 bpm) leading to acute decompensation. At admission, mean systolic blood pressure was 83±7 mmHg, NT-proBNP levels were 24,756 pg/mL, and mean ejection fraction (EF) was 22%. Due to the inability to achieve rate control pharmacologically, AVNA followed by CRT-D upgrade was performed.

CRT-D implantation was successful in 22/25 patients (88%). Left ventricular lead positions were anterolateral (41.7%), lateral (41.7%), and posterolateral (16.6%). Complications included hematoma in 7% of cases. The mean biventricular QRS duration was 124±9 ms. After an initial pacing rate of 90 bpm, patients were reprogrammed to a lower rate of 70 bpm. At follow-up (mean 19±10 months), patients showed excellent rate control (mean heart rate: 70 bpm), significant stabilization of blood pressure (mean systolic BP: 93 ±5 mmHg vs. 83±7 mmHg at baseline, $p < 0.0001$), improved cardiac function (mean EF: 28% vs. 22% at baseline), and reduced NT-proBNP levels (12,172 pg/mL vs. 24,756 pg/mL at baseline, $p < 0.0001$). Survival at follow-up was 75%, with 35% of patients experiencing episodes of heart failure exacerbation. Appropriate ICD interventions occurred in 25% of patients, and spontaneous restoration of sinus rhythm was observed in 2 patients.

The "ablate and pace" strategy (AVNA combined with CRT-D upgrade) is an effective and life-saving intervention for rate control in patients with refractory AF and cardiogenic shock. It significantly improves hemodynamic parameters and cardiac function, representing a critical therapeutic option in high-risk settings where traditional approaches are insufficient.

Cardiomyopathies - Amyloidosis

Abstract citation ID: suag058.037

SINGLE–CENTER ANALYSIS OF A POPULATION OF PATIENTS WITH TRANSTHYRETIN CARDIAC AMYLOIDOSIS TREATED WITH TAFAMIDIS: OUTCOMES AND IMPACT ON DISEASE PROGRESSION

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Introduction: Tafamidis is the cornerstone therapy for transthyretin amyloid cardiomyopathy (ATTR–CM); however, validated criteria for monitoring disease progression in treated patients are still lacking. Emerging evidence from untreated cohorts suggests that increases in NT–proBNP levels and outpatient diuretic intensification (ODI) may represent markers of progression.
Objectives: To evaluate all–cause mortality and cardiovascular hospitalizations in a real–world population of NYHA class I–II ATTR–CM patients treated with tafamidis; to assess the frequency of disease progression markers; and to identify those associated with an unfavourable prognosis.
Methods: This single–center retrospective observational study was conducted at the Cardiomyopathy Unit. Eighty-eight consecutive patients with wild–type or variant ATTR–CM, NYHA class I–II, who initiated tafamidis between 2020 and 2024 and had at least 12 months of follow–up were included. The primary endpoint was a composite of all–cause mortality, hospitalization for heart failure requiring iv diuretics, and hospitalization for other cardiovascular causes. Two analyses were performed: a Cox proportional hazards model and a landmark analysis excluding patients with events occurring before the 12–month time point, in which the prognostic value of progression markers between baseline and 12 month, was assessed. After identifying clinically relevant progression criteria, the population was divided into those who experienced progression versus those who didn't.
Results: Over a median follow–up period of 26 months, the all–cause mortality rate was 5.7%(Fig .1). The primary endpoint occurred in 28.4% of patients. Thirty patients (34.9%) showed progression defined by at least one marker (NT–proBNP or ODI), while seven patients (8.4%) met both criteria (Fig.2). At multivariable analysis, the presence of a single progression marker was associated with increased risk of the primary endpoint (HR 2.47, 95% CI 0.99–6.27; p=0.05), with a stronger association when both markers were present (HR 4.40, 95% CI 1.32–14.70; p=0.016). (Fig.3)
Conclusions: In a contemporary real–world cohort of ATTR–CM patients treated with tafamidis mortality rate was acceptably low. However, a relevant proportion of patients experienced disease progression. NT–proBNP increase

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and ODI emerged as clinically meaningful markers of progression associated with adverse prognosis, supporting closer follow–up and optimization of therapeutic strategies.

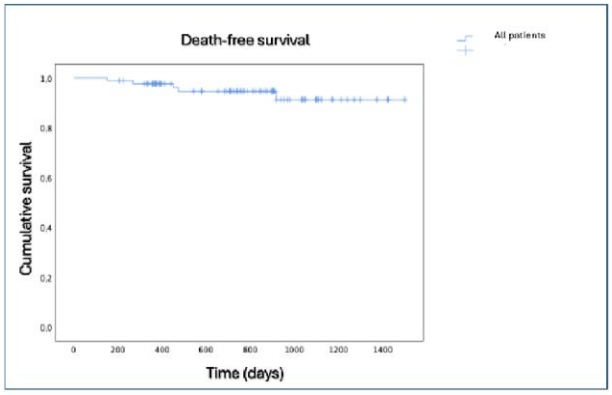

Fig. 1 Overall survival

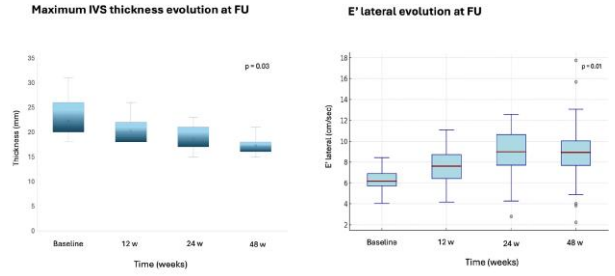

Fig. 2 Variation of interventricular septum (IVS) thickness and E' lateral during FU

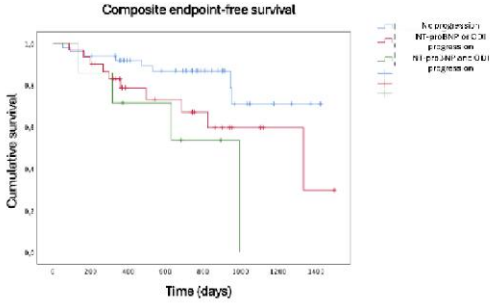

Fig. 3 Event-free survival according to progression criteria: no criteria, one criterion, or both criteria

Abstract citation ID: suag058.038

PREDICTING THE FINAL DIAGNOSIS IN PATIENTS WITH SUSPECTED AMYLOID CARDIOMYOPATHY REFERRED FOR TISSUE BIOPSY

A. Aimo, L. Latorre, G. Tersalvi, C. Nitsche, Y. Izumiya, M. Cameli, F. Cappelli, V. Castiglione, C. Chimenti, A. Cipriani, C. Forleo, S. Longhi, M. Musumeci, G. Limongelli, M. Merlo, F. Musca, M. Serenelli, G. Tini, D. Tomasoni, C. Zuchi, A. Dispenzieri, M. Grogan, K. Tsujita, G. Sinagra, A. Pucci, C. Passino, O. Abouezzeddine, G. Vergaro, and M. Emdin
Fondazione Toscana Gabriele Monasterio; Mayo Clinic; University Hospital of Vienna; Kumamoto University; Ospedale Universitario Di Siena; Ospedale Careggi; Policlinico Umberto I; Ospedale Universitario Di Padova; Policlinico Universitario Di Bari; Ospedale Sant'Orsola; Ospedale Sant'Andrea; Ospedale Monaldi; Ospedale Universitario Di Trieste; Ospedale Niguarda; Ospedale Universitario Di Ferrara; Ospedale Universitario Di Brescia; Ospedale Universitario Di Perugia; Azienda Ospedaliero Universitaria Pisana

Background: In patients with suspected amyloid cardiomyopathy (CM) and a monoclonal protein, tissue biopsy is mandatory to exclude amyloid light–chain CM (AL–CM), the subtype requiring urgent therapy. We aimed to develop a pragmatic approach to estimate the most likely final diagnosis before biopsy.
Methods: We studied a multicenter cohort of adults referred for biopsy because of suspected amyloid CM. Clinical, laboratory, ECG/echocardiographic and bone–tracer scintigraphy data were collected at initial suspicion. In patients with a monoclonal protein, we derived age cut–offs overall and by carpal tunnel syndrome (CTS), defined an age–based "grey zone" (74–83 years), and evaluated risk modifiers for AL–CM and transthyretin CM (ATTR–CM). We built a points–based algorithm for "grey–zone" patients. Clinical utility was assessed using decision–curve analysis.
Results: Among 602 patients (median age 76 years; 81% male), 524 (87%) had a monoclonal protein. In the monoclonal–protein subgroup, ATTR–CM accounted for 49%, AL–CM for 30%, and neither ATTR– nor AL–CM for 21%. Age ≤73 years was the Youden–optimal threshold favoring AL–CM (sensitivity 66%, specificity 78%), whereas age ›84 years made AL–CM unlikely (sensitivity 98%, negative predictive value 94%), defining a "grey zone" (n=261; ATTR–CM 63%, AL–CM 18%, no amyloid CM 20%). Within the gray zone, abnormal free light–chain ratio, positive urine immunofixation, proteinuria, and higher troponin T and N–terminal pro–B–type natriuretic peptide (NT–proBNP) favored AL–CM, while higher Perugini grade, male sex, greater interventricular septal thickness, and higher NT–proBNP favored ATTR–CM. Penalized models achieved cross–validated area under the curves of 0.87 (AL–CM) and 0.94 (ATTR–CM). A two–score algorithm identified small grey–zone subsets enriched for AL–CM (positive predictive value 81.5%, specificity 98%) or ATTR–CM (positive predictive value 95.2%, specificity 94%). DCA showed higher net benefit for score– and model–based strategies versus treat–all/treat–none across clinically relevant threshold probabilities, with consistent patterns across regions (Figure 1-2).
Conclusions: In patients with suspected amyloid CM and a monoclonal protein, age– and CTS–anchored stratification refined by a compact set of routine laboratory and imaging features provides actionable pre–biopsy probabilities and may help prioritize urgent biopsy and AL–directed work–up while definitive tissue typing is pursued.

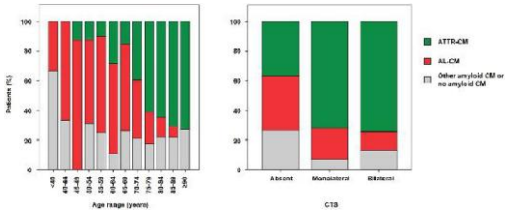

Figure 1

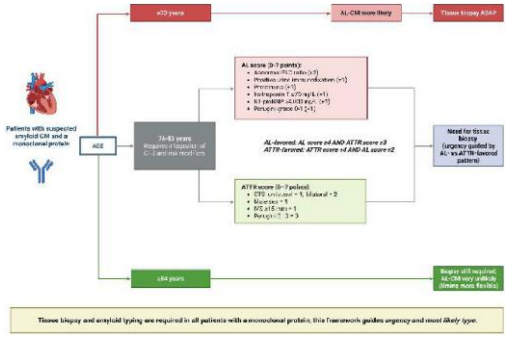

Figure 2

Abstract citation ID: suag058.039

ORTHOPEDIC RED FLAGS AS PREDICTORS OF ADVANCED PHENOTYPE IN CARDIAC AMYLOIDOSIS: A RETROSPECTIVE ANALYSIS

Y. Ferrari Chen, A. Aimo, V. Castiglione, A. Russo, F. Mori, M. Emdin, and G. Vergaro
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Background: Cardiac amyloidosis (CA) is a systemic infiltrative disease often associated with musculoskeletal manifestations. Orthopedic "red flags" include carpal tunnel syndrome (CTS), lumbar spinal stenosis, and spontaneous rupture of the distal biceps tendon. While their role in early suspicion is established, the association between the presence of these orthopedic signs and the severity of cardiac structural involvement at the time of diagnosis remains under investigation.

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Aim: The aim of this study was to evaluate the correlation between the presence of orthopedic red flags and echocardiographic markers, specifically interventricular septal thickness (IVS) and left ventricular mass index (LVMI).
Methods: We retrospectively analysed data from patients referred to our tertiary center for the diagnostic work–up and management of CA from 2018 to 2025. Medical history was collected and echocardiography was performed. We performed two analyses: (A) Comparing patients with "at least one orthopedic red flag" vs. "no red flags"; and (B) Comparing patients with "CTS" vs. "No CTS". Continuous variables were compared using the Wilcoxon rank–sum test.
Results: We enrolled 551 patients (80% male, mean age 77 years) with confirmed ATTR (n=425), AL (n=122), ATTR+AL (n=2), and AA amyloidosis (n=2). The prevalence of orthopedic red flags was CTS in 170 patients (30.85%), distal biceps tendon rupture in 25 (4.54%), and spinal canal stenosis in 37 (6.72%). In Analysis A, in patients with at least one orthopedic manifestation, IVS was significantly higher in the red flag group (median: 16 [IQR: 5] vs. 15.5 [IQR: 4], p = 0.015), as was LVMI (median: 154 [IQR: 62.5] vs. 149 [IQR: 57], p = 0.015) compared to those without red flags. In Analysis B, patients with a history of CTS exhibited a significantly higher LVMI (median: 157 [IQR: 62.8] vs. 150 [IQR: 57], p = 0.038). The difference in IVS for the CTS group showed a trend toward increased thickness but did not reach statistical significance (median: 16 [IQR: 5] vs. 16 [IQR: 4], p = 0.065).
Conclusions: Our data suggest that orthopedic red flags are not merely early warning signs but are associated with a more advanced cardiac phenotype. Patients with a history of orthopedic involvement present with significantly greater IVS and LVMI. This correlation implies that the systemic burden of amyloid deposition in the musculoskeletal system may parallel the magnitude of myocardial infiltration (Figure C).

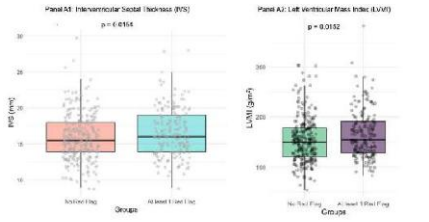

Figure A. Cardiac structural remodeling stratified by the presence of orthopedic red flags. Comparison of echocardiographic parameters between patients with no orthopedic signs and those presenting at least one orthopedic red flag (carpal tunnel syndrome, spinal stenosis, or biceps rupture). (A1) Patients with red flags exhibit significantly increased interventricular septal thickness (IVS) (p=0.015). (A2) Left ventricular mass index (LVMI) is significantly higher in the red flag group (p=0.015). Central lines represent medians; box limits indicate the interquartile range. P-values calculated via Wilcoxon rank-sum test

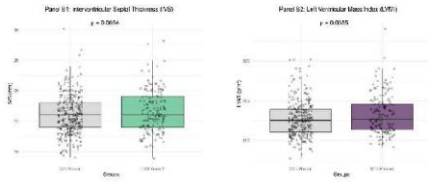

Figure B. Cardiac structural remodeling stratified by the presence of Carpal Tunnel Syndrome (CTS). Comparison of echocardiographic parameters between patients with and without carpal tunnel syndrome (CTS). (B1) Interventricular Septal Thickness (IVS) shows a trend toward higher values in CTS patients, though it does not reach statistical significance (p=0.065). (B2) Left ventricular mass index (LVMI) is significantly higher in the red flag group (p=0.038). Central lines represent medians; box limits indicate the interquartile range. P-values calculated via Wilcoxon rank-sum test.

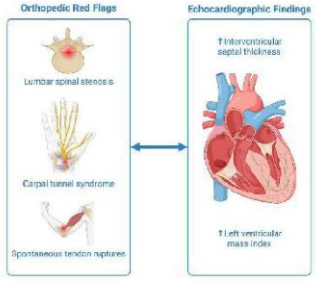

Figure C. Conceptual diagram illustrating the parallel between orthopedic manifestations and cardiac structural changes in amyloidosis. The presence of orthopedic red flags is associated with advanced echocardiographic findings. (CTS) Carpal Tunnel Syndrome; (IVS) Interventricular Septal Thickness; (LVMI) Left Ventricular Mass Index.

Abstract citation ID: suag058.040

COMPREHENSIVE ASSESSMENT OF BIVENTRICULAR AND BIATRIAL MECHANICS IN PATIENTS WITH NON–FIBROTIC EXTRACARDIAC SARCOIDOSIS

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Background: Speckle–tracking echocardiography (STE) has been increasingly used to uncover subtle cardiac dysfunction in patients with extracardiac sarcoidosis (ECS) who show no clinical evidence of heart disease. However, prior investigations were mostly retrospective, methodologically heterogeneous, and focused primarily on left ventricular (LV) function. We conducted a prospective study to provide a broader evaluation of myocardial deformation across both ventricles and atria in non–fibrotic ECS.
Methods: Forty–one patients with non–fibrotic ECS (mean age 57.4±10.2 years; 58.5% male) and 30 age– and sex–matched healthy controls (58.5±11.1 years; 53.3% male) were enrolled. All participants underwent conventional transthoracic echocardiography (TTE) supplemented by comprehensive STE analysis of ventricular and atrial function. Subclinical myocardial dysfunction was defined as LV global longitudinal strain (GLS) less negative than –20%, and potential predictors were analysed.
Results: Standard TTE excluded infiltrative cardiomyopathy but revealed higher E/average e' ratios in the ECS group, suggesting subtle diastolic dysfunction. While traditional indices of biventricular systolic function remained preserved, STE demonstrated significant reductions in LV–GLS, LV global circumferential strain, right ventricular–GLS, and both left and right atrial reservoir strain. Multivariate analysis identified disease duration as the sole independent determinant of LV–GLS impairment (OR 2.26, 95%CI 1.10–4.65; p=0.03). A disease duration of ≥4.5 years predicted abnormal GLS with 88% sensitivity and 75% specificity (AUC 0.89; 95%CI 0.76–1.00).
Conclusions: Non–fibrotic ECS is associated with early impairment of biventricular and biatrial strain despite preserved conventional function. The extent of dysfunction correlates strongly with disease duration, underscoring the value of STE for early detection and monitoring.

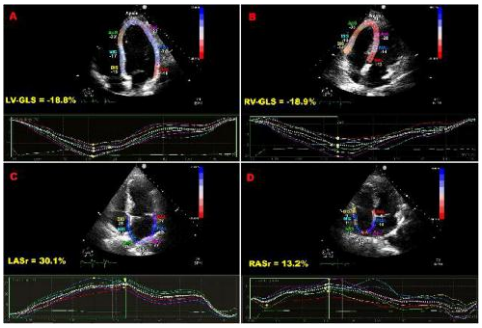

Figure 1. Illustrative example of LV–GLS (A), RV–GLS (B), LASr (C) and RASr (D) assessment by speckle tracking echocardiography in an ECS patient participating in the present study.

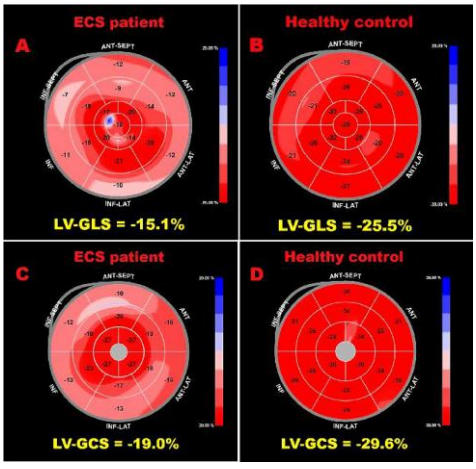

Figure 2. Bull's eye plots derived from 2D–STE illustrating LV–GLS and LV–GCS in an ECS patient (A and C, respectively) and in a healthy control (B and D, respectively).

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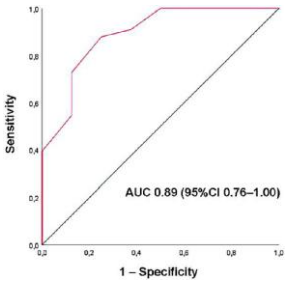

Figure 3. ROC curve analysis performed to determine the optimal cutoff for disease duration in predicting impaired LV–GLS within the ECS cohort.

Abstract citation ID: suag058.041

IMPACT OF TAFAMIDIS ON SLEEP–DISORDERED BREATHING IN TRANSTHYRETIN CARDIAC AMYLOIDOSIS

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Background: Heart failure (HF) is frequently associated with central apnea (CA) and obstructive apnea (OA), which often improve after treatment. Amyloid transthyretin (TTR) cardiomyopathy (ATTR–CM) is increasingly recognized as a cause of HF. Tafamidis, a TTR stabilizer, slows disease progression by preventing TTR misfolding and aggregation, reducing mortality, cardiovascular hospitalizations, and functional decline. Its potential effect on apnea burden in ATTR–CM remains unclear.
Purpose: To evaluate the impact of tafamidis on the apneic burden in patients with ATTR–CM and HF.
Methods: Consecutive ATTR–CM patients initiating tafamidis therapy underwent a 24–hour ambulatory cardiorespiratory monitoring to evaluate the prevalence and severity of breathing disorders at baseline and after 6 months. The severity of these disorders was quantified using the apnea–hypopnea index (AHI). Patients were categorized as having CA (AHI ›5/hour, ≥50% central), OA (AHI ≥5/hour, ›50% obstructive), or normal breathing (NB, AHI ‹5/hour).
Results: Ninety–six ATTR–CM patients (90% males, mean age 78±6 years) were enrolled. At baseline, 63% of patients had OA, and 30% had CA. After 6 months, 66% and 21% of patients presented with OA and CA, respectively. Then after the treatment, AHI remained unchanged over 24 hours (p=0.93), as well as during daytime (p=0.39), and nighttime (p=0.44), regardless of apnea type or baseline severity. When classifying patients according to the type of apneas, tafamidis treatment was not associated with significant changes in daytime, nighttime, or 24–hour AHI (Figure 1).
Conclusions: In a real–life cohort of ATTR–CM patients, 6–month treatment with tafamidis was associated with stabilization of apneic burden without differences between obstructive and central apnea, or between daytime and nighttime events.

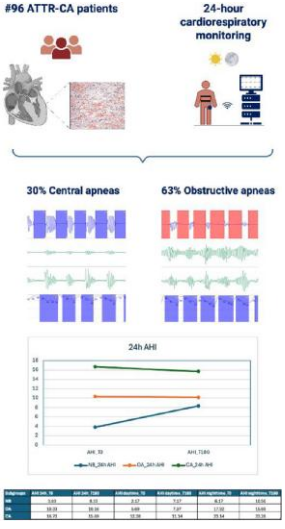

Figure 1

Abstract citation ID: suag058.042

MYOCARDIAL FIBROSIS IN CARDIAC AMYLOIDOSIS: EVIDENCE FROM LEFT VENTRICULAR ENDOMYOCARDIAL BIOPSIES

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Background: Treatment options for cardiac amyloidosis (CA) are rapidly expanding. Therapies suppressing further amyloid accumulation may enable partial amyloid reabsorption; emerging monoclonal antibodies may further enhance amyloid clearance. Myocardial fibrosis, triggered by cardiac injury and amyloid deposition, may be less reversible. Fibrosis data in CA remain limited and mostly derived from explanted hearts.
Methods: We analysed consecutive patients undergoing left ventricular (LV) endomyocardial biopsy for suspected CA at a tertiary referral center; patients with prior myocardial infarction were excluded. Histology quantified fibrosis and amyloid burden and measured inflammatory cell density. Cardiovascular magnetic resonance (CMR) was performed as clinically indicated and extracellular volume (ECV) was assessed.
Results: The cohort included 110 patients (median age 75 years, interquartile range [IQR] 69–80; 82% male); diagnoses were ATTR–CA in 61 and AL–CA in 49. Median fibrosis extent was 10% (IQR 5–15) in the whole cohort (AL–CA, 10% [5–15%]; ATTR–CA, 10% [5–18%]; p=0.640). Fibrosis was focal or plurifocal in both forms (AL–CA: 48% vs 52%; ATTR–CA: 60% vs 40%; p=0.30). Fibrosis did not correlate with total amyloid burden (whole cohort, Spearman rho=–0.122, p=0.230; AL–CA: rho=–0.087, p=0.569; ATTR–CA: rho=–0.160, p=0.251), while it correlated with macrophage and T–cell density (AL–CA: CD68+ rho=0.332, p=0.028; CD3+ rho=0.340, p=0.022; ATTR–CA: CD68+ rho=0.408, p=0.002; CD3+ rho=0.342, p=0.015). In the subset with ECV (n=54; AL–CA n=31, ATTR–CA n=23), ECV tracked amyloid burden more closely than fibrosis (ECV vs amyloid rho=0.442, p=0.001; ECV vs fibrosis rho=0.225, p=0.105), driven primarily by ATTR–CA (ECV vs amyloid rho=0.528, p=0.010; ECV vs fibrosis rho=0.110, p=0.617). In AL–CA, ECV showed only borderline associations with both amyloid and fibrosis (rho=0.327, p=0.083, and rho=0.344, p=0.063, respectively) (Figure 1-2).
Conclusions: In patients with LV biopsy–proven CA, fibrosis is common and similar in AL– and ATTR–CA. Fibrosis is more closely related to inflammatory infiltrates than to total amyloid burden, and CMR–derived ECV appears to track amyloid burden more than fibrosis, particularly in ATTR–CA. Together, these results support pursuing adjunct antifibrotic therapies and fibrosis–specific imaging, to better estimate recovery potential and monitor myocardial remodeling after amyloid–removal therapies, rather than relying on ECV alone.

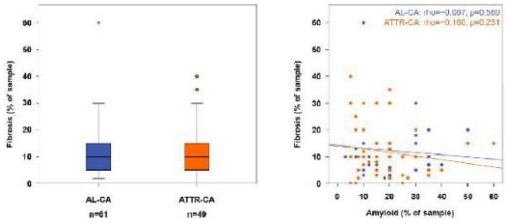

Figure 1

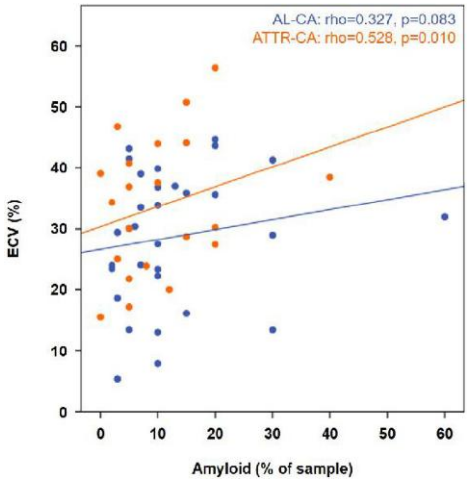

Figure 2

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Cardiomyopathies - Hcm

Abstract citation ID: suag058.043

A HIGH–RISK PREGNANCY IN HYPERTROPHIC CARDIOMYOPATHY: A CASE REPORT HIGHLIGHTING INTRAFAMILIAL PHENOTYPIC VARIABILITY AND MANAGEMENT CHALLENGES

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Introduction: Hypertrophic cardiomyopathy (HCM) is a genetically heterogeneous myocardial disease characterized by marked phenotypic variability, even among carriers of the same pathogenic mutation. Pregnancy in women with obstructive HCM represents a high–risk condition, particularly in the presence of severe left ventricular outflow tract (LVOT) obstruction and limited pharmacological options. We report a case highlighting the challenges of risk stratification and management of obstructive HCM during pregnancy.
Case Presentation: A 24–year–old woman with a family history of HCM was referred for cardiological evaluation during the third month of pregnancy. Genetic testing identified a pathogenic MYH7 variant (c.1987C›T, exon 18), shared with her mother and sister. Marked intrafamilial phenotypic variability was observed, with both obstructive and non–obstructive HCM phenotypes; the patient's mother and grandmother were obstructive, whereas her sister was non–obstructive, and the patient showed cardiac involvement from the neonatal period. At presentation, she reported dyspnea on mild–to–moderate exertion (NYHA class III). Electrocardiography showed left atrial enlargement and left ventricular hypertrophy with secondary right ventricular repolarization abnormalities (Fig. 1). Transthoracic echocardiography revealed severe concentric hypertrophy (septal thickness 25 mm), grade II diastolic dysfunction, systolic anterior motion of the mitral valve, and severe LVOT obstruction with a peak gradient ›150 mmHg (Fig. 2). Due to the high maternal risk and limited pharmacological options during pregnancy, close outpatient monitoring was adopted. Given an estimated HCM sudden cardiac death risk of 6.62%, a subcutaneous implantable cardioverter–defibrillator was implanted during pregnancy. The patient completed pregnancy without major complications and delivered at term by elective cesarean section. Postpartum optimization of medical therapy led to symptomatic improvement (NYHA II). Subsequently, CYP2C19 genotyping was performed to evaluate potential eligibility for treatment with the cardiac myosin inhibitor mavacamten.
Conclusion: This case underscores the complexity of managing obstructive HCM during pregnancy, emphasizing the importance of early risk assessment, multidisciplinary care, and individualized management strategies, particularly in patients with severe LVOT obstruction and significant intrafamilial phenotypic variability.

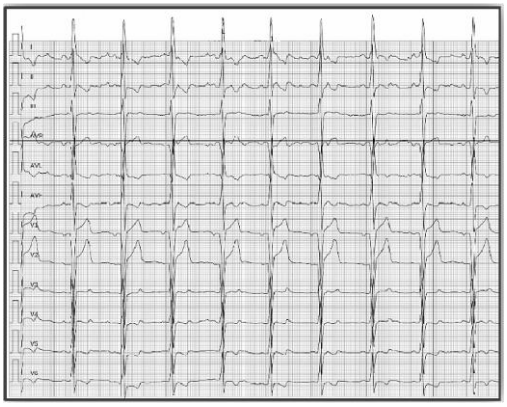

Figure 1

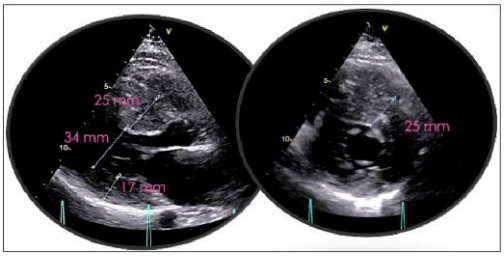

Figure 2

Abstract citation ID: suag058.044

CLINICAL PREDICTORS OF GENOTYPE POSITIVITY IN HYPERTROPHIC CARDIOMYOPATHY: DATA FROM A MULTICENTER REGISTRY

F. Juvenal, F. Angelini, A. Fenenziani, R. Manai, M. Bianco, E. Lonni, G. Brach Del Prever, F. Ravera, P. Bocchino, G. Giannino, D. Melis, G. Gobello, L. Laiso, G. Gallone, S. Pidello, B. Mabritto, A. Chinaglia, W. Grosso Marra, S. Deaglio, G. De Ferrari, V. Dusi, and C. Raineri
Departement of Medical Sciences, University of Turin, 10124 Turin, Italy; Division of Cardiology, Cardiovascular and Thoracic Departement, "Città Della Salute E Della Scienza" Hospital, 10126 Turin, Italy; Division of Cardiology, Azienda Sanitaria Ospedaliera Ordine Mauriziano, Torino, Italy; Cardiology Division, San Luigi Gonzaga University Hospital, Turin, Italy; Santa Croce Hospital; Immunogenetics and Transplant Biology Service, Città Della Salute E Della Scienza Hospital, Turin, Italy; Cardiology Division, Civil Hospital, Ivrea, Italy

Background: Genetic testing in hypertrophic cardiomyopathy (HCM) shows variable genotype positivity, not consistently predicted by clinical features or severity. Identifying clinical predictors of genotype positivity could improve pre–test counselling and refine expectations, given the typical 30–50% yield of genetic testing in HCM, which varies across cohorts and settings.
Methods: We analysed probands with HCM from a contemporary multicenter cohort across four tertiary centers. Family members were excluded. Genotype positivity was defined as at least one pathogenic/likely pathogenic variant (ACMG class 4–5). Multivariable logistic regression identified independent predictors of genotype positivity. Sensitivity analyses evaluated left atrial volume index (LAVI) ≥34 mL/m² and mode of first presentation.
Results: Among 274 genotyped probands, 86 (31%) were genotype–positive (median age at diagnosis 54 years, 62% male). Among genotype–positive patients, pathogenic/likely pathogenic variants predominantly involved sarcomeric genes, with MYBPC3 (n = 33; 38.4%) and MYH7 (n = 25; 29.1%) accounting for the majority of genotype–positive cases. A positive genetic test was independently predicted by age at diagnosis ‹40 years (OR 2.43), family history of SCD/major ventricular arrhythmias (2.27), family history of non–ischemic cardiomyopathy (1.93), and, as a protective factor, hypertension (0.42). Maximal LV wall thickness ›20 mm and gender were not independently associated with genotype positivity. The main clinical model demonstrated good discrimination and calibration (AUC ~0.75–0.76). Adding LAVI or first presentation mode provided no meaningful improvement.
Conclusions: Genotype positivity in HCM links to early onset and familial clustering; traditional severity markers and initial presentation do not independently indicate genetic causality. These findings support a phenotype–driven, probabilistic approach to genetic counselling in HCM that emphasizes when disease manifests and how it aggregates within families, rather than how patients initially present clinically

Abstract citation ID: suag058.045

ELEVATION OF APOLIPOPROTEIN B LEVELS AND CHANGES IN PROTEIN GLUTAHIONYLATION SUGGEST NOVEL BIOMARKERS FOR PAEDIATRIC CARDIAC HYPERTROPHY

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Metabolic syndrome (MetS) is a major predictor of adverse cardiac events associated with cardiac hypertrophy (CH). From a pathophysiological perspective, oxidative stress and redox status imbalance may play a pivotal role. In other pathological contexts, dysregulation of S–glutathionylation, a redox–dependent post–translational protein modification involving the conjugation of glutathione to cysteines, may contribute to oxidative injury and metabolic dysfunction. Experimental studies demonstrated that glutathionylated proteins (PSSG) may also have a role in regulating hypertrophic phenotype in cardiomyocytes, even though there is no evidence in patients. Hence, we aimed to depict the connection between CH and MetS and the role of PSSG in the CH development, in order to identify non–invasive biomarkers and potential targetable proteins. We conducted an observational case–control study involving non–syndromic overweight/obesity children aged 10–18 years with CH (cases) or without (controls). We collected anthropometric and biochemical parameters, cardiac data, levels of Apolipoprotein B (ApoB) and N–terminal pro B–type natriuretic peptide (NT–proBNP), and PSSG were evaluated in peripheral blood mononuclear cells (PBMCs) by mass spectrometry. To date, we have evaluated data from 43 paediatric patients, including 19 controls and 24 CH patients. No significant alterations in anthropometric and biochemical parameters were found between the two groups. Otherwise, children with CH exhibited significantly

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higher ApoB levels than controls. Although not significant, there is a trend toward higher NT–proBNP levels in cases than in controls, suggesting that the association may become statistically significant with a larger cohort. Notably, glutathionylation analysis in PBMCs in a cohort subgroup revealed differences in the pattern of glutathionylated proteins between controls and patients with CH. Specifically, among the 104 PSSG identified in the patient group, several key cytoskeletal proteins already known for their role in cardiac remodelling (e.g. α– and β–tubulin, tropomyosin A1, and tropomyosin 1) emerged. Our preliminary results suggest that patients with CH exhibit elevated ApoB levels, underscoring its central role in linking MetS and CH; moreover, the cardiac phenotype could be reflected in blood by evaluating glutathionylation of specific proteins. Further investigations are needed to support the translational relevance of our results.

Abstract citation ID: suag058.046

EFFECTS OF EMPAGLIFLOZIN AND DAPAGLIFLOZIN ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN PATIENTS WITH HFPEF AND NON–OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY: PRELIMINARY RESULTS

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Cardiologia, Ospedale Guglielmo Da Saliceto

Background: Patients with nonobstructive hypertrophic cardiomyopathy (nHCM) frequently present with exertional intolerance and features of heart failure with preserved ejection fraction (HFpEF). Although sodium–glucose cotransporter 2 inhibitors (SGLT2i) have shown clinical benefit in HFpEF, patients with hypertrophic cardiomyopathy have been excluded from major randomized trials, leaving a relevant unmet therapeutic need.
Methods: This longitudinal, observational multicenter study evaluated the effects of SGLT2 inhibitors on functional capacity and quality of life in patients with nHCM treated with empagliflozin or dapagliflozin, prescribed according to current cardiological indications for diastolic dysfunction. All patients had genetically confirmed nHCM and evidence of structural, functional, or serological abnormalities consistent with diastolic dysfunction. Baseline assessment and six–month follow–up included clinical evaluation, cardiopulmonary exercise testing (CPET), Kansas City Cardiomyopathy Questionnaire (KCCQ), and NT–proBNP measurement. This abstract reports preliminary data from the first ten patients enrolled at the coordinating center of Piacenza, within an ongoing multicenter project involving Ospedale Maggiore di Parma, Policlinico di Milano, Centro Cardiologico Monzino, Ospedale di Messina, Ospedale di Palermo, Ospedale di San Benedetto del Tronto, and Ospedale di Verona.
Results: Baseline peak oxygen uptake (VO_2) was 19.1 ± 3.7 mL/kg/min, indicating mild–to–moderate functional limitation, and increased to 20.7 ± 3.8 mL/kg/min at six months (p = 0.415) (Figure 1). Oxygen pulse rose from 12.3 ± 2.8 to 13.1 ± 2.5 mL/beat (p = 0.476), while ventilatory efficiency improved, with VE/VCO_2 slope decreasing from 30.5 ± 6.8 to 28.9 ± 5.2 (p = 0.221). Maximal workload increased from 89.7 ± 31.4 to 98.7 ± 25.4 W (p = 0.109) (Figure 3). KCCQ–CSS showed a favourable trend (84.8 ± 11 to 86.5 ± 13; p = 0.332). NT–proBNP decreased from 595 pg/mL (IQR 242–784) to 451 pg/mL (IQR 244–894; p = 0.262) (Figure 2).
Conclusions: Although statistical significance was not achieved, likely due to the limited sample size, all analysed parameters showed a consistent trend toward improvement. These preliminary findings suggest a biologically coherent benefit of SGLT2 inhibition in patients with nHCM and an HFpEF phenotype, supporting further investigation in larger multicenter studies.

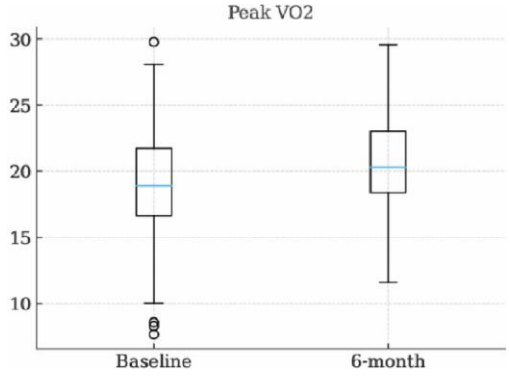

Figure 1. Blot plot showing mean peak VO_2 values at baseline and 6 months

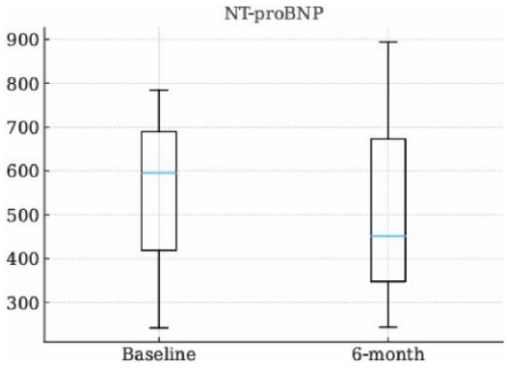

Figure 2. Blot plot showing median NT–proBNP values at baseline and 6 months

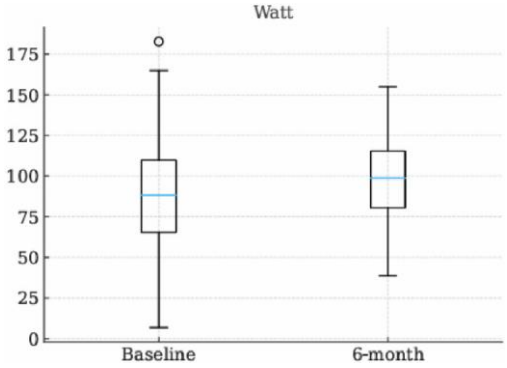

Figure 3. Blot plot showing mean maximal workload in watts at baseline and 6 months

Abstract citation ID: suag058.047

VARIATION IN COMBINED CARDIOPULMONARY EXERCISE TEST AND STRESS ECHOCARDIOGRAPHY FINDINGS IN PATIENTS WITH OBSTRUCTIVE HYPERTROPHYC CARDIOMYOPATHY TREATED WITH MAVACAMTEN: A PROSPECTIVE OBSERVATIONAL MULTICENTER STUDY

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Azienda Ospedaliero Universitaria Sant'Andrea Di Roma – Università La Sapienza; Ospedale San Camillo Forlanini; Policlinico Umberto I – Università La Sapienza; Ospedale Santo Spirito In Sassia

Background: Mavacamten, a selective cardiac myosin inhibitor, improves left ventricular outflow tract (LVOT) obstruction and symptoms in obstructive hypertrophic cardiomyopathy (HCM). However, real–world data integrating cardiopulmonary exercise testing (CPET) and echocardiography remain limited.
Methods: In this prospective multicenter study, 28 patients with symptomatic obstructive HCM underwent transthoracic echocardiography and symptom–limited CPET at baseline and after 6 months of mavacamten therapy. The primary endpoint was the change in echocardiographic and CPET parameters. An exploratory secondary endpoint was the identification of baseline predictors of functional response, defined as a ≥5 percentage point increase in predicted peak oxygen consumption (%pred pVO_2).
Results: After 6 months of treatment, resting LVOT gradient decreased from 30.5 [19.2–40.0] to 7.0 [6.0–8.2] mmHg (p = 0.001), and peak LVOT gradient from 75.5 [60.0–106.2] to 34.0 [17.8–51.2] mmHg (p = 0.001) (Figure 1). Left atrial volume index and diastolic function indices significantly improved, with reductions in E/e' at rest (12.6 [9.4–17.2] to 10.6 [8.3–12.7]; p=0.001) and at peak (14.1 [13.1–17.1] to 11.2 [9.3–13.8]; p = 0.001) (Figure 2). Peak pVO_2 increased from 1213 [918–1598] to 1352 [1039–1992] ml/min (p= 0.001), pVO_2 ml/min/kg from 16.0 [13.5–17.8] to 16.4 [14.6–21.0] (p=0.004), and %pred pVO_2 from 68.0 [63.0–78.0] to 77.0 [69.5–86.0] (p=0.008) (Figure 3). $PETCO_2$ at peak exercise increased (34.1 [31.2–35.6] to 35.4 [33.1–37.6]; p=0.002), and VE/VCO_2 slope decreased significantly (35.0 [32.7–37.0] to 31.6 [28.7–35.0]; p=0.007), indicating enhanced ventilatory efficiency. Overall, 46% of patients achieved a functional response (Δ%pred pVO_2 ≥+5). Lower baseline %pred pVO_2 (OR 0.58 [0.36–0.91]; p=0.021) and higher VE/VCO_2 slope (OR 1.56 [1.02–2.42]; p=0.041) independently predicted response, with fair model discrimination (AUC=0.73).

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Conclusions: Mavacamten significantly reduced LVOT gradients and improved diastolic, ventilatory, and functional parameters in obstructive HCM. Nearly half of patients experienced a clinically relevant improvement in exercise capacity, with baseline ventilatory inefficiency and lower aerobic performance identifying those most likely to benefit.

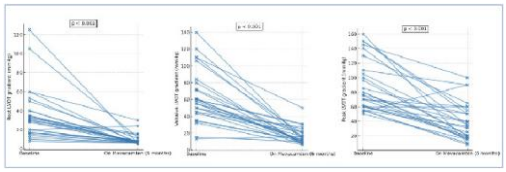

Figure 1

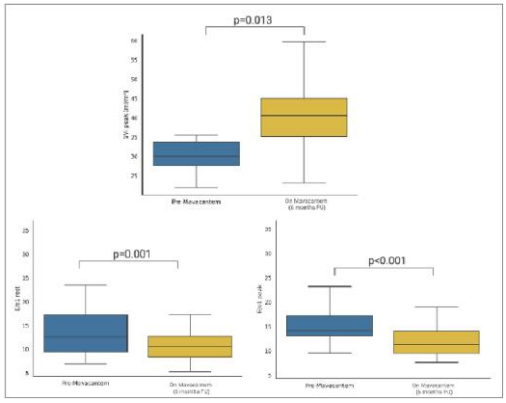

Figure 2

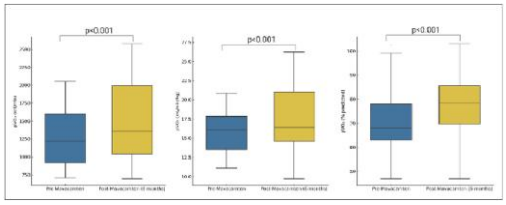

Figure 3

Abstract citation ID: suag058.048

UNMASKING THE IMPACT OF SEVERE LVOT OBSTRUCTION IN HYPERTROPHIC CARDIOMYOPATHY BY COMBINED STRESS ECHOCARDIOGRAPHY AND CARDIOPULMONARY EXERCISE TESTING

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Università La Sapienza, Azienda Ospedaliera Sant'Andrea; Ospedale San Camillo

Background: Hypertrophic cardiomyopathy (HCM) is a complex disease in which left ventricular outflow tract (LVOT) obstruction influences both functional capacity and clinical outcomes. However, the clinical relevance of varying obstruction severity remains debated.
Objectives: To evaluate the relationship between LVOT gradient severity and both exercise performance and long–term prognosis in HCM using combined cardiopulmonary exercise testing and stress echocardiography (TTE–CPET).
Methods: We retrospectively analysed 388 HCM patients undergoing TTE–CPET, stratified into four groups based on peak LVOT gradient: ‹30 mmHg, 30–49 mmHg, 50–79 mmHg, and ≥80 mmHg. Clinical, echocardiographic, and CPET data were compared. The primary outcome was a composite of NYHA class worsening, heart failure hospitalization, new–onset atrial fibrillation, or progression to end–stage HCM, assessed over a median follow–up of 7.4 years.
Results: Only patients with severe obstruction (≥80 mmHg, n=82) showed significantly lower peak VO_2 (15.9 vs. 19.7 ml/kg/min, p=0.003, Figure 1), higher pulmonary pressures, more advanced diastolic dysfunction, and greater symptom burden. They also had a higher incidence of adverse events (50.0% vs. 31.6%, p=0.011) and worse event–free survival (log–rank p=0.011). A peak gradient ≥80 mmHg independently predicted adverse outcomes (HR: 1.87; p=0.009), even after adjustment. Patients with intermediate gradients (30–79 mmHg) had generally preserved outcomes, though some exhibited early structural or functional changes

Conclusions: Severe dynamic LVOT obstruction identifies a high–risk HCM subgroup with impaired exercise capacity and poor prognosis. Intermediate gradients may still warrant close monitoring. TTE–CPET offers critical insight for risk stratification and early intervention.

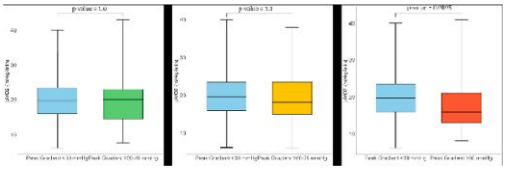

Figure 1

Cardio-Oncology

Abstract citation ID: suag058.049

THE GLP–1 RECEPTOR AGONIST SEMAGLUTIDE PRESERVES CARDIAC FUNCTION, REDUCES INFLAMMATION–DRIVEN CARDIOTOXICITY WITH CARDIO–RENAL BENEFITS IN NON–DIABETIC MODELS EXPOSED TO ANTHRACYCLINES AND HER2 BLOCKADE

V. Quagliariello, M. Berretta, M. Barbato, R. Arianna, C. Maurea, M. Canale, A. Paccone, I. Bisceglia, A. Tedeschi, M. Scherillo, A. Inno, I. Santagata, S. Oliva, C. Dessalvi, P. Forte, D. Gabrielli, A. Di Mauro, G. Ferrara, I. D'Arbitrio, G. Palma, A. Luciano, F. Bruzzese, G. Gallucci, and N. Maurea
Division of Cardiology, Istituto Nazionale Tumori–Irccs–Fondazione G. Pascale; Cardiology Division; Patologia; Patology; Animal Facility, Istituto Nazionale Tumori–Irccs–Fondazione G. Pascale

Introduction: Cardiotoxicity remains a major limitation in the use of anthracyclines and anti–HER2 agents, such as doxorubicin and trastuzumab, particularly when administered sequentially. Glucagon–like peptide–1 receptor agonists (GLP–1RAs), including semaglutide, have demonstrated cardioprotective and anti–inflammatory properties beyond glycemic control. However, their potential role in mitigating chemotherapy–induced cardiac injury in non–diabetic settings has not been explored. We investigated the effects of semaglutide in non–diabetic murine models subjected to sequential treatment with doxorubicin followed by trastuzumab over 10 days.
Methods: Mice were randomized to receive semaglutide or vehicle. Cardiac function was assessed by echocardiography, including left ventricular ejection fraction (LVEF), longitudinal strain, and radial strain. Histological analyses evaluated myocardial fibrosis and hypertrophy. IHC analysis were performed in myocardial, hepatic and renal tissues. Circulating cardiac injury and inflammation biomarkers, including troponins, IL–1β, IL–6, IL–8, CCL12, and high–sensitivity C–reactive protein (hsCRP), were quantified.
Results: Sequential exposure to doxorubicin and trastuzumab induced significant cardiac dysfunction, characterized by a reduction in LVEF and strain parameters, increased myocardial fibrosis and hypertrophy, and elevated circulating troponins and inflammatory cytokines.
Conclusion: Semaglutide treatment significantly attenuated these changes, preserving LVEF, longitudinal and radial strain, and reducing histological evidence of fibrosis and cardiomyocyte hypertrophy. Moreover, semaglutide markedly decreased systemic concentrations of troponins and inflammatory mediators, including IL–1β, IL–6, IL–8, CCL12, and hsCRP.

Abstract citation ID: suag058.050

METABOLIC MODULATION BY SGLT2 INHIBITORS CANAGLIFLOZIN AND DAPAGLIFLOZIN: A NOVEL STRATEGY TO BALANCE ANTITUMOR EFFICACY AND CARDIOTOXICITY IN HER2–POSITIVE BREAST CANCER THERAPY

V. Quagliariello, M. Berretta, M. Barbato, I. Santagata, F. Maurea, M. Canale, A. Paccone, A. Inno, S. Oliva, I. Bisceglia, A. Tedeschi, M. Scherillo, R. Arianna, C. Dessalvi, P. Forte, D. Gabrielli, and N. Maurea
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Background: The clinical use of doxorubicin and trastuzumab in HER2–positive breast cancer is limited by significant cardiotoxicity. Sodium–glucose cotransporter 2 inhibitors (SGLT2is), such as canagliflozin and dapagliflozin, have demonstrated cardiovascular protection in diabetes and heart failure, and emerging evidence suggests potential antineoplastic activity. Whether SGLT2is can simultaneously enhance antitumor efficacy and protect cardiomyocytes during chemotherapy remains unclear.
Methods: Human induced pluripotent stem cell–derived cardiomyocytes (hiPSC–CMs) and HER2–positive breast cancer cell lines (BT–474, SKBR3) were co–

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exposed to doxorubicin (1 μM) and trastuzumab (10 μg/mL), alone or in combination with canagliflozin (10 μM) or dapagliflozin (5 μM). Cell viability and apoptosis were quantified via MTT assay, Annexin V/PI staining, and caspase–3/7 activity. Oxidative stress (ROS production, mitochondrial membrane potential), inflammatory markers (IL–1β, TNF–α, NF–κB signaling), and stress–response proteins (NLRP3, MyD88, CXCR4) were evaluated by ELISA, Western blot, and immunofluorescence. Pathway analysis included AMPK activation, SIRT1, and Nrf2 signaling in cardiomyocytes, and GLUT1/GLUT3 modulation in tumor cells.
Results: Both canagliflozin and dapagliflozin significantly enhanced the cytotoxicity of doxorubicin–trastuzumab in HER2–positive breast cancer cells, as evidenced by reduced proliferation and increased apoptotic activity ($p < 0.001$). In contrast, in hiPSC–CMs exposed to chemotherapy, both agents preserved cell viability, reduced ROS generation, and maintained mitochondrial potential. Inflammatory cytokine release (IL–1β, TNF–α) and NLRP3 inflammasome activation were markedly attenuated by SGLT2is. Mechanistically, cardioprotection was associated with upregulation of AMPK–SIRT1–Nrf2 pathways, while the enhanced antitumor effect correlated with downregulation of glucose transporters and metabolic stress induction in HER2+ cells. Notably, canagliflozin exerted stronger antitumor synergy, whereas dapagliflozin displayed more pronounced cardioprotective effects.
Conclusion: This study demonstrates a dual effect of SGLT2 inhibitors in vitro: potentiation of chemotherapy–induced cytotoxicity in HER2–positive breast cancer cells and attenuation of cardiotoxicity in human cardiomyocytes. These findings suggest that SGLT2 inhibition may represent a novel therapeutic approach in cardio–oncology.

Abstract citation ID: suag058.051

FROM PERICARDIAL EFFUSION TO NSTEMI: A CASE OF CORONARY COMPRESSION BY CARDIAC LYMPHOMA

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Background: Primary cardiac lymphoma is an extremely rare condition, accounting for less than 0.5% of extranodal lymphomas. It can present with a variety of symptoms, including pericardial effusion, heart failure, arrhythmias, or coronary artery compression. Accurate diagnosis requires a multimodal imaging approach—utilizing echocardiography, cardiac magnetic resonance (CMR), and PET–CT—complemented by cytological or histological confirmation.
Case Description: A 62–year–old male with a history of B–cell lymphoma presented to the Emergency Department with pleuritic chest pain and pericardial and pleural effusions. Despite initial treatment for suspected pericarditis with colchicine and ibuprofen, the patient's condition progressed to hemodynamic compromise, requiring pericardiocentesis. Cytologic analysis and a supraclavicular mass biopsy confirmed recurrence of high–grade B–cell non–Hodgkin lymphoma. PET–CT imaging showed systemic spread with significant cardiac and pleural uptake. During hospitalization, the patient developed hypoxemia, hypotension, and acute chest pain. CT angiography excluded embolism but identified extrinsic compression of the right pulmonary artery. Concurrently, ECG changes and new regional wall motion abnormalities (posterolateral hypokinesia) appeared, with a decline in left ventricular ejection fraction (LVEF) (Figure1). Coronary angiography demonstrated critical stenoses of the left anterior descending, intermediate, and circumflex arteries, all suggestive of extrinsic compression. CMR further confirmed extensive intramyocardial infiltration. Following the failure of first–line Polatuzumab–Rituximab, second–line therapy with Obinutuzumab and Glofitamab was initiated. This targeted approach led to progressive lesion regression, normalization of ventricular function (LVEF improved from 38% to 56%), and complete resolution of the coronary stenosis (Figure 2, 3).
Conclusions: This case highlights the importance of considering cardiac lymphoma in the differential diagnosis of recurrent pericardial effusion, unexplained ventricular dysfunction, or atypical coronary stenoses, particularly in patients with a history of lymphoproliferative disease. Integrating advanced imaging with histological confirmation is essential for diagnosis and targeted immunochemotherapy. These therapies can effectively induce mass regression and complete functional cardiac recovery, including the resolution of extrinsic vascular compression.

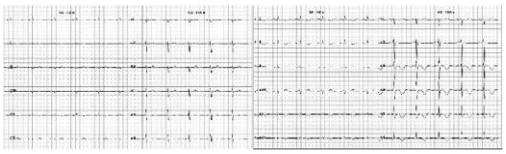

Figure 1

Figure 2

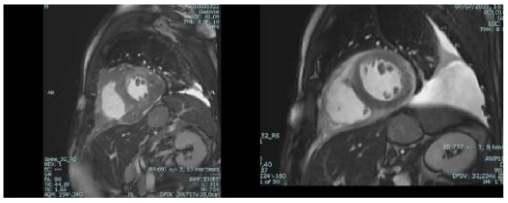

Figure 3

Abstract citation ID: suag058.052

SGLT2 INHIBITOR DAPAGLIFLOZIN ATTENUATES CARDIOMYOCYTE INJURY INDUCED BY PI3KΑ–SELECTIVE INHIBITOR ALPELISIB AND FULVESTRANT UNDER HYPERGLYCEMIA

V. Quagliariello, M. Berretta, M. Barbato, R. Arianna, C. Maurea, M. Canale, A. Paccone, I. Bisceglia, A. Tedeschi, M. Scherillo, A. Inno, I. Santagata, S. Oliva, C. Dessalvi, P. Forte, D. Gabrielli, and N. Maurea
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Background: PIK3CA mutations occur in approximately 40% of hormone receptor–positive (HR+)/HER2–negative (HER2–) breast cancers and are associated with endocrine resistance. The combination of the PI3Kα inhibitor alpelisib and fulvestrant significantly improves progression–free survival (PFS) in this patient population, as demonstrated by the SOLAR–1 trial. However, treatment–induced hyperglycemia, observed in over 60% of patients, can not only compromise cardiovascular health but also promote cancer progression through compensatory hyperinsulinemia and reactivation of the PI3K/AKT pathway. Retrospective clinical data suggest that co–administration of SGLT2 inhibitors may mitigate these effects, prolonging time on treatment and potentially improving PFS.

This study aimed to investigate the direct cardiotoxic effects of alpelisib and fulvestrant on human cardiomyocytes under hyperglycemic conditions (25 mM glucose), and assess whether dapagliflozin, an SGLT2 inhibitor, provides cardioprotection in vitro, under co–treatment condition.
Methods: Human iPSC–derived cardiomyocytes were exposed to alpelisib and fulvestrant under hyperglycemic conditions (50 mM) to simulate the clinical metabolic milieu of treated breast cancer patients. Dapagliflozin was introduced either concomitantly. Cellular viability, mitochondrial membrane potential, ROS and markers of cardiotoxicity and apoptosis (BNP, troponin I, caspase–3) were quantified. Transcriptomic analysis was performed to explore cardiometabolic signaling pathways.
Results: Dapagliflozin significantly attenuated cardiotoxic responses induced by alpelisib/fulvestrant, including preservation of mitochondrial function, reduction in ROS, and inhibition of apoptotic signaling. Transcriptomic analysis revealed suppression of pro–inflammatory and insulin–related stress pathways.
Conclusion: These in vitro data support the potential clinical utility of SGLT2 inhibitors in minimizing cardiotoxic risk and improving treatment tolerance in HR+/HER2– PIK3CA–mutant breast cancer patients.

Abstract citation ID: suag058.053

STEROID–INDUCED OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY IN A CHILD WITH LANGERHANS CELL HISTIOCYTOSIS

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Introduction: Langerhans cell histiocytosis is a rare disease, more common in the pediatric age; the vinblastine–corticosteroid combination represents the first–line treatment. Cardiovascular effects of corticosteroids are generally mild; however, rare cases of obstructive hypertrophic cardiomyopathy have been described,

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mainly in the neonatal age. We report an exceptional case of reversible obstructive hypertrophic cardiomyopathy in a school–aged child.
Clinical Case: An 11–year–old boy started treatment for Langerhans cell histiocytosis according to the LCH–IV protocol with vinblastine and prednisone (1 mg/kg/day). After five weeks of therapy, an obstructive hypertrophic cardiomyopathy pattern was incidentally detected: parietal hypertrophy (IVS 10 mm, Z–score +2.8, figure 1) and dynamic left ventricular outflow tract obstruction (max PG 83 mmHg, figure 2) in an asymptomatic child. Over the following 3–4 weeks, during gradual steroid tapering, a complete regression of the condition was observed: echocardiography documented normalization of parietal thickness (IVS 8.5 mm, Z–score +1.1) and absence of outflow tract obstruction.
Discussion and conclusions: obstructive hypertrophic cardiomyopathy represents a rare but clinically relevant complication of corticosteroid therapy in pediatric age. Most cases described in the literature involve neonates or infants exposed to high steroid doses, in whom myocardial hypertrophy appears related to the direct anabolic effect of glucocorticoids on the immature myocardium. In school–aged children this event is exceptional and poorly documented, particularly in the context of therapy for Langerhans cell histiocytosis. The reported case is peculiar due to the patient's age, the absence of symptoms, and the diagnosis made during routine cardiologic surveillance. The close temporal correlation with the initiation of steroid therapy and the rapid and complete regression of the condition after prednisone reduction strongly support a pharmacological etiology. This case highlights the importance of maintaining a high level of clinical awareness and considering targeted cardiologic surveillance in pediatric patients undergoing steroid treatment, especially in cases of prolonged exposure or high doses.

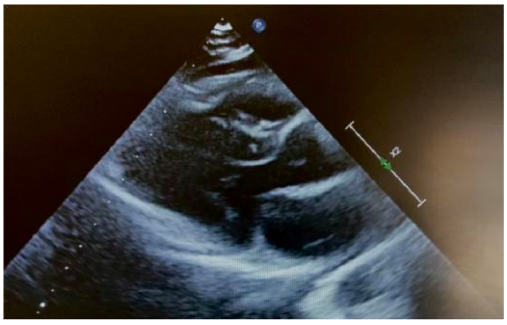

Figure 1: Parasternal long-axis view acquired at the first echocardiographic evaluation showing left ventricular hypertrophy.

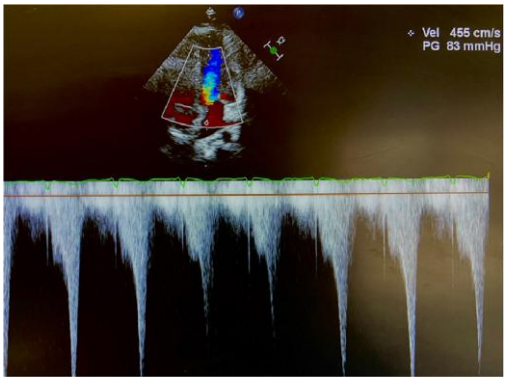

Figure 2: Maximum peak gradient in the left ventricular outflow tract

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CARDIAC INVOLVEMENT IN ACUTE LYMPHOBLASTIC LEUKEMIA DETECTED BY MULTIMODALITY IMAGING

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Background: Cardiac involvement in hematologic malignancies is uncommon and often subclinical; it may present with pericardial effusion and myo–pericardial infiltration.

Case presentation: A 41–year–old man with relapsed acute lymphoblastic leukemia (prior chemotherapy and two bone–marrow transplant attempts) was referred for hypotension and marked asthenia. He denied chest pain, palpitations, and syncope. ECG showed sinus rhythm, anterior T–wave inversion, and low QRS voltages. Laboratory tests revealed mild anemia and leukocytosis. Urgent echocardiography demonstrated a large circumferential pericardial effusion (Figure 1C) with pre–tamponade signs (right atrial collapse, marked respiratory variation of transtricuspid inflow) and a dilated, poorly collapsible inferior vena cava; biventricular function was otherwise preserved. Diagnostic–therapeutic pericardiocentesis drained ›1,000 mL of frankly hemorrhagic fluid; cytology was positive for malignant cells. CMR showed mid–basal LV wall thickening (anterior/anteroseptal/inferoseptal) with mild T2–STIR hyperintensity and increased T1/T2 mapping values (Figure 2A-D), consistent with myo–pericardial leukemic involvement. Infiltrating tissue was detected along the anterior interventricular groove encasing the left main and LAD, extending to the left atrial anterior/lateral walls and surrounding the circumflex, and reaching the aorto–pulmonary window in close contiguity with the main pulmonary artery; ventricular function was preserved. Speckle–tracking echocardiography showed normal global longitudinal strain with regional reduction in basal anterior, anterolateral, inferolateral segments and basal inferior septum (Figure 1A). During ongoing hemato–oncologic therapy, the patient has remained asymptomatic, without recurrent pericardial effusion and with stable echocardiographic parameters.
Discussion/Conclusions: A hemorrhagic pericardial effusion with positive cytology may be the first clue of cardio–pericardial infiltration. Regional strain abnormalities can support escalation to advanced imaging; CMR is pivotal for non–invasive tissue characterization and diagnostic confirmation.

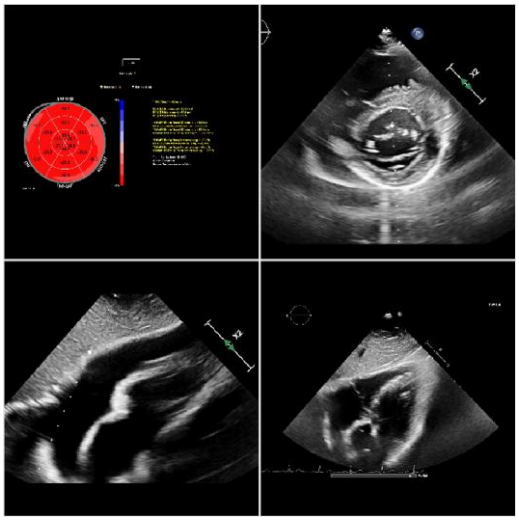

Figure 1

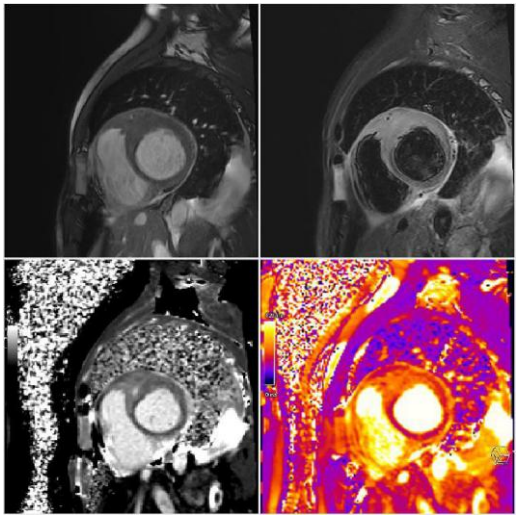

Figure 2

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Congenital Heart Disease and Pregnancy

Abstract citation ID: suag058.055

MULTIDISCIPLINARY APPROACH TO PREGNANCY IN WOMEN WITH MARFAN SYNDROME: A CASE SERIES

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Background: Pregnancy in women with Marfan syndrome (MFS) carries a high risk of cardiovascular complications, particularly aortic dissection, due to hemodynamic and hormonal changes. Multidisciplinary management of pregnancy and delivery and continue risk reassessment are essential to minimize maternal and fetal complications.
Case Series: We report three cases of women with MFS managed at our cardio–obstetric clinic during pregnancy (table 1). A 27–year–old woman with familial MFS (pathogenic FBN1 mutation) was referred at 12 weeks during her second pregnancy. She was in mWHO class II–III and started on low–dose beta–blocker for heart rate and blood pressure control. Echocardiography showed stable aortic root dimensions throughout pregnancy, and regular fetal growth. Due to previous cesarean section, the patient was assigned to cesarean delivery, successfully performed at 38w with general anaesthesia due to dural ectasia which contraindicated spinal anaesthesia. A 34–yo woman with familial MFS (carrier of double mutation of FBN1 and connexin 26) had a planned pregnancy with in–vitro fertilisation and pre–implant genetic testing. Angiotensin–II receptor–blocker was discontinued upon pregnancy confirmation, and the patient was kept on beta–blocker. Echocardiography revealed a stable aortic root dilatation associated with mitral annular disjunction. Cesarean section was performed at 37w due to mWHO Class III. The third case, a 23–yo woman, was referred at 12w due to suspected MFS (aortic root 49 mm, severe aortic regurgitation). She was started on beta–blocker and continued pregnancy under close follow–up. Due to mWHO Class IV and worsening chest pain, caesarean section was performed at 32w with cardiac surgery back–up, without maternal or fetal complications.
Conclusion: Pregnancy in MFS requires individualized, multidisciplinary care. Early risk assessment, with re–evaluation throughout the whole pregnancy, close monitoring with serial echocardiograms, and coordination among cardiologists, obstetricians, anaesthesiologists, and cardiac surgeons are crucial to optimize both maternal and fetal outcomes.

	Case 1	Case 2	Case 3
Age	27 yo	34 yo	23 yo
Ethnicity	Caucasian	Caucasian	Hispanic
Family history of Marfan syndrome	Yes, mother	Yes, father	No
Family history of aortic dissection	Yes, mother	No	No
Genetic mutation	FBN1	FBN1 and connexin 26	NA
Aortic dimensions – I trimester	38 mm (z score 3.0)	44 mm (z score 2.3)	49 mm
Aortic dimensions – II trimester	38 mm (z score 2.2)	44 mm (z score 2.2)	49 mm
Aortic dimensions – III trimester	38 mm (z score 2.1)	44 mm (z score 2.2)	50 mm
Aortic regurgitation	Mild	Mild	Severe
Type of conception	Spontaneous	In vitro fertilization + pre-implantation genetic testing	Spontaneous
Parity	G2P1	G1P0	G3P1
mWHO 2.0	II-I-I	III	IV
Delivery mode	Cesarian section	Cesarian section	Cesarian section
Week of delivery	38	37	32
Fetal outcome	Favorable	Favorable	Favorable

Table 1

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FONTAN REGISTRY: A SINGLE–CENTER RETROSPECTIVE STUDY ON LONG–TERM FOLLOW–UP IN FONTAN PATIENTS

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Background: The Fontan procedure is a palliative surgical strategy for patients with single–ventricle congenital heart disease. Although surgical advances have improved survival, Fontan patients remain exposed to multiple late complications, including arrhythmias, thromboembolic events (TE), protein–losing enteropathy (PLE), and liver disease.
Purpose: To evaluate long–term clinical outcomes in adult Fontan patients and to explore the impact of Fontan surgical techniques and underlying congenital defects on prognosis.
Methods: We conducted a single–center retrospective cohort study using data from the institutional Fontan Registry between January 2005 and December 2023. Seventy–seven adult patients with a minimum follow–up of two years after Fontan completion were included. Data on surgical history, complications, antithrombotic therapy, hospitalizations, and survival were analysed.
Results: The cohort included 77 patients (mean age 31.6 ± 9.6 years, 58% male). Tricuspid atresia was the most frequent diagnosis (38%), followed by double–inlet left ventricle (13%). Total cavopulmonary connection with extracardiac conduit was performed in 69%. Arrhythmias were the most common complication (43%), particularly in atriopulmonary connections. TE occurred in 18%, mainly intracardiac thrombosis and pulmonary embolism. TE rates were higher in patients not receiving antithrombotic therapy (43%) compared with those on aspirin or anticoagulation. Hemorrhagic complications occurred in 19%, with major bleeding in 5%. PLE was diagnosed in 12% of patients, requiring repeated hospitalizations. Liver disease, including fibrosis or cirrhosis, was detected in 39%. Among female patients, 15% experienced pregnancy, with one arrhythmic complication requiring cardioversion. The annual hospitalization rate was 0.236 per patient–year. Overall mortality was 9%, mainly related to heart failure and PLE.
Conclusions: Despite improved survival, adult Fontan patients remain burdened by significant long–term morbidity. Arrhythmias and thromboembolic events have a major impact on prognosis, while liver disease and PLE contribute to hospitalizations and disease complexity. These findings emphasize the importance of lifelong, multidisciplinary follow–up, careful risk stratification, and individualized management strategies to improve outcomes and quality of life in this growing population.

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ECHOCARDIOGRAPHIC STRAIN AND NT–PROBNP IN THE SYSTEMIC RIGHT VENTRICLE: COMPLEMENTARY INDICATORS OF HEMODYNAMIC SEVERITY

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Background: The systemic right ventricle (sRV), present in patients with d–TGA after atrial switch and in congenitally corrected TGA (ccTGA), is chronically pressure–loaded, leading to ventricular remodeling and progressive dysfunction. In this setting, markers of myocardial mechanics and wall stress integrating imaging and biomarkers are useful.
Aim: To evaluate the association between NT–proBNP and sRV longitudinal strain (four–chamber strain, RV4CSL, and free–wall strain, RVFWSL) and, secondarily, to describe its relationship with conventional echocardiographic indices (FAC, TAPSE, TDI S') in a GUCH cohort with sRV in biventricular circulation (Mustard/Senning and ccTGA).
Methods: Retrospective study of 20 patients followed at our Center (ARNAS Civico–Di Cristina, Pediatric Cardiology Unit). All underwent comprehensive clinical assessment with functional evaluation, laboratory testing, ECG/Holter and echocardiography; speckle–tracking strain was available in 13/20 patients (Figure 1-2). Associations were explored using linear models and Pearson correlation; NT–proBNP was also log–transformed (log10) and results were checked with Spearman as a sensitivity analysis for outliers.
Results: In patients with complete echocardiographic strain and NT–proBNP data (n=13), RVFWSL was inversely associated with NT–proBNP (Pearson r= –0.555; p=0.049; Spearman ρ=–0.527; p=0.064) (Figure 3A), suggesting that reduced longitudinal deformation (less negative strain values) is accompanied by greater neurohormonal activation. RV4CSL also showed a consistent inverse association with NT–proBNP (Pearson r=–0.509; p=0.076; Spearman ρ=–0.591; p=0.033) (Figure 3B), with less negative RV4CSL values associated with higher NT–proBNP. As a complementary analysis, higher FAC was associated with higher absolute RV4CSL (r=0.624; p=0.023), whereas TAPSE and TDI S' showed weaker but concordant associations.
Conclusions: In our biventricular–circulation sRV cohort, higher NT–proBNP is associated with worse longitudinal mechanics, particularly at the free wall. Interpreted together, strain and NT–proBNP may help grade hemodynamic severity and guide follow–up; these exploratory findings require confirmation, using additional diagnostic modalities.

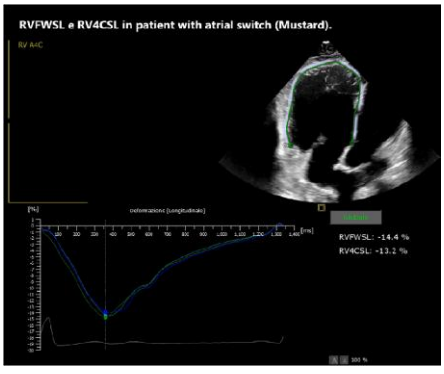

Figure 1

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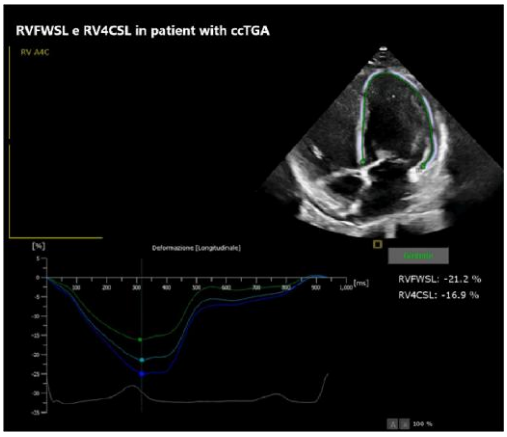

Figure 2

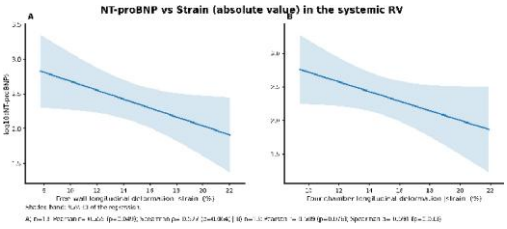

Figure 3

Abstract citation ID: suag058.058

THE CLINICAL IMPLICATIONS OF RENAL DOPPLER ULTRASONOGRAPHY FOR PREDICTING CHRONIC KIDNEY DISEASE AND FONTAN FAILURE

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Background: Renal congestion caused by increased central venous pressure has been one of the main pathophysiologic findings in the Fontan associated kidney dysfunction. Despite widespread availability of screening tools for renal function, data regarding the kidney diseases in Fontan patients are very limited. We aim to characterize new approaches to evaluate renal congestion using Doppler ultrasonography in Fontan population evaluating the clinical relevance of the Renal Resistance index (RRI) compared to conventional surrogates for chronic kidney diseases, adverse clinical events and/or other surrogates of Fontan Failure
Methods: RRI was assessed using Doppler ultrasonography in 22 patients who had previously undergone Fontan palliation. Clinical parameters, echocardiography, and biochemistry were recorded. Standard renal function assessment was obtained by the measurement of creatinine serum levels and the estimation of the glomerular filtration rate (GFR) using bedside Schwartz" equation in children (‹ 18 years) and the Modification of Diet in Renal Disease (MDRD) equation in adults. The IVC diameters were indexed to the body surface area (iIVC).
Results: Median age was 16 +5 years and 72% were female patients. All patients had previously undergone the Fontan procedure at a median age of 5 years (range 1–11 years). The median GFR was 120,8 mL/min/1.73m 2. Patients with RRI › 75 showed a higher rate of clinical adverse events after Fontan palliation (75%) compared to those with RRI ‹ 75 (16%) (p=0.0178). However, there were no significant relations between the RRI and the finding of the iIVC diameter › 1 cm/m2
Conclusions: The renal doppler ultrasonography may be a useful tool to monitor Fontan pathophysiology. Specifically, high RRI may predict the risk of Fontan failure in these patients. Continued investigation of the e"ects of chronically venous congestion on kidneys and other factors associated with renal dysfunction in patients with Fontan circulation is warranted.

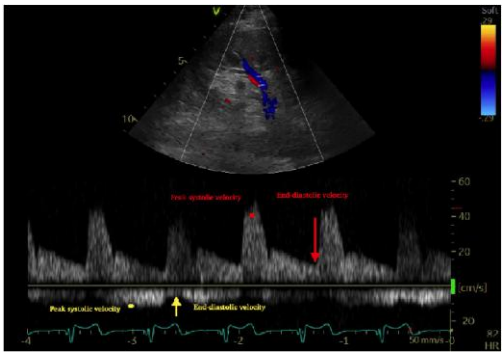

Fig1: Evaluation of RRI using Spectral Doppler ultrasound. The upward Doppler signal indicated the intrarenal arterial flow, and the downward Doppler signal indicated the venous flow.

Abstract citation ID: suag058.059

THE ROLE AND RESULTS OF THE PREGNANCY HEART TEAM: 2025 DATA FROM MASSA INTEGRATED BIRTH CENTER

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Introduction: Cardiovascular risk in pregnancy is rising, driven by a higher average maternal age at first conception and an increasing number of women with congenital heart defects (CHD) who are successfully completing pregnancies. Furthermore, for a fetus with a prenatal diagnosis of CHD, giving birth in a center with integrated congenital cardiac care is essential.
Methods: In 2025, we managed 52 pregnancies involving either maternal heart disease or a fetus with CHD. A dedicated Pregnancy Heart Team, consisting of a cardiologist, gynecologist, obstetrician, anesthetist, and neonatologist, provided multidisciplinary care. The management for each patient was a collegial process, adhering to the criteria defined by WHO and ESC guidelines. Follow–up during pregnancy was conducted quarterly or, in some cases, monthly, always involving the multidisciplinary team. The timing of delivery was within the 40th week. Both spontaneous and caesarean section deliveries were performed at our center, following distinct, dedicated pathways.
Results: The mean age of women delivering at our center was 33 years. Maternal heart disease affected 23% of the cases, while 40 patients (77%) had a fetus diagnosed with CHD prenatally.
Maternal Heart Disease Group: 66% of these patients were classified as mWHO III, with the remainder in class II.
Parity: It was the first pregnancy for 50% of the patients, the second for 36.5%, and the third or more for the remaining 12.5%.
Delivery Mode: caesarean section was performed on 5 patients (9%) with maternal heart disease and 17 mothers (32.5%) carrying a fetus with CHD.
Post–partum complications: Post–partum bleeding (› 500 mL) occurred in 2 patients (4%) with maternal heart disease and 9 mothers (17%) of fetuses with CHD without need of blood transfusions in any cases. Post–partum bleeding (defined as 600 mL) was observed in a total of 11 mothers. None of these cases required blood transfusions.
Other Adverse Events: we recorded one case (2%) of pre–eclampsia, which did not require the intensive care unit for the mother.
Conclusions: Advances in the diagnosis and treatment of both congenital and acquired heart disease have enabled a growing number of women referred to our Institute to achieve a safe pregnancy outcome. This positive result is attributed to the systematic, multidisciplinary management provided by our Pregnancy Heart Team, evidenced by limited post–partum bleeding and the absence of major adverse events.

Abstract citation ID: suag058.060

IMPACT OF SPECIALIZED MONITORING ON THE RISK OF MAJOR CARDIAC EVENTS IN PREGNANT WOMEN WITH TETRALOGY OF FALLOT

P. Pasquale, N. Borrelli, V. Casale, G. Ciriello, G. Gaudieri, D. Sorice, C. Mastellone, L. De Luca, R. Barracano, M. Palma, N. Grimaldi, F. Fusco, V. Gesuete, G. Egidy Assenza, G. Scognamiglio, and B. Sarubbi
Ospedale Monaldi; Policlinico Sant'Orsola

Introduction: Repaired Tetralogy of Fallot (ToF) exposes pregnant women to significant cardiovascular risks, including Major Adverse Cardiac Events (MACE: clinically relevant arrhythmia or heart failure), often due to residual

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lesions such as pulmonary regurgitation. This study evaluates maternal and perinatal outcomes in a high–risk ToF cohort, analysing the impact of a specialized management protocol.
Methods: A retrospective, single–center study was conducted at the Adult Congenital Heart Disease (ACHD) Center of Monaldi Hospital in Naples. Between 2000 and 2025, 75 pregnancies were recorded in ToF women and included in the study. The primary endpoint was the incidence of MACE. All patients received intensive outpatient monitoring, with a minimum of two follow–up during gestation, and pre–existing antiarrhythmic therapy was maintained when necessary.
Results: The mean maternal age was 30.3±5.8 years. The cohort presented a high–risk profile: Severe Pulmonary Regurgitation: 27 cases (36%). History of Arrhythmia: 15 cases (20%). Unoperated ToF (natural history): 3 cases (4%). Continuous Antiarrhythmic Therapy: 7 patients (9.3%) remained on therapy (5 on beta–blockers, 1 on digoxin, 1 on beta–blockers + digoxin). Maternal outcome: A total of four MACE (5.3%) were observed, all manifesting as clinically relevant arrhythmias; no heart failure events were recorded. Univariate analysis suggested a significant association between the occurrence of MACE (arrhythmias) and history of arrhythmia (p=0.02), reduced TAPSE (p‹0.01), and reduced LVEF (p‹0.01). Perinatal outcomes: Two perinatal deaths (2.6%) were recorded: one fetal demise (placental abruption) and one neonatal death (renal malformations).
Conclusions: Our data demonstrate that, within a specialized ACHD management protocol, the risk of major maternal cardiac complications can be effectively mitigated, even in the presence of established high–risk factors. The absence of heart failure events confirms the protective efficacy of an intensive outpatient monitoring. However, the persistent presence of arrhythmic events underscores the critical need for comprehensive arrhythmic risk stratification to optimize outcomes. The significant perinatal risk underscores the critical importance of integrated obstetrics–cardiology care.

Chronic Heart Failure

Abstract citation ID: suag058.061

ROLE OF GLP1 AGONIST AFTER TAVI: INSIGHTS FROM MOTIVE REGISTRY

M. Ferrua Trucco, F. Giacobbe, M. Balducci, M. Nebiolo, F. Bruno, O. De Filippo, F. D'Ascenzo, F. Conrotto, G. Cimino, L. Carando, and G. De Ferrari
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Introduction: GLP–1a are a novel class of cardiometabolic drugs that have been shown to reduce the risk of MACE and cardiovascular mortality in patients with type 2 diabetes, overweight, or obesity. Improved outcomes have also been reported in patients undergoing TAVI treated with the SGLT2 inhibitor dapagliflozin in the recent DAPA–TAVI trial. Whether GLP–1a could provide similar benefits in patients with valvular heart disease, such as aortic stenosis, remains unknown.
Methods: We retrospectively analysed TAVI patients enrolled in the monocentric MOTIVE registry at Molinette Hospital, Turin, between 2015 and 2025. Patients were stratified according to whether they were prescribed GLP–1a at discharge. Outcomes were compared between groups using both propensity score matching (PSM) and inverse probability weighting (IPW). Cox regression was applied to assess the following endpoints: the composite of all–cause death and hospitalization for heart failure (HHF), all–cause death, cardiovascular death, HHF, and stroke.
Results: A total of 803 TAVI patients were included, of whom 45 (5.6%) received GLP–1a at discharge. The mean age was 81.1 ± 6.2 years, with a slight female predominance (403, 50.2%). Mean left ventricular ejection fraction was 56.5 ± 11.3%, and mean transvalvular gradient was 42.1 ± 12.3 mmHg. A self–expandable valve was implanted in 509 patients (63.4%), most commonly the Evolut R/PRO/PRO+ (362, 45.0%). Baseline, echocardiographic, and procedural characteristics were balanced between groups, except for diabetes, which was markedly more prevalent in the GLP–1a group (43/45, 95.5%). After a median follow–up of 363.5 days (IQR 224–592), in the IPW–adjusted cohort, GLP–1a prescription at discharge was associated with a lower risk of the composite endpoint of all–cause death or HHF (HR 0.34, 95% CI 0.17–0.68, p = 0.01), primarily driven by a reduction in HHF (HR 0.30, 95% CI 0.15–0.56, p = 0.008). No significant differences were observed in cardiovascular death or stroke during long–term follow–up.
Conclusions: In this cohort, GLP–1a prescription at discharge was associated with a marked reduction in the composite of all–cause death and HHF, mainly due to fewer heart failure hospitalizations. Given the observational and monocentric nature of this study, these findings should be considered hypothesis–generating. Larger multicenter registries and randomized controlled trials are warranted to confirm these preliminary results.

Abstract citation ID: suag058.062

EFFECTS OF SGLT2 INHIBITORS ON ATRIAL FUNCTION ASSESSED BY ECHOCARDIOGRAPHIC STRAIN IN PATIENTS WITH HEART FAILURE WITH REDUCED EJECTION FRACTION

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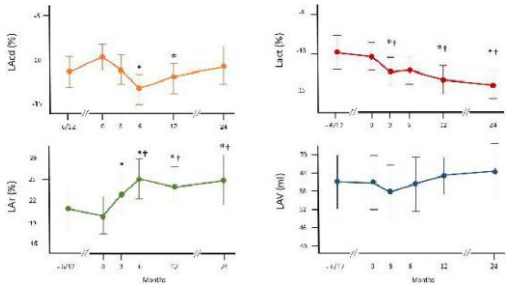
Aou Policlinico Riuniti Di Foggia

Background: Type 2 sodium–glucose cotransporter inhibitors (SGLT2i) have shown clinical benefits in patients affected by chronic heart failure (CHF), but the mechanisms underlying their beneficial effects are still debated. Over the last years, SGLT2i showed its ability to improve left and right ventricular function, whereas its impact on atrial function remains less defined.
Objective: The aim of this study was to evaluate the effects of SGLT2i on echocardiographic parameters of left atrial function in outpatients affected by CHF with reduced ejection fraction (HFrEF).
Methods: At baseline, all patients underwent a medical visit, an ECG and an echocardiographic examination. The evaluations were repeated at 3, 6, 12, and 24 months after the introduction of SGLT2i. In a subgroup of patients, an echocardiographic evaluation was performed 6–12 months before SGLT2i introduction. Left atrial function was assessed by two–dimensional speckle tracking analysis by calculating left atrial reservoir (LAr), conduit (LAcd) and contraction (LAct). Left atrial volume was also calculated. Changes in the repeated measures were evaluated by linear mixed models. A p<0.05 was considered significant.
Results: Sixty HFrEF patients (83% males, age 61 ± 13, mean LVEF 31 ± 7%, NYHA class II in 75% and III in 25%) were enrolled. All were in conventional medical therapy (sacubitril/valsartan or ACE inhibitors or angiotensin II receptor blockers in 100%, beta–blockers in 100%, mineralcorticoid receptor antagonists in 87%, loop diuretics in 62%).
As shown in the figure, LAr increased from 3 months onwards, with sustained benefit up to 24 months. LAcd improved significantly at 3 and 12 months (p<0.05), while LAct showed a progressive and persistent improvement from month 3 to month 24. Left atrial volume (LAV) remained unchanged throughout the follow–up.



Abstract citation ID: suag058.063

TELEMONITORING FOR HEART FAILURE CARE: FEASIBILITY AND EARLY CLINICAL IMPACT OF "TELECUORE" PROGRAM

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Background: Telemedicine may improve heart failure (HF) management by enabling early detection of clinical instability and therapy optimization. The TeleCuore program was implemented at the Cardiology Unit of "Guglielmo da Saliceto" Hospital (Piacenza, Italy) to assess feasibility, clinical impact, and patient experience.
Methods: Patients discharged with de novo HF or chronic HF patients recently destabilized during follow–up were enrolled if digitally literate or supported by caregivers. A multidisciplinary team, led by a nurse case manager, provided education and multiparameter telemonitoring (blood pressure, heart rate, SpO2, weight, single–lead electrocardiogram [ECG]) via the AdiLife® platform, with centralized alert triage and shared management with cardiologists. Outcomes over a 9.3–month mean follow–up included therapy changes, clinical events, NT–proBNP and echocardiographic trends, and 6–month patient–reported outcomes.
Results: A total of 257 patients were included (mean age 70.6 years; HF with reduced [HFrEF] 57.6%, mildly reduced [HFmrEF] 24.9%, or preserved ejection

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fraction [HFpEF] 17.5%). Guideline–directed medical therapy (GDMT) increased, with higher SGLT2 inhibitor uptake and up–titration of sacubitril/valsartan. NT–proBNP decreased overall, significantly in HFpEF and de novo HFmrEF. Follow–up echocardiography showed significant improvement in ejection fraction (EF) for HFrEF (30.6±6.6% vs 38.6±9.6%; p‹0.001) and HFmrEF (44.5 ±2.2% vs 46.5±7.5%; p‹0.001). In HFpEF, while EF remained stable, diastolic function improved significantly (medial E/e' ratio: 14.8±2.3 vs 12.9±2.1; p‹0.001). Clinical worsening occurred in 12.5% of patients: 56.2% were managed via teleconsultation or outpatient visits, while 43.8% required emergency department access. Programmed in–office visits were reduced by 30%. Patient satisfaction was high (9.02/10).
Conclusion: TeleCuore program proved feasible and well–accepted by patients and caregivers, enabling early detection of instability, supporting community–based management, and improving biomarkers and echocardiographic parameters, mainly due to strictly directed parameter control by the case manager. Comparative studies against usual care are warranted; a randomized trial is being prepared for next year.

Abstract citation ID: suag058.064

SUPRA–NORMAL EJECTION FRACTION AT HOSPITAL ADMISSION STRATIFIES MORTALITY RISK IN HFPEF PATIENTS AGED ≥70 YEARS

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Background: During the last few years, significant pathophysiological differences between heart failure (HF) patients with "normal" ejection fraction (EF) (50% to 64%) and those with supra–normal EF (≥65%) have been highlighted. However, these distinct EF phenotypes have been poorly investigated in elderly patients aged ≥70 yrs. Accordingly, the present study aimed at assessing the clinical and echocardiographic characteristics of a retrospective cohort of elderly HFpEF patients (aged ≥70 yrs), categorized on the basis of "normal" EF (50 to 64%) or "supra–normal" EF (≥65%).
Methods: All patients aged ≥70 yrs discharged from our Institution with a first diagnosis of HF with preserved EF (HFpEF) between January 2020 and March 2021 entered the study. All patients underwent clinical evaluation, blood tests and transthoracic echocardiography. The primary endpoint was "all–cause mortality", while the secondary one was the composite "all–cause mortality or rehospitalization for all causes" over a mid–term follow–up.
Results: A total of 200 HFpEF patients (86.4±6.6 yrs, 70% females) were retrospectively evaluated. The "normal" EF group (n=99) and the "supra–normal" EF one (n=101) were separately analysed. Compared to patients with "normal" EF, those with "supra–normal" EF were older, with greater comorbidity burden and moderate–to–severe frailty status. Mean follow–up duration was 3.6±0.3 yrs. During follow–up, 79 patients died and 73 were re–hospitalized. On multivariate Cox regression analysis, age (HR 1.09, 95% CI 1.03–1.16, p=0.002), EF (HR 1.08, 95% CI 1.03–1.14, p=0.004), tricuspid annular plane systolic excursion (TAPSE)/systolic pulmonary artery pressure (sPAP) ratio (HR 0.14, 95% CI 0.03–0.61, p=0.009) and infectious disease occurring during the baseline stay (HR 7.23, 95% CI 2.41–21.6, p‹0.001) were independently associated with the primary endpoint in the whole study population. EF (HR 1.04, 95% CI 1.01–1.07, p=0.02) also predicted the secondary endpoint. EF ≥65% was the best cut–off to predict both endpoints.
Conclusions: "Supra–normal" EF (≥65%) at hospital admission is independently associated with all–cause mortality and rehospitalization for all causes in elderly HFpEF patients over a mid–term follow–up. Kaplan–Meier survival curves drawn to compare the rates of "all–cause mortality" (Figure 1) and the composite of "all–cause mortality or reospitalization for all causes" (Figure 2) in HFpEF patients, categorized according to LVEF value.

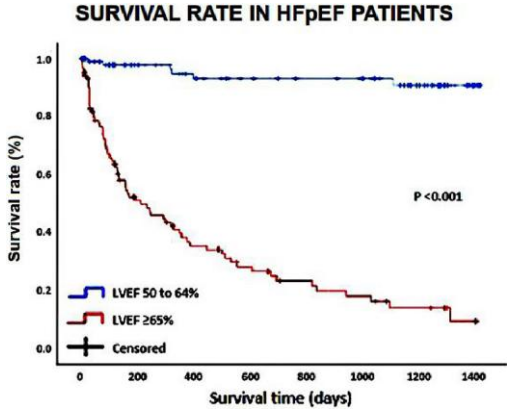

Figure 1

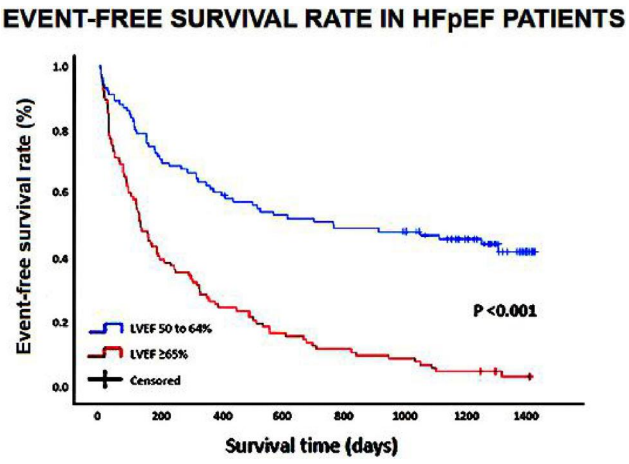

Figure 2

Abstract citation ID: suag058.065

CONGESTION AND SYSTEMIC INFLAMMATION IN ACUTE HEART FAILURE: CORRELATIONS AND PROGNOSTIC ROLE

I. Barnaba, D. De Feo, M. Iacoviello, G. Citarelli, G. Ricci, A. Livrieri, C. Campanella, V. Bonfantino, P. Caldarola, M. Ciccone, F. Massari, and P. Scicchitano
Cardiologia, Università Degli Studi Di Bari "Aldo Moro"; Cardiologia, Ospedale "San Paolo"; Cardiologia, Università Degli Studi Di Foggia; Cardiologia, Ospedale "F. Perinei"; Cardiologia, Ospedale "Di Venere"

Background: The reciprocal correlation between systemic inflammation and heart failure (HF) is a hotline research topic although the exact role in risk stratification and prognosis within the acute setting is a matter of debate.
This study aimed to evaluate the correlation among two inflammatory biomarkers– namely, high–sensitivity C–reactive protein (hs–CRP) and neutrophil–lymphocyte ratio (NLR), congestion status, and prognosis in patients with acute HF (AHF).
Methods: We consecutively enrolled 314 AHF patients. Congestion biomarkers [brain natriuretic peptide, estimated plasma volume status (ePVS), hydration index (HI), blood urea nitrogen to creatinine ratio (BUN/Cr)] were evaluated to assess hemodynamic intravascular, peripheral, and venous congestion. We also measured hs–CRP and NLR as markers of inflammation. The endpoint was all–cause mortality at 90 days.
Results: hs–CRP concentrations at admission [12.1 mg/L, 95% confidence interval (CI) 10–15] were associated with NLR values (4.8, 95% CI: 4.3–5.3) (R 2 = 0.11; p < 0.0001). They both positively correlated with congestion indexes (log hs–CRP, ePVS r = 0.2, HI r = 0.24, p < 0.0001 for both; log NLR, ePVS r = 0.20, HI r = 0.29, BUN/Cr 0.14, log brain natriuretic peptide (BNP) r = 0.16, p < 0.01 for all). After 90 days, the cumulative mortality rate was 26%. Inflammatory biomarkers (hs–CRP and NLR cut-offs were >60 pg/mL and >7.5, respectively) were predictors of death. By using all these parameters, we performed an index of inflammation (from 0 to 2) for each patient. Congestion and inflammation indexes were independent predictors of mortality (hazard ratios 1.4 and 2.3, respectively; C–index 0.72).
Conclusion: Systemic inflammation seemed directly associated with congestion burden in patients with AHF. Both of them have different impacts on the prediction of adverse outcomes in these patients. Further studies are needed to address unmet needs.

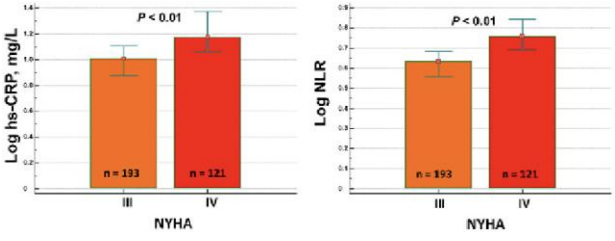

Figure 1 Correlation between high-sensitivity C-reactive protein (hs-CRP) and neutrophil–lymphocyte ratio (NLR).

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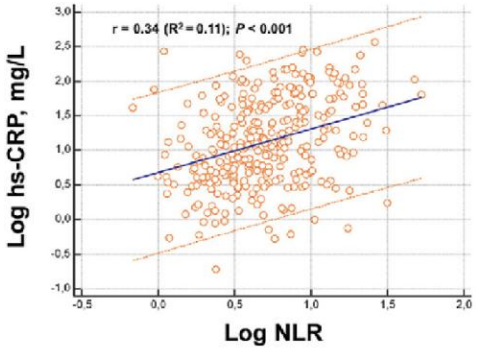

Figure 2 Relationship between high-sensitivity C-reactive protein (hs-CRP) and neutrophil–lymphocyte ratio (NLR) and NYHA functional class.

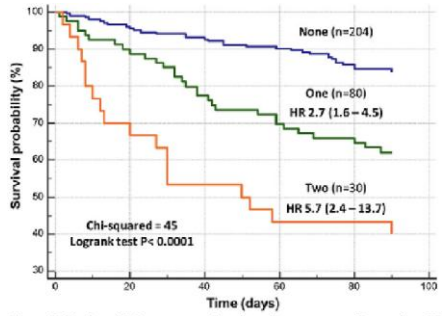

Figure 3. Kaplan–Meier curves related to the presence of none (n = 204), one (n = 80), or two (n = 30) inflammatory biomarkers above the optimal cutoff. **HR**, hazard ratio (95% CI) vs. group with no biomarker of inflammation.

Abstract citation ID: suag058.066

PERIPHERAL CONGESTION PREDICTS INFLAMMATORY BURDEN IN ACUTE HEART FAILURE INDEPENDENTLY OF LOOP DIURETICS: A SUBANALYSIS FROM THE CAESAR REGISTRY

I. Barnaba, A. Livrieri, D. De Feo, M. Iacoviello, G. Citarelli, G. Ricci, C. Campanella, V. Bonfantino, P. Caldarola, M. Ciccone, F. Massari, and P. Scicchitano
Cardiologia, Università Degli Studi Di Baro "Aldo Moro"; Cardiologia, Ospedale "F. Perinei"; Cardiologia, Ospedale "San Paolo"; Cardiologia, Università Degli Studi Di Foggia; Cardiologia, Ospedale "Di Venere"; Cardiologia, Università Degli Studi Di Bari "Aldo Moro"

Background: The relationship between congestion and inflammation in heart failure is a challenging issue. We sought to evaluate the relationship between congestion and inflammation in acute heart failure (AHF) and the impact of therapies on it.
Methods: We enrolled 124 patients with AHF (79 ± 10 years, 52% men). Brain natriuretic peptide (BNP), abdominal and peripheral congestion by (intra–abdominal pressure [IAP] and bioimpedance vector analysis (Hydration Index, HI, %)], and systemic inflammation by mean of high–sensitivity C–Reactive Protein (hs– CRP) were assessed both at admission and discharge.
Results: hs–CRP levels at admission (median values of 11.9 mg/L) correlated with HI (r=0.22; P<0.02). hs– CRP higher than 7.1 mg/L predicted HI with a positive predictive value of 39% and negative predictive value of 91% (AUC=0.70). hs–CRP level reduction was higher in those with severe peripheral congestion (HI: 66%, 95%CI 38–76). The modifications in hs–CRP levels were significantly correlated to HI variations (r=0.31; P<0.001), but not to BNP and IAP variations. After intravenous administration of loop diuretics (mean duration: 7 days, 95% CI 6–8), BNP, HI, hs–CPR, and IAP values significantly decreased: –43% (95% CI 37–51), – 4.6 % (95% CI: 3.1–5.7), –34% (95% CI: 4–48), and –15% (95% CI: 9–18), respectively. Nevertheless, the impact on the relationship between hs–CRP and congestion was independent from loop diuretics at multivariate analysis.
Conclusions: Systemic inflammation was associated with severe peripheral congestion although this relationship seemed not to be influenced by the administration of loop diuretics. This finding suggests that peripheral interstitial fluid accumulation is a source of immune activation and loop diuretics did not influence such a correlation.

Rehabilitation

Abstract citation ID: suag058.067

MECHANICAL THROMBECTOMY UNDER CONTINUOUS TRANSESOPHAGEAL ECHOCARDIOGRAPHY GUIDANCE FOR THE MANAGEMENT OF A RIGHT ATRIAL FLOATING THROMBUS IN THE CONTEXT OF MASSIVE PULMONARY EMBOLISM

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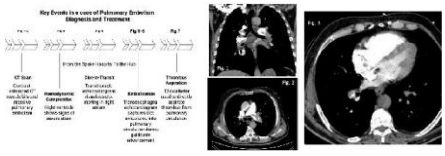
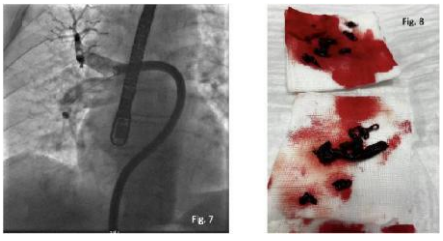
UOC Cardiologia–Utic Ospedale Provinciale Macerata; UOC Radiologia Interventistica Ospedale Provinciale Macerata; UOC Cardiologia–Utic Ospedale Civitanova Marche ; UOC Anestesia E Rianimazione Ospedale Provinciale Macerata

A 75–year–old male presented to the emergency department with acute, progressively worsening dyspnea associated with syncopal episode. Initial presentation included a BP 125/65 mmHg, a HR ‹110 bpm, and SO2 97%. Arterial blood gas analysis revealed normal pH, mild hypocapnia, and elevated plasma lactate levels. Troponin Hs 53 ng/L, NT–proBNP 799 pg/mL, and D–dimer ›20,000 ng/mL. Computed tomography (CT) of the chest demonstrated a filling defect in the common arterial trunk and a “saddle“ thrombus extending into both main pulmonary arteries. TTE revealed reduced right ventricular (RV) function and dilated RV dimensions with a D–shaped septum. A mobile, serpiginous image was noted in the right atrium, extending to the tricuspid valve plane, consistent with a clot–in–transit (Fig 1–3). The (PESI) score was 115, indicating a high mortality risk (8.9%). Given the size and mobility of the clot–in–transit in intermediate–high risk pulmonary embolism the pulmonary embolism response team (PERT) decided to perform mechanical thrombectomy using the FlowTriever® system (Inari Medical) due to the high risk of clinical deterioration caused by recurrent embolization. While initially intended for the treatment of pulmonary embolism, it can also be used off–label to treat thrombi in other locations, such as the cardiac atria or ventricles. The procedure was planned following a multidisciplinary discussion with PERT and was performed after oro–tracheal intubation. The passage of the Triever24 was always monitored by transesophageal echocardiography in order to identify the thrombus and guide the thrombus aspiration During this maneuver transesophageal echocardiographic monitoring revealed the embolization of the thrombotic material through the right heart chambers with the need of a rapid change of strategy (Fig 4–6) The patient‘s hemodynamic condition rapidly deteriorated into overt shock, necessitating the infusion of high–dose norepinephrine and dobutamine. Immediately the aspiration catheters (Triever24 and Triever20) were advanced to the pulmonary thrombosis with removal of multiple thrombi and rapid improvement of hypotension (Fig 7–8) Arterial blood gas analysis at the conclusion of the procedure showed a pH of 7.1, lactate of 1.7 mmol/L, PCO2 of 68 mmHg ETT performed 4 days later revealed a reduction in RV dimensions and an improvement in RV function. Tricuspid regurgitation (TR) improved from severe to mild. The patient was discharged from the ICU on Day 5.





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Abstract citation ID: suag058.068

THE IMPACT OF OBESITY ON RESIDUAL INFLAMMATORY RISK AFTER ACUTE CORONARY SYNDROME. INSIGHT FROM THE PRATO–ACS REGISTRY

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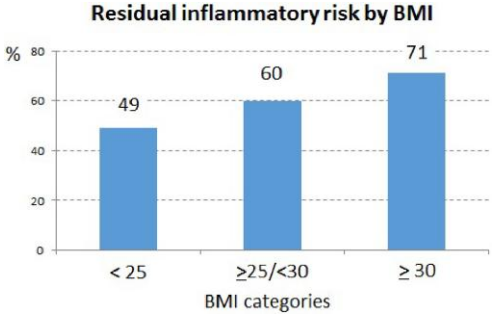
Ospedale Santo Stefano Azienda Usl Toscana Centro

Background: It is well known that residual inflammatory risk (RIR) is closely associated with prognosis in patients with acute coronary syndrome (ACS), independently of cholesterol levels achieved with high–intensity statin treatment. Subjects with a higher body mass index (BMI) often show a greater degree of systemic inflammation, highlighting BMI as a key factor in RIR. The aim of this retrospective analysis was to investigate the relationship between BMI and RIR at 1 month after ACS in patients treated with early invasive strategy and high–intensity statins from admission.
Methods: Patients with non ST elevation ACS, included in the PRATO–ACS Registry (ClinicalTrials.gov ID: NCT04087200), were stratified into three groups based on BMI: group 1 (underweight/normal weight, BMI ‹25), group 2 (overweight, BMI ≥25 and ‹ 30) and group 3 (obese, BMI ›30). One month after the acute event, RIR was defined as high–sensitivity C–reactive protein (hs–CRP) levels ≥ 2 mg/L. The association between BMI and hs–CRP at 1 month was evaluated with Cox proportional analysis.
Results: This study included 1094 subjects (68±12 years, 70.3% males), only 24.2% on statin therapy before admission. Percutaneous coronary intervention was performed in 68 % of cases. At 1 month the majority (59%) of patients had levels of hs–CRP above the risk cut–point. The percentage of patients with RIR increased progressively and significantly with increasing BMI (49% in group 1, 60% in group 2 and 71% in group 3, p‹0.0001). Overweight and obesity were found to be independent predictors of RIR (adjusted odds ratios 1.5 and 2.3, respectively), together with age and diabetes, but not cholesterol levels.
Conclusion: In this population of ACS patients on high–intensity statin therapy BMI was independently associated with RIR at 1 month. Early intensification of secondary prevention measures, based not only on cholesterol values, could lead to a more targeted reduction in residual risk after ACS.



Abstract citation ID: suag058.069

CARDIOVASCULAR COMORBIDITIES IN AN ITALIAN COHORT OF OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS) PATIENTS

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Introduction: Cardiovascular (CV) comorbidities significantly contribute to the burden of OSAS disease and increase the complexity for management of this condition. The OSA–related rEDS (OSAREDS) study, planned and managed by AIMS (Accademia Italiana della Medicina del Sonno), collected data on cardiovascular comorbidities and their treatments.
Aims and objectives: OSAREDS is a retrospective study, involving 7 sleep medicine centres dedicated to OSAS management, mainly aimed at assessing the prevalence of excessive daytime sleepiness (EDS) and residual EDS (rEDS) after OSAS treatment and at defining relationships between EDS and other symptoms and comorbidities.
Methods: OSAS patients' characteristics, symptoms, vital signs comorbidities, and treatments were collected retrospectively from medical records and analysed.
Results: 2663 patients (pts) included in the final analysis (males: 77.4%, mean age±SD: 55.7±9.4 yrs, BMI: 31.4±4.7 kg/m2) had a baseline visit (V1) and 807 pts (males: 75.5%, mean age±SD: 56.6±9.0 yrs, BMI: 31.4±4.7 kg/m2) had V1 and a control visit (V2) after 3–12 months (median 7.9 months) of CPAP treatment. In the whole cohort, anamnestic prevalence of hypertension, arrhythmias, coronary artery disease, congestive heart failure and stroke were, respectively: 56.6%, 7.5%, 8.4%, 2.9%, and 2.9%. According to blood pressure measurements, pts with borderline and high values were, respectively, 23.8% and 36.9%. CV diseases (CVD) were significantly (p‹0.01) more frequent in pts without EDS (91%), than in sleepy pts. (82%). In the same population, the drugs indicated in CVD most often prescribed were Angiotensin II receptor blockers (20.2%), lipid lowering drugs (20.0%), antithrombotic agents (18.1%), b–blockers (17.7%), and ACE–inhibitors (16.7%). In pts with V1 and V2 visits anamnestic prevalence of hypertension, arrhythmias, coronary artery disease, congestive heart failure and stroke changed, respectively: from 60.6% to 52.0%, from 7.4% to 5.6%, from 10.9% to 11.2%, from 3.5% to 2.7%, and from 3.8% to 2.7%. Pts with borderline and high blood pressure values at V2 were, respectively, 10.4% and 12.4%.
Conclusions: OSAREDS was the first study done on a large cohort of Italian OSAS pts which collected data on CVD. Its data confirmed, in these patients, the high prevalence both of CVD and of their treatments. Moreover, the trends of variables suggested a positive effect of CPAP treatment on some CVD.

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FROM GUIDELINES TO PRACTICE: COMPARING ITALIAN CARDIOLOGISTS' AND PATIENTS' PERCEPTIONS OF PSYCHOLOGICAL SUPPORT IN CARDIOVASCULAR CARE

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Psychological factors (depression, anxiety, chronic stress) and related vulnerabilities (e.g., maladaptive coping, emotion dysregulation, social isolation) are common in cardiovascular disease (CVD) and are associated with worse prognosis, adherence, rehospitalizations, rehabilitation outcomes and quality of life. ESC guidance recommends integrated, multidisciplinary care including psychologists to strengthen risk assessment, patient engagement and health–behavior change, yet implementation in routine care remains limited. We compared cardiologists' and patients' perceptions of the utility of psychology/psychologists in cardiac care. National cross–sectional anonymous online survey of Italian ANMCO cardiologists and adults (≥18 years) with a CVD diagnosed recruited via a patient advocacy organisation. Parallel ad hoc items assessed knowledge/attitudes, prior psychological involvement/collaboration and barriers. Both groups completed the "Attitudes Toward Seeking Professional Psychological Help Scale–Short Form" (ATSPPHS–SF) and the "Marlowe–Crowne Social Desirability Scale short form". N=436 (218 patients; 218 cardiologists). Patients were older (66.69±10.27 vs 53.97±13.81 years, p‹.001) and reported lower perceived psychological utility (69.59±13.93 vs 82.78±11.31, p‹.001), fewer psychological involvements (4.98±1.36 vs 6.92 ±1.37, p‹.001) and less positive help–seeking attitudes (ATSPPHS–SF 17.93 ±6.00 vs 21.07±5.39, p‹.001) than cardiologists; social desirability was slightly higher (22.06±2.17 vs 21.32±2.43, p=.001). Cardiologists rated higher the usefulness of training on psychological/cognitive factors in CVD (5.76±1.34 vs 5.39±1.58, p=.009), physician–patient relationship dynamics (6.11±1.27 vs 5.67±1.51, p=.001), and psychologist involvement in selected clinical communications (5.85±1.39 vs 5.26±1.72, p‹.001). Notably, 70.2% of patients had never received information on psychological factors in CVD. Among those reporting unmet need, main barriers were lack of information on services (34.0%) and economic constraints (32.0%). Cardiologists appear more supportive of psychological care than patients; improving patient information, affordability and clear referral pathways, alongside low–threshold/step–care options (including telepsychology), may enhance uptake and align practice with ESC recommendations. Embedding brief psychosocial screening and shared decision–making in cardiology visits may further reduce disengagement.

Abstract citation ID: suag058.071

ONE–YEAR CHANGES IN MENTAL HEALTH AFTER CARDIAC INTERVENTIONS: INSIGHTS FROM A PROSPECTIVE CARDIAC REHABILITATION COHORT

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Background: Psychological distress is common after cardiac interventions and may adversely affect recovery and long–term prognosis. However, data on the

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longitudinal evolution of anxiety, depression, and mood during structured cardiac rehabilitation (CR), and across different cardiac diagnoses, remain limited.
Methods: In this prospective observational study, 171 patients admitted to a one–year CR program after cardiac intervention were evaluated at baseline, 6 months, and 12 months. Anxiety and depressive symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS), while positive mood was evaluated using the Global Mood Scale (GMS, Positive Affect subscale). Longitudinal changes were analysed using linear mixed–effects models with time as a fixed effect and patient as a random intercept. Both unadjusted models and models adjusted for age, sex, body mass index, and baseline functional capacity (Incremental Shuttle Walk Test) were performed. Interaction terms were used to explore differences between coronary artery disease (CAD) and valvular heart disease (VHD).
Results: At baseline, mean HADS–Anxiety was 5.7±4.1 and HADS–Depression was 4.4±3.3, with a mean GMS score of 22.8±. Anxiety significantly decreased at 6 months (Δ −0.84, 95% CI −1.35 to −0.32; p=0.002) and remained reduced at 12 months (Δ −0.80, 95% CI −1.35 to −0.26; p=0.004). Depressive symptoms showed a progressive reduction at 6 months (Δ −0.78, 95% CI −1.23 to −0.34; p=0.001) and 12 months (Δ −1.08, 95% CI −1.55 to −0.61; p<0.001). In parallel, positive mood significantly improved at 6 months (Δ +2.38, 95% CI 1.26 to 3.51; p<0.001) and was maintained at 12 months (Δ +2.47, 95% CI 1.29 to 3.64; p<0.001). These changes remained significant after multivariable adjustment. No significant time–by–diagnosis interaction was observed for anxiety, depression, or mood, indicating similar psychological recovery patterns in CAD and VHD patients (Figure 1).
Conclusions: Participation in a structured cardiac rehabilitation program was associated with significant improvements in both anxiety and depression, accompanied by a sustained enhancement of positive mood. These benefits appear consistent across different cardiac diagnoses and independent of baseline functional capacity. The findings support the integration of systematic psychological assessment and support within comprehensive cardiac rehabilitation programs.

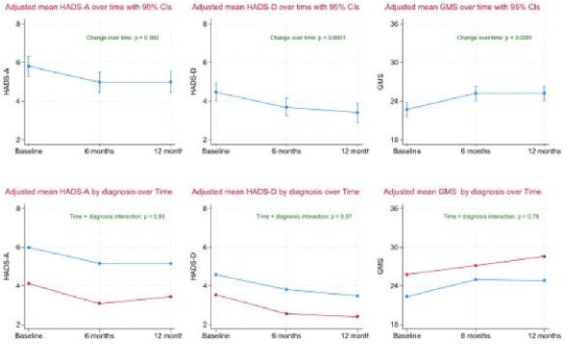

Figure 1: Longitudinal changes in anxiety, depression, and positive mood during one year of cardiac rehabilitation. Adjusted mean trajectories of anxiety (HADS-A), depression (HADS-D), and positive mood (GMS Positive Affect) during a structured cardiac rehabilitation program.Upper panels show overall adjusted mean scores (±95% confidence intervals) at baseline, 6 months, and 12 months. Lower panels depict adjusted trajectories stratified by cardiac diagnosis (coronary artery disease [blue line] vs valvular heart disease [red line]). Estimates were derived from adjusted linear mixed-effects models.

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FROM SEA LEVEL TO 3647 METERS: EXPLORING THE HIGH–ALTITUDE CHALLENGE OF MAXIMAL EXERCISE AND PHYSIOLOGICAL ADAPTATION

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Background: Individuals who reach high altitudes engage in strenuous physical activity that increases their oxygen demand in an environment where atmospheric oxygen availability is reduced and the body's ability to use it is compromised. These effects are influenced by hypoxia but also by adverse environmental conditions, such as cold and low humidity, which imply greater energy consumption compared to exercise performed at sea level. Aim of this analysis is to evaluate in detail the cardiovascular, respiratory, and muscular adaptations to high altitude, in order to improve understanding of the underlying physiological mechanisms.
Methods: 12 healthy subjects (46±12 y/o, 75% males) performed maximal cardiopulmonary exercise testing (CPET) at sea level and at Capanna Gnifetti (Monte Rosa, 3647 m.), after at least 1 day of acclimatization (Figure 3). The same ramp protocol, on an electronically braked cycle ergometer, was applied for each individual. Before and after each test, a blood sample was collected for the assessment of haemoglobin, haematocrit, lactates and BNP. This is a preliminary analysis of data from a larger research project that includes the simultaneous measurement of peripheral muscle extraction (NIRS – Near Infra–Red Spectroscopy) and non–invasive cardiac output (Physioflow) during maximal physical exertion.
Results: Effects of high altitude are already evident at rest with higher systolic blood pressure and ventilation, and lower SpO2, PetCO2, PetO2 compared to sea level (p<0.05). High altitude also affects peak exercise performance, with a lower workload achieved, heart rate, and oxygen consumption (peakVO2), regardless the increase in Hb induced by altitude. There is no statistically significant effect on ventilation, but ventilatory efficiency (VE/VCO2 slope) is increased by being at high elevation (Figure 1 and Figure 2). BNP increases during exercise in both environments but never exceeding the threshold of clinical significance. The increase in lactate levels induced by physical exertion is reduced at high altitudes.
Conclusions: Although ventilation peak values are very similar, our data confirm a significant reduction in performance after exposure to high altitude in a non–hyperacute manner. Further analyses considering peripheral muscle extraction and cardiac output are underway.

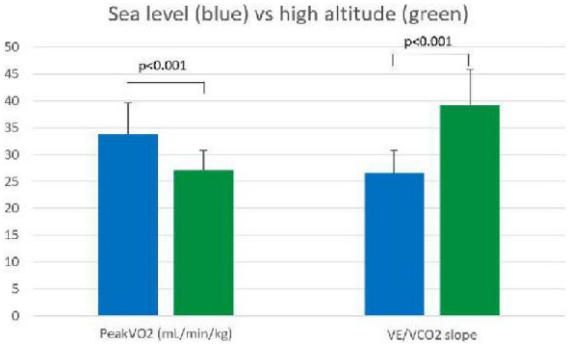

Figure 1

		Sea level Mean± SD	High altitude Mean± SD	p
REST	SBP (mmHg)	120.8± 10.0	131.7± 14.8	0.004
	SpO_2 (%)	96.9± 1.0	87.3± 3.9	0.000
	$PetO_2$ (mmHg)	111.8± 3.6	61.1± 4.5	0.000
	$PetCO_2$ (mmHg)	33.7± 2.4	28.5± 4.6	0.003
	VE (L/min)	11.1± 1.5	13.5± 2.0	0.002
	Hb (g/dL)	13.36± 1.17	14.81± 1.35	0.000
	Hct (%)	43.90± 3.29	41.86± 4.16	0.027
	Lactates (mmol/L)	0.96± 0.17	1.30± 0.63	0.164
	BNP (pg/mL)	23.5± 13.3	43.3± 38.3	0.164
PEAK EXERCISE	Workload (watt)	215± 55	166± 53	0.000
	RQ	1.17± 0.10	1.09± 0.19	0.246
	VE (L/min)	90.6± 25.2	97.0± 26.6	0.252
	RR (1/min)	37.5± 7.4	41.0± 5.4	0.051
	TV (L)	2.46± 0.59	2.39± 0.68	0.413
	VCO_2 (mL/min)	2801± 670	2130± 712	0.000
	$PetO_2$ (mmHg)	116.8± 5.8	70.7± 2.3	0.000
	$PetCO_2$ (mmHg)	37.5± 5.9	25.2± 3.7	0.000
	SpO_2 (%)	95.0± 1.9	82.4± 3.6	0.000
	HR (bpm)	171.2± 16.7	155.8± 18.6	0.001
	Y intercept (L/min)	3.0± 3.6	0.0± 4.1	0.051
	VO_2/work (mL/min/watt)	9.64± 0.67	9.05± 1.36	0.246
	Hb (g/dL)	14.70± 1.40	14.58± 1.37	0.760
	Hct (%)	48.05± 4.13	40.93± 4.26	0.000
	Lactates (mmol/L)	10.59± 2.82	4.29± 2.18	0.000
	BNP (pg/mL)	38.4± 29.7	75.5± 50.5	0.044

Figure 2

Figure 3

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Advanced Heart Failure

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FROM FIRST DIAGNOSTIC EVALUATION TO NON–DILATED LEFT VENTRICULAR CARDIOMYOPATHY: THE ADDED VALUE OF CARDIAC MAGNETIC RESONANCE

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Background: Non–dilated left ventricular cardiomyopathy (NDLVC) is a heterogeneous and evolving entity, recently recognized as a distinct category in the 2023 European Society of Cardiology (ESC) Guidelines. Cardiac magnetic resonance (CMR) enables a multiparametric assessment, with myocardial strain emerging as a key functional marker. However, genotype–phenotype correlations in NDLVC remain poorly defined.
Objectives: To evaluate the contribution of CMR in patients with NDLVC, focusing on myocardial strain and its relationship with fibrosis burden and genetic status.
Methods: The study included 191 patients with CMR findings suggestive of cardiomyopathy who underwent CMR at the Fondazione Toscana Gabriele Monasterio (Pisa and Massa, Italy) between 2010 and 2022 after referral for ECG, Holter or echocardiographic abnormalities. A standardized CMR protocol including strain analysis and late gadolinium enhancement (LGE) assessment was applied. LGE extent was quantified as involved left ventricular segments, LGE mass (g), and percentage of affected myocardium; ring–like patterns were also evaluated. Comprehensive genetic testing was performed, identifying pathogenic or likely pathogenic (P/LP) variants and mutations in high–risk genes. Associations between CMR findings and genetic status were analysed.
Results: Patients with NDLVC showed reduced strain values despite normal ventricular volumes and ejection fraction (EF). Strain impairment correlated with wall motion score index, LVEF (both p ‹0.0001) and fibro–fatty replacement (p=0.024). Abnormal strain was more prevalent in genotype–positive patients, but only myocardial fibrosis was significantly associated with genetic status. Genotype–positive patients, particularly carriers of P/LP variants, exhibited greater myocardial fibrosis irrespective of quantification method (all p‹0.001) and a higher prevalence of ring–like LGE patterns (p‹0.001). Among P/LP carriers, high–risk genotypes were associated with the greatest fibrotic burden (median LGE 9.9g) and a higher prevalence of ring–like patterns (57.1% vs 21.7%, p=0.029).
Conclusions: CMR provides comprehensive insight into NDLVC. Myocardial strain identifies early disfunction even in the absence of overt remodeling or reduced EF. A quantitative rather than dichotomous assessment of LGE extent and ring–like patterns strengthened genotype–phenotype correlations, supporting myocardial scarring as a marker of a genetically mediated arrhythmogenic substrate.

Table 1:
Association between genetic status and LGE: P/LP vs no P/LP (VUS/Genotype-negative)

	P/LP (n=44)	No P/LP (n=123)	p-value
LV LGE, n (%)	42 (95.5%)	106 (86.2%)	0.096
n of segments with LGE, *Mean ± SD (Med)*	6.18 ± 4.31 (5.00)	3.47 ± 3.44 (3.00)	< 0.001
Fibrosis extent (g), *Mean ± SD (Med)*	7.40 ± 6.86 (5.10)	5.46 ± 13.10 (1.50)	< 0.001
Fibrosis extent (% of LV mass), *Mean ± SD (Med)*	6.50 ± 7.57 (3.94)	3.35 ± 5.13 (1.00)	< 0.001

Association between genetic status and LGE: P/LP vs no High-risk P/LP (VUS/Genotype-negative)

	High-risk P/LP (n=21)	No High-risk (n=148)	
LV LGE, n (%)	12 (57.1%)	24 (16.2%)	< 0.001
n of segments with LGE, *Mean ± SD (Med)*	8.14 ± 4.99 (8.00)	3.62 ± 3.33 (3.00)	< 0.001
Fibrosis extent (g), *Mean ± SD (Med)*	9.96 ± 7.86 (7.00)	5.40 ± 12.20 (2.00)	< 0.001
Fibrosis extent (% of LV mass), *Mean ± SD (Med)*	10.20 ± 9.27 (6.30)	3.44 ± 4.93 (1.36)	< 0.001

Association between genetic status and LGE: P/LP vs High-risk P/LP

	P/LP (n=23)	High-risk P/LP (n=21)	
LV LGE, n (%)	22 (95.7%)	20 (95.2%)	1.000
n of segments with LGE, *Mean ± SD (Med)*	4.39 ± 2.59 (4.00)	8.14 ± 4.99 (8.00)	0.017
Fibrosis extent (g), *Mean ± SD (Med)*	5.07 ± 4.90 (4.00)	9.96 ± 7.86 (7.00)	0.037
Fibrosis extent (% of LV mass), *Mean ± SD (Med)*	3.87 ± 3.72 (3.20)	10.20 ± 9.27 (6.30)	0.011

Table 2: Association between genetic status and presence of LGE-Ring like

	Ring like -	Ring like +	*Total, n*	p-value
No P/LP, *n (%)*	106 (84.8%)	19 (15.2%)	125	**p = 0.001.**
P/LP, *n (%)*	27 (61.4%)	17 (38.6%)	44	
High-risk P/LP, *n (%)*	9 (42.9%)	12 (57.1%)	21	***p < 0.001***
No high-risk P/LP, *n (%)*	124 (83.8%)	24 (16.2%)	148	
P/LP, *n (%)*	18 (78.3%)	5 (21.7%)	23	**p = 0.029.**
High-risk P/LP, *n (%)*	9 (42.9%)	12 (57.1%)	21	

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EFFICACY AND TOLERABILITY OF SACUBITRIL/VALSARTAN IN DUCHENNE DYSTROPHIC CARDIOMYOPATHY: A REAL–WORLD EXPERIENCE

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Background: Duchenne muscular dystrophy (DMD) is an X–linked hereditary neuromuscular disorder characterized by progressive muscular weakness and the development of a dystrophic cardiomyopathy. Despite standard therapy with ACE–inhibitors (ACEi), betablockers (BB) and mineralocorticoids receptor antagonists (MRA), the progression of left ventricular dysfunction remains one of the main causes of mortality. Sacubitril/valsartan, belonging to the class of angiotensin receptor–neprilysin inhibitor (ARNI), has been shown to be effective in treating heart failure patients with reduced left ventricular ejection fraction; however, data on DMD patients remain limited.
Objectives: To evaluate the efficacy and the tolerability of sacubitril/valsartan in patients with dystrophic cardiomyopathy.
Methods: We enrolled 26 consecutive patients affected by DMD with reduced left ventricular ejection fraction (LVEF ‹40%), on chronic optimal medical therapy, started on sacubitril/valsartan. We evaluated N–terminal pro–B–type natriuretic peptide (NTproBNP), left ventricular ejection fraction (LVEF), renal parameters and pressure levels at baseline and at 3, 6, 12 months and at the last available follow–up. Statistical analysis was conducted with paired–sample t–test or Wilcoxon signed–rank test, with statistical significance set at p ‹ 0.05.
Results: The median age was 26 ± 4 years; all patients were on chronic therapy with BB and 88% with MRA. LVEF increased from 32.8 ± 3.7% to 35.9 ± 5.5% after 6 months (p = 0.006) and remained stable at 12 months. NTproBNP was reduced from 702 ± 877 to 424 ± 368 pg/ml (p = 0.009). In a single case (3.8%), ARNI was suspended due to worsening renal function; in all other patients renal function remained stable. A mild reduction in blood pressure was observed (from 99.8 ± 10.7 to 93.8 ± 8.1 mmHg, p = 0.02), without therapy discontinuation.
Conclusion: Sacubitril/valsartan was effective and well tolerated in patients affected by Duchenne dystrophic cardiomyopathy, with improvement of left ventricular function and reduction of neurohormonal cardiac biomarkers, without clinically relevant renal effects. These data support the potential role of sacubitril/valsartan in the management of heart failure in dystrophic cardiomyopathy.

Abstract citation ID: suag058.075

RELEVANCE OF RIGHT HEART IN PATIENTS RECEIVING MCS FOR ACUTE HEART FAILURE

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Introduction: Acute heart failure (AHF) is the most common emergency admission in patients above 65 years old. Pulmonary hypertension (PH) is a very common finding in AHF patients. Due to the increase of the afterload, the right ventricle (RV) increases contractility to maintain its coupling with the pulmonary artery (PA). Actually, there are no studies on RV–PA coupling during mechanical circulatory support (MCS) in AHF. Aim of the present study is to evaluate in AHF receiving a MCS the role of TAPSE/PASP parameter on MCS performance (in terms of improving patient ‘s hemodynamic status) and its changes over time during MCS.
Methods: We enrolled 116 consecutive patients with AHF in ICU from January 2023 to June 2025. Inclusion criteria were AHF diagnosed by the Framingham criteria (plus elevated natriuretic peptides) on admission. Exclusion criteria were age ‹18 years, severe valvular disease, acute coronary syndrome with RV failure on admission, life expectancy ‹12 months due to noncardiac diseases or infections.
Results: 116 consecutive patients (77 males [66.4%] and 39 females [33.6%]; age 70 ± 14 years) hospitalized for AHF in our ICU were recruited. Among these patients, 12 received MCS (5 IABP, 6 IMPELLA CP and 1 ECMO A–V). Compared to patients who did not receive MCS, these 12 patients had significantly lower SBP, pH, pO2, P/F ratio, SV and a significantly higher HR, Lac, ICU length of stay and use of inotropes. The Wilcoxon signed–rank test showed that TAPSE/PASP significantly improved in patients receiving MCS (Admission: 0.45 [0.50–0.37];
Discharge: 0.77 [0.81–0.73]; p=0.007). The Spearman’s correlation analysis showed a correlation between TAPSE/PASP and EF (r□=0.287, p=0.009), SV (r□=0.395, p‹0.0001), pH (□=0.223, p=0.047), pO2 (r□=0.253, p=0.024), P/F ratio (r□=0.308, p=0.005), creatinine (r□=–0.461, p‹0.0001), Lac (r□=–0.309, p=0.005), number of inotropes required (r□=–0.342, p=0.002) and CV death (r□=–0.411, p‹0.0001). Regarding MCS, we found a correlation between MCS use and number of inotropes required (r□=0.365, p‹0.0001), length of stay in ICU (r□=0.288, p=0.004) and SV (r□=–0.303, p=0.002).

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Conclusion: Patients needing MCS, whose severity is expressed by the correlation with SV, need for inotropes and length of stay in the ICU, showed an improvement in RV–PA coupling, which corresponds to an improvement in systemic perfusion parameters. Consequently, the higher the TAPSE/PASP, the lower the risk of CV death during MCS using.

Abstract citation ID: suag058.076

PULMONARY HYPERTENSION AS AN INDEPENDENT PROGNOSTIC DETERMINANT IN AMBULATORY PATIENTS WITH ADVANCED HEART FAILURE: A PROSPECTIVE COHORT STUDY

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Background: Pulmonary hypertension (PH) complicates advanced heart failure (AdvHF) and may limit access to life–saving therapies such as heart transplantation (HTx). However, the independent prognostic value of PH in contemporary cohorts of patients with AdHF remains unclear.
Methods: We prospectively enrolled ambulatory patients with at least one European Society of Cardiology (ESC) criterion for AdvHF referred to a tertiary centre for evaluation of advanced therapies. All underwent comprehensive clinical assessment, cardiopulmonary testing, echocardiography, and right heart catheterization (RHC); only patients with RHC and echocardiography within 24 hours were included. PH was defined according to the current ESC criteria for group 2 PH. The primary endpoint was a composite of all–cause death, left ventricular assist device implantation, or HTx.
Results: Among 149 patients (mean age 53±12 years; 75% male; 36% ischemic heart disease; mean left ventricular ejection fraction 30±12%) 70 (47%) had PH at baseline (Figure 1A). During follow–up, 44 patients (29.5%) experienced the primary endpoint, with a higher event rate in the PH group (38.6% vs 21.5%) (Figure 1B). In multivariable Cox analysis, PH remained the only independent predictor of the composite endpoint (HR 3.46, 95% CI 1.08–11.05; p=0.037).
Conclusion: In ambulatory patients with AdvHF referred for advanced therapies, invasively confirmed PH is an independent prognostic determinant. Systematic assessment of PH should be integrated into risk stratification to optimize the timing of referral to advanced therapies.

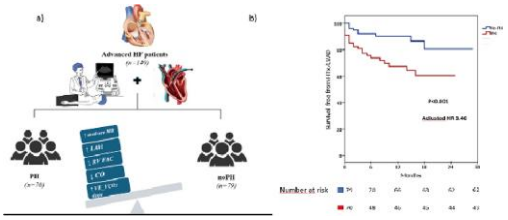

Figure 1

Abstract citation ID: suag058.077

MECKI SCORE THRESHOLDS FOR HEART TRANSPLANTATION REFERRAL OF AMBULATORY HEART FAILURE PATIENTS

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Background: In patients with chronic heart failure (HF), current guidelines recommend the use of prognostic scores to estimate survival and to support referral for heart transplantation (HTX). However, the clinical use of these tools remains limited, and no universally accepted cut–off values are currently available to guide transplant listing. Among the available scores, the MECKI score – based on easily obtainable parameters (peak VO_2, VE/VCO_2 slope, hemoglobin, sodium, left ventricular ejection fraction, and glomerular filtration rate) – has shown one of the highest prognostic accuracies.
Aim: The aim of this study was to compare the survival of patients enrolled in the MECKI score registry with that of heart transplant recipients reported in the ISHLT registry, and to identify a MECKI score threshold beyond which 5–year prognosis is worse than that of HTX recipients.
Methods: Consecutive ambulatory HF patients included in the MECKI score program between January 2010 and January 2022 were analyzed. The primary endpoint was a composite of cardiovascular death, HTX, or left ventricular assist device implantation. Post–HTX survival data were obtained from the International Society of Heart and Lung Transplantation (ISHLT) registry updated through 2023. To identify the prognostic threshold, patients were stratified by MECKI score deciles.
Results: A total of 3,865 patients were evaluated (mean age 62.4±12.6 years). Mean peak VO_2 was 58.2±18.3% predicted; mean VE/VCO_2 slope 33.2±8.2; hemoglobin 13.5±1.7 g/dL; sodium 139±3 mmol/L; LVEF 33.7±10.4%; eGFR 73 ±26 mL/min/1.73 m². Periodic breathing was observed in 15.8% of cases. At 5 years, overall survival was 83.7%. The mean 5–year survival of HTX recipients (71.2%) fell between the 8th and 9th MECKI score deciles, identifying a threshold value of 0.1368 as the point beyond which prognosis becomes worse than that of transplant recipients (Figure 1).
Conclusion: A MECKI score ≥0.1368 may represent a reliable threshold for referral to HTX evaluation, whereas lower values are associated with survival comparable to or better than transplantation, thus supporting deferral of listing. Incorporating the MECKI score into routine clinical practice could enable a more rational and timely selection of transplant candidates, addressing a current gap in guideline recommendations.

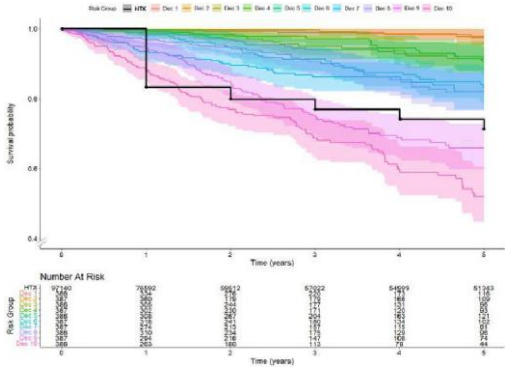

Figure 1

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INVASIVE HAEMODYNAMICS AND ADVANCED ECHOCARDIOGRAPHY TO DEFINE THE DIAGNOSTIC AND PROGNOSTIC VALUE OF LEFT ATRIAL FUNCTION IN ADVANCED HEART FAILURE

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Background: Advanced heart failure (AdHF) presents challenges for haemodynamic assessment and carries a poor prognosis. Left atrial (LA) function by strain imaging has emerged as a promising non–invasive marker in several cardiovascular conditions, but its relationship with invasively measured haemodynamic parameters and its prognostic role in AdHF is poorly understood.
Methods: Consecutive patients referred for AdHF were prospectively enrolled. On the same day, patients underwent advanced transthoracic echocardiography and invasive right heart catheterisation (RHC). Elevated pulmonary artery wedge pressure (PAWP) was defined as ›15 mmHg at RHC. Primary composite outcome was a death/heart transplant/left ventricular assist device implantation/heart failure hospitalisation.
Results: A total of 155 patients were included. Median age was 55 years (IQR 48–61), median peak left atrial strain (PALS) was 11% (7–17), and mean PAWP was 14 mmHg (8–20). Patients with lower PALS showed features of more severe disease. PALS correlated significantly and linearly with PAWP (r=–0.53, p‹0.001) and with all other invasive haemodynamic parameters. PALS showed the best performance for identifying increased PAWP (AUC 0.78, p‹0.001), outperforming LA volume, E/E' and guideline–based assessment (Figure 1). Spline analysis demonstrated a non–linear association between PALS and the primary outcome, with steeper risk increases at lower PALS values (p = 0.014), confirmed after multivariable adjustment (Figure 2). Adding PALS to models including clinical variables, echocardiography, and invasive haemodynamics further improved prognostic accuracy for 1–year risk of events (Harrel C–index 0.840).
Conclusions: In AdHF, PALS is a robust marker closely related to invasively measured PAWP and identifies patients who require urgent advanced

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therapies. Routine incorporation of LA strain into the evaluation of AdHF may enhance haemodynamic assessment and substantially improve prognostic stratification.

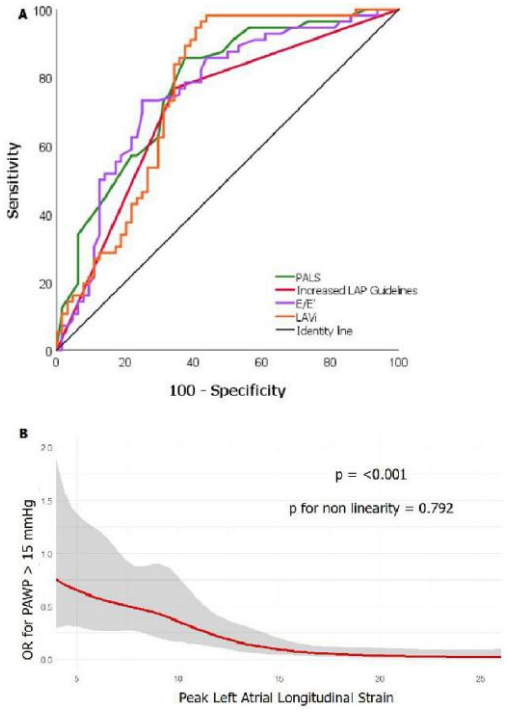

Figure 1

Figure 2

Cardiogenic Shock

Abstract citation ID: suag058.079

ENVIRONMENTAL DETERMINANTS OF CORONARY PLAQUE VULNERABILITY AN OPTICAL COHERENCE TOMOGRAPHY STUDY

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Background: Environmental exposures may trigger acute coronary events, but links with in vivo plaque microstructure remain unclear. We examined associations between air pollution/meteorological variables and optical coherence tomography (OCT) plaque vulnerability, and explored long–term outcomes (Figure 1).
Methods: We retrospectively analysed a registry of 508 patients undergoing coronary OCT (mean age 65.5±12.0 years; 22.9% women). Exposures to PM10, NO_2, benzene, and meteorological variables (temperature, humidity, pressure, rainfall) were summarized over prespecified windows preceding the index procedure. OCT was analysed in a core laboratory. Regression models tested associations with OCT features, including a four–criterion vulnerability composite (Figure 1A-B). Clinical outcomes were evaluated during follow–up (Figure 1C).
Results: Across OCT analyses (up to N=505), higher long–term NO_2exposure (hours above mean over 1 year) was associated with a large macrophage arc (›67°) (adjusted OR 1.38, 95% CI 1.06–1.79). Lower annual temperature was associated with macrophage presence (OR 0.56, 95% CI 0.34–0.92). Higher annual humidity was associated with the vulnerability composite (OR 1.50, 95% CI 1.04–2.18) and with TCFA (‹75 μm) (OR 1.21, 95% CI 1.03–1.42). NO_2over 3 months was associated with layered tissue (adjusted OR 1.12, 95% CI 1.02–1.24). Over a median follow–up of 6.8 years, 46 events occurred (incidence 9.1%, 95% CI 6.7–11.9%). In multivariable outcome models, annual temperature remained inversely associated with MACE (OR 0.074, 95% CI 0.020–0.278), whereas PM10 over 1 month showed borderline significance (Figure 1B-C).
Conclusions: Environmental exposures, including traffic–related air pollution and climate–related variables, were associated with in vivo OCT signatures of plaque inflammation and vulnerability. The observed relationships with macrophage arc, TCFA, layered tissue, and the vulnerability composite suggest that chronic ambient conditions may influence plaque biology beyond traditional risk factors. Furthermore, long–term temperature exposure was independently associated with incident MACE during follow–up, highlighting the potential prognostic relevance of environmental profiling. These findings support integrating environmental data into cardiovascular risk assessment and motivate prospective studies to confirm causality and identify modifiable exposure windows (Figure 1).

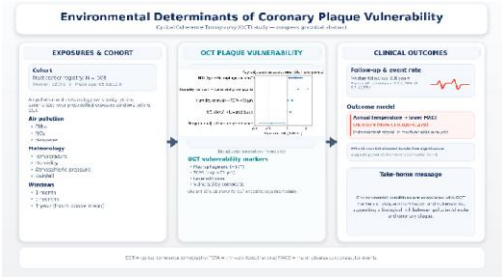

Figure 1

Abstract citation ID: suag058.080

THE FIRST EXPERIENCE IN ROME OF A HUB AND SPOKE MODEL FOR PERCUTANEOUS AORTIC VALVE REPLACEMENT PROCEDURES

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Background: The number of patients with severe aortic stenosis eligible for transcatheter aortic valve implantation (TAVI) has increased worldwide. To shorten waiting times, ensure equal access to care for all referred patients, and strengthen collaboration with spoke centers, we implemented a dedicated Hub & Spoke model in our regional TAVI pathway.
Methods: According to our protocol, the initial clinical evaluation—including echocardiography, computed tomography and coronary angiography—was performed at the spoke center, where patients were also followed in a dedicated TAVI clinic. Each case was discussed by a multidisciplinary Heart Team, including cardiac surgeons of the Hub and the interventional cardiologist of the Spoke. Patients were admitted to the Spoke center, transferred to the Hub center for TAVI, and returned to the Spoke center after 12–24 hours of post–procedural monitoring, if no complications occurred. The spoke center operator completed a master's degree in structural cardiology and subsequently completed a finalized training appointment at a high–volume center in a different region prior to program initiation. After this phase, procedures were performed by the Spoke center interventional cardiologist in collaboration with a cardiac surgeon from the Hub center as second operator
Results: Between July 2021 and November 2025, 60 patients with severe aortic stenosis underwent TAVI (mean age 82 years; 60% female; mean left ventricular ejection fraction 58.0 ± 9.7%). A balloon–expandable valve (Edwards Sapien 3 Ultra) was implanted in 65% of cases. A transfemoral approach was used in 95% of patients. Five patients required prolonged hospitalization at the hub center: three due to transapical access, one because of vascular complications requiring surgery and one following intra–procedural cardiac arrest resulting in death. At 30 days no deaths were observed. The pacemaker implantation rate was required in five patients.
Conclusions: The Hub & Spoke TAVI model proved to be safe and effective, leading to reduced waiting lists, optimized bed utilization, equitable access to

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treatment, with no significant implementation of resources. Additionally, it promoted increased awareness, education, and training among healthcare operators in spoke centers.

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SEX–DIFFERENCE IN PATIENTS HOSPITALIZED WITH ACUTE MYOCARDIAL INFARCTION: A 25–YEARS STUDY IN THE VENETO REGION

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Aim: Sex differences in the management and outcomes of patients hospitalized with acute myocardial infarction (AMI) had been reported worldwide. In this analysis, we aimed to examine this topic in the Veneto Region (Italy) through a 25–year population–based study.
Methods: We conducted a retrospective analysis of all hospital discharge records from 2000 to 2024 in the Veneto Region, identifying AMI cases through ICD9–CM codes. The proportion of AMI patients hospitalized in a cardiology ward (ordinary or intensive care) and the proportion of same–day percutaneous coronary intervention (PCI) among ST–Elevation myocardial infarction (STEMI) cases, as well as 30–day mortality, were estimated according to sex.
Results: Over the study period, 107,620 males (mean age: 68.0±13.1 years) and 59,657 females (mean age: 77.3±12.1 years) were hospitalized for AMI in the Veneto Region. Of these patients, 81.4% of males were admitted to a specialized cardiology ward compared to 65.7% of females (p‹0.001), with a 13–18% sex–gap observed steadily over the entire time series (Figure 1). The proportion of STEMI patients who underwent a same–day PCI was also higher in males compared to females (43.2% and 24.7% respectively), with a gap in favour of males that enlarged progressively during the first decade of the study and remained within the range 17–24% from 2010 onwards (Figure 2). Both care process indicators showed an increase over time in both sexes, with a slight steeper increase among females. Crude 30–day mortality rate was 9.7% (95% CI: 9.5 to 9.9) for males and 17.1% (95% CI: 16.7 to 17.4) for females. Age–adjusted mortality rate was 12.5% (95% CI: 12.3 to 12.8) for males and 12.9% (95% CI: 12.6 to 13.2) for females. A continuous decline might be observed in both sexes (Figure 3).
Conclusions: Sex differences in AMI management was observed in the Veneto Region from 2000 to 2024. However, the 30–day mortality rates overlapped throughout the entire time series after adjusting for age, suggesting that also the differences in management might be largely due to sex–difference in age at diagnosis. Care process indicators increased in both sexes reflecting the progressive implementation of standardized care pathways.

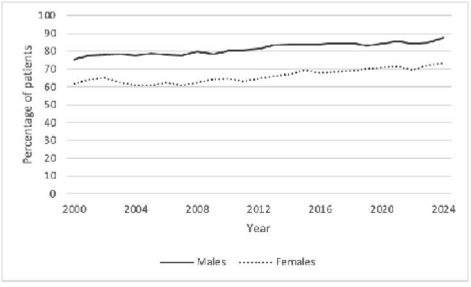

Figure 1. Veneto Region, 2000-2024. Trend of AMI patients admitted to a cardiology ward, according to sex.

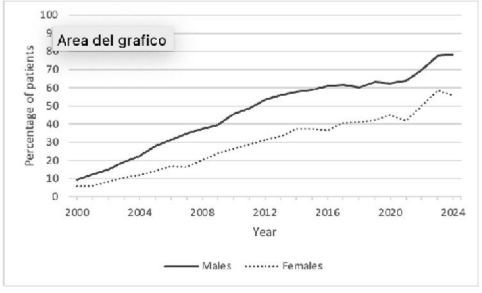

Figure 2. Veneto Region, 2000-2024. Trend of STEMI patients treated with same-day PCI, according to sex.

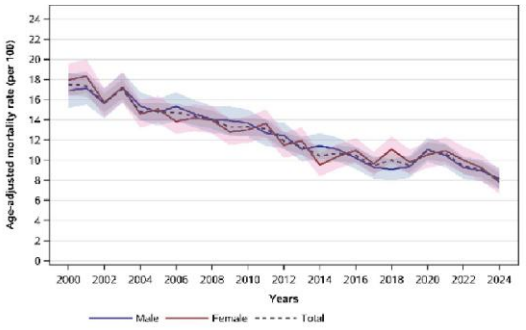

Figure 3. Veneto Region, 2000-2024. Trend of age-adjusted 30-day mortality rates (per 100 AMI patients), overall and according to sex. Reference population: Veneto residents hospitalized for AMI in the year 2007. The shaded area indicates the 95% CI.

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EXTRACORPOREAL CARDIOPULMONARY RESUSCITATION (E–CPR) FOR CARDIAC ARREST: A SINGLE–CENTER RETROSPECTIVE OBSERVATIONAL STUDY (2018–2025)

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Background: Out–of–hospital cardiac arrest (OHCA) is associated with high mortality and poor neurological outcomes despite advances in emergency cardiovascular care. Extracorporeal cardiopulmonary resuscitation (E–CPR) has emerged as a rescue strategy for selected patients with refractory cardiac arrest. In 2019, an E–CPR program was integrated into a pre–existing acute myocardial infarction (AMI) network.
Objectives: To describe indications and clinical outcomes of patients treated with E–CPR at a tertiary referral ECMO center.
Methods: We performed a retrospective, single–center observational study including all consecutive patients (n=46) who underwent E–CPR for OHCA or for in–hospital cardiac arrest (IHCA) (Figure 1A)related to acute myocardial infarction. Institutional inclusion criteria were age ‹70 years, shockable presenting rhythm, low–flow time ‹10 minutes, time from advanced cardiac care activation to shock room arrival ‹45 minutes, and time from cardiac arrest to ECMO flow ‹60 minutes. Demographic data, E–CPR indications, and outcomes were collected. Survival and neurological outcome were assessed at index hospital discharge using the Cerebral Performance Category (CPC) scale.
Results: Forty–six patients (median age 61 years) received E–CPR: 38 (83%) for OHCA and 8 (17%) for IHCA. Median ECMO duration was 2 days. Among OHCA patients, cardiac rhythm at shock room arrival was return of spontaneous circulation (ROSC) in 4/38 (10.5%), pulseless electrical activity in 2/38 (5.3%), ventricular fibrillation in 2/38 (5.3%), and asystole in 30/38 (79%) (Figure 1B). At hospital discharge, CPC among OHCA patients was CPC 1 in 3/38, CPC 3 in 2/38 (Figure 1C), and CPC 4 in 2/38. Overall survival was 13/46. Among survivors, CPC was 1 in 7 patients, 3 in 2 patients, and 4 in 2 patients. Favourable neurological outcome (CPC 1–2) was observed in 6/13 survivors (46%).
Conclusions: In this single–center experience, E–CPR was associated with survival and favourable neurological outcomes in a selected subgroup of patients despite high overall mortality. These findings support the role of E–CPR within organized regional systems of care.

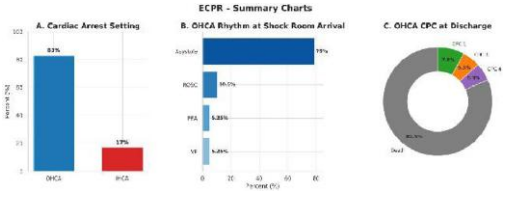

Figure 1

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ROLE OF PERCUTANEOUS STELLATE GANGLION BLOCK IN PATIENTS WITH ELECTRICAL STORM AND CARDIOGENIC SHOCK: A SUBSTUDY OF THE STAR REGISTRY

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Introduction: Electrical storm (ES) complicated by cardiogenic shock (CS) is a life–threatening emergency sustained by the interaction between malignant ventricular arrhythmias (VA), hemodynamic deterioration, and sympathetic hyperactivation. Percutaneous stellate ganglion block (PSGB) has emerged as a neuromodulatory strategy to interrupt this vicious cycle. We performed a retrospective analysis of the prospective multicenter STAR registry.
Aims: To evaluate the impact of PSGB on cardiac function, hemodynamic profile, and clinical outcomes in patients with ES complicated by CS.
Materials and methods: We analysed 115 PSGB procedures performed from July 2017 to August 2025 in patients with ES and CS of different etiologies (ischemic heart disease: 37.4%) across 10 Italian centers. The primary endpoint was the impact of PSGB on hemodynamic profile, defined by SCAI class, lactate clearance, and biventricular systolic function. Secondary endpoints included antiarrhythmic efficacy and the association between SCAI class and in–hospital mortality.
Results: The study population was predominantly male (76%), with a median age of 68 years (IQR 57–79). Within 24 hours after PSGB, the proportion of patients with severe CS (SCAI class C–D–E) significantly decreased (47.8% vs 29.2%, p<0.0001), along with median lactate levels (2.02 vs 1.03 mmol/L, p=0.0003). Left ventricular ejection fraction improved from PSGB to discharge (30% to 35%, p<0.0001), together with right ventricular function [FAC 40% to 42%, p=0.02; TAPSE 18 to 19 mm, p=0.016], while early 24–hour changes were not significant. SCAI class independently predicted in–hospital mortality at baseline and at 24 hours (all p<0.05). PSGB was associated with a marked reduction in ventricular arrhythmic events (3 [1–7] vs 0 [0–1] in the 12 hours pre– vs post–PSGB, p<0.0001), already evident within 1 hour. Greater arrhythmia reduction was associated with a lower probability of severe CS at 24 hours (OR 0.97 [0.94–0.99], p=0.03).
Conclusions: PSGB was safe and highly effective in suppressing refractory VA, improving hemodynamic stability, and enabling progressive ventricular recovery. These findings support PSGB as a valuable therapeutic option in ES complicated by CS and highlight the prognostic relevance of early post–procedural SCAI class.

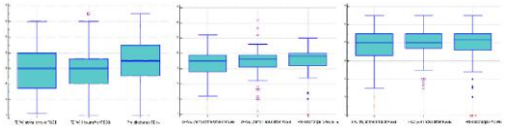

Figure 1. Comparison of biventricular function parameters (LVEF, TAPSE, and FAC) at the time of PSGB, at 24 hours, and before discharge. A progressive improvement in biventricular ventricular function was observed, with a significant increase in LVEF, TAPSE, and FAC from baseline to pre-discharge assessment, whereas early changes at 24 hours were not yet significant.

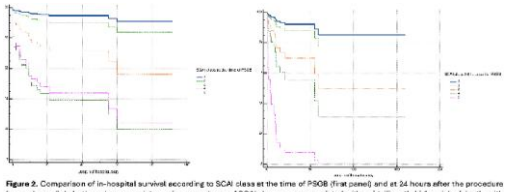

Figure 2. Comparison of in-hospital survival according to SCAI class at the time of PSGB (first panel) and at 24 hours after the procedure (second panel). In both analyses, persistence in more advanced SCAI classes was associated with a significantly higher risk of death, with a prognostic gradient that became more pronounced at 24 hours.

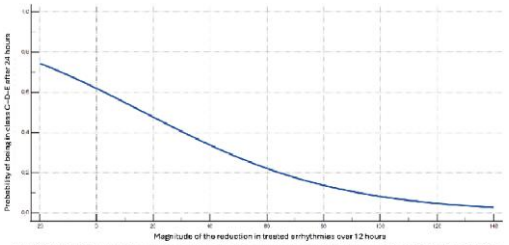

Figure 3. Relationship between the reduction in treated arrhythmic events during the first 12 hours and the probability of being in SCAI class C-D-E at 24 hours. For each shock avoided, the probability was reduced by 3%.

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EARLY PROGNOSTIC MARKERS IN CARDIOGENIC SHOCK: IMPLICATIONS FOR CLINICAL DECISION MAKING

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Background: cardiogenic shock (CS) remains associated with high in–hospital mortality despite therapeutic advances. Early identification of patients at risk of deterioration is essential for timely escalation of therapy.
Aims: the aim of this prospective observational study was to identify early markers of clinical deterioration associated with high in–hospital mortality, enabling prompt escalation of pharmacologic and non–pharmacologic therapy.
Methods: this study consecutively enrolled 20 patients admitted to the Intensive Cardiac Care Unit of a tertiary center for CS from February to August 2025. Daily multimodal monitoring was performed to identify early markers of poor prognosis by assessing clinical (systolic and mean arterial pressure, SOFA score), laboratory (white blood cell count, AST, ALT, serum creatinine), blood gas (SvO_2, arterial lactate, serum bicarbonate, arterial–venous pCO_2 gap), echocardiographic (ejection fraction, indexed stroke volume, cardiac index), and invasive hemodynamic (indexed stroke volume and cardiac index) parameters. These variables were compared according to outcome, with emphasis on in–hospital mortality, and their changes during the first 24 hours were also evaluated. The impact of these parameters on in–hospital mortality and time to recovery was assessed using Cox proportional hazards regression.
Results: lower mean invasive arterial pressure (MAP) at admission (p = 0.011, HR 0.88) and urine output ‹ 150 mL/h (p = 0.04, HR 0.97) were associated with higher in–hospital mortality, as well as higher creatinine levels (p = 0.03, HR 0.42). Poorer outcomes were seen in patients with higher SCAI class (p = 0.03, HR 4.3), SOFA score (p = 0.043, HR 1.35), and Vasotropic–Inotropic Score (p = 0.029, HR 1.07), and in those whose SCAI class increased within the first 24 hours from diagnosis (p = 0.014, HR 2.54). Low serum bicarbonate levels at the onset of CS were associated with increased in–hospital mortality (p = 0.015, HR 0.56) as well as rising in serum lactate levels (p = 0.017, HR 2.64), and higher white blood cells count (p = 0.038, HR 1.34) within the first 24 hours.
Conclusions: dynamic monitoring of early markers of hypoperfusion and systemic inflammation, rather than single absolute values, allows timely identification of patients at risk of CS deterioration and may serve as a clinical decision–support tool.

Early prognostic markers	p value, HR
SCAI at presentation	0.03, 4.3
Worsening of SCAI class during the first 24 hours	0.014, 2.54
Worsening SOFA score during the first 24 hours	0.043, 1.35
Increasing of VIS during the first 24 hours	0.029, 1.07
Urinary output < 100-150 ml/h	0.04, 0.97
Static creatinine	0.03, 0.42
MAP < 65 mmHg	0.011, 0.88
HCO3- at the admission	0.015, 0.56
Increasing on lactate levels during the first 24 hours	0.017, 2.64
Increasing in white blood cells count during the first 24 hours	0.038, 1.34

Heart Valve Disease and Non-Invasive Imaging

Abstract citation ID: suag058.085

VEXUS SCORE CORRELATES WITH TOTAL BILIRUBIN IN FONTAN PATIENTS: A CARDIO–HEPATIC CONGESTION SIGNA

S. Napoleone, P. Zarcone, A. Viola, C. Vullo, G. Scardino, M. Sanfilippo, M. Cardillo, and C. Comparato
Arnas Ospedali Civico Di Cristina – Palermo UOC Cardiologia Pediatrica

Background: In Fontan physiology, chronic systemic venous congestion is a key haemodynamic determinant and contributes to end–organ damage, particularly liver dysfunction. The Venous Excess Ultrasound Score (VEXUS) integrates inferior vena cava assessment with venous Doppler patterns: hepatic, portal (Figure 1) and renal (Figure 2) to estimate venous congestion and may provide a bedside, cardiology–focused marker of venous load.
Aim: To assess the relationship between venous congestion (VEXUS) and a marker of hepatic congestion/cholestasis (total bilirubin) in our Fontan patient cohort.
Methods: Observational study of 8 Fontan patients (6 extracardiac, 2 intracardiac). Clinical, laboratory and ultrasound data were collected. The association between VEXUS score and total bilirubin was tested using Spearman correlation (ρ).

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Results: Median age was 30 years (IQR 22.5–36); 62.5% were female. Median oxygen saturation was 91.5% (IQR 87.0–94.3). Hepatosplenomegaly was present in 75% of cases. Median VEXUS was 1.5 (IQR 0–2) and median total bilirubin 2.05 mg/dL (IQR 1.28–3.03). VEXUS score correlated positively with total bilirubin (ρ=0.73; p=0.039) (Figure 3), with higher VEXUS values associated with higher bilirubin levels, consistent with greater systemic venous congestion and increased hepatic venous pressure in Fontan circulation.
Conclusions: In our cohort, VEXUS was associated with total bilirubin, suggesting that an ultrasound–based congestion index may capture the cardio–hepatic phenotype in Fontan patients and support integrated cardiology follow–up. The small sample size and observational design warrant confirmation in larger prospective cohorts with clinical endpoints and comparison with structural liver assessments (e.g., elastography)

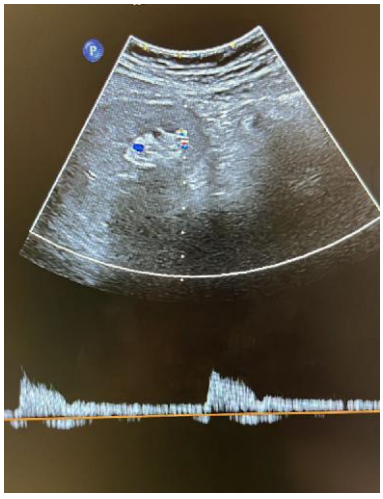

Figure 1

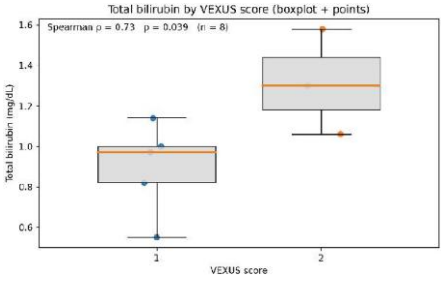

Figure 2

Figure 3

Abstract citation ID: suag058.086

TRANSCATHETER EDGE–TO–EDGE REPAIR FOR TRICUSPID REGURGITATION – SYSTEMATIC REVIEW AND META–ANALYSIS

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A.O.U. Città' Della Salute

Background: Severe tricuspid regurgitation (TR) is associated with significant morbidity, reduced exercise capacity and impaired quality of life, while many patients are at prohibitive surgical risk. Transcatheter tricuspid edge–to–edge repair (T–TEER) using TriClip™, MitraClip™ or PASCAL™ has emerged as a less invasive alternative, but pooled evidence on reverse remodeling, functional status and quality–of–life (QoL) outcomes remains limited.
Objectives: To perform a systematic review and meta–analysis of studies reporting pre– and post–T–TEER outcomes in patients with at least severe TR, focusing on clinical, functional and echocardiographic outcomes.
Methods: MEDLINE/PubMed, Embase, Scopus and Google Scholar were searched from inception to May 2025 following PRISMA/Cochrane methodology. Studies reporting paired pre– and post–T–TEER data were included. Data extraction and quality assessment were independently performed, and pooled analyses of echocardiographic, clinical and QoL outcomes were conducted.
Results: Thirty studies (n = 7,563 patients) met inclusion criteria. Pooled analyses demonstrated a significant reduction in severe or greater TR following T–TEER (RR = 0.39; 95% CI 0.30 to 0.51), with a decrease in effective regurgitant orifice area (EROA; MD = −0.37 cm²; 95% CI −0.42 to −0.31). Right ventricular size decreased: basal RVEDD MD = −3.44 mm (95% CI −4.68 to −2.20) and mid RVEDD MD = −4.40 mm (95% CI −7.92 to −0.88). Markers of venous congestion improved with a smaller IVC diameter (MD = −2.28 mm; 95% CI −4.50 to −0.05). There was a small deterioration in RV contractile indices (RV–FAC MD = −2.02%; 95% CI −3.68 to −0.36; TAPSE MD = − 0.57 mm; 95% CI −1.12 to − 0.02) and a modest, non–statistically significant change in LVEF (MD = −1.73%; 95% CI −4.94 to 1.47). Clinically meaningful benefits were evident, with fewer patients in NYHA class III–IV (RR = 0.44; 95% CI 0.38–0.51), 6MWD increased (MD = +42.4 m; 95% CI 28.2–56.6), and KCCQ score improved (MD = +15.3 points; 95% CI 12.9–17.7). Cardiovascular and all–cause mortality were 6.9% and 10.1%, respectively, with low rates of major complications,
Conclusion: T–TEER is an effective and safe treatment option for high–risk patients with severe TR, providing significant reduction in regurgitation, favourable right ventricular remodelling and consistent improvements in symptoms, exercise capacity and QoL

Abstract citation ID: suag058.087

CARCINOID HEART DISEASE: THE PULMONARY VALVE IS OFTEN THE FORGOTTEN VALVE!

T. Gaudenzi, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, E. Paolini, I. Battistoni, M. Nazziconi, K. Maurizi, A. Massari, G. Furlani, B. Anselmi, C. Gatti, S. Luciani, F. Pietrucci, A. Scavuzzo, A. Dello Russo, F. Vagnarelli, C. Lofiego, and M. Marini
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Background: Carcinoid Heart Disease (CHD) is a rare but ominous complication of neuroendocrine tumors (NETs), characterized by fibrotic plaque deposition on endocardial surfaces. While tricuspid valve involvement is well–documented, the pulmonary valve is often overlooked despite its significant impact on right ventricular (RV) hemodynamics.
Case Presentation: A 73–year–old male with an ileal NET and liver/peritoneal metastases, stable under lanreotide acetate for four years, presented with progressive dyspnea and peripheral edema. Initial transthoracic echocardiography (TTE) and cardiac MRI identified severe tricuspid regurgitation (TR) and significant right heart dilation. The patient was referred to our Department to explore the feasibility of transcatheter tricuspid intervention.
Advanced Imaging Findings: Comprehensive TTE and transesophageal echocardiography (TEE) confirmed RV dilation (RVD1 49 mm, RVOT 44 mm) with preserved systolic function (TAPSE 22 mm, FAC 48%). The tricuspid valve exhibited classic CHD features: fibrotic, retracted, and rigid leaflets with commissural fusion. 3D echocardiography showed a fixed, oval–shaped orifice (1.6 cm²) that remained immobile throughout the cardiac cycle due to systolic–diastolic mobility restriction (Fig.1). This resulted in massive TR (VC 16 mm, ERO 1.6 cm², dense triangular CW Doppler profile and systolic flow reversal in suprahepatic veins, Fig.2) combined with tricuspid stenosis (mean gradient 5 mmHg). Crucially, detailed evaluation of the pulmonary valve revealed retracted cusps. Diagnosis of pulmonary regurgitation (PR) was challenging at Color Doppler but a multiparametric assessment detected severe PR (dense CW Doppler with rapid interruption due to a rapid rise of RV diastolic pressures with pressure half–time of 80 msec and PR index of 0,62, Fig.3).

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Conclusion: These findings are pathognomonic for CHD, where vasoactive substances (e.g., serotonin) induce endocardial fibrosis. In this case, the complex anatomy of the tricuspid valve, combined with significant pulmonary valve involvement, rendered the patient unsuitable for transcatheter correction. This case emphasizes that the pulmonary valve must be rigorously evaluated in CHD, with a multiparametric approach, as its involvement is a critical determinant of surgical vs. percutaneous strategy. Management in this case must involve a multidisciplinary Heart Team to balance surgical risks against oncological prognosis.

Fig.1 Ventricular perspective of tricuspid valve showing rigid, retracted and fused leaflets with a fixed diastolic and systolic oval-shaped orifice.

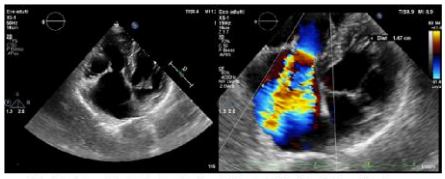

Fig.2 Apical modified 4-C view showing rigid, retracted leaflets of tricuspid valve with a marked systolic apposition gap and massive tricuspid regurgitation.

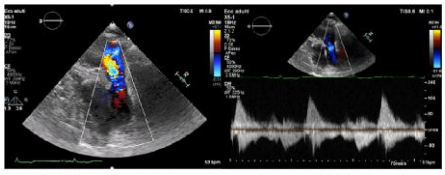

Fig. 3 Parasternal short-axis view at pulmonary valve showing the Color Doppler jet of pulmonary regurgitation and the rapid interruption of CW Doppler profile.

Abstract citation ID: suag058.088

CONCORDANCE BETWEEN INVASIVE AND ECHOCARDIOGRAPHIC METRICS IN PATIENTS WITH SEVERE TRICUSPID REGURGITATION

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Background: Right ventricular–pulmonary arterial (RV–PA) coupling, expressed as the ratio of end–systolic to arterial elastance (Ees/Ea), is a key marker of RV efficiency and prognosis in advanced tricuspid regurgitation (TR). Non–invasive surrogates of coupling may help identify patients who could benefit from transcatheter tricuspid valve repair (TTVR).
Methods: Forty–three symptomatic patients with at least severe TR referred for TTVR at Tampa General Hospital underwent comprehensive echocardiographic, computed tomographic, and invasive hemodynamic assessment. Pressure–volume (PV) loops were acquired using a conductance catheter (INCA®, CD Leycom) to determine Ees/Ea at end–expiration. Ea was calculated using both the conventional single–beat formula (Ea = end–systolic pressure/stroke volume) and the modified Brener equation. Correlations between invasive and echocardiographic indices (TAPSE/PASP, S'/PASP, RVFWLS/PASP, FAC/ESA, SV/ESA) and Ea and PASP/SVLV were analysed using Spearman's test and ROC curves.
Results: Ea values derived from the Brener's formula showed no correlation with invasive hemodynamic parameters, whereas significant associations were found when Ea was computed using the forward stroke volume (SV)–based method. SV and RV–PA coupling were markedly reduced, reflecting advanced VA uncoupling and maladaptation characterized by high afterload, poor contractile reserve, and inefficient energy transfer. Consistent with this advanced stage, only nine patients (20%) were ultimately treated with TTVR. Among echocardiographic surrogates, SV/ESA ($r = 0.9$, AUC 0.95, $p < 0.0001$) and FAC/ESA ($r = 0.88$, AUC 0.73, $p < 0.0001$) demonstrated the strongest correlations with invasive coupling, whereas TAPSE/PASP and S'/PASP were not significant.
Conclusions: In patients with severe TR and advanced RV–PA uncoupling, volumetric indices such as SV/ESA and FAC/ESA most accurately reflect invasive coupling, whereas Doppler–based surrogates perform poorly. The Brener–derived Ea formula appears inapplicable in populations with pulmonary hypertension, supporting Tedford's observations that its correction is appropriate only in physiologic coupling conditions.

Abstract citation ID: suag058.089

ARRHYTHOGENIC MITRAL PROLAPSE: A CASE OF OUT–OF–HOSPITAL CARDIAC ARREST, FROM DIAGNOSIS TO ICD IMPLANTATION

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Ospedale San Luca

A 42–year–old woman experienced an out–of–hospital cardiac arrest (OHCA) at her home, presenting with ventricular fibrillation (VF). She was successfully resuscitated with three DC shocks and transported to our hospital in return of spontaneous circulation (ROSC). The patient had no notable medical history, cardiovascular risk factors, or family history, and was only taking oral contraceptives at home. Upon arrival in the emergency department (ED), she was agitated and non–responsive. Her blood pressure was 115/70 mmHg, and she was eupneic without oxygen support. ECG showed negative T waves in leads AVF and DIII (Figure 1). Occasional premature ventricular beats (PVB) were noted originating from the inferior wall of the left ventricle. Echocardiography revealed good biventricular function, mitral valve prolapse, and evidence of pseduo–mitral annular disjunction (pseudoMAD) with 7mm of disjunction in systole, which led to severe mitral regurgitation (MR). Pichelhaube's sign was noted No reversible causes were identified. Due to her extreme agitation and recent arrhythmic storm, she was intubated, mechanically ventilated, and transferred to the intensive care unit (ICU). Antiarrhythmic therapy with propranolol 80 mg/day and amiodarone was initiated. The following day, the patient was successfully extubated without neurological deficits and transferred to our coronary intensive care unit (UTIC). Follow–up echocardiography showed improvement in mitral regurgitation (now moderate), and a focal reduction in global longitudinal strain (GLS) was observed in the basal posterolateral and inferior walls (Figure 2). A contrast–enhanced chest CT ruled out pulmonary embolism, and coronary angiography revealed no significant lesions. A transesophageal echocardiogram confirmed psuedoMAD and moderate mitral insufficiency. Subsequently, she underwent implantation of a subcutaneous implantable cardioverter defibrillator (S–ICD). The patient was discharged asymptomatic on medical therapy with propranolol 60 mg/day. During her stay in UTIC, no further arrhythmic events occurred. Cardiac MRI revealed a transmural late gadolinium enhancement (LGE) area in the basal inferior, posterolateral, and septal walls, also pseudoMAD was confirmed. This case highlights the complexity of diagnosing and managing pseudoMAD, especially in the context of life–threatening arrhythmias.

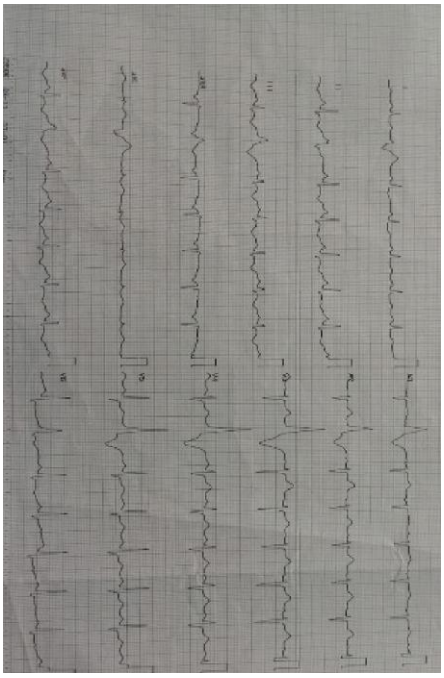

Figure 1

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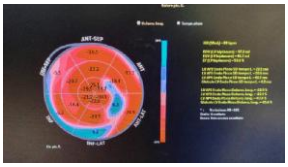

Figure 2

Abstract citation ID: suag058.090

NOVEL RIGHT VENTRICULAR FUNCTION PARAMETERS CAN IDENTIFY SHORT–TERM NON–RESPONDERS TO TRANSCATHETER EDGE–TO–EDGE REPAIR FOR MITRAL REGURGITATION

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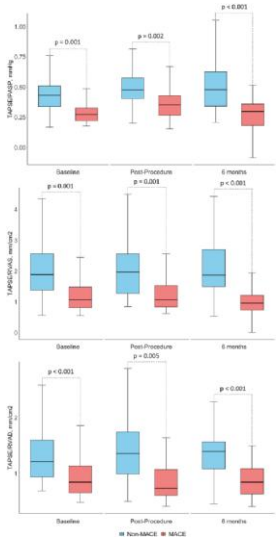
Background: Mitral regurgitation (MR) is a prevalent valvular heart disease with poor outcome. Percutaneous mitral valve repair on top of guidelines–directed medical therapy has been associated with prognostic benefit. Yet, the percentage of patients who die or are re–hospitalized for heart failure, within the first year is high. Identification of these short–term non–responders to PMVR is of great clinical importance.
Aims: This study aims to assess the prognostic value of advanced right ventricular (RV) function parameters in predicting major adverse cardiovascular events (MACE) following percutaneous mitral valve repair using the MitraClip system.
Methods: This study analysed 60 consecutive patients with symptomatic severe MR who underwent percutaneous mitral valve repair. Echocardiographic assessments were performed at baseline, post–procedure before discharge, and at 6–month follow–up. Analysed echocardiographic parameters included tricuspid annular plane systolic excursion (TAPSE) normalized either to pulmonary artery systolic pressure (TAPSE/PASP), or to RV end–diastolic (TAPSE/RVAD) and end–systolic area (TAPSE/RVAS), and indices of RV myocardial work. MACE including all–cause death, heart failure hospitalization, and stroke, was assessed at one year of follow–up.
Results: A total of 35% of patients experienced MACE during the first year after percutaneous mitral valve repair. At baseline, patients with versus without MACE had significantly higher creatinine, troponin T, NT–proBNP and larger right heart size and lower TAPSE (all p ‹ 0.05) while the remaining clinical, imaging and procedural characteristics were similar (Figure 1). In multivariate regression analysis, TAPSE/PASP, TAPSE/RVAS and TAPSE/RVAD were only significant imaging predictors of MACE (all p ‹ 0.05). The AUC values using the multivariate models ranged from 0.80 to 0.85, indicating moderate to strong predictive capacity for these RV indices (Figure 2-3). Throughout the follow–up, these indices of RV function remained significantly lower in patients with versus without MACE (all p ‹ 0.05). In contrast, parameters of RV myocardial work had significantly lower AUC (‹ 0.60) across all the time points.
Conclusion: The results of the present study suggest that the comprehensive assessment of the right ventricle can identify short–term non–responders to PMVR. The indices including TAPSE emerged as independent predictors of outcome while the indices based on RV myocardial work showed limited predictive power.



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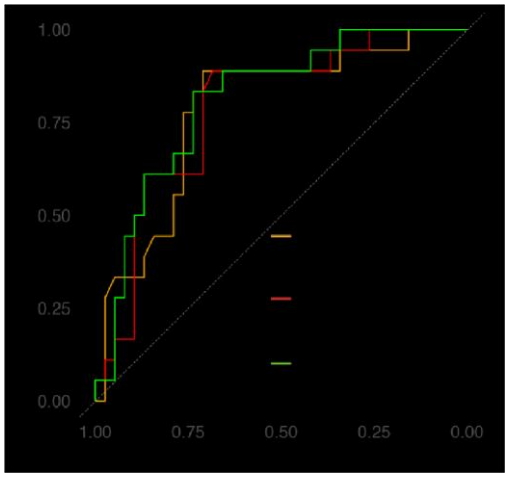

Figure 2

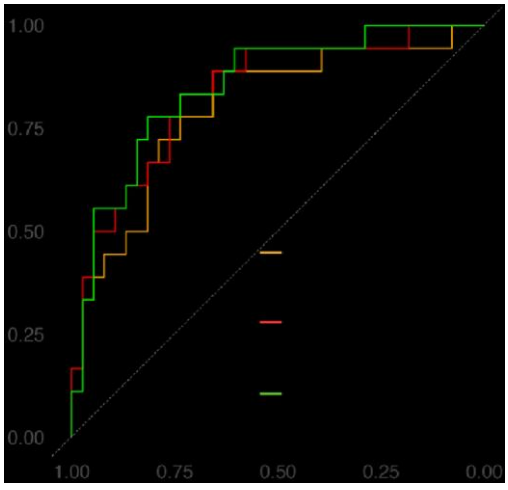

Figure 3

E-Posters

Ablation

Abstract citation ID: suag058.091

CONTROLLED DEEP SEDATION PROTOCOL WITH BISPECTRAL INDEX MONITORING SYSTEM (BIS) AND CONTINUOS PROPOFOL INFUSION: A NEW SEDATIVE STRATEGY FOR PULSED–FIELD ABLATION OF ATRIAL FIBRILLATION

M. Villani, L. Rossi, G. Halasz, G. Melegari, A. Biagi, L. Serena, D. Aschieri, and R. Corso
UOC Anestesia E Terapia Intensiva Ospedale Guglielmo Da Saliceto; UOC Cardiologia Ospedale Guglielmo Da Saliceto; UOC Cardiologia Azienza Ospedaliera San Camillo Forlanini; Dipartimento Anestesia E Terapia Intensiva Aou Policlinico; UOC Cardiologia Arcispedale Santa Maria Nuova

Aims: A standardized sedation protocol for pulsed–field ablation (PFA) of atrial fibrillation (AF) through irreversible cellular electroporation has not been well established. We report our experience of a protocol for deep sedation with propofol maintaining spontaneous respiration during the PFA of AF. Bispectral index Monitoring System (BIS) is a technologies used to monitor depth of anesthesia and to maintain a targeted sedation range .
Methods and results: All consecutive patients undergoing PFA for AF at our center were included. Our sedation protocol involves the intravenous administration of fentanyl (1 mcg/kg) and midazolam (2 mg) at low doses before local anesthesia with lidocaine. A propofol infusion (1 mg/kg/h) was

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injected about 5 minutes before the first PFA delivery and suspended at the end of the procedure. We enrolled 52 patients (age = 54 +– 9 years, 72,6 % males, body mass index = 26.7+– 5 kg/m2, fluoroscopy time = 21[15–30] min, skin–to–skin time = 70 [60–100] min and PFA LA dwell time = 25[22–28] min). By the end of the procedure, PVI had been achieved in all patients by means of PFA alone. The mean time under sedation was 48.4 –+ 6 min, with 8 (4%) patients being sedated for more than 1 hour. A satisfactory Ramsey Sedation Scale level during propofol infusion was achieved in all patients except one (84.1% of the patients with rank 3; 15.9 % with rank 2). In all procedures, the satisfaction level was found to be acceptable by both the patient and the primary operator (Score = 0 in 99.4% of cases). All patients reported none or mild pain. No major procedure or anesthesia–related complications were reported.

Conclusion: Our standardized anesthesia protocol with the administration of drugs in association with Bispectral Index Monitoring System to maintain a targeted sedation range during pulsed–field ablation of atrial fibrillation was safe and effective, with an optimal degree of patient and operator satisfaction.

Abstract citation ID: suag058.092

ELECTROANATOMIC ACTIVATION MAPPING OF KOCH TRIANGLE IN AVNRT PATIENTS: DEFINING THE FAST PATHWAY LOCATION AND CONDUCTION PROPERTIES

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Introduction: Slow pathway ablation is currently the target for AV nodal reentrant tachycardia (AVNRT) with a high success rate of almost 100% and 0.5% to 2% risk of II– to III–degree AV block. Kock triangle (KT) mapping is helpful to define the fast pathway location, to find out its physiologic anteroseptal location. We aimed to describe the KT mapping by means of electroanatomic (EA) activation mapping of fast pathway, performed beside the conventional EP study.

Methods: KT was mapped as follows: atrial pacing from peri–Hisian antero–septal (AS), mid–septal (MS) and postero–septal (PS) regions, by means of 4 mm ablating catheter beside a quadripolar diagnostic catheter placed on His region. The EA local activation time (LAT) was performed by means of Ensite X system (Abbott Medical) in all patients; the window of interest was set from 10 msec after the pacing atrial spike extended beyond the ventricular EGM on the His catheter tracing. The spike– to–His deflection (S–H) interval was measured to define the fast pathway location (activation gradient). On the ablator catheter tracing the annotation was set (ROV), timed to the His deflection on His catheter tracing; the annotation was set even when no His deflection was recorded on ablator tracing as in MS and PS regions ("mirroring"). The KT was mapped before and after successful elimination of the slow pathway.

Results: Seventeen consecutive AVNRT patients were included who underwent to successful ablation with slow pathway elimination. In all cases, at baseline pre–ablation KT mapping, a progressive prolonged S–H interval was found (AS‹MS‹PS), depicted as activation gradient, traditionally meaning as anteroseptal fast pathway physiologic location and confirmed by the EA LAT (Fig 1). As compared to pre–ablation, the post–ablation LAT mapping showed the same activation gradient in all patients (Fig 2), as follows: 1) pre–AS= 89,2 msec vs post–AS= 91,2 msec p=0.2 2) pre–MS= 106,8 msec vs post–MS= 110,2 msec p=0.15 3) pre–PS= 127,7 msec vs post PS=130 msec p=0.38 (Normality of paired differences was assessed using the Shapiro–Wilk test and was not violated; therefore, Student's t– test was applied)

Conclusion: The activation mapping of KT by LAT may help to define the AV node dual physiology beside the conventional EP mapping. It might depict a safer region for slow pathway ablation and confirms the preserved anterograde conduction properties of fast pathway after slow pathway ablation.

Fig 1: pre-ablation Kock triangle activation mapping

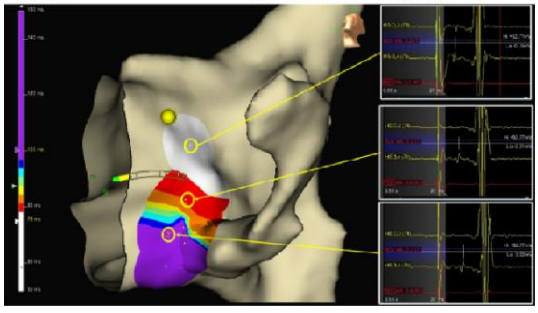
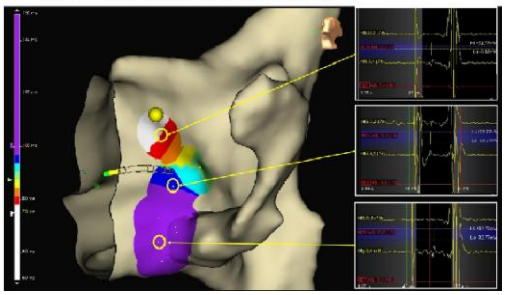


Fig 2: post-ablation Kock triangle activation mapping



Abstract citation ID: suag058.093

MAPPING THE UNEXPECTED: CRYO–GUIDED ABLATION OF MID–SEPTAL AV NODAL EXTENSION USING THE PICENO ZERO–FLUOROSCOPY PROTOCOL

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Pineta Grande Hospital; Mazzoni Hospital; Federico Ii

35–year–old male, active smoker, presented with recurrent episodes of palpitations. EKG showed sinus rhythm without pre–excitation or conduction disturbances. Ambulatory ECG recordings documented regular narrow QRS tachycardia with a short RP interval, consistent with supraventricular tachycardia (Figure 3). No structural heart disease and was referred for electrophysiological study and ablation. Noninvasive evaluation excluded ischemic and structural heart disease. Patient underwent an electrophysiological study using the PICENO AVNRT low–fluoroscopy protocol with the CARTO system. During the electrophysiological study, typical AV nodal re–entrant tachycardia (AVNRT) was induced and confirmed by ventricular pacing maneuvers. A 3D Koch's Triangle Pace Mapping (KTPM) was performed to localize the compact AV node by measuring the stimulus–to–His (St–His) interval at different sites within Koch's triangle (Figure 2). Unexpectedly, short St–His intervals were recorded in the mid–paraseptal region, while longer intervals were found in the antero–septal area indicating a mid–paraseptal extension of the compact AV node. Voltage Bridge Mapping (VBM) then identified a discrete low–voltage bridge connecting two high–voltage atrial areas in the same region, corresponding to the functional slow pathway. Because of the close proximity between the slow pathway and the compact node (identified via KTPM), cryoablation was selected to minimize the risk of iatrogenic atrioventricular block. Cryo–energy applications were delivered under 3D guidance at the VBM–defined low–voltage bridge site. Junctional beats appeared during freezing, indicating successful slow pathway modification (Figure 1). Post–ablation stimulation (baseline and isoproterenol challenge) showed no inducible AVNRT. The procedure was completed without fluoroscopy or complications, and the patient was discharged the day after. At 12–month follow–up, he remained asymptomatic and arrhythmia–free, with preserved AV conduction on ECG and Holter monitoring. This case illustrates the power of the PICENO AVNRT protocol, integrating KTPM and VBM to identify atypical compact AV nodal anatomy. Recognition of short St–His intervals in the mid–paraseptal zone revealed a mid–septal extension of the AV node, guiding the choice of cryoablation for safety. The fully 3D–guided, zero–fluoroscopy workflow allowed effective slow pathway modification while preventing AV block—underscoring its value in anatomically complex AVNRT cases.

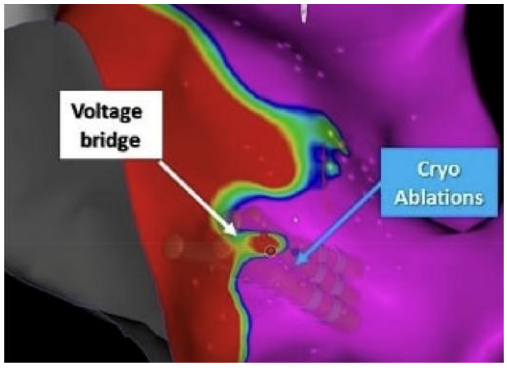

Figure 1

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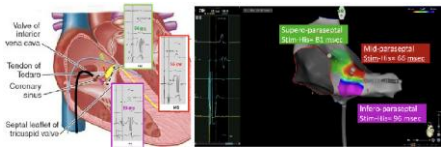

Figure 2

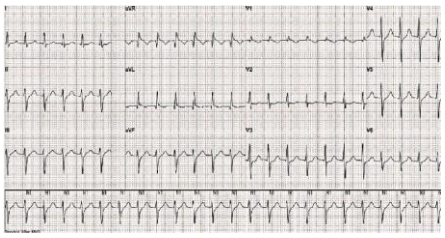

Figure 3

Abstract citation ID: suag058.094

EPICARDIAL ABLATION VIA CORONARY SINUS INSTEAD OF EPICARDIAL PUNCTURE, A SAFE AND EFFECTIVE APPROACH

L. Cocchiara, B. Brescia, A. Rapacciuolo, S. Nardi, and L. Argenziano
Pineta Grande Hospital; Federico Ii; Villa Betania; Pineta Grande

40–year–old male, no major cardiovascular risk factors, regular sports activity reported recurrent palpitations. In 2021, during excercise, he experienced palpitations associated with presyncope which resolved spontaneously, ECG revealed a short PR interval and delta wave, suggestive of a postero–septal accessory pathway (Figure 1). Exercise stress test induced a short episode of orthodromic tachycardia at 93% of the maximal predicted heart rate, spontaneously terminating. Electrophysiology study confirmed a postero–septal AP, although tachycardia was not inducible at that time. In 2023, due to increasing frequency of palpitations a second electrophysiology study was performed with the intention to ablate was planned. Programmed atrial stimulation induced AV re–entrant tachycardia with the earliest ventricular activation recorded on the CS 5–6 dipole, consistent with a postero–septal AP. Mapping of the left atrium via a patent foramen ovale identified a clear AP potential, preceding the QRS onset by 10–15 ms, between CS 5–6 and CS 7–8. However, several endocardial radiofrequency applications produced no effect on pre–excitation. Instead of proceeding to an epicardial puncture, intraluminal CS mapping was performed. Positioning the ablation catheter within the CS confirmed a sharp AP potential at CS 5–6, matching the earliest activation site. Radiofrequency ablation (15 W) was delivered from within the CS, resulting in abrupt loss of AP conduction after approximately 5 seconds. (Figure 2) A full 40–second RF application was completed. No recurrence was observed after a 30–minute waiting period, and adenosine administration confirmed complete block of the accessory pathway. The patient was discharged the following day without complications. After more than 2 years of follow–up, the patient remains asymptomatic, shows no evidence of pre–excitation on serial ECGs, and reports full return to normal physical activity. Epicardial accessory pathways located along the postero–septal region can be technically challenging when approached endocardially. Because surface ECG cannot reliably distinguish endocardial from epicardial pathways, careful mapping within the coronary sinus is essential before considering epicardial access. Ablation from within the coronary sinus proved safe, effective, and avoided the need for percutaneous epicardial puncture. CS–guided epicardial ablation should be considered a valuable alternative when conventional endocardial ablation fails.

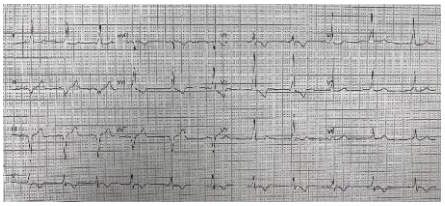

Figure 1

Figure 2

Abstract citation ID: suag058.095

AGE AND EARLY OUTCOMES AFTER ATRIAL FIBRILLATION ABLATION: NO IMPACT ON PROCEDURAL SAFETY OR ARRHYTHMIC RECURRENCE IN A REAL–WORLD COHORT

G. De Rosa, M. Giuggia, M. Peddis, M. Peyracchia, R. Di Summa, E. Pelissero, G. Trapani, F. Fiore, F. Ugliano, P. Cirillo, and G. Senatore
Dipartimento Di Scienze Biomediche Avanzate, Universita' Degli Studi Di Napoli Federico Ii; Po Di Cirie', Asl To4; Dipartimento Di Scienze Mediche Traslazionali, Universita' Degli Studi Di Napoli Federico Ii

Background: Transcatheter ablation (TCA) is an established therapy for atrial fibrillation (AF), but the influence of age on procedural safety and early efficacy remains uncertain, especially in real–world practice.
Objective: To determine the impact of age on early procedural safety and arrhythmic outcomes after TCA for AF in an unselected real–world cohort.
Methods: We analysed 217 patients (mean age 67 ± 9 years) who underwent TCA for AF at the Cardiology Unit of Ciriè Hospital (ASL Torino 4, Turin, Italy) between January 2022 and December 2023. Outcomes were assessed across three predefined age cut-offs (‹65, ‹70, and ‹80 years) and with age modelled as a continuous variable. Logistic regression was used to evaluate the association between age and procedural safety and efficacy endpoints. Primary safety endpoints included a composite of pericardial effusion, pericardiocentesis, vascular complications, bleeding, stroke, and cardiovascular or all–cause death within 48 hours. Secondary efficacy endpoints consisted of a composite of AF recurrence and AF persistence within 48 hours, with both the composite and its individual components analysed in covariate–adjusted models.
Results: No significant differences in early complications or arrhythmic outcomes were observed across any age cut-off. In multivariable logistic regression, age was not independently associated with procedural safety (OR 0.98; 95% CI 0.93–1.03; p=0.69), AF recurrence (OR 1.01; 95% CI 0.97–1.05; p=0.77), or AF persistence (OR 1.00; 95% CI 0.96–1.05; p=0.91).
Conclusions: In this real–world single–center cohort, age did not influence procedural safety or early arrhythmic outcomes after AF ablation. These findings indicate that advanced age alone should not preclude referral for TCA in appropriately selected patients.

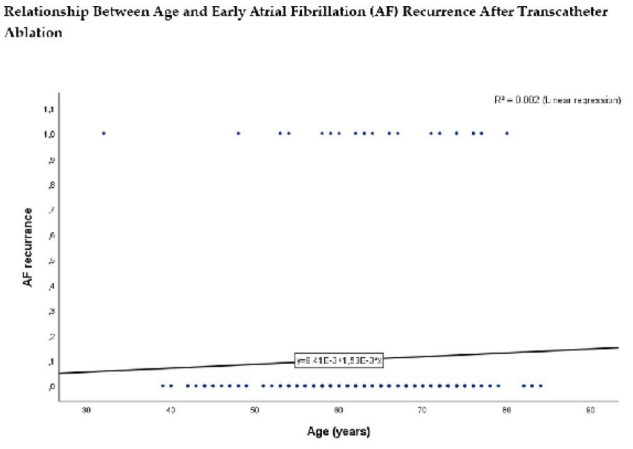

Figure 1. Scatter plot showing the relationship between age and early AF recurrence (within 48 hours) after transcatheter ablation. The linear regression line demonstrates no significant association (R^2 = 0.002).

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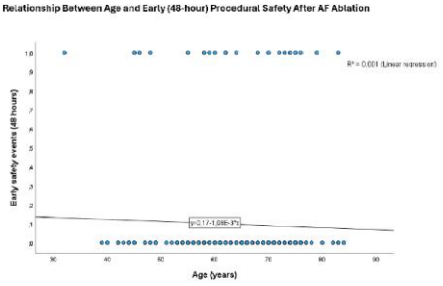

Figure 2. Scatter plot showing the relationship between age and early (48-hour) procedural safety after AF ablation. Linear regression indicates no significant association ($R^2 = 0.001$).

Ablated carina	Classic Protocol (n = 30)	New Protocol (n = 15)	p-value
Both carinas, n (%)	10 (33.3%)	5 (33.0%)	1.0
Left carina, n (%)	28 (93.3%)	14 (93.3%)	1.0
Right carina, n (%)	12 (40.0%)	6 (40.0%)	1.0

Carina	Classic Protocol (n = 30)	New Protocol (n = 15)	p-value	Hodges-Lehmann, (95% CI)
Left+right carina, median (IQR)	17 (12-25)	6 (4-9)	< 0.001	10 (6.0 - 16.0)
Left carina, median (IQR)	13 (10-17)	5 (4-6)	< 0.001	8 (5.0 - 10.0)
Right carina, median (IQR)	11 (10-15)	4 (3-4)	< 0.001	7.5 (5.0 - 10.0)

FIGURE 2

Variable	Classic Protocol (n = 30)	New Protocol (n = 15)	p-value
Complications	4 (13.3%)	3 (20.0%)	0.67
Cardiac Tamponade, n (%)	0 (0.0%)	1 (6.7%)	0.33
Pericarditis, n (%)	2 (6.7%)	2 (13.3%)	0.59
Pericardial effusion, n (%)	2 (6.7%)	0 (0%)	0.54
Recurrences	**Classic Protocol (n = 30)**	**New Protocol (n = 15)**	**p-value**
Any AF/AFL, n (%)	8 (26.7%)	1 (6.7%)	0.23
Early* AF/AFL, n (%)	4 (13.3%)	1 (6.7%)	0.65
Early* AF/AFL among recurrent cases, n (%)	4 (50.0%)	1 (100.0%)	1.0
Any AF, n (%)	4 (13.3%)	1 (6.7%)	0.65
Early* AF, n (%)	2 (6.7%)	1 (6.7%)	1.0
Early* AF among recurrent cases, n (%)	2 (50.0%)	1 (100.0%)	1.0
Any AFL, n (%)	4 (13.3%)	0 (0.0%)	0.29
Early* AFL, n (%)	2 (6.7%)	0 (0.0%)	0.54
Early* AFL among recurrent cases, n (%)	2 (50.0%)	0 (0.0%)	

*(< 3 months); AF – Atrial fibrillation; AFL – Atrial flutter

FIGURE 3

Abstract citation ID: suag058.096

ATRIAL FIBRILLATION ABLATION WITH SELECTIVE TARGETING OF CARINA NEGATIVE POTENTIALS: EARLY CLINICAL EXPERIENCE

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Background: Radiofrequency ablation (RFA) with pulmonary vein isolation (PVI) represents a cornerstone of atrial fibrillation (AF) treatment. Persistent conduction across the carina requires extensive additional ablation. Combining bipolar and unipolar voltage CARTO maps and applying voltage thresholds [Fig.1], our group observed areas with discrete negative potentials in the carina regions, which may represent critical sites for carina conduction.
Objectives: The objective of the study was to evaluate whether selective ablation of discrete negative potentials (New Protocol, NP) within the carina could reduce the total number of radiofrequency applications required to achieve PVI compared with ablation of total carina extension (Classic Protocol, CP), without compromising safety or clinical efficacy.
Materials and Methods: This single–center study included 45 patients undergoing RFA: 30 treated with the CP (July 2022 – April 2025) and 15 with the NP (April 2025 – October 2025). The evaluated outcomes included: number of ablation applications, periprocedural complications and arrhythmia recurrences [AF or atrial flutter (AFL)] during follow–up.
Results: The population characteristics were comparable. The number of radiofrequency applications was significantly lower in the NP group [Total lesions, median: 6 vs 17; p ‹ 0.001. Left carina, median: 5 vs 13; p ‹ 0.001. Right carina, median: 4 vs 11; p ‹ 0.001)] [Fig.2]. Complication rates showed no significant difference between groups (NP: 20.0%, CP: 13.3%; p = 0.67). Arrhythmia recurrences were analysed with Kaplan–Meier curves; to ensure comparable observation a truncation of follow–up period (defined as period between ablation and end of follow–up or recurrence) at 6 months was performed and blanking period was excluded. A decreasing trend in recurrences was observed in the NP group, but with no statistically significant difference (p = 0.69) [Fig.3]. The greatest deviation between the curves was observed when only AFL recurrences in the first 6 months after ablation were considered, with no events in the NP group (p = 0.33).
Conclusions: The New Protocol allowed to significantly reduces lesion burden without increasing procedural time or complication rates. Early observations regarding recurrence–free outcomes are promising though limited, due to a shorter follow–up and a smaller sample size in NP group. More definitive conclusions will require a longer follow–up and a higher number of patients.

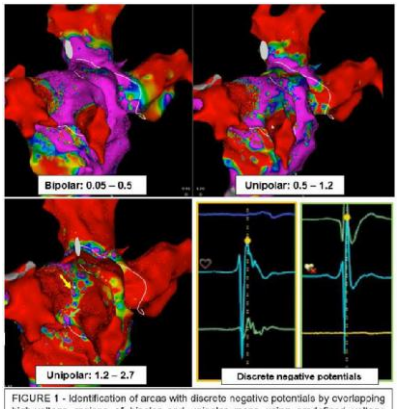

FIGURE 1 - Identification of areas with discrete negative potentials by overlapping high-voltage regions of bipolar and unipolar maps using predefined voltage thresholds.

Abstract citation ID: suag058.097

IMPACT OF PULSED FIELD VERSUS RADIOFREQUENCY ON ATRIAL FIBRILLATION ABLATION WORKFLOW AND ORGANIZATION: A SINGLE HIGH VOLUME CENTER EXPERIENCE

D. Ciliberti, A. Di Monaco, F. Quadrini, F. Troisi, N. Vitulano, L. Sgarra, V. Perniciaro, R. Caruso, V. Anzelmo, and M. Grimaldi
Ente Ecclesiastico Ospedale Generale Regionale "F. Miulli"

Background: Pulsed field ablation (PFA) is a novel non–thermal ablative modality. Data about periprocedural time comparison between PFA and radiofrequency ablation (RFA) of atrial fibrillation (AF) are lacking.
Purpose: We would assess if PFA compared to RFA could have an impact on procedural organization and workflow of AF ablation, including effects on vagal nervous system. Methods In this retrospective, propensity–matched, case–control study we analysed paroxysmal or persistent AF ablations, performed over the last year, 2024, in our high–volume center. In all cases only pulmonary veins isolation was performed. The population was divided into two groups: PFA group under deep sedation and RFA under light sedation. All procedures were supported by electro–anatomical mapping. We collected all procedural times as primary outcome, then we examined all other procedural data and vagal ganglionated plexi (GPs) involvement.
Results: This study included 110 patients (mean age 57±11,9, 61,8% males), 55 in PFA (mean age 58,1±8,7, 63,6% males) and 55 RFA group (mean age 55,9±14,3, 60% males). Baseline characteristics of patients are reported in fig.1. Longer post–procedural time (43,9±25,2 vs 19,3±8,3 min; p ‹0,001) was reported in PFA group. On the contrary, shorter skin to skin times (93,5±28,6 vs 131,9±35,2 min; p ‹0,001), mapping times (6,27±3,5 vs 13,1±4,1 min; p ‹0,001) and left atrium dwell times (45,6±8,6 vs 73,7±21,6 min; p ‹0,001) were evidenced for electroporation (fig. 2). No statistical differences were documented between PFA and RFA about pre–procedural (32±10,9 vs 28,1±6,8 min; p 0,96), ablation (22,2±7,5 vs 22,4±9,1 min; p 0,66) and total lab occupancy times (169,47±34,3 vs 179,4±35,2 min; p 0,05). Interestingly, fluoro–time was shorter in RFA (5,3±2,9 vs 3,3±3,2 min; p ‹0,001), but fluoro–dose was similar (15,3±17,2 vs 13±13,4 mGy/m2; p 0,56) (fig.1 and 2). Complication rate was very low for both. About GPs involvement, heart rate variation before and after procedure was similar between PFA and RFA (fig.3). Interestingly, vagal reflexes were more frequently induced using PFA (67,2% vs 30,1%; p ‹0,001) and atropine use was more in RFA group (20% vs 65,4%; p ‹0,001).

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Conclusion: PFA has a mild impact on periprocedural workflow using deep sedation protocol. There is no significant difference in total lab occupancy time when compared to RFA point–by–point ablation. Interestingly, more vagal reflexes were elicited in the PFA group.

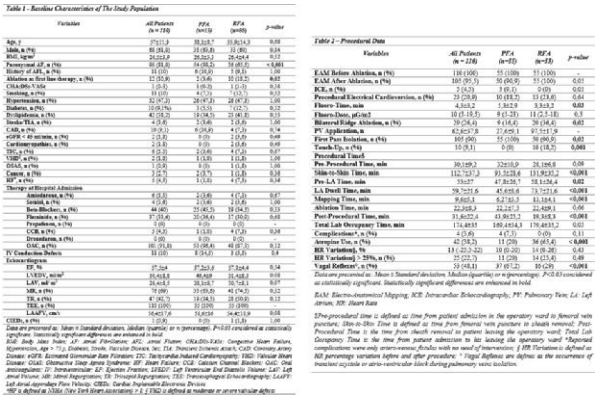

Table 1

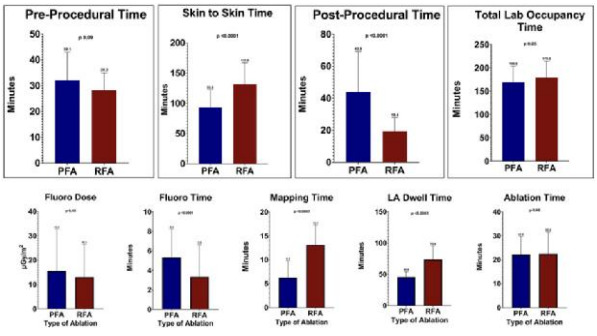

Figure 2

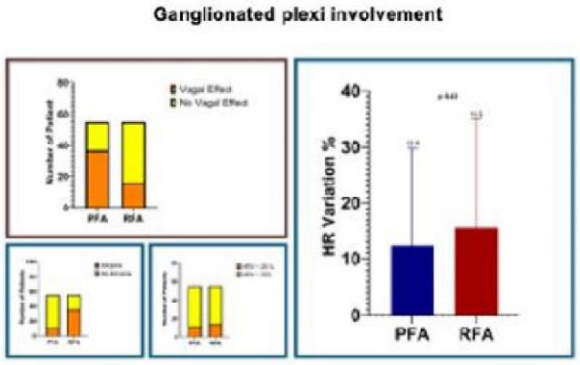

Figure 3

Amyloidosis 1

Abstract citation ID: suag058.098

THE AMYLOIDOSIS YOU DON'T EXPECT!

A. Polo, V. Guarente, and G. Erente
Ospedale San Bassiano, Ulss7 Pedemontana; Ospedale San Bassiano

A 72–year–old male, with a medical history of hypertension, remote bilateral carpal tunnel syndrome and smoldering IgG kappa multiple myeloma (MM), was referred for evaluation of suspected cardiac amyloidosis (CA) due to mild exertional intolerance. Electrocardiogram revealed sinus rhythm, left–axis deviation, low voltage QRS. A transthoracic echocardiogram revealed reduced left ventricular systolic function (ejection fraction of 40%), but the acoustic window was suboptimal. Therefore, a cardiac magnetic resonance was performed, which revealed moderate basal septal hypertrophy (13 mm), transmural late–enhancement in the lateral and inferior wall of the left ventricle and in the atrial walls, with a left ventricular ejection fraction of 36%. On laboratory evaluation high–sensitivity troponin I was normal (18 ng/L), N–terminal pro–B–type natriuretic peptide was mildly elevated (509 pg/ml). The presence of MM and imaging findings of CA led to high suspicion of AL–CA. A fat pad aspirated was negative for amyloid deposition. Radionuclide imaging showed grade 1 cardiac uptake. At that point, an endomyocardial biopsy was required, since CA was highly suspected in the presence of plasma cell dyscrasia: the endomyocardial biopsy was Congo red positive, and the immunoelectron microscopy was positive for transthyretin (TTR) amyloid deposition. TTR gene analysis did not reveal any pathogenic mutation. Taken together, these findings confirmed wild–type TTR–CA in a patient with concurrent smoldering multiple myeloma.

The patient was referred to Padua cardiological clinic: given the limited burden of symptoms, the low level of cardiac biomarkers and the low grade of Perugini's score, it was decided a "wait and see" approach and a close clinical follow–up with a nuclear bone scintigraphy scan at 6 months.

This case highlights several important teaching points:

(1) TTR–CA can present with concomitant MM and should be on the list of differential diagnoses along with AL–CA when amyloid cardiomyopathy is suspected;
(2) endomyocardial biopsy is required to make the diagnosis of TTR–CA for cases of suspected CA with plasma cell dyscrasia;
(3) diagnosis of TTR–CA in MM patients is crucial to ensure appropriate treatment targeting TTR–CA.

In addition, this case underscores the importance of a multidisciplinary approach, integrating hematology, pathology and cardiology expertise, to ensure accurate diagnosis and optimal management in this complex patient population.

Abstract citation ID: suag058.099

A YOUNG NIGERIAN PATIENT IN DIALISIS FOR IRC END STAGE AND ATTR VARIANT BUT PERUGINI 0: A CONTROVERSIAL CLINICAL CASE EXPRESSING THE LIMITS OF NON INVASIVE DIAGNOSTIC TOOLS IN CARDIAC AMYLOIDOSIS

B. Centanni, E. Giacomin, M. Focardi, and C. Bellagamba
Ospedale Santa Maria Le Scotte

Background: Transthyretin amyloidosis is caused by extracellular deposition of misfolded transthyretin protein and may involve the heart, leading to heart failure and arrhythmias. ATTR can be wild–type or hereditary (variant ATTR). One of the pathogenic variants is Val122Ile, prevalent in individuals of West African ancestry. Non–invasive diagnosis of ATTR cardiomyopathy relies on bone scintigraphy combined with exclusion of monoclonal gammopathy. However, discordant clinical and imaging findings may occur, particularly in pluricomorbid patients.
Case presentation: A 49–year–old Nigerian man with multiple cardiovascular risk factors, long–standing diabetes mellitus, end–stage chronic kidney disease on dialysis, and advanced peripheral arterial disease with lower limb amputation was evaluated for heart failure. NT–proBNP was 2574 pg/mL and troponin 265 ng/L. Echocardiography showed left ventricular hypertrophy, reduced systolic function (LVEF 35–40%), severe mitral and tricuspid regurgitation and biatrial enlargement (Figure 1). Coronary CT angiography revealed a moderate plaque burden with minimal mid left anterior descending artery stenosis. Absence of opacification of the posterior interventricular branch was reported, of uncertain significance. Cardiac magnetic resonance demonstrated left ventricular hypertrophy with moderate systolic dysfunction and a non–ischemic late gadolinium enhancement pattern; T1 and T2 mapping were not assessable (Figure 2). Serum and urine immunofixation were negative. Bone scintigraphy showed Perugini 0, while genetic testing identified a pathogenic TTR p.Val142Ile mutation. Although a Perugini score of 0 precludes non–invasive diagnosis of ATTR–CM, it does not fully exclude the disease in patients with high pre–test probability. Moreover, chronic dialysis raises the possibility of alternative or concomitant forms of amyloidosis not detectable by bone scintigraphy.
Conclusions: This case highlights the limitations of current non–invasive diagnostic algorithms for cardiac amyloidosis and the need for an integrated, individualized approach, especially in highly pluricomorbid patients. In such settings, cardiac manifestations may reflect an overlap of different pathological processes complicating both diagnosis and management. Moewove, severe renal impairment may limit access to disease–modifying therapies for hereditary ATTR. Personalized clinical decision–making beyond standardized diagnostic pathways is therefore essential in real–world patients

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Figure 1

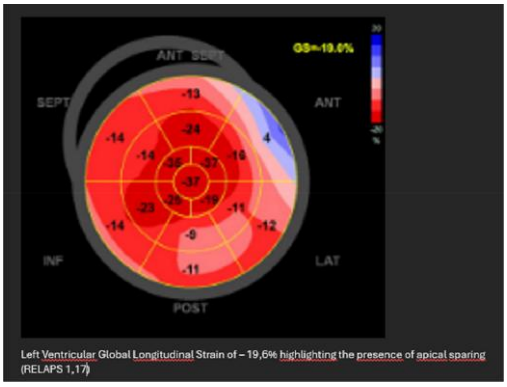

Figure 2

Abstract citation ID: suag058.100

THE HEART AS A DIAGNOSTIC CLUE TO AMYLOID A AMYLOIDOSIS

G. Pecci, G. Marchionni, M. Alfarano, F. Ballatore, J. Costantino, A. Lattanzio, S. Stavagna, F. Ciccarelli, C. Giordano, G. D'Amati, C. Vizza, and C. Chimenti
Policlinico Umberto I, Roma

A 64–year–old woman with a history of arterial hypertension, type 2 diabetes mellitus and end–stage chronic kidney disease on hemodialysis, who was admitted to our hospital for acute heart failure. At admission the patient was hemodynamically stable with signs of central and peripheral congestion. Electrocardiography showed sinus rhythm with left bundle branch block and secondary ventricular repolarization abnormalities (Figure 1). Transthoracic echocardiography revealed eccentric left ventricular hypertrophy with severely reduced left ventricular ejection fraction (LVEF 33%). Coronary angiography excluded significant coronary artery disease. Cardiac magnetic resonance (CMR) demonstrated meso–subendocardial late gadolinium enhancement (LGE) in the basal inferolateral wall, associated with diffuse elevation of native T1 values and extracellular volume (ECV), findings consistent with infiltrative cardiomyopathy. Given the suspicion of cardiac amyloidosis, a peri–umbilical fat pad biopsy was performed and the patient was discharged in relatively good conditions. One month later, she was readmitted due to central venous catheter (CVC) dysfunction caused by extensive central venous thrombosis, requiring catheter removal, percutaneous transluminal angioplasty with stent implantation in the superior vena cava, and subsequent CVC repositioning. Histological examination confirmed the presence of serum amyloid A (SAA) deposits in the periumbilical fat tissue. Follow–up echocardiography showed stable findings with LVEF equal to 33% with markedly reduced global longitudinal strain and a relative apical sparing pattern (Figure 2).**Conclusions:** Cardiac involvement in AA amyloidosis is rare and typically described in advanced stages of the disease. In our patient, the clinical history was dominated by renal failure of unknown origin, which rapidly progressed to end–stage renal disease requiring hemodialysis. The cardiac presentation occurred six years after dialysis initiation and became evident in the absence of a previously recognized inflammatory disease. The underlying inflammatory disorder is still under investigation, and the lack of an early etiological diagnosis likely delayed recognition of SAA amyloidosis. In this clinical context, advanced echocardiography and CMR played a pivotal role in the detection and characterization of cardiac involvement; most importantly, comprehensive cardiac phenotyping led to the diagnosis of a previously unrecognized systemic disease.

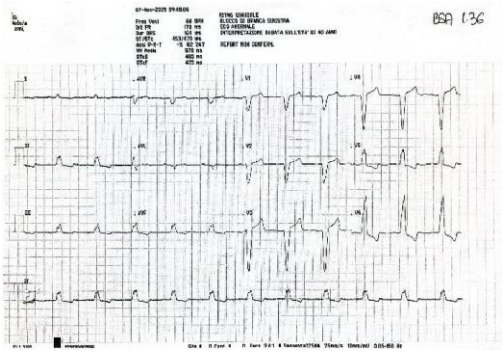

Figure 1

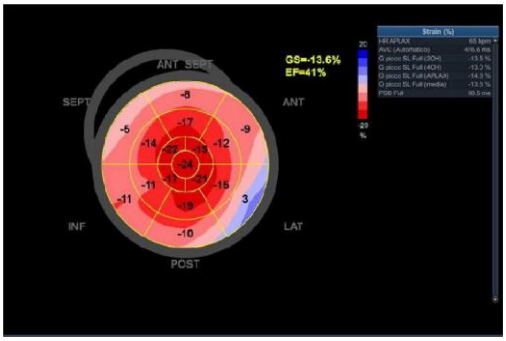

Figure 2

Abstract citation ID: suag058.101

BETWEEN DELAYED BENEFIT AND CLINICAL REBOUND – THE IMPORTANCE OF TIMING IN TAFAMIDIS THERAPY

G. Lattanzi, E. Trovarelli, F. Ricciutelli, C. Zuchi, A. Mengoni, G. Bardelli, R. Lauciello, S. D'Addario, and E. Carluccio
Azienda Ospedaliera Santa Maria Della Misericordia

Introduction: Wild–type transthyretin cardiac amyloidosis poses a therapeutic challenge, particularly in elderly patients, requiring a balance between clinical stability, treatment cost, and management complexity.
Case: In 2016, an 82–year–old male patient was admitted to the Cardiology ward after experiencing precordial pain. Coronary angiography was negative for significant coronary stenoses. Echocardiography revealed mild left ventricular hypertrophy (12 mm), reduced left ventricular ejection fraction (LVEF 30%), grade I diastolic dysfunction. NT–proBNP was 599 pg/ and troponin negative. In 2019, echocardiography showed increased thickness of the interventricular septum (18 mm), LVEF 35%, and NT–proBNP levels of 6070 pg/mL. Bone scintigraphy demonstrated Perugini grade 3, TTR genetic test and hematologic screening were negative. In 2022, stability was observed. After AIFA approval, Tafamidis therapy was initiated. After 24–months, the patient showed clinical stability: interventricular septal thickness decreased (16 mm) and LVEF increased to 40%. The patient remained NYHA class II, completed a 6–minute walking test of 300 m, had a KCCQ score of 75, and NT–proBNP levels decreased to 6200 pg/mL. In July 2024, Tafamidis was discontinued due to advanced age and patient preference. Within a few months, the patient experienced rapid clinical deterioration, with frequent hospital admissions for heart failure, progression to NYHA class III symptoms, and increasing diuretic requirements (up to 100 mg of furosemide per day). Echocardiography revealed severe biventricular dysfunction (EF 15%, TAPSE 10 mm), elevated filling pressures (E/e' 21). NT–proBNP and high–sensitivity troponin levels increased twofold (12,000 pg/mL and 84 ng/L) (Figure 1-2).
Discussion: Tafamidis has been shown to stabilize TTR tetramers, thereby preventing the formation of amyloid. However, it has also been demonstrated that this process concomitantly results in an increase in circulating TTR levels. Its abrupt discontinuation has been hypothesised to lead to rapid TTR deposition in myocardial tissue, potentially triggering acute decompensation (Figure 3).
Conclusion: This case demonstrates the capacity of Tafamidis to stabilise clinical status in ATTR–wt, but raises the alarm about a possible rebound effect after discontinuation. If confirmed, our hypothesis highlights the need for careful

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evaluation before initiating treatment in elderly and frail patients where any subsequent suspension could even be harmful.

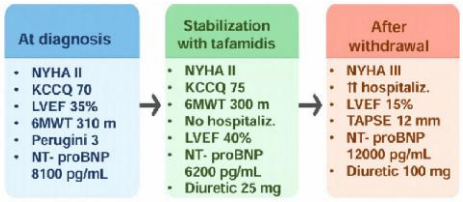

Figure 1

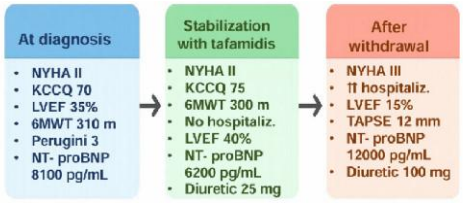

Figure 2

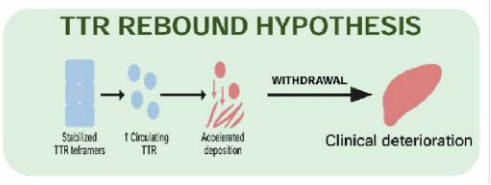

Figure 3

Abstract citation ID: suag058.102

THERAPEUTIC IMPACT OF VUTRISIRAN ON ATTR–CA: CLINICAL EXPERIENCE

I. Gianfrancesco, A. Nardone, S. Testa, D. Mandunzio, A. Viele, B. Cuzzola, F. D'Amico, N. Porchetta, A. Trivisonno, and A. Colavita
Ospedale Cardarelli

Vutrisiran is the first gene silencer to demonstrate clear clinical benefit. To date, vutrisiran has been approved for the treatment of ATTR with neuropathy following the positive results of the HELIOS–A study. The Phase 3 HELIOS–B study was developed to evaluate the drug's efficacy in patients with ATTR–CA. The results demonstrated a 28% reduction in all–cause mortality and cardiovascular events in the population treated with vutrisiran.

We present the case of a 59–year–old patient previously diagnosed with TTR amyloidosis due to the Val–Met 30 mutation with multisystem involvement. This is an extremely complex patient, with symptom onset at age 35 with paresthesias of the lower limbs and subsequent diagnosis of variant amyloidosis. He was therefore initiated on tafamidis with poor results. Approximately 2 years later, he underwent a liver transplant and began treatment with patisiran. Over the years, the neurological condition progressively worsened, leading to almost total disability, forcing the patient to use a walker or, alternatively, a wheelchair. Over the years, progressive infiltration of the myocardium and conduction system was observed, requiring the implantation of a dual–chamber PMK for MNSA. The echocardiogram showed a moderate reduction in global systolic function (EF 40%) with concentric wall hypertrophy (SIV 16 mm, PP 12 mm, DTD 45 mm) with apical sparing (GLS –9), right ventricular hypertrophy with preserved longitudinal function, and diffuse thickening of the valvular apparatus, Figure 1 and 2.

After several years of therapy with patisiran, the patient was switched to vutrisiran due to significant progressive polyneuropathy (as we know, to date, this drug is prescribed only by neurologists, despite the results of the HELIOS–B trial). The patient was referred for cardiac evaluation after two administrations of vutrisiran, reporting significant clinical improvement. At echocardiography, a striking improvement in global systolic function was observed, with a biplane EF of 52% and a GSL of –11% (at the previous follow–up, global systolic function was moderately reduced, EF 40%) Figure 3.

This case highlights the importance and efficacy of this new drug, which can significantly improve global systolic function, thus resulting in an improvement in quality of life and functional capacity.

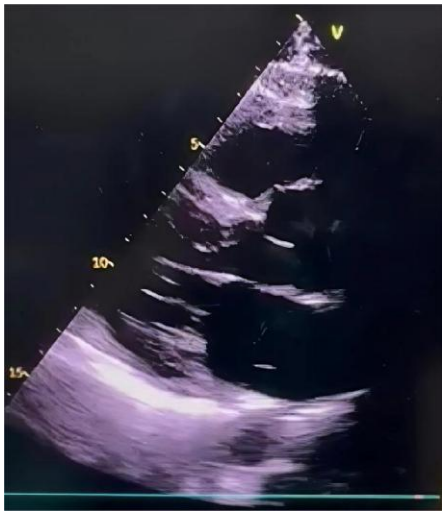

Figure 1: Markedly hypertrophic and dysfunctional left ventricular stenosis. Infiltration of the ventricle is evident.

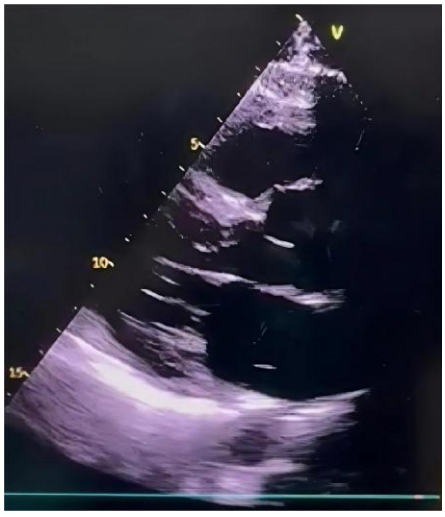

Figure 2: Parasternal long axis showing ventricular thickening.

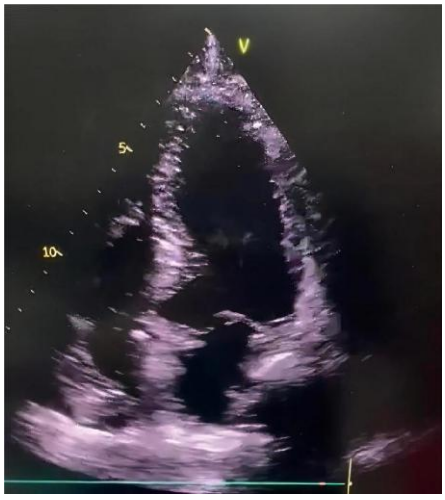

Figure 3: Apical 4-chamber showing left ventricular dysfunction and granular sparklink

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Abstract citation ID: suag058.103

MULTIMODALITY IMAGING FOR THE EVALUATION OF CARDIAC AMYLOIDOSIS IN A TTR MUTATION CARRIER

E. Belmonte, L. Arcari, G. Camastra, F. Ciolina, and L. Cacciotti
Ospedale Madre Giuseppina Vannini, Roma.

A 48–year–old woman carrying the heterozygous Glu89Gln mutation in the TTR gene, with a family history of hereditary transthyretin amyloidosis (hATTR), underwent cardiac evaluation. She was asymptomatic from a cardiac standpoint, aside from a prior bilateral carpal tunnel syndrome, a common early manifestation of ATTR amyloidosis. Cardiac biomarkers (troponin and NT–proBNP) and the ECG were within normal limits. Transthoracic echocardiography showed normal ventricular size and wall thickness (Figure 1A), preserved diastolic function (Figure 1B and 1C), a GLS of –20% (Figure 1D), and normal atrial strain (Figure 1E), with no evidence of infiltrative cardiomyopathy. Given her genetic background, cardiac magnetic resonance imaging was performed, revealing a mildly elevated native T1 (1059 ms) (Figure 1F), normal T2 values (Figure 1G), and an increased extracellular volume (ECV) of 32% (Figure 1H), consistent with early interstitial expansion. Late gadolinium enhancement demonstrated a non–ischemic pattern, most pronounced in the basal lateral wall (Figure 1I), along with biatrial enhancement (Figure 1J), findings suggestive of subclinical amyloid infiltration. 99mTc–DPD scintigraphy showed Perugini grade 2 myocardial uptake (Figure 1K), which—together with a pathogenic TTR mutation—allowed a non–biopsy diagnosis of ATTR cardiac amyloidosis according to the Gillmore algorithm. The patient was subsequently started on Tafamidis. This case highlights the pivotal role of multimodality imaging in TTR mutation carriers: while echocardiography, strain analysis, and biomarkers may remain normal in the earliest stages, CMR tissue mapping and bone–tracer scintigraphy enable the detection of subtle amyloid infiltration, supporting timely initiation of disease–modifying therapy.

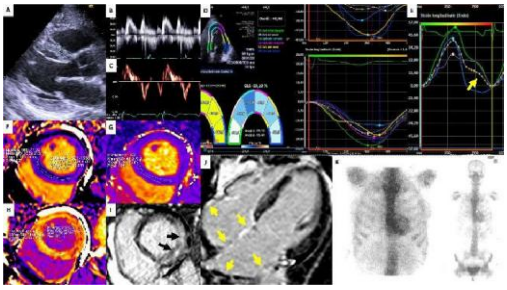

Figure 1

Abstract citation ID: suag058.104

MACROGLOSSIA AND PERIORBITAL PURPURA AS EARLY RED FLAGS OF AL AMYLOIDOSIS ASSOCIATED WITH MULTIPLE MYELOMA

M. Ghelardi, E. Giacomin, M. Focardi, M. Pastore, and M. Cameli
Aou Senese, Siena

Background: AL amyloidosis is a rare systemic disorder related to plasma cell dyscrasias and caused by deposition of monoclonal light chains. Cardiac involvement is the main prognostic determinant. Macroglossia is an uncommon manifestation, usually described in advanced disease stages.
Case Report: A 61–year–old woman with obesity (BMI 39), smoking history, hypertension, dyslipidemia, and hypothyroidism presented to her general practitioner with progressive macroglossia and periorbital and labial purpura lasting two months. Screening for amyloidosis red flags was positive for macroglossia, periorbital and labial purpura, previous bilateral carpal tunnel surgery, chronic constipation, and lower–limb sensory disturbances. Laboratory tests showed hemoglobin 11.9 g/dL, creatinine 0.56 mg/dL, NT–proBNP 171 ng/L, and high–sensitivity troponin 17 ng/L. Serum and urine immunofixation revealed markedly elevated free lambda light chains (1060 mg/L), without proteinuria. Genetic testing for transthyretin mutations was negative. Electrocardiogram was unremarkable. Transthoracic echocardiography showed mild concentric left ventricular hypertrophy with preserved systolic function (LVEF 55%), LV global longitudinal strain –17.7%, left atrial enlargement (LAVi 59 mL/m²), impaired atrial function (PALS 16%, PACS –8%), grade I diastolic dysfunction, and relative apical sparing (RELAPS 0.88). Minor salivary gland biopsy demonstrated Congo red–positive amyloid deposits. Bone marrow biopsy revealed IgG/lambda multiple myeloma with monoclonal plasma cell infiltration. Cardiac magnetic resonance excluded cardiac involvement.
Conclusions: This case highlights the importance of early recognition of AL amyloidosis red flags, even in the primary care setting. In the literature, macroglossia and periorbital purpura are usually described as late manifestations associated with poor prognosis. However, although rare, they may represent early clinical signs, allowing prompt diagnosis and potentially improving prognosis and therapeutic options.

Amyloidosis 2

Abstract citation ID: suag058.105

AGE IS NOT PROGNOSIS: THE VALUE OF MULTIDIMENSIONAL AND FUNCTIONAL ASSESSMENT IN AN OCTOGENARIAN WITH WILD–TYPE TRANSTHYRETIN CARDIAC AMYLOIDOSIS

G. Lanati, M. Di Dio, F. Di Spigno, D. Aschieri, E. Rocchelli, and G. Rusticali
Ausl Piacenza

An 88–year–old man with hypertension, dyslipidemia, mild glucose intolerance, and chronic kidney disease (eGFR ~40 ml/min) was reassessed for known wild–type transthyretin cardiac amyloidosis (ATTRwt), diagnosed in 2022 after an initial episode of heart failure. The patient remained clinically stable and currently reports no exertional dyspnea, consistent with NYHA Class I.

Physical examination was unremarkable, without signs of congestion. ECG showed sinus rhythm with low limb–lead voltages. Echocardiography confirmed a non–dilated left ventricle with severe concentric hypertrophy, preserved ejection fraction (57%), and reduced longitudinal strain with an apical sparing pattern. Right ventricular function was normal and no pulmonary hypertension was evident. Laboratory findings showed stable renal function and mildly elevated natriuretic peptides.

To obtain an objective measurement of physiological reserve and for prognostic stratification, the patient underwent cardiopulmonary exercise testing (CPET) using a 5 W/min ramp protocol. He achieved a peak oxygen consumption of 17.8 ml/kg/min (94% predicted) with an appropriate chronotropic response, normal rise in oxygen pulse, preserved ventilatory reserve, and a VE/VCO_2 slope of 29.7. CPET revealed a remarkably preserved exercise capacity, unexpected for his age and infiltrative cardiomyopathy.

This observation supports the concept that chronological age alone is insufficient to estimate prognosis, functional capacity, or therapeutic suitability in older adults with cardiac amyloidosis.

In this context, at AUSL Piacenza a multidimensional geriatric assessment has been incorporated into the pre–treatment evaluation pathway for cardiac amyloidosis, recognizing that frailty, cognition, functional status, and biological age provide a more realistic framework for decision–making. In particular, the use of the Multidimensional Prognostic Index (MPI) allows a validated, quantitative assessment of the patient's risk of developing adverse clinical outcomes. Within this pathway, CPET adds a crucial functional information, helping refine risk assessment and therapeutic eligibility.

Take–home message: Even in octogenarians, exercise capacity and global physiological reserve may be far better than expected. A multidimensional clinical and geriatric evaluation — complemented by CPET — helps avoid age–based therapeutic exclusion and supports individualized, evidence–based care in cardiac amyloidosis.

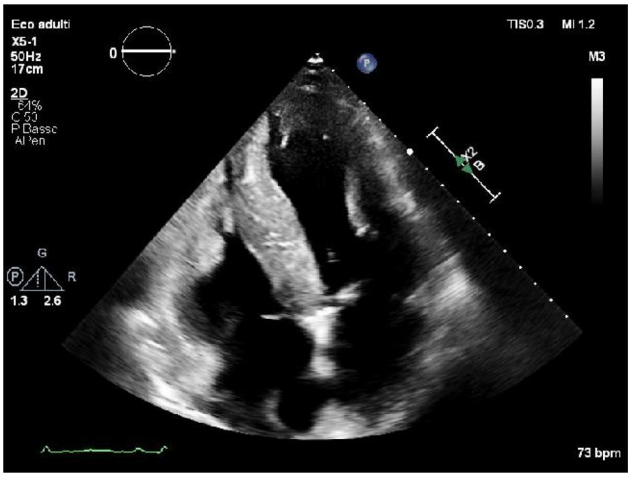

Figure 1. Transthoracic echocardiography (apical four-chamber view) showing marked concentric LV hypertrophy consistent with cardiac amyloidosis

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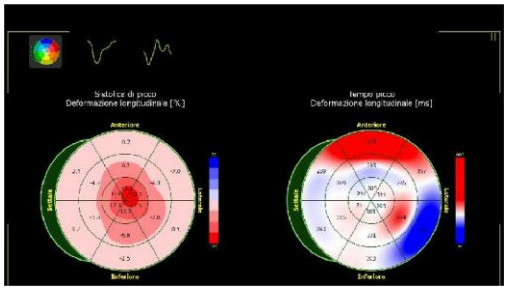

Figure 2. Speckle-tracking longitudinal strain bull's-eye plot showing reduced GLS with apical sparing

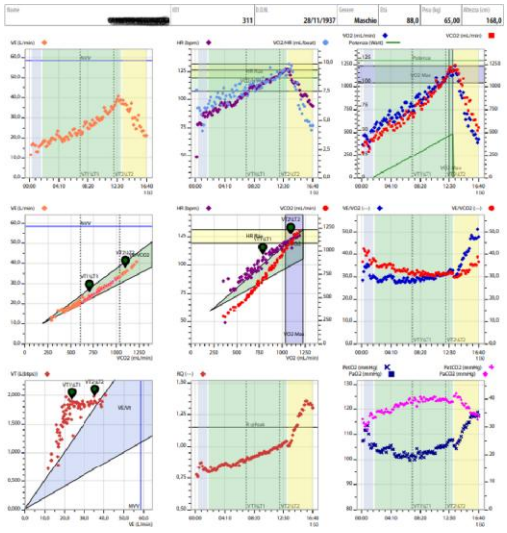

Figure 3. CPET summary plots showing preserved exercise capacity: peak VO_2 17.8 mL/kg/min (94% predicted) and VE/VCO_2 slope 29.7

Abstract citation ID: suag058.106

CARDIAC AMYLOIDOSIS IN OLDER ADULTS AGED ≥80 YEARS: REAL–WORLD CLINICAL AND BIOMARKER STABILITY WITH TAFAMIDIS

A. Risoli, F. Re, F. Albi, G. Halasz, G. Giacalone, F. D'Ignazio, F. Andreoli, E. Serafini, M. Antocicco, M. Ciaburri, L. Alessandrini, G. Artuso, G. Ozino Caligaris, D. Pellerani, F. Casella, C. Corcione, V. Ingrosso, F. Landi, G. Zuccalà, and D. Gabrielli
Policlinico Universitario "Agostino Gemelli"; Azienda Ospedaliera San Camillo–Forlanini; Azienda Ospedaliera San Camillo – Forlanini; Policlinico Universitario "S. Andrea"

Background: Transthyretin cardiac amyloidosis (ATTR–CM) is an increasingly recognised cause of heart failure in older adults, but real–world data in patients aged ≥80 years are limited.
Methods: A retrospective analysis was conducted on a real–world cohort of patients aged ≥80 years with cardiac amyloidosis, as part of routine clinical practice in Amyloidosis referral center in S. Camillo–Forlanini Hospital in Rome. A comprehensive data set was collected at the time of the initial evaluation and at the subsequent follow–up, as defined by the first available clinical reassessment following the initial evaluation during routine clinical practice. This included clinical characteristics, echocardiographic findings, biomarkers, electrocardiographic features and medical therapy. The functional status and cognitive performance of the subjects were systematically assessed.
Results: The population included 12 male patients with a median age of 82 years (IQR 80–85); follow–up data were available for 7 patients. At baseline, all patients were independent in activities of daily living and had preserved cognitive function. Symptoms of decompensation were frequent, with moderate to severe dyspnoea in approximately 75% of cases and peripheral oedema in over 80%. Left ventricular ejection fraction was generally preserved (median 52.5%), with increased wall thickness and typical echocardiographic findings of amyloidosis, including apical sparing. NTproBNP levels were markedly elevated. All patients with available data were treated with tafamidis, combined with diuretics and, in most cases, SGLT2 inhibitors. During the 6– and 12–month follow–up, despite incomplete data, there was no evidence of accelerated disease progression. NT–proBNP levels were stable or reduced in most patients (Figure A), left ventricular systolic function remained stable (Figure B), and a descriptive improvement in congestive symptoms was observed (Figure C). There were no deaths or hospitalisations for heart failure.
Conclusions: In this real–world cohort of older adults aged ≥80 years with cardiac amyloidosis who were functionally and cognitively preserved, a contemporary therapeutic strategy was associated with clinical and biomarker stability over time. Despite the limits imposed by the sample size and incomplete follow–up data, our findings support the hypothesis that advanced age per se should not be considered a contraindication for active treatment.

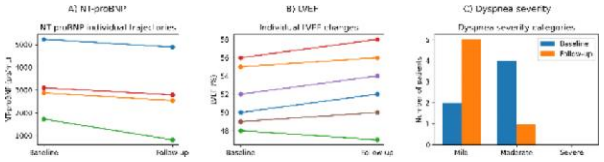

Figure 1

Abstract citation ID: suag058.107

THE IMPORTANCE OF DIAGNOSIS

S. Testa, I. Amaranto, D. Mandunzio, and A. Colavita
Ospedale Cardarelli, Napoli

Cardiac TTR amyloidosis is an increasingly common diagnosis in the geriatric population. Although age is often a confounding factor, timely diagnosis remains crucial, especially in hereditary forms, due to its implications for family screening. This is why it is important to avoid diagnostic delays in patients who are often overlooked due to age–related comorbidities.

We present the case of an 87–year–old patient who was admitted to the emergency room following an accidental fall with evidence of shoulder swelling and a high fever. Blood tests revealed increased inflammation markers (PCT 1.9 pg/ml, CRP 393 mg/dl, and neutrophilic leukocytosis). The patient was therefore admitted to the Infectious Diseases Unit with suspected septic arthritis. An MRI of the shoulders was performed, revealing severe acromioclavicular osteochondropia with abundant joint effusion and synovial capsule impregnation. Blood cultures revealed S. aureus MRSA. A cardiac evaluation was requested to exclude vegetations affecting the valvular system. The echocardiogram showed marked ventricular hypertrophy (SIV 18 mm, PP 12 mm) with apical sparing (GLS –9%) as indicated by infiltrative disease. The right ventricle was hypertrophic (9 mm) with preserved longitudinal function (S wave 13 cm/s). Papillary muscle hypertrophy was present. Global and segmental systolic function was preserved (estimated EF 55%). Grade III diastolic dysfunction (E/e' average 33). Biatrial dilation, thickening of the atrial fibrillation and valvular apparatus were present, but no significant flow changes were noted. Figure 1 and 2. Despite her advanced age, a bone scan was performed, revealing a pattern compatible with ATTR amyloidosis (Perugini score 3), and blood tests were within normal limits. Genetic testing was also performed, which surprisingly proved positive for the IL–68–Leu mutation.

This diagnosis allowed for the initiation of family screening, which revealed the presence of the same mutation in two of her children. This clinical case highlights the importance of diagnosis even in very elderly patients, as an accurate diagnosis can have significant therapeutic and prognostic implications, especially in the family setting.

Figure 1

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Figure 2

Abstract citation ID: suag058.108

CENTRAL NERVOUS SYSTEM INVOLVEMENT IN CARDIAC AMYLOIDOSIS: REDEFINING THE HEART–BRAIN AXIS

D. Giamundo, G. Cassataro, S. Ministrini, and S. Stämpfli
Policlinico Casilino; Università Degli Studi Di Palermo; Center for Molecular Cardiology, University of Zurich

Background: Amyloidosis is characterised by the extracellular accumulation of misfolded proteins forming amorphous aggregates called amyloid (Figure 1). Cardiac amyloidosis results from myocardial involvement in systemic amyloidosis, leading to impaired heart function (Figure 2). Besides myocardial involvement, cardiac amyloidosis may also directly and indirectly affect the central nervous system (Figure 3).
Methods: This narrative review summarises current evidence about on central nervous system involvement in cardiac amyloidosis and the pathophysiological mechanisms linking heart and brain in the context of this systemic disease.
Results: Although the pathophysiological relationship between cardiac amyloidosis and cognitive decline remains poorly understood, central nervous system involvement likely results from the complex interplay of direct amyloid deposition, cerebrovascular changes, and cardiac dysfunction.
Conclusion: The growing awareness of cognitive impairment in patients with cardiac amyloidosis highlights the need for further research and supports a multidisciplinary approach in the assessment and management of affected individuals.

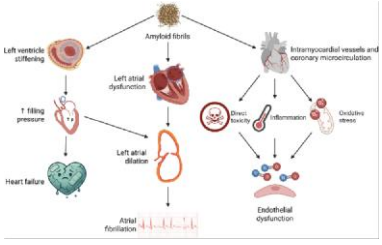

Figure 1

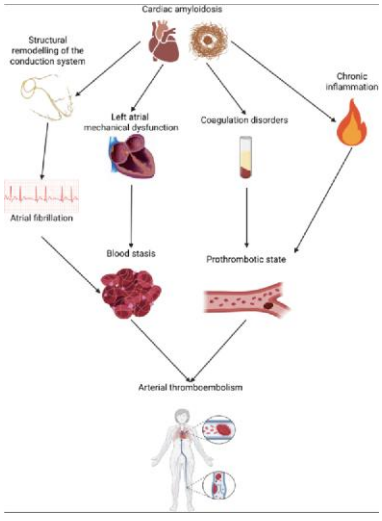

Figure 2

	Alzheimer's disease	Cerebral amyloid angiopathy	Transthyretin amyloidosis
Cortical atrophy	✓	✘	✘
Intracellular tangles	✓	✘	✘
Peri-vascular amyloidosis	✘	✓	✓
Capillary amyloidosis	✘	✓	✘
Involvement of meningeal vessels	✘	✓	✓
Patchy pattern	✓	✓	✘
Spatial–temporal progression pattern	✘	✘	✓
Micro-bleedings	✘	✓	✓
Ischemic stroke and micro-infarctions	✘	✘	✓
White matter disease	✘	✓	✘
Basal ganglia involvement	✘	✘	✓
Hippocampal and amygdala involvement	✓	✘	✘

Figure 3

Abstract citation ID: suag058.109

THE CALM BEFORE THE STORM: RAPID PROGRESSION AND HEMODINAMIC FRAGILITY IN ATTRWT AMYLOIDOSIS

S. Vago, R. Barone, A. Guidorossi, F. Russo, F. Barocelli, L. Vignali, and G. Niccoli
Ospedale Maggiore Di Parma; Emilia Romagna

Wild–Type Transthyretin Amyloidosis (ATTRwt) is a progressive infiltrative cardiomyopathy, often preceded by typical extracardiac manifestations that can serve as early diagnostic red flags. While the cardiac phenotype is carachterised by concentric hypertrophy and is thus restrictive, management is frequently complicated by hemodynamic fragility that limits the use of standard heart failure therapies.

We report the case of a 74–year–old man with a revealing history of bilateral carpal tunnel syndrome and of trigger finger syndrome. After a prolonged preclinical phase, the clinical scenario rapidly evolved: he presented with paroxysmal atrial fibrillation, rate–dependent left bundle branch block, and sudden overt heart failure symptoms (NYHA class II) with an ejection fraction declining to 46%.

Transthoracic echocardiography (Figure 1 – 2) showed severe concentric left ventricular hypertrophy (IVS 19 mm), pathognomonic apical sparing and granular sparkling. Cardiac Magnetic Resonance (CMR) (Figure 3) confirmed the diagnosis (IVS 23 mm, extensive diffuse LGE, ECV 52%). DPD scintigraphy showed a Perugini score of 3, while genetic testing excluded TTR variants, thus confirming ATTRwt. Pharmacological management proved challenging due to hemodynamic fragility: significant hypotension required suspension of angiotensin receptor blockers and of loop diuretics. Disease–modifying therapy with Tafamidis was initiated alongside an SGLT2i (Dapagliflozin), later interrupted for a relapsing fungal infection. Strict cardiovascular risk factor control was implemented (non–critical coronary atherosclerosis on Cardiac CT).

This case highlights a specific trajectory of ATTRwt characterized by a prolonged period of clinical quiescence, where orthopedic history provided red flags, followed by a rapid onset of the cardiac manifestations. We also aim to highlight the complex therapeutic balance required in these patients: standard heart failure therapy is often poorly tolerated due to hemodynamic fragility, necessitating an approach focused on disease–modifying agents.

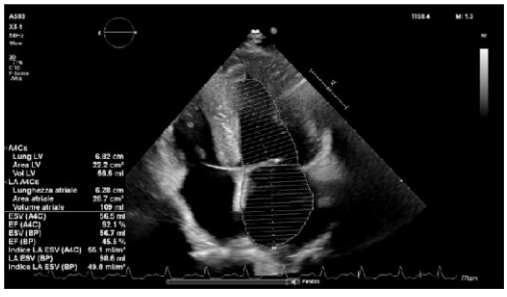

Figure 1: Transthoracic Echocardiography, Apical 4-Chamber view. Assessment of left ventricular systolic function using Simpson's biplane method. The image reveals a mildly reduced Left Ventricular Ejection Fraction (LVEF 46%) relative to the preservation of cavity volumes, marking the onset of overt heart failure symptoms

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Figure 2: Transthoracic Echocardiography, Parasternal Long-Axis (PLAX) view. The scan demonstrates severe concentric left ventricular hypertrophy with an interventricular septal thickness of 19 mm. The myocardium exhibits the characteristic texture suggestive of infiltrative cardiomyopathy

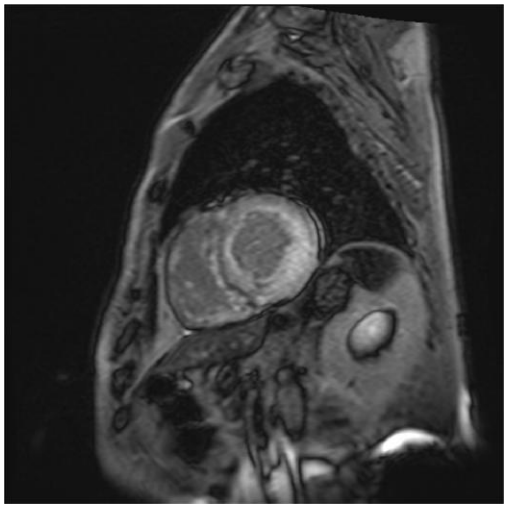

Figure 3: Cardiac Magnetic Resonance (CMR), Short-Axis view. Late Gadolinium Enhancement (LGE) sequence showing diffuse, circumferential subendocardial and transmural enhancement associated with severe wall thickening (IVS 23 mm). These findings, combined with an elevated Extracellular Volume (ECV 52%), are pathognomonic for cardiac amyloidosis.

Abstract citation ID: suag058.110

A NON–CASE OF HEREDITARY TRANSTHYRETIN AMYLOIDOSIS WITH A VAL142LEU MUTATION IN A YOUNG AFRICAN–AMERICAN HEMODIALYZED PATIENT

S. Rosania
S.C. S.S. Annunziata, Taranto.

Background: Cardiac amyloidosis in individuals of African ancestry is most commonly associated with the autosomal dominant transthyretin (TTR) gene variant Val142Ile, which is linked to an age–dependent increase in heart failure risk. This has relevant implications for early screening.
Purpose: A 26–year–old African male on chronic hemodialysis since 2020 underwent renal biopsy, which revealed advanced chronic kidney disease. In 2024, cardiac evaluation raised suspicion of restrictive cardiomyopathy (Figure 1). Transthoracic echocardiography showed mild left ventricular systolic dysfunction with an apical sparing pattern and severely reduced global longitudinal strain (GLS 10%). Cardiac magnetic resonance demonstrated diffuse left ventricular hypokinesia with reduced ejection fraction, late gadolinium enhancement of the inferolateral wall, mid–basal anterior septum, inferior septum, and mid–lateral wall, along with increased native T1 mapping values. Bone scintigraphy (Figure 2) showed no myocardial tracer uptake. Serum and urine protein electrophoresis and immunofixation were negative for monoclonal components. Genetic testing identified a pathogenic TTR Val142Leu mutation. Based on imaging findings, a provisional diagnosis of hereditary transthyretin amyloid cardiomyopathy with a cardiac phenotype (NAC stage 3) was considered. To confirm amyloid deposition, abdominal fat pad biopsy was performed but was non–diagnostic. Subsequent ^18F–flutemetamol PET/CT showed no evidence of myocardial amyloid deposition. Endomyocardial biopsy was also negative for amyloid on Congo red staining and immunohistochemistry.
Conclusion: Despite the presence of a pathogenic TTR mutation and imaging findings suggestive of amyloid cardiomyopathy, extensive multimodal evaluation failed to demonstrate amyloid deposition and disease–modifying therapies were not initiated.

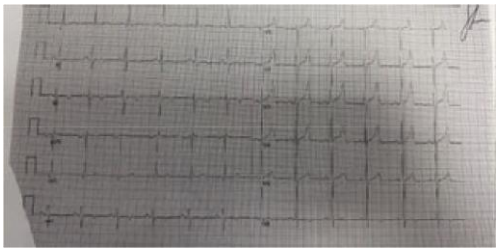

Figure 1

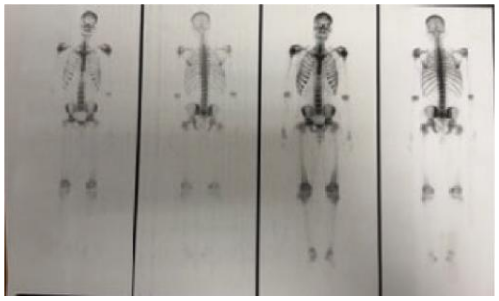

Figure 2

Abstract citation ID: suag058.111

HYPOPERFUSION–INDUCED MYOPATHY IN A PATIENT WITH WILD–TYPE TRANSTHYRETIN CARDIACA AMYLOIDOSIS: A CASE REPORT

G. Lanati, F. Di Spigno, F. Giangregorio, D. Aschieri, and G. Rusticali
Ausl Piacenza

An 84–year–old man with wild–type transthyretin cardiac amyloidosis (ATTRwt), permanent atrial fibrillation and moderately reduced ejection fraction (baseline LVEF 40%) was admitted with progressive dyspnea, fatigue and poor oral intake. On arrival he showed atrial fibrillation with rapid ventricular response (150 bpm), pulmonary congestion and signs of right–sided overload. Laboratory tests revealed a marked rise in NT–proBNP (27,648 pg/mL), mild troponin elevation, elevated lactate levels and worsening renal and hepatic function, consistent with acute decompensated heart failure with low–output features.

During the first days of hospitalization, the patient developed severe quadriceps pain with a significant elevation of creatine kinase (peak 1,251 U/L) and positive urine myoglobin. Trauma, drugs and inflammatory myopathies were excluded. In the context of clinical hypoperfusion and systemic congestion, a diagnosis of ischemic hypoperfusion myopathy was considered. Continuous intravenous diuretics and cautious hydration were initiated to restore effective perfusion. Over the following days, diuresis improved markedly, renal and hepatic indices normalized, and CK levels gradually returned to baseline. The patient regained autonomous ambulation and entered a low–intensity cardiac rehabilitation program.

Once he achieved hemodynamic stabilization, he remained clinically fragile and hypotensive, with a history of intolerance to ACE inhibitors. In this “vulnerability window,” vericiguat was initiated at 5 mg according to the Velocity protocol. The drug was well tolerated without blood pressure reduction. In the subsequent weeks, NT–proBNP progressively declined to baseline values, renal and hepatic function normalized, CK levels remained stable and no further arrhythmic events occurred. The patient reported improved exercise tolerance and absence of congestion.

This case highlights two key aspects. First, ischemic hypoperfusion myopathy is a rare, underrecognized complication in low–output ATTRwt cardiomyopathy and should be suspected in the presence of acute CK elevation and muscle pain. Second, vericiguat may represent a safe therapeutic option in fragile amyloid patients who are unable to tolerate neurohormonal blockade. Although ATTR patients were excluded from the VICTORIA trial, real–world experience suggests good tolerability and potential benefit in consolidating post–acute stabilization.

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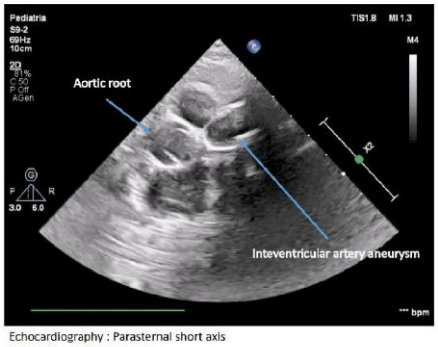
Pediatric Arrhythmias

Abstract citation ID: suag058.112

RESIDUAL INFLAMMATORY ACTIVITY AFTER INTRAVENOUS IMMUNOGLOBULIN THERAPY AND RISK OF ANEURYSMS IN KAWASAKI DISEASE: A MONOCENTRIC EXPERIENCE

M. Cardillo, M. Sanfilippo, and C. Comparato
Ospedale Dei Bambini G. Di Cristina, Palermo.

Introduction: Kawasaki disease (KD) is a systemic vasculitis of childhood in which the response to intravenous immunoglobulin (IVIG) therapy represents a crucial determinant for the prevention of cardiovascular complications. A non–negligible proportion of patients shows an incomplete response or resistance to treatment, reflecting persistent vasculitic activity.
Materials and Methods: We conducted a monocentric retrospective observational study including 14 consecutive pediatric patients diagnosed with KD. Clinical, laboratory, and cardiological features at disease onset and during follow–up were analysed. Resistance to IVIG was defined as persistence or recurrence of fever, or the development of aneurysms after the first IVIG infusion.
Results: The mean age at diagnosis was 3.3 years (range 7 months–6 years), with a mean duration of fever before treatment of 9.5 days. Baseline laboratory findings showed leukocytosis (~17,000/μL), elevated C–reactive protein (~9.2 mg/dL), and a tendency toward hypoalbuminemia (~3.4 g/dL). Incomplete or atypical KD was observed in 30.8% of the cohort. IVIG resistance occurred in 38.5% of patients, requiring a second IVIG infusion or steroid therapy. Among negative prognostic factors, delayed diagnosis and treatment, marked hypoalbuminemia, and elevated pro–BNP and troponin levels emerged as relevant. Notably, in a single patient, the persistence of leukocytosis, thrombocytosis, and conjunctival inflammation/lip fissuring after the first IVIG cycle —despite normalization of CRP and procalcitonin levels and resolution of fever— was associated with the late development of coronary aneurysms and was interpreted as a sign of residual vasculitic activity.
Conclusions: In our case series, beyond established severity markers, the lack of normalization of apparently “minor” clinical and laboratory findings —such as persistent thrombocytosis and conjunctival inflammation/lip fissuring— may represent indicators of ongoing active vasculitis and incomplete response to IVIG. Careful clinical and laboratory monitoring after the first IVIG infusion may support earlier and more personalized therapeutic decisions in KD patients at high cardiovascular risk.



Echocardiography : Parasternal short axis
Severe Coronary Aneurysm

Figure 1: Transthoracic Ecocardiography parasternal short axis. Giant aneurysm of the coronary artery.

Clinical caracteristics

Characteristic	Value
Age at diagnosis, years	3.3 (range 0.6–6)
Male sex, n (%)	NR
Fever duration before treatment, days	9.5
Complete form, n (%)	9 (69.2%)
Incomplete/atypical form, n (%)	4 (30.8%)
High-risk patients, n (%)	46.1%
IVIG resistance, n (%)	38.5%

Laboratory Parameters

Parameter	Mean value
White blood cells (×10³/μL)	~17.0
C-reactive protein (mg/dL)	~9.2
Albumin (g/dL)	~3.4
BNP / pro-BNP (pg/mL)	Elevated in high-risk cases
Troponin	Elevated in selected cases
Procalcitonin	Markedly elevated in severe cases

Figure 2: Table with clinical characteristics and laboaratory parameters of the patients

Abstract citation ID: suag058.113

PERSISTENT VENTRICULAR PRE–EXCITATION AS A REVERSIBLE CAUSE OF LEFT VENTRICULAR DYSSYNCHRONY AND SYSTOLIC DYSFUNCTION IN A PEDIATRIC PATIENT

M. Cardillo, A. Mondello, M. Sanfilippo, and C. Comparato
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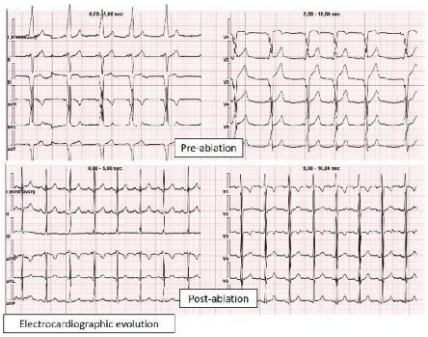
Introduction: Considering ventricular pre–excitation exclusively as an electrical disorder may be reductive, as it overlooks the close relationship between electrical activation and mechanical cardiac function. Persistent ventricular pre–excitation may lead to left ventricular dyssynchrony, resulting in global or regional systolic dysfunction and justifying an interventional approach even in the absence of documented arrhythmias. We describe the case of a pre–adolescent patient who developed ventricular dysfunction secondary to ventricular pre–excitation.
Case presentation: A 12–year–old boy with a history of constant ventricular pre–excitation for approximately five years, without documented arrhythmias, had been treated for about one year with low–dose flecainide due to recurrent palpitations. Cardiological re–evaluation revealed left–sided ventricular pre–excitation on surface electrocardiogram. Transthoracic echocardiography showed a left ventricle of normal size, with mildly reduced global systolic function and dyskinesia of the inferior wall. Exercise stress testing demonstrated persistence of ventricular pre–excitation up to high heart rates (maximum heart rate 180 bpm), consistent with a high–risk accessory pathway. Based on the overall clinical picture, defined not only by electrocardiographic but also by echocardiographic findings, a multidisciplinary decision was made to proceed with an electrophysiological study and transcatheter ablation of the accessory pathway. Post–procedural evaluation demonstrated disappearance of ventricular pre–excitation on surface electrocardiogram, with repolarization abnormalities consistent with the electrical memory phenomenon. Echocardiography documented resolution of basal inferior wall dyskinesia and recovery of global systolic function. The patient was discharged in good general condition, without antiarrhythmic therapy.
Conclusions: This case highlights that persistent ventricular pre–excitation, even in the absence of documented arrhythmias, may lead to left ventricular dyssynchrony with subclinical systolic dysfunction, which is potentially reversible after catheter ablation. Persistence of anterograde conduction at high heart rates represents a key element in risk stratification, but should not be considered the sole criterion guiding the indication for electrophysiological study and ablative treatment in the pediatric population.

Echocardiography 2 chmber view: Diskynesia of the inferiore left ventricular wall

Figure 1: Confrontation of pre-ablation and post-ablation electrocardiograms



Electrocardiographic evolution

Figure 2: Transthoracic echocardiography apical 2 chamber view: Diskynesia of the basal inferior left ventricular wall

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Abstract citation ID: suag058.114

RIGHT ATRIAL CARDIONEUROABLATION OF ASYSTOLIC REFLEX SYNCOPE

D. Giamundo, L. Calò, M. Rebecchi, E. De Ruvo, M. Tomaino, M. Iori, A. Del Rosso, V. Russo, and M. Brignole
Policlinico Casilino; Ospedale Di Bolzano; Azienda Ospedaliera S. Maria Nuova, Reggio Emilia; Ospedale S. Giuseppe, Empoli; Università Degli Studi Della Campania Luigi Vanvitelli; Irccs Istituto Auxologico Italiano, Faint and Fall Research Centre, S. Luca Hospital, Milano

Background: Cardioneuroablation (CNA) should focus on the vagal ganglia located in the right atrium close to the sinoatrial and the atrioventricular nodes.
Objective: The study aimed to evaluate the efficacy and safety of right atrial CNA.
Methods: Patients with severe, asystolic reflex syncope identified by implantable loop recorder (ILR) or tilt testing underwent right atrial CNA and were subsequently monitored using ILR.
Results: The population included 28 patients with a mean age of 40.5 ± 13.4 years, of whom 71% were men. Over a median follow–up period of 12.5 months, 8 patients experienced 44 episodes of asystole lasting longer than 3 seconds, as recorded by an ILR. The burden of asystolic episodes significantly reduced from 0.89 episodes per month before CNA (145 over 163 patient–months) to 0.11 episodes per month after CNA (44 over 397 patient–months), with a relative risk reduction of 0.12, P = .0001 (Figure 1). Similarly, the burden of syncopal episodes decreased from 0.23 episodes per month before CNA to 0.06 episodes per month after CNA, resulting in a relative risk reduction of 0.24, P = .0001 (Figure 2). Median heart rate increased from 75 bpm (interquartile range: 72–79) before ablation to 83 bpm (interquartile range: 78–85) after ablation, lasting up to 9 months post–procedure (Figure 3). No patients experienced complications during the procedure. During follow–up, 2 patients received pacemakers, 1 underwent a redo procedure, and 4 experienced mild transient symptoms: 3 had palpitations and 1 had dyspnea, none requiring therapy (Figure 4).
Conclusion: Right atrial CNA reduced asystolic episodes by 88% and syncopal episodes by 76% during the mid–term follow–up. Adverse events were infrequent and mild.

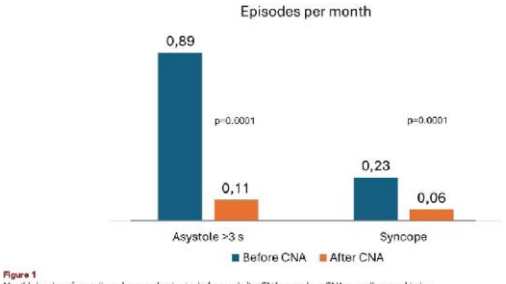

Figure 1
Monthly burden of asystolic and syncopal episodes before and after CNA procedure. CNA = cardioneuroablation.

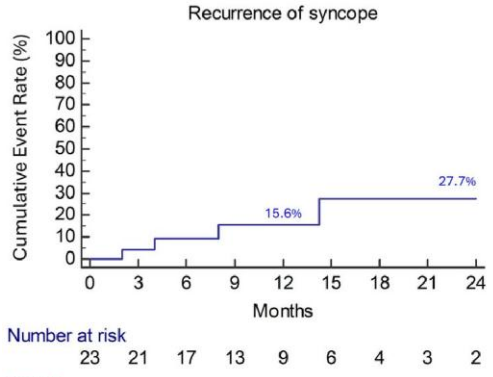

Figure 2
Kaplan-Meier estimated recurrence rate of syncope after CNA. CNA = cardio-neuroablation.

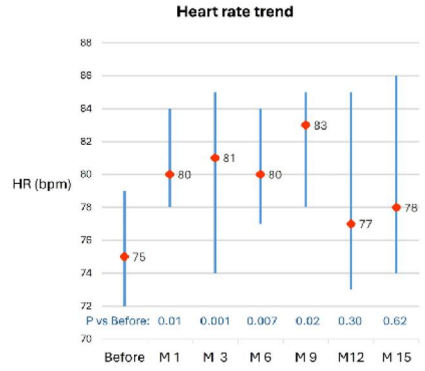

Figure 3
Heart rate (HR) trend. HR is reported as the median (red bullets) and interquartile range (blue vertical lines) over 30-day periods: the month before ablation, the month immediately after ablation (M1), and months 3 (M3), 6 (M6), 9 (M9), and 12 (M12). Monthly HR is the median HR (with its interquartile range) of each patient over 30 days. The Wilcoxon matched-pair test compared intra-individual values.

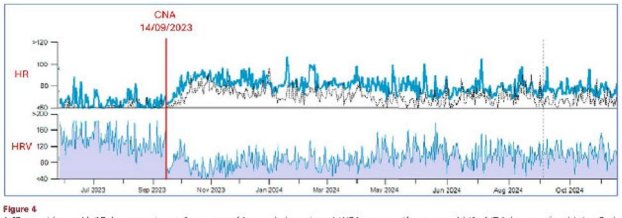

Figure 4
A 47-year-old man with ILR-documented asystolic syncopes of 6 seconds showed a rapid HR increase and heart rate variability (HRV) decrease after ablation. Peak variations were observed after 2 months, gradually reducing over the next year but still present after 14 months. CNA = cardioneuroablation; HR = heart rate; ILR = implantable loop recorder.

Abstract citation ID: suag058.115

A STRANGE CASE OF SYNCOPE IN A PATIENT WITH UNKNOWN CARDIOVASCULAR RISK

A. Damiani Tripolino, I. Fabiani, G. Boccia, C. Ferrante, B. Squitieri, and I. Enea
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Syncope is characterized by a transient loss of consciousness occurring because of a self–limited and spontaneously terminating period of global cerebral hypoperfusion. Fainting, in an alcoholic, can be caused by several factors related to alcohol abuse, including heart problems, dehydration, hypoglycemia, or alcohol withdrawal syndrome [Figure 1].**Description:** A 60–year–old man was admitted from the emergency room with a diagnosis of «recurrent syncope in a patient with a history of alcohol abuse». After a more detailed anamnesis, the patient denied recent alcohol abuse. In his medical history: obesity, hypertension, type II diabetes mellitus in decompensation, diabetic polyneuropathy, previous hospitalization for loss of consciousness attributed to a probable "tonic–clonic seizure in a non–epileptic patient", essential tremor. In the emergency room, a cranial CT scan was performed, negative for acute episodes. On admission the patient was haemodynamically stable, blood tests showed hyperglycemia, hypertrygliceridemia and hypercholesterolemia.

The following were performed: Holter ECG (absence of noteworthy arrhythmic episodes); echocolordoppler of the supra–aortic trunks (right ICA 65% stenosis); echocardiogram (apical hyperechogenic oval formation of approximately 1 cm, in the absence of angina symptoms or confirmed previous ischemic episodes). Warfarin and clopidogrel therapy was started and lipid–lowering and hypoglycemic therapy was optimized while awaiting evaluation with cardiac MRI, which showed "outcomes of anteroseptal transmural ischemia and fibrocalcific blood clot in the apical area". Subsequently, anticoagulant therapy was modified by introducing rivaroxaban in place of warfarin, in accordance with the clinical evidence of the RIVAWAR study [Figure 2].
Conclusions: Syncope may involve multiple etiologies operating simultaneously. The multiple syncopal episodes, initially related to a history of potus and diabetic neuropathy, were later diagnosed as having atherosclerotic vascular and cardiac etiology, in the context of the progression of metabolic syndrome, resulting in a perfect example of continuity between thrombotic and cardiovascular risk. Antiplatelet and anticoagulant therapy, along with adequate lipid–lowering and hypoglycemic therapy, were set and adequate over time. The patient is undergoing follow–up at our center.
Acknowledgements: [1]. Benditt DG et al. Phys Rev 2025 Jan [2]. JA Shah et al. RIVAWAR an Open–Label RCT. JACC Adv 2025 Aug.

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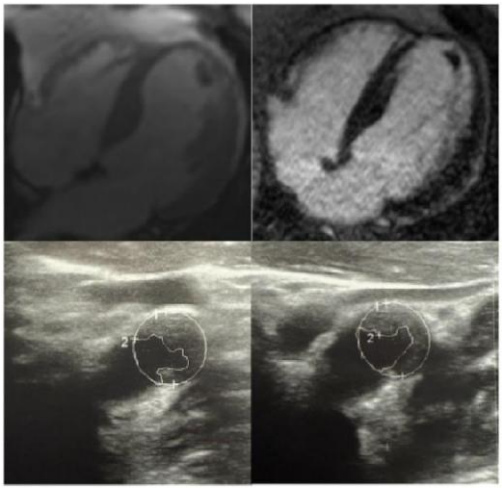

Figure 1

Laboratory tests	
Hemoglobin	15,7 gr/dL [14,0 – 17,5]
Glycated hemoglobin	7,91 % [4,00 – 6,00]
Creatinine	0,81 mg/dL [0,67 – 1,20]
Homocysteine	31,8 umol/L [6,26 – 15,01]
Total cholesterol	297 mg/dL [30 – 200]
HDL cholesterol	54 mg/dL [35 – 120]
LDL cholesterol	200 mg/dL [< 135]
Triglycerides	280 mg/dL [< 200]
Troponin I	< 0,100 ng/ml [0,00 – 0,16]

Figure 2

Abstract citation ID: suag058.116

INTER–ATRIAL DISSOCIATION DURING SINUS RHYTHM: A CASE REPORT

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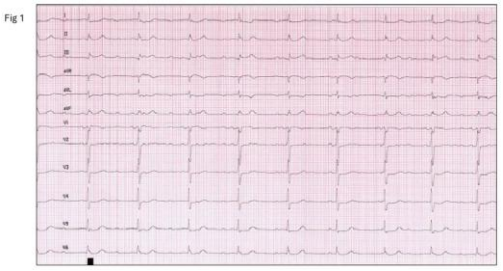
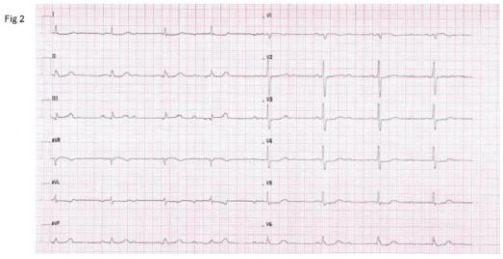
Cardiologia Dell'ulss 4 Veneto Orientale, San Dona' Di Piave

Case presentation: Male, 65 years old T2DM Iperlipidemia. In 2009 undergone aortic valve replacement with a mechanical valve (+ CABG with LIMA on left anterior descending artery) for severe aortic valve stenosis. At discharge sinus rhythm; EF 60%. Follow up: 2017 EF 40%. In the 2022 atrial fibrillation occurred; at Echo: severe atrial enlargement (59 mm x 59 mm). Scheduled for a single attempt of elective electrical cardioversion (amiodarone started). Immediately after cardioversion the first repetitive ECG show a double atrial activity as shown in the figure 1 and 2
Discussion: 1) The ECG shows: Sinus rhythm with a P wave morphology suggesting probably a para–sinusal origin A second atrial activity is present with a stable cycle length and dissociation from the basal sinus rhythm. The polarity and morphology of the P waves of the second atrial dissociated rhythm suggest a left atrial origin (negative in D1 aVL).

The hypothesis proposed is that an interatrial dissociation is present and might be probably due to Bachmann bundle conduction block, beside the effect of amiodarone. It can be also discussed that a Bachmann jatrogenic block might be due the surgical sewing around the right atrial cannulation for extracorporeal circulation for cardioplegia, which may impair the interatrial connection via Bachmann bundle.

Moreover, in some cases a retrograde cardioplegia (coronary sinus balloon cannulation) is needed; it may also impair the interatrial connection via coronary sinus. Unfortunately, the surgical report of the patient is not available.
Conclusion: The case shows a sinus rhythm with a second atrial activity with a stable slow cycle length and consequently inter–atrial dissociation.





Ventricular Arrhythmias 1

Abstract citation ID: suag058.117

NOT SO IDIOPATHIC: RVOT TACHYCARDIA AS A HERALD OF ARRHYTHMOGENIC CARDIOMYOPATHY NOT SO IDIOPATHIC: RVOT TACHYCARDIA AS A HERALD OF ARRHYTHMOGENIC CARDIOMYOPATHY

R. Calvanese, C. Capobianco, P. Maddaluna, G. Izzo, F. Dell'Aversana, C. Cascone, and B. Tuccillo
Ospedale Del Mare, Napoli; Ospedale Generale Regionale Miulli; Abbott Medical Italy

Background: Ventricular tachycardia (VT) with a left bundle branch block (LBBB) morphology and inferior axis is classically associated with idiopathic right ventricular outflow tract (RVOT) arrhythmias. However, overlapping electrocardiographic patterns may conceal an underlying arrhythmogenic cardiomyopathy, particularly when multiple VT morphologies coexist.
Case Presentation: A 61–year–old man presented to the emergency department with acute palpitations and diaphoresis. Twelve–lead ECG revealed a hemodynamically unstable wide–complex tachycardia at 250 bpm, promptly terminated by electrical cardioversion. Coronary angiography excluded ischemic heart disease. The arrhythmia morphology (LBBB, inferior axis, V4 transition) initially suggested idiopathic RVOT–VT.
Electrophysiological Study and Mapping: High–density electroanatomic mapping of the right ventricle identified discrete low–voltage regions in the posterior RVOT and inferolateral mid–basal right ventricle, predominantly meso–epicardial on unipolar mapping (Figure 2). Programmed ventricular stimulation induced two distinct VT morphologies: one with inferior axis (cycle length 250 ms) and a second with superior axis (cycle length 300 ms) (Figure 1). Pace mapping showed ›92% concordance with both VTs. Targeted radiofrequency ablation rendered the arrhythmias non–inducible.
Imaging and Diagnosis: Cardiac magnetic resonance demonstrated right ventricular fibrofatty replacement, free–wall aneurysms, regional dyskinesia, and mildly reduced right ventricular ejection fraction (41%) (Figure 3). Integration of clinical, electroanatomic, and imaging findings fulfilled two major Padua criteria, confirming a diagnosis of arrhythmogenic right ventricular cardiomyopathy.
Management and Conclusions: A dual–chamber implantable cardioverter–defibrillator was implanted for secondary prevention. This case highlights how dual VT morphologies and advanced electroanatomic mapping can reveal concealed arrhythmogenic cardiomyopathy masquerading as idiopathic RVOT–VT. Multimodal integration is essential for accurate diagnosis and risk stratification in complex ventricular arrhythmias.

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Figure 2: Electroanatomic mapping of the right ventricle in a patient with ventricular tachycardia.
(From left to right)
A. Bipolar voltage map showing confluent low-voltage areas (<1.5 mV) in the posterior RVOT and inferolateral wall, consistent with fibrofatty scar.
B. Substrate map displaying low voltage – high frequency area on inferolateral mid-basal region
C. Substrate map displaying low voltage – high frequency area on posterior infundibular region of the RVOT.
D. Unipolar voltage map revealing epicardial and myocardial scar involvement (<5.5 mV), extending beyond the bipolar-defined endocardial borders.
E. Substrate map with ablation tags highlighting RF lesions targeting low-voltage zones.

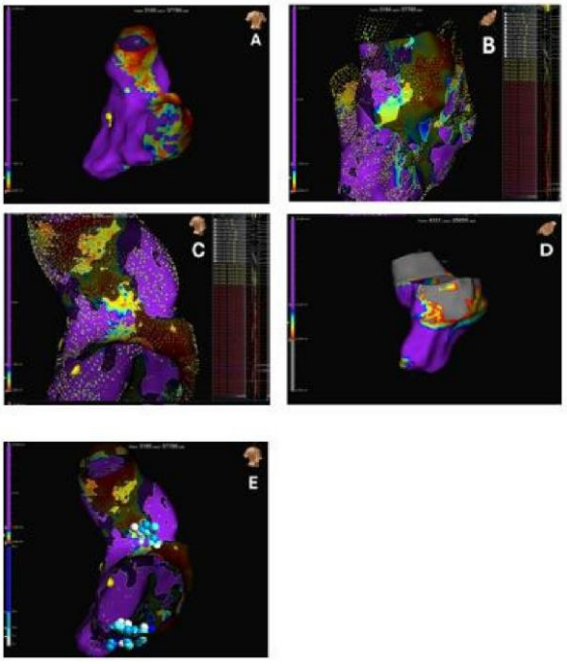


Figure1:

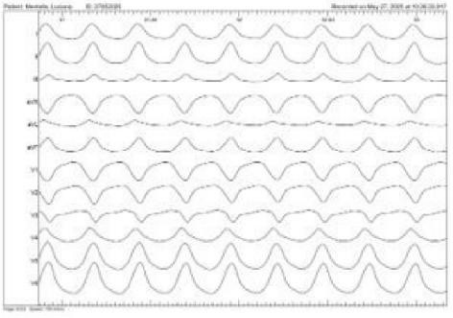


Figure 1A: Ventricular tachycardia with inferior axis, LBBB morphology, and transition in V4 (cycle length 250 ms).

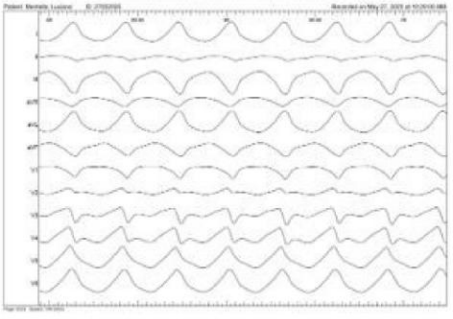


Figure 1B: Ventricular tachycardia with superior axis, LBBB morphology, and transition in V4 (cycle length 300 ms).

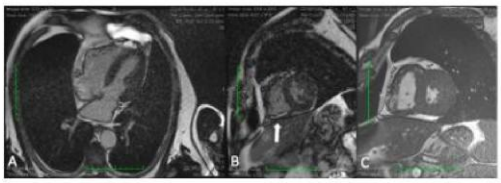
Figure 3:

Cardiac magnetic resonance imaging (CMR) frames showing structural abnormalities consistent with arrhythmogenic right ventricular cardiomyopathy (ARVC).

A: *Cine steady-state free precession (SSFP) sequence, Four-Chamber (4C) view.* Contractile dyskinesia is observed in the mid-basal segments, with multiple parietal bulgings contributing to reduced right ventricular systolic function (RV ejection fraction = 41%). The left ventricle (LV) shows preserved size and function. The right ventricle (RV), although not dilated (EDV = 173 mL), exhibits irregular walls with myocardial thinning and multiple aneurysms along the free wall.

B: *Tissue Characterization Sequence (PSIR / LGE), Mid-Ventricular Short-Axis.* Wall irregularities with multiple aneurysms are evident, along with myocardial replacement by predominantly fatty infiltration involving the free and inferior walls (mid-basal level), consistent with the fibro-fatty substrate characteristic of the disease (white arrow).

C: The right ventricle (RV), although not dilated (EDV = 173 mL), exhibits irregular walls with myocardial thinning and multiple aneurysms along the free wall.



Abstract citation ID: suag058.118

VENTRICULAR ARRHYTHMIAS IN A PATIENT WITH MITRAL VALVE PROLAPSE: ROLE OF CARDIAC MRI IN RISK STRATIFICATION

R. Magnano, M. Di Marino, D. Rossi, S. Saraullo, D. Sacchetta, T. Civitarese, L. Pezzi, C. Scollo, A. D'Alleva, D. Forlani, E. Genovesi, F. Fulgenzi, P. Vitulli, V. Zuardi, M. Rizzuto, and M. Di Marco
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Background: Mitral valve prolapse (MVP), historically regarded as a benign valvular condition, has progressively gained attention for its potential arrhythmic implications. A subset of patients exhibits ventricular ectopy or complex arrhythmias, sometimes in the absence of significant valvular dysfunction. In this context, cardiac magnetic resonance (CMR) has become essential for identifying myocardial fibrosis, an established substrate for malignant ventricular arrhythmias.
Case Summary: A 34–year–old woman with no prior cardiovascular disease underwent gastroscopy for persistent dyspeptic symptoms. During the procedure, the anesthetist incidentally noted frequent ventricular ectopic beats, prompting referral for cardiologic evaluation. Twenty–four–hour Holter monitoring captured 4,362 premature ventricular beats, including ventricular couplets and periods of bigeminy, although no sustained or repetitive ventricular arrhythmias were recorded. To further investigate the ectopic burden, an exercise stress test was performed. During peak exertion, the ECG demonstrated horizontal ST–segment depression in precordial leads, although the patient remained entirely asymptomatic. Sporadic ventricular ectopy reappeared during recovery, reinforcing the suspicion of an underlying structural abnormality. Transthoracic echocardiography revealed a bileaflet MVP, with marked myxomatous thickening of the posterior leaflet and mild mitral regurgitation. The characteristic systolic curling of the mitral annulus and subtle inferobasal myocardial "tugging" suggested increased mechanical stress—features associated with the so–called arrhythmogenic MVP phenotype.Given these findings, CMR was undertaken to refine risk stratification and confirmed bileaflet prolapse with normal biventricular volumes and preserved systolic function. Importantly, there was no late gadolinium enhancement, ruling out focal myocardial fibrosis and significantly reducing the probability of malignant arrhythmogenic substrate.
Discussion: This case illustrates how an incidental finding during a non–cardiac procedure can uncover a potentially arrhythmogenic MVP phenotype. This case highlights the crucial value of multimodality imaging in preventing overtreatment while ensuring vigilant monitoring of patients at possible arrhythmic risk.In the absence of myocardial fibrosis, conservative management with structured follow–up was deemed appropriate.

Abstract citation ID: suag058.119

AN ATIPICAL SUPRAVENTRICULAR TACHYARRHYTHMIA

G. Vitulano, F. Di Fraia, N. Kola, M. Di Muro, C. Vecchione, and F. Franculli
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A 76 y.o. patient presented to E.R. after the onset of dyspnea. The ECG showed a tachyarrhythmia (QRS width 115 ms) at 150 bpm with LAFB and a RBBB morphology, with regularly inscribed P within the QRS.

Electrical cardioversion was performed, restoring SR with persistent deep negative T waves in the inferoseptal leads. The patient reported prior palpitations and history of paroxysmal AF treated with flecainide (pill–in–the–pocket). Therefore, atrial flutter conducted with aberrancy was hypothized. Given the elevated troponin values and persistent repolarization abnormalities, coronary angiography was performed, revealing critical stenosis of the mid–LAD, which was treated with PTCA + stenting. During hospitalization, ECG monitoring revealed several episodes of the original arrhythmia, resistant to infusion of Amiodarone and to implementation of beta–blockers and subsequent switching to nonDHP Calcium Channel Blockers. Therefore, after pharmacological washout, an EP study was indicated. Using a programmed stimulation protocol, the clinical tachycardia was induced (double extrastimulus). However, the signals revealed the presence of a ventricular arrhythmia with fixed retrograde atrial conduction. Morphology was consistent with posterior fascicular VT, then a subsequent transaortic approach was used to perform mapping of the LV chamber. In the inferior septal area, inert tissue attributable to an ischemic scar was identified. Near this area local LAVA and during tachycardia pre–sistolic potential EGM with a – 45 ms activation timing and an unipolar QS were found.

Therefore, RF energy (35 W) was applied in this zone, resulting in complete non–inducibility even after 20 minutes when protocols were repeated. At 6 month follow–up, there was not recurrence of tachycardia. Discussion: The presence of tachycardia with RBBB + LAFB and a not broad QRS should not rule out a VT, especially fascicular types, whose features are characteristic (they represent about 10% of idiopathic VT). Furthermore, our specific case was a reentry circuit ventricular tachycardia on an ischemic scar basis, with exit site near the posterior fascicle. Morphology was related to exit site, but the existence of a reentry circuit explained its resistance to nonDHP CCB. Differential diagnosis with a SV tachyarrhythmia in our case was more difficult by the history of paroxysmal atrial fibrillation and the inducibility of arrhythmia despite flecainide, consistent with an ischemic etiology.

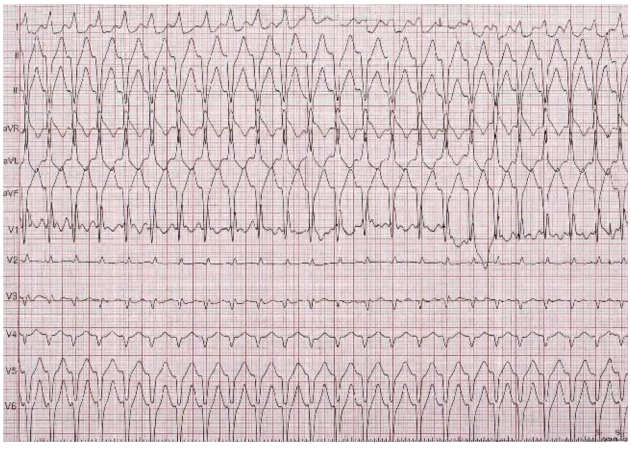

Figure 1: Surface ECG of tachycardia

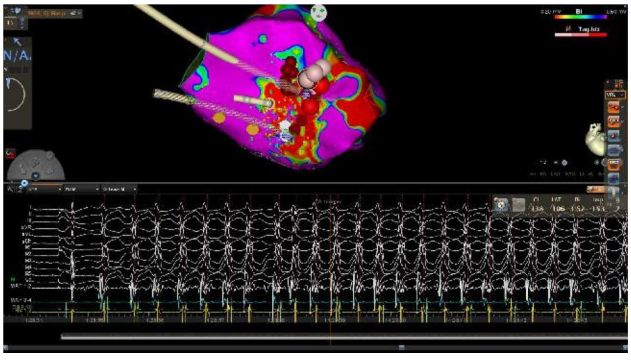

Figure 2: Induction of ventricular tachycardia during ablation

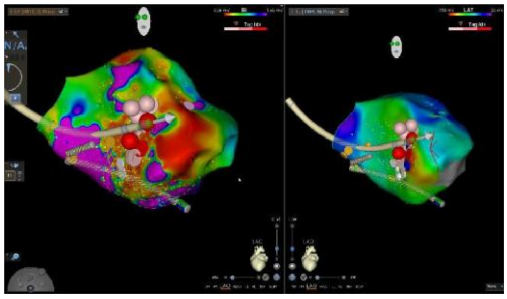

Figure 3: Voltage and activation map with points of ablation

Abstract citation ID: suag058.120

PROCEDURAL PREDICTORS OF ARRHYTHMIC RECURRENCE AFTER VENTRICULAR TACHYCARDIA ABLATION: A REAL–WORLD SINGLE–CENTRE EXPERIENCE

B. Noli, M. Casula, M. Porcu, L. Fini, E. Agus, A. Setzu, B. Schintu, A. Scalone, E. Cesarano, G. Tola, and M. Corda
U.O.C. Di Cardiologia E Utic – Arnas "G. Brotzu"; U.O.C. Di Cardiologia E Utic – Ospedale "San Francesco"

Background: Catheter ablation is a key therapeutic strategy for ventricular tachycardia (VT). Nonetheless, a standardized gold–standard procedural strategy has yet to be defined.
Methods: We retrospectively analysed all consecutive patients treated with VT ablation at our centre between May 2011 and August 2025. The impact of procedural variables on VT recurrence (i.e. documented sustained VT or appropriate ICD therapy) after 24 months from ablation was assessed with logistic regression analyses. Acute procedural success was defined as non–inducibility at Programmed Electrical Stimulation (PES) or abolition of abnormal potentials.
Results: A total of 105 VT ablation procedures were performed, 90 first procedures and 15 redo ablations. Median age was 69 years (IQR 58 – 74) and 87% were male. Structural heart disease was present in 82% (64% ischemic); median left ventricle ejection fraction (LVEF) was 34% (IQR 25–50%). Clinical VT was induced and mappable in 44 cases (42%), 88 patients (84%) underwent endocardial ablation, and 17 patients also required epicardial access. General anesthesia and mechanical circulatory support were used in 34% and 5% of cases, respectively. Acute procedural success was obtained in 69 patients (66%). Follow–up data (available for 80 patients) showed arrhythmic recurrence in 27 patients (34%) at 12 months and in 32 patients (40%) at 24 months. Female gender (OR 0,11; 95% CI 0,01 – 0,93; p=0,043) and higher LVEF (OR 0,96; 95% CI 0,93 – 0,99; p=0,018) were associated with a reduced risk of recurrence. Among procedural variables (Table 1), pre–ablation clinical VT inducibility significantly increased risk of recurrence (OR 3,07; 95% CI 1,18–7,95; p = 0,021) and acute success showed a protective trend, although not statistically significant (OR 0,43; 95% CI 0,16–1,17; p = 0,097). No significant difference in recurrence was found between activation–guided (during VT) vs. substrate–based ablation (p=0.633).
Conclusions: Our real–world single–centre experience suggests that a procedural strategy targeting clinical VT versus a substrate–based approach does not significantly impact long–term procedural efficacy. While acute success showed a protective trend, pre–procedural inducibility of clinical VT appears to be a marker for increased recurrence risk. Larger studies are warranted to confirm these findings.

Table 1

	OR	95% CI	p
Age (years)	1,02	0,98 – 1,06	0,366
Body Mass Index (kg/m²)	0,98	0,84 – 1,14	0,800
Female	**0,11**	**0,01 – 0,93**	**0,043**
Structural heart disease	4,29	0,87 – 21,1	0,073
Ischemic etiology	0,55	0,15 – 1,95	0,353
Left Ventricle Ejection Fraction (%)	**0,96**	**0,93 – 0,99**	**0,018**
General Anesthesia	0,97	0,37 – 2,60	0,958
Mechanic Circulatory Support	1,40	0,19 – 10,5	0,744
Inducibility of Clinical VT	**3,07**	**1,18 – 7,85**	**0,021**
Inducibility of Nonclinical VT	2,05	0,77 – 5,48	0,151
Ablation during clinical VT	1,28	0,46 – 3,54	0,633
Complete Procedural Success	0,43	0,16 – 1,17	0,097

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Abstract citation ID: suag058.121

VENTRICULAR-PULSED FIELD ABLATION FOR VENTRICULAR ARRHYTHMIAS: POOLED EFFECTIVENESS, SAFETY, AND MID–TERM RECURRENCE FROM 43 CLINICAL STUDIES

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Azienda Ospedaliero Universitaria Delle Marche

Background: Ventricular pulsed field ablation (PFA) is increasingly adopted for ventricular arrhythmias, yet the evidence base remains fragmented.
Purpose: To pool outcomes of ventricular PFA across indications (PVC, VT), estimate between–study heterogeneity, and test robustness in analyses restricted to cohorts with ≥3 patients.
Methods: We performed a systematic review and meta–analysis of clinical reports to 10 October 2025. Primary endpoints were: (1) acute success (PVC: elimination of the clinical focus; VT: non–inducibility), (2) intra/≤30–day complications, and (3) recurrence incidence (events per patient–year) at longest follow–up. Proportions were synthesised with generalised linear mixed models. Recurrence was modelled using mixed–effects Poisson models with a person–time offset. Overlapping reports were de–duplicated at patient level; a prespecified sensitivity included only cohorts with ≥3 patients (Figure 1).
Results: 355 patients (PVC 122, VT 233) from 43 studies were included; mean age 59.3±14.8 years. Mean LVEF was 53.9±11.7% in PVC and 34.8±12.6% in VT. Redo procedures in 43% of all index PFA sessions. Main etiology was ischemic cardiomyopathy in VT group (51%) and idiopathic in PVC group (72%). Mean follow–up was ~5 months (PVC 155±79 days; VT 152±44 days). Six distinct PFA ablation systems were identified across studies. Hybrid workflows (PFA+RF) occurred in 38%. On average, JBI risk of bias ratings were moderate.
(1) Acute effectiveness: In ≥3–patient cohorts, pooled success was 93% (95% CI 85–99; I^2=0%) for PVC and 89% (95% CI 83–93; I^2=0%) for VT. When all studies were pooled, estimates were ≈100% (PVC) and ≈99% (VT), with I^2=0% for both, consistent with small–study/publication effects (Figure 2).
(2) Safety (≤30 days): In ≥3–patient cohorts, complications were 8% (95% CI 1–21; I^2≈47%) for PVC and 10% (95% CI 5–15; I^2=0%) for VT. Across all studies, model–based pooled proportions were ≈1% with I^2=0% in both indications (Figure 2)
(3) Recurrence: Incidence was 0.33 events/patient–year for PVC (I^2=0%) and 0.40–0.44 for VT, with modest heterogeneity for VT (I^2≈28% in ≥3–patient analyses); the VT prediction interval was ≈0.19–1.25 events/patient–year, reflecting variability in substrate, approach, and surveillance (Figure 2).
Conclusion: Across heterogeneous platforms and workflows, ventricular PFA demonstrates high acute effectiveness and near–term safety, and acceptable mid–term durability. Estimates restricted to ≥3 patients studies appear more generalisable than all–study pools.

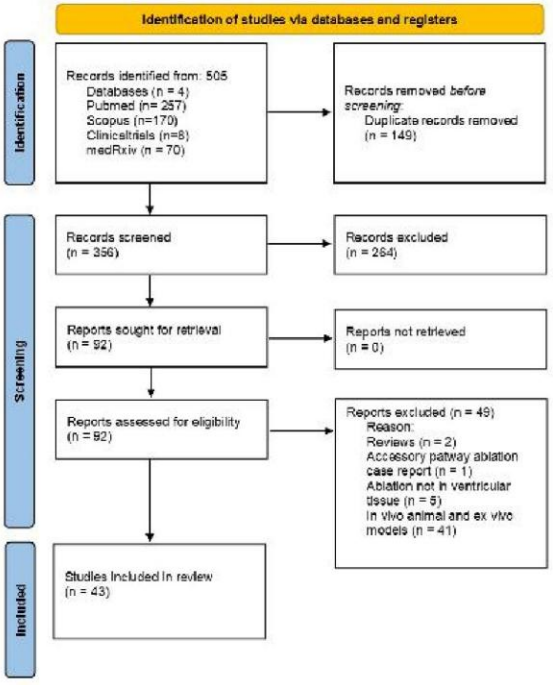

Figure 1

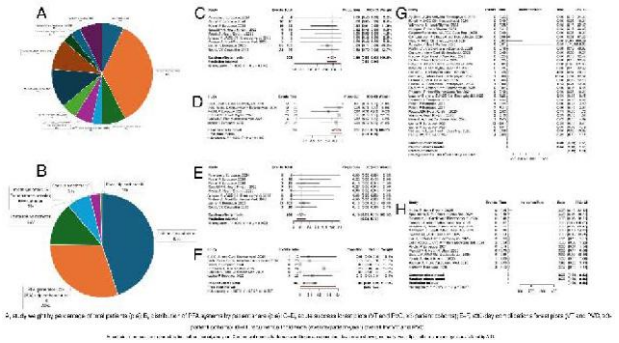

Figure 2

Ventricular Arrhythmias 2 and Drugs

Abstract citation ID: suag058.122

LANDIOLOL AND ARGIPRESSIN IN ELECTRICAL STORM COMPLICATED BY CARDIOGENIC SHOCK IN SEVERE DILATED CARDIOMYOPATHY: A CASE REPORT

L. D'Onghia, V. Castrovillari, V. De Luca, M. Bonfantino, F. Bux, and M. Cuonzo
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Background: Electrical storm (ES) and cardiogenic shock (CS) frequently coexist, sustaining a vicious cycle driven by sympathetic overactivation, malignant ventricular arrhythmias and hemodynamic collapse. Management is particularly challenging when beta–blockade and catecholamine escalation are limited by severe hypotension and pro–arrhythmic risk.
Case report: A 74–year–old man with end–stage non–ischemic (Figure 3) dilated cardiomyopathy, CRT–D, permanent atrial fibrillation (Figure 2) and chronic kidney disease was admitted for ES with recurrent ventricular tachycardia and ventricular fibrillation (Figure 1) requiring multiple appropriate ICD shocks. Despite treatment with metoprolol, magnesium, lidocaine and intravenous amiodarone, ES recurred and evolved into CS with mean arterial pressure of 50 mmHg, oliguria, acute kidney injury and rising lactate. Mechanical circulatory support was excluded because of advanced frailty. Given the high arrhythmic burden, escalation of norepinephrine was limited. Metoprolol was discontinued and intravenous landiolol, an ultra–short–acting and highly selective β1–blocker, was cautiously introduced in association with continuous amiodarone infusion. To maintain adequate perfusion pressure without further adrenergic stimulation, arginine vasopressin was added to middle–dose norepinephrine. This combined strategy led to a reduction of sustained ventricular arrhythmias, restoration of electrical stability, improvement of mean arterial pressure above 65 mmHg, recovery of urine output and partial renal function improvement, allowing clinical stabilization and transfer to the regional arrhythmology center for ablation evaluation.
Conclusions: This case supports the effectiveness and safety of intravenous landiolol, even in the setting of CS, for the control of refractory ES when combined with amiodarone. The adjunctive use of arginine vasopressin allowed hemodynamic stabilization while avoiding excessive norepinephrine dose escalation and its pro–arrhythmic effects. An integrated antiarrhythmic and hemodynamic approach may represent a valuable therapeutic option in selected high–risk patients with ES with concomitant CS.

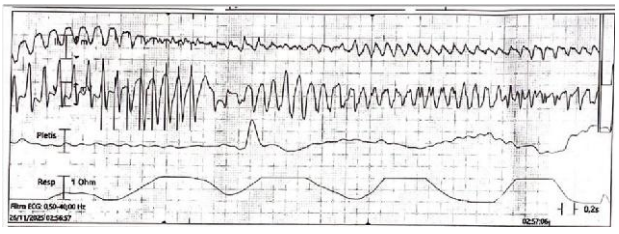

Figure 1 Cardiac monitor showing ventricular fibrillation.

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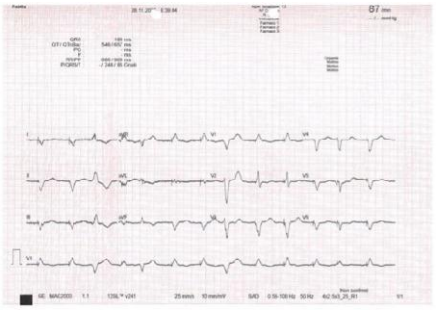

Figure 2: Twelve-lead electrocardiogram.

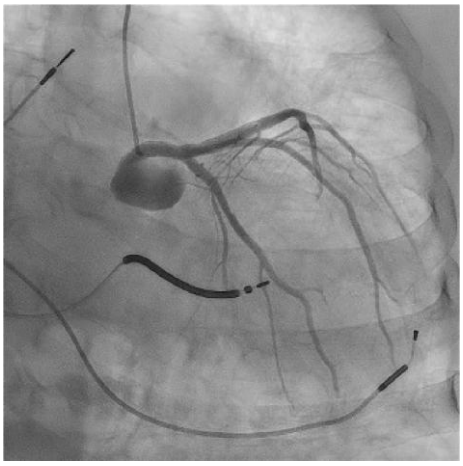

Figure 3 Angiography of the left coronary artery.

Abstract citation ID: suag058.123

DEXTROCARDIA AND SODIUM CHANNEL BLOCKADE: AN ECG TRAP

M. Di Marino, E. Genovesi, R. Magnano, L. Pezzi, A. D'Alleva, C. Scollo, D. Rossi, S. Saraullo, D. Forlani, P. Vitulli, E. Verrengia, D. Sacchetta, S. Campobassi, V. Vitullo, N. De Luca, and M. Di Marco
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A 78–year–old patient with arterial hypertension, paroxysmal atrial fibrillation, prior ischemic stroke with post–ischemic epilepsy, active smoking, and Kartagener syndrome presented to the Emergency Department for repeated vomiting and fever; the home medication history was initially unavailable. On arrival, blood pressure was 90/60 mmHg and oxygen saturation 95%. Arterial blood gas showed pH 7.2, pCO2 49 mmHg, HCO3– 22 mmol/L, anion gap 15, lactate 2 mmol/L, sodium 137 mmol/L and potassium 5 mmol/L, consistent with mixed acidosis with dehydration. Electrocardiography with right–sided precordial leads (Fig.1) showed tachycardia with extremely wide complexes, gross repolarization abnormalities, and markedly prolonged corrected QT interval, consistent with sodium–channel blockade. Transthoracic echocardiography with dextrocardia views showed preserved biventricular function, no significant valvular disease or effusion; the inferior vena cava and internal jugular veins were small, supporting hypovolaemia. Treatment included a prokinetic agent, rapid intravenous fluids, magnesium sulfate 2 g bolus, and sodium bicarbonate 160 mEq bolus followed by 8.4% infusion. Within ∼10 minutes, clinical status and the electrocardiogram improved. A control tracing was misleading due to incorrect limb–lead placement, producing an apparent extreme right axis (Fig.2); repeat with correct limb–lead inversion (Fig.3) showed sinus rhythm with first–degree atrioventricular delay, moderately widened QRS with a left bundle–branch block–like pattern, and corrected QT interval near the upper normal limit, without primary ST–T abnormalities. The caregiver later confirmed chronic flecainide 50 mg and lacosamide (a sodium channel–blocking antiepileptic drug). Laboratory tests revealed acute kidney injury with normal electrolytes. We diagnosed combined flecainide and lacosamide accumulation precipitated by vomiting–related dehydration, acidosis, and acute kidney injury. Prompt recognition of the wide–complex toxicity pattern enabled targeted therapy despite uncertain history; correct lead placement and modified imaging in dextrocardia were essential to avoid time–critical misinterpretation. This highlights that sodium–channel–blocking drug toxicity may be severe even at therapeutic doses when dehydration, acidosis, and renal dysfunction coexist.

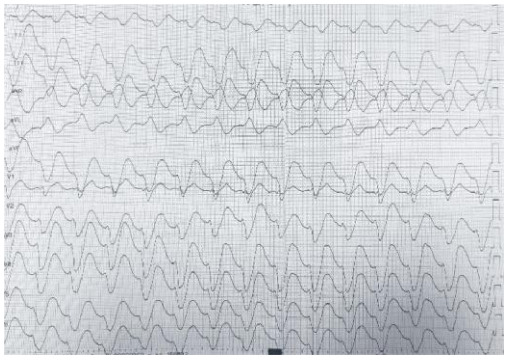

Figure 1

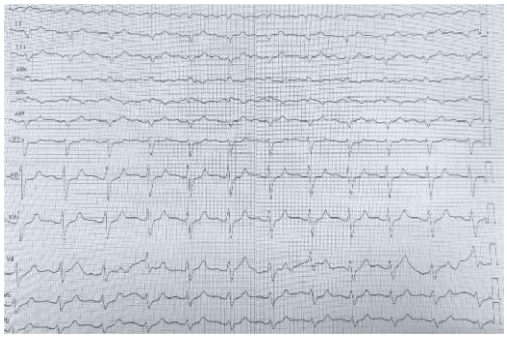

Figure 2

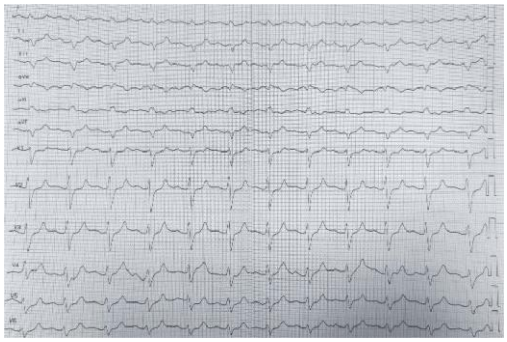

Figure 3

Abstract citation ID: suag058.124

WIDE QRS TACHYARRHYTHMIA IN FLECAINIDE–LACOSAMIDE COMBINATION: A CASE REPORT

S. Cherubini, M. Fornelli, L. De Luca, L. Gioffrè, F. Mercanti, G. Varricchione, and A. Ciolli
Ospedale S.Pertini, Roma; Ospedale S. Andrea, Roma.

Introduction: Flecainide is a class Ic antiarrhythmic drug, approved for the control of supraventricular and ventricular arrhythmias in the absence of structural heart disease. Iacosamide is an antiepileptic drug approved as monotherapy for the treatment of partial seizures with or without secondary generalization. Both drugs act by blocking fast voltage–gated sodium channels expressed in various tissues. The cardiac isoform Na?1.5 (SCN5A) is strongly blocked by flecainide. Some experimental studies have demonstrated an inhibitory effect of lacosamide on NaV1.5 (SCN5A). Dose–dependent inhibition of cardiac sodium channels produces a marked slowing of conduction velocity in fibers dependent on fast depolarization channels. This could be one of the mechanisms hypothesized to underlie the potential proarrhythmic risk and PR and QRS widening on the ECG associated with flecainide and lacosamide. Concomitant use of the two drugs could lead to a potential additive effect on

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cardiac sodium channel inhibition and, consequently, be associated with an increased risk of arrhythmic events.
Case report: An 82–year–old female with a history of paroxysmal atrial fibrillation and epileptic seizures undergoing treatment with flecainide and lacosamide, presented to the emergency department due to palpitations. The admission ECG showed wide QRS tachycardia (206 ms) with left bundle branch block morphology at a heart rate of 110 bpm. After administration of 100 mg metoprolol IV and suspension of flecainide, atrial fibrillation emerged with a mean ventricular response of 130 bpm, conducted with incomplete left bundle branch block (QRS 110 ms). After washout from flecainide and reduction of lacosamide, the ECG showed resolution of QRS widening, with disappearance of left bundle branch block morphology. Even after spontaneous restoration of sinus rhythm, normalized intraventricular conduction with narrow QRS persisted. The patient was discharged home with rhythm control therapy with amiodarone and and with optimized antiepileptic therapy with reduced dosing of lacosamide.
Conclusions: It has been widely documented that the independent use of lacosamide and flecainide may be associated with cardiac arrhythmias. In contrast, there is little information on the combined administration of them. The definition of therapeutic indications requires careful. The initial assessment and periodic monitoring should be part of the multidisciplinary clinical management of these patients.

Abstract citation ID: suag058.125

VENTRICULAR TACHYCARDIA IN CARDIAC SARCOIDOSIS: TO IMMUNOSUPPRESS OR NOT? 1–YEAR FOLLOW–UP

M. Mazza, M. Palazzini, I. Cartella, and G. Seresini
Grande Ospedale Metropolitano Niguarda; Ospedale Di Sondrio

A 56–year–old man was admitted for palpitations and near–syncope. ECG documented sustained monomorphic ventricular tachycardia (VT), with QRS positivity in V3–V6 and inferior leads, suggesting a RVOT origin (Figure 1).

Medical history included stage I pulmonary sarcoidosis treated with oral corticosteroids (OCS), stage II seminoma treated with left orchiectomy and chemotherapy in persistent remission, and a family history (FH) of sudden cardiac arrest attributed to non–investigated left ventricular (LV) cardiomyopathy (CM).

Electrical cardioversion (ECV) restored sinus rhythm. Transthoracic echocardiography showed a normal–sized LV with diffuse hypokinesis, especially in the basal interventricular septum (IVS), and mildly reduced ejection fraction. HS–TnI peaked at 432 ng/L after ECV. Coronary angiography excluded obstructive coronary artery disease.

Cardiac magnetic resonance (CMR) revealed hypertrophy of the IVS with preserved systolic function and no myocardial edema on T2–weighted imaging. Transmural LGE was noted in the basal IVS, along with increased T1/T2 mapping and extracellular volume values (Figure 2). 18F–FDG–PET demonstrated uptake limited to carinal lymph nodes, without evidence of active myocardial inflammation (Figure 3).

According to the 2014 HRS consensus, a diagnosis of probable cardiac sarcoidosis (CS) was established based on histologically proven extracardiac sarcoidosis, sustained VT, and typical LGE findings. Alternative diagnoses, including arrhythmogenic CM, could not be fully excluded due to limited FH information. A dual–chamber ICD was implanted for secondary prevention. Given the absence of active inflammation on imaging, immunosuppressive therapy was initially withheld. A myocardial scar was identified as the arrhythmogenic focus, so amiodarone and heart failure (HF) therapy were initiated.

At two–month follow–up (FUP), CMR–guided endomyocardial biopsy (EBM) was negative for granulomas, but its sensitivity is approximately 50%, thus not excluding CS. Device interrogation revealed an asymptomatic VT episode terminated by antitachycardia pacing, prompting beta–blocker up–titration. If VT requiring ICD discharges recurs nevertheless therapy, catheter–based RFA would be considered to reduce mortality and prevent HF progression.

Despite lack of evidence of inflammation–triggered VT and a negative PET, low–dose OCS was increased to assess arrhythmic response and prevent further scarring. During 1–year FUP, no further VT occurred, so OCS were subsequently tapered

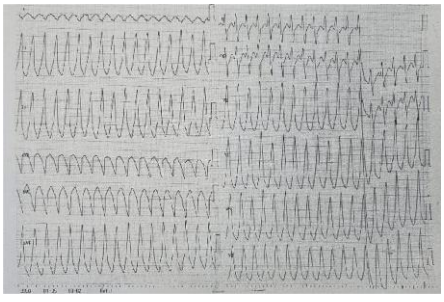


Figure 1

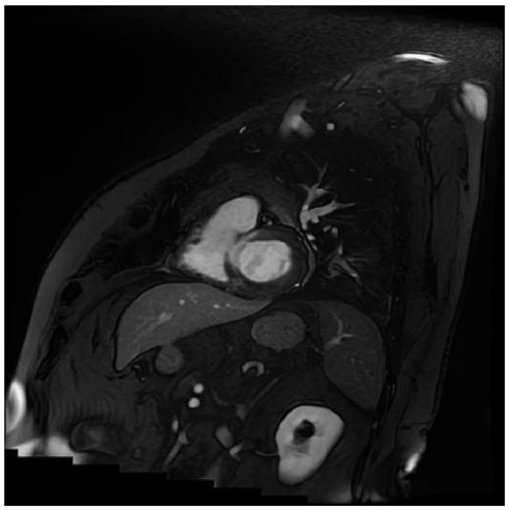
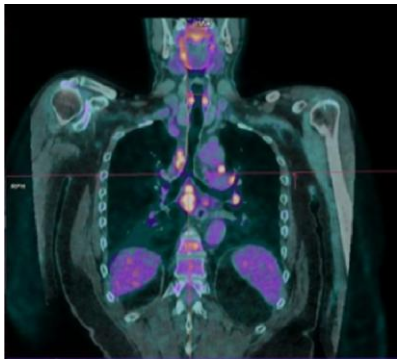


Figure 2



Figue 3

Abstract citation ID: suag058.126

LIFE STUDY – RATIONALE AND DESIGN OF THE PROSPECTIVE OBSERVATIONAL STUDY FOR THE EVALUATION OF OUT–OF–HOSPITAL CARDIAC ARREST IN EMILIA–ROMAGNA

D. Aschieri, S. Bricoli, G. Pagnoni, L. Rossi, M. Bolognesi, A. Arata, A. Biagi, and G. Casella
Ospedale Guglielmo Da Saliceto; UOC Cardiologia Reggio Emilia; Ospedale Sant'orsola Bologna

Out–of–hospital cardiac arrest (OHCA) is a public health problem that affects approximately 800,000 people each year in Europe and the United States. Despite technological advances and organizational efforts, survival remains extremely low, still below 10%. The establishment of structured multicenter registries represents a fundamental tool for identifying the most effective interventions to improve survival. Building on the experience gained with the Progetto Vita Registry of Piacenza, we submitted the LIFE study to the Ethics Committee and obtained approval. The LIFE study is a prospective, observational, multicenter regional study promoted by ANMCO Emilia–Romagna, involving all provincial Cardiology Units in Emilia–Romagna, with the aim of subsequently extending the model to Italian provinces willing to participate.

The primary objective of the LIFE Registry is to evaluate survival after OHCA across the entire Emilia–Romagna region, both in the acute phase and during mid– to long–term follow–up. For each patient, data related to the event, baseline clinical information, and follow–up data will be collected using a dedicated CRF. Data sources will include territorial emergency medical services (EMS/118), Emergency Departments and hospital wards, clinical documentation, and clinical and/or telephone follow–up contacts. Secondary objectives include evaluating survival in relation to the type of first response (bystanders, EMS/118, emergency forces), the use of automated external defibrillators available in the community, the use of the DAEResponder app for responder activation, the performance of resuscitation maneuvers, pre–hospital survival, survival of patients admitted alive to the Emergency Department, and survival at 30 days, 1, 3, and 5 years, as well as early and

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30–day neurological outcomes (and, where available, mid– to long–term outcomes). Particular attention will be devoted to the analysis of intervention times in order to identify potential strategies to reduce delays along the chain of survival.

The LIFE Registry represents the first region–wide registry in Italy specifically structured for OHCA. It complements existing multi–province but not yet regional experiences and constitutes an organizational model that may be extended at the national level, with the ultimate goal of analysing outcomes in patients with out–of–hospital cardiac arrest and improving the governance of the emergency response system and patients' clinical outcomes.

Abstract citation ID: suag058.127

WEARABLE CARDIOVERTER DEFIBRILLATOR IN PATIENT WITH TRANSIENT RISK OF SUDDEN CARDIAC DEATH: SINGLE CENTRE EXPERIENCE

M. Bolognesi, S. Bricoli, V. Pelizzoni, L. Rossi, M. Pisati, and D. Aschieri
Ospedale Guglielmo Da Saliceto

Background: Nowadays sudden cardiac death (SCD) remains a major cause of death, despite the recent progress in prevention and interventions of cardiac disease. In case of transient risk of SCD, the use of a wearable cardioverter defibrillator (WCD) is recommended in current guidelines.

The purpose of this study was to investigate the safety and the adherence to WCD in a real world population; moreover, we reviewed the rate of ICD implantation after WCD use.

Methods: We considered consecutively 130 patients discharged from our cardiology department for potentially transient high risk of SCD, weared a WCD from August 2017 to December 2025. The patients were discharged with WCD protection and followed through remote monitoring or outpatient. A clinical and echocardiographic evalutation was performed at baseline and at the end of the WCD use period.

Results: Out of 130 patients, with average age 64,9±11,9 years old and baseline average left ventricular ejection fraction (LVEF) 31 ±9,5,79 % were males,72% suffered from arterial hypertension, 25% diabetes mellitus 16% chronic renal failure ,6% previous stroke, 22% atrial fibrillation (AF). 57% of these patients weared WCD for severe systolic dysfunction in ischemic cardiac disease, 3% after removal of an infected ICD, 40% after newly diagnosed cardiomyopathy. 84% patients were in therapy with beta blockers, 39% with sacibitril/valsartan and 38% with glifozine. The average wearing time of WCD was 61±42,9 days and 23±2,4 hours daily. We received these events: 2 sustained ventricular tachicardia, 6 non sustained ventricular tachicardia (TV) 4 atrial fibrillation. One patient received inappropriate shock. At the end of the WCD use,42% of patients proceeded to device implantation. At last follow up 14 deaths was detected in patients that weared WCD due to advanced heart failure. Considering sex difference, we observed in females a better baseline LVEF (f 34±9vs m 29±8,1 p=0,03) and a significant lower ICD implantation rate at the end of WCD use [f 7(26%) vs m 48(55%)p=0.04]. During wearing time 7 Tv occurred in males and 1 in females.

Conclusions: In our experience we may confirm that WCD use is, effective, safe and with a good adherence in all patients. The WCD allows resources saving not only during therapy titration but also by enabling arli discharge supporting appropriate decision making regarding ICD implantation. Females presented a lower ICD implantation rate

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MANAGEMENT OF AN ELECTRICAL STORM IN A PATIENT WITH LONG QT SYNDROME TYPE 2: COMBINING BETA–BLOCKERS AND OVERDRIVE PACING

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Hôpital Privé Jacques Cartier; Ospedale S. Pertini; Ospedale Cisanello

Long QT syndrome (LQTS) is a genetic channelopathy with a prevalence of approximately 1 in 2000. Type 2 (LQT2), caused by KCNH2 gene variants affecting the IKr current, is particularly prone to life–threatening arrhythmias triggered by sudden noises, emotional stress, or bradycardia. In the acute setting of an electrical storm, management remains a critical challenge.

A 26–year–old female with a known KCNH2 mutation, already under treatment with Nadolol 80 mg daily, presented with an electrical storm (Figure 1). The patient had a concomitant diagnosis of epilepsy treated with Vimpat and Clobazam; therefore, an implantable loop recorder (ILR) had been previously inserted to evaluate a potential arrhythmic cause for her convulsive syncope. This device was fundamental in the diagnosis, as it documented multiple episodes of sustained ventricular tachycardia and a 2–minute episode of ventricular fibrillation, confirming the cardiac origin of her crises. At admission, the surface ECG showed a markedly prolonged QTc of 690 ms and notched T waves (Figure 2). Initial laboratory results showed a potassium level of 3.9 mmol/l.

Acute stabilization was initiated with intensive electrolyte replacement and intravenous Esmolol. To address the electrical instability, a temporary external atrial pacemaker was programmed for overdrive pacing at 90 bpm. This strategy served as a crucial bridge to manage the acute phase, successfully suppressing Torsades de Pointes (TdP) and allowing for the safe re–introduction and up–titration of her Nadolol to 80 mg twice daily.

The patient subsequently underwent successful implantation of a dual–chamber cardioverter–defibrillator (ICD). To prevent the bradycardia–induced pause–dependent prolongation of the QT interval typical of LQT2, the device was programmed with a base rate of 70 bpm. This higher heart rate prevents the long–short sequences that initiate TdP while allowing the patient to maintain the necessary high–dose beta–blockade. At discharge, the QTc had significantly shortened to 480 ms (Figure 3).

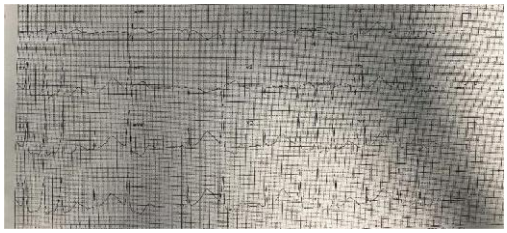

Figure 1

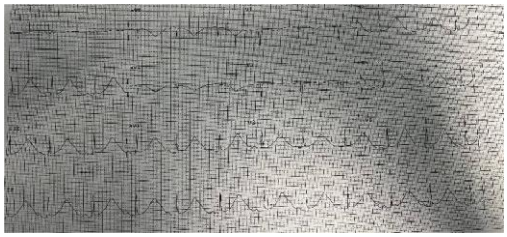

Figure 2

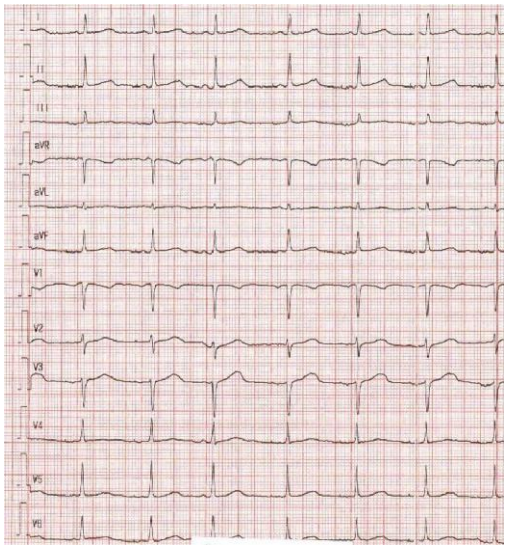

Figure 3

Cardiac Arrest and Organizational Models

Abstract citation ID: suag058.129

IS HYPOGLYCEMIA THE 5TH H OF PULSELESS ELECTRICAL ACTIVITY?

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Reversible causes of pulseless electrical activity (PEA) are classically categorized into the "4 H's and 4 T's": Hypovolemia, Hypoxia, Hydrogen ion excess (acidosis), Hypo–/Hyperkalemia, and Tension pneumothorax, Cardiac Tamponade, Toxins, Thrombosis.

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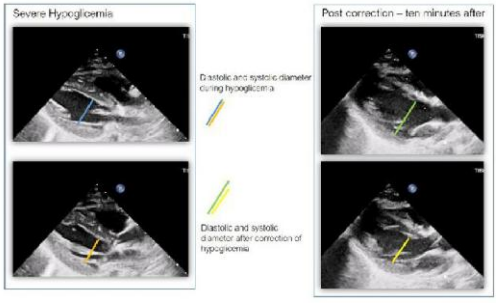
This scheme is usually reported for pediatric and adult population but, while the adult heart relies primarily on fatty acid metabolism, the pediatric myocardium —especially in stress states— shows a much higher dependence on glucose as an immediate energy substrate. This metabolic vulnerability may have relevant clinical implications in conditions of stress and notably, hypoglycemia is not included among pediatric PEA causes despite the recognized metabolic role.

We report the case of a child with severe polytrauma complicated by acute hepatic injury. There was no cardiac injury as testified by admission echocardiogram showing normal heart function and structures. During hospitalization, (12 hours later) the patient developed a state of PEA characterized by severe left ventricular dysfunction (EF 10%), with no structural abnormalities, no pericardial effusion, no evidence of right ventricular strain, and no signs of mechanical obstruction. Arterial blood gas analysis revealed severe metabolic acidosis and profound hypoglycemia. In the absence of other causes hypoglycemia emerged as the only identifiable acute derangement. Intravenous glucose administration resulted in rapid normalization of blood glucose levels. Remarkably, within approximately 10 minutes, the LVEF improved to 35%, without any significant additional interventions.

The abrupt and isolated recovery of systolic performance strongly suggested that severe hypoglycemia played a direct and reversible role in precipitating myocardial depression and a pseudo–PEA state. Given the patient's hepatic impairment, reduced metabolic reserves likely amplified the myocardial susceptibility to glucose depletion.

To our knowledge, this is the first reported pediatric case in which severe hypoglycemia appears to have contributed to the development of pseudo–PEA and profound yet rapidly reversible systolic dysfunction. This case highlights the need to recognize hypoglycemia as a potential contributor to cardiovascular collapse in metabolically vulnerable children. We propose that, in pediatric advanced life support, hypoglycemia should be considered as an additional reversible cause alongside the traditional 4 H's and 4 T's.



Abstract citation ID: suag058.130

OUT–OF–HOSPITAL CARDIAC ARREST (OHCA): EXPERIENCE OF AN APULIAN TOWN

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Out–of–hospital cardiac arrest (OHCA) is a worldwide cause of death. Survival remains low —around 7% globally— and many survivors experience significant neurological impairment. Numerous experiences have demonstrated that OHCA survival can be improved by strengthening the "chain of survival" and ensuring that pre–hospital care begins as early as possible. This requires increasing the number of bystanders capable of performing cardiopulmonary resuscitation (CPR) and ensuring rapid access to an automated external defibrillator (AED).

Since 2023, a structured program aimed at providing cardioprotection to an Italian town with approximately 26,000 inhabitants has been implemented.

The project was endorsed by the local government (Conversano Town), which supported the installation of AEDs in accessible public areas. A fundraising campaign was launched, obtaining contributions from banks, local industries, and private citizens.

52 strategically located AEDs were installed, ensuring that they can be reached within a 10–minute walk from nearly all inhabited areas. With the support of certified instructors, 400 laypersons were trained and certified in Basic Life Support and Defibrillation (BLSD), in accordance with international guidelines and the training programs of the American Heart Association and the Gruppo Intervento Emergenze Cardiologiche (GIEC). We also encouraged schools, gyms, and commercial venues to acquire their own AEDs, providing assistance when needed and helping train an adequate number of staff members. A detailed city map of all public AED locations has been created, and a dedicated mobile application is under development to help citizens locate the nearest AED quickly (verifiable at www.cuoregrande.org). A shared protocol between our volunteer organization and local institutions ensures regular maintenance of all AED units. Our organization provides periodic BLSD courses and retraining sessions, installs new AED stations, and promotes public awareness of OHCA through short educational sessions (2–hour modules) using CPR simulators. This experience allowed three people to survive OHCA. We aim to collect data in the coming years regarding cases of OHCA in which the implemented cardioprotection system has contributed to saving lives.

Abstract citation ID: suag058.131

LIFE STUDY: OBSERVATIONAL STUDY FOR THE EVALUATION OF OUT–OF–HOSPITAL CARDIAC ARREST IN EMILIA ROMAGNA. RATIONALE AND DESIGN

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Out–of–hospital cardiac arrest still has a survival rate of less than 10%. Starting data collection through multicenter registries is essential in order to identify the most appropriate interventions to improve survival rates. The LIFE registry is a prospective, observational, and multicenter study, non–profit. The primary objective of the study is to assess the survival of out–of–hospital cardiac arrests in the entire Emilia–Romagna region, both in the acute phase and in the medium– to long–term follow–up.

Participating centers include: Azienda USL Romagna, Azienda USL di Bologna, IRCCS Azienda Ospedaliero–Universitaria di Bologna, Azienda USL di Imola, Azienda USL di Ferrara, Azienda Ospedaliero–Universitaria di Ferrara, Azienda USL di Modena, Azienda Ospedaliero–Universitaria di Modena, Azienda USL–IRCCS di Reggio Emilia, Azienda USL di Parma, Azienda Ospedaliero–Universitaria di Parma.

For each patient, data will be collected on the cardiac arrest event, baseline clinical data, and follow–up information reported in the data collection form (CRF). Data sources include: Territorial emergency systems (AAT 118), Emergency Departments and hospital departments of the participating centers, patient clinical documentation, data from clinical follow–up and/or telephone follow–up.

Secondary objectives of the study include: evaluating survival in relation to the type of first aid (bystander, 118, emergency responders), the use of AEDs available in the area, any apps (AED RESPONDER), the application of resuscitation maneuvers, survival before hospitalization for all causes, survival of patients admitted alive to the Emergency Department, at 30 days after the arrest, at 1, 3, and 5 years after the arrest, neurological outcome at discharge and at 30 days from the arrest, and optionally in the medium– and long–term follow–up. Regarding the evaluation of times, intervention times will be considered to potentially develop a reduction plan (time from 118 call to arrival at the scene, time from arrival at the scene to arrival at the Emergency Department, time from first responder intervention to application of the AED).

Abstract citation ID: suag058.132

IN–HOSPITAL ORGANIZATIONAL MODEL FOR MULTIDISCIPLINARY MANAGEMENT OF PULMONARY EMBOLISM

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U.O. Di Cardiologia – Utic Ed Emodinamica; U.O. Cardiologia – Utic Ed Emodinamica

Introduction: Pulmonary embolism (PE) is associated with high mortality when not promptly diagnosed and adequately treated. The often nonspecific clinical presentation is responsible for the diagnostic difficulty and the frequent finding of PE at autopsy.
Materials & Methods: Since 2022, we have implemented an in–hospital management pathway based on the multidisciplinary assessment of patients arriving in the of patients arriving in the Emergency Department (ED) and the integration of clinical suspicion with first–level diagnostic tests (ECG, ABG, chest X–ray, blood tests) and clinical pre–test probability (modified Wells, Geneva). Patients with a Wells score of 0 to 4 and a negative D–dimer are excluded from the diagnosis of PE; in other cases, CT pulmonary angiography is performed. The integration of the diagnostic data thus obtained with the troponin dosage (sPESI Score) and the echocardiogram are used in patients diagnosed with high–risk PE for prognostic stratification and to identify the destination of hospitalization.
Results: Comparing hospital admissions for PE between 2021 and 2023 allowed us to verify how, thanks to the in–hospital shared management pathway, a different distribution of admissions was achieved in the Operating Units involved: admissions to Cardiology decreased by 50%; conversely, admissions to Internal Medicine increased by 60% in 2022, remaining stable in 2023. In 2024 and 2025, out of 64 patients diagnosed with PE in the ED, 25 were admitted to Cardiology and 38 to Medicine wards; 1 patient was admitted to Cardiac Surgery. Admissions to other departments of the Hospital for patients with other major prevalent comorbidities increased from 3% to 7%.

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Conclusions: These results justified and rewarded the effort to organize multidisciplinary management of the patient admitted to the emergency department. It was possible to ensure the correct diagnostic assessment and timely treatment, but above all, to identify the risk class and the most appropriate hospitalization setting.

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MANAGEMENT OF CHEST PAIN IN THE EMERGENCY DEPARTMENT: THE ROLE OF DEDICATED PATHWAYS AND SPECIALIST CONSULTATION AT AORN CARDARELLI

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Aorn Cardarelli

Background: Chest pain is one of the most frequent and challenging reasons for admission to the Emergency Department (ED), requiring rapid triage and precise diagnostic stratification to distinguish life–threatening cardiovascular events from benign conditions. At AORN Cardarelli, the management of these patients is standardized through a specific Diagnostic–Therapeutic Diagnostic Pathway (PDTA) for Chest Pain. This study analyses the clinical flow and outcomes of patients presenting with chest pain in 2025, emphasizing the integration between the ED and the Intensive Cardiac Care Unit (UTIC).
Materials and Methods: A retrospective analysis was conducted on all patients who accessed the AORN Cardarelli ED for chest pain during the year 2025. Data were extracted from electronic health records, focusing on the adherence to the institutional PDTA. The clinical pathway involves immediate ECG execution, serial troponin dosage, and the early involvement of a cardiologist as a consultant directly within the ED. The study focused on the distribution of diagnoses among hospitalized patients and the impact of the cardiologist's presence on appropriateness of admission.
Results: In 2025, approximately 3,500 patients accessed the ED for chest pain. Following initial screening, 35–40% (n=1,400) required admission to the UTIC. Within this hospitalized cohort, the distribution of Acute Coronary Syndromes (ACS) was as follows: about 20–25% were ST–Elevation Myocardial Infarctions (STEMI), about 35–40% were Non–ST–Elevation Myocardial Infarctions (NSTEMI). The data demonstrate that the presence of a dedicated cardiologist in the ED significantly streamlined the "door–to–diagnosis" time. Furthermore, this integrated model led to a measurable reduction in "inappropriate admissions", ensuring that UTIC beds were prioritized for high–risk patients while safely discharging or redirecting low–risk cases.
Conclusions: The management of chest pain at AORN Cardarelli highlights the efficacy of a structured PDTA combined with early specialist intervention. The 2025 data confirm that a significant portion of chest pain admissions corresponds to high–acuity ACS cases, justifying the intensive resource allocation. The role of the cardiologist as a consultant in the ED is a cornerstone of this success, providing the expertise necessary to speed up life–saving treatments for STEMI/NSTEMI patients and minimize the clinical and economic burden of unnecessary hospitalizations.

Channelopathies

Abstract citation ID: suag058.134

SYNCOPE WITHOUT PRODROMES DURING FEVER IN TYPE 1–INDUCED BRUDAGA SYNDROME PATIENT: LOOKS CAN BE DECEIVING

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Case presentation: A 53-year-old man, with no family history of sudden cardiac death (SCD), was admitted to the Emergency Department for transient of loss consciousness (TLOC) and facial trauma. The TLOC occurred at rest, in an upright position, without prodromes and/or specific triggers. At admission, the body temperature was 37.8°C. The ECG showed a pattern compatible with the type 1 Brugada pattern (Figure 1). The patient was referred to Cardiology Unit for arrhythmic risk stratification. After 2 days of hospitalization a transition from type 1 to type 2 Brugada ECG pattern occurred. No electrocardiographic risk markers for ventricular fibrillation (VF) were present. The late potentials on the signal-averaged electrocardiogram (SAECG) were negative. No arrhythmic events were recorded at the in-hospital telemetric monitoring. The clinical interpretation of TLOC without prodromes in patients with the type 1 Brugada pattern was not univocal (arrhythmic or not), such as the patients' management (conservative or invasive). Head-up tilt test (HUTT) performed showed the induction of vasodepressive syncope without prodromes (Figure 2). An endocardial three-dimensional (3D) map of the right ventricle was constructed and the programmed ventricular stimulation (PVS) at two ventricular sites, with up to three premature extrastimuli was performed. At unipolar and bipolar voltage mapping in sinus rhythm and at the propagation map, no abnormalities were shown. The PVS was negative for the induction of ventricular arrhythmias. Finally, some doubts remained about the etiology of syncope, and a long-sensing vector loop recorder (ILR) was implanted. The patient was discharged with the diagnosis of vasodepressive syncope in need of physical counterpressure manoeuvres and tilt training. At 12 months' follow-up, there were no arrhythmias at ILR monitoring or syncopal recurrence. The next-generation sequencing-based gene panel test for cardiovascular genomics, including the SCN5A gene, was negative for BrS pathogenic variants.
Conclusion: the use of an ILR should be considered in patients with Brugada pattern and unexplained syncope; and in BrS patients with low/intermediate risk, it can help guide the management and ascertain the cause of unexplained syncope. A careful comprehensive evaluation aiming to exclude the correlation between arrhythmic events and clinical symptoms should be considered in the patients' centered care of subjects with type 1-induced BrS pattern.

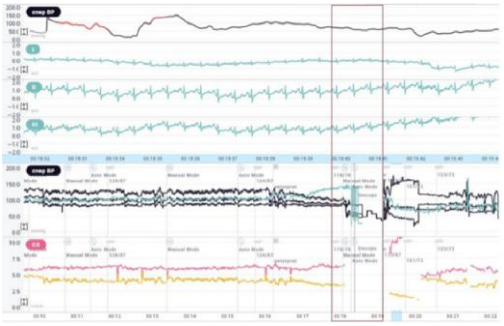

Figure 1

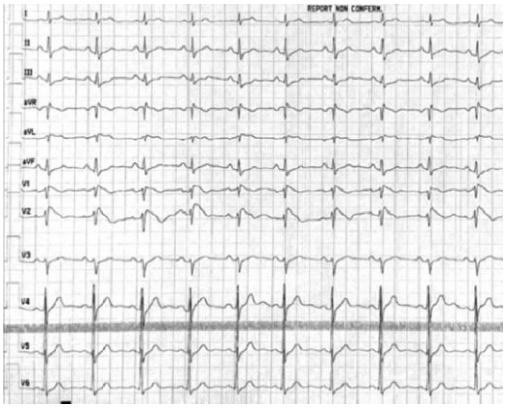

Figure 2

Abstract citation ID: suag058.135

CHANNELOPATHY OR CARDIOMYOPATHY? PREVENTION OF SUDDEN CARDIAC DEATH IN A PATIENT WITH BRUGADA SYNDROME AND MITRAL ANNULAR DISJUNCTION (MAD)

L. Milillo, D. Conforme Torres, M. Varrenti, F. Guarracini, R. Falco, R. Menè, M. Carbonaro, M. Baroni, G. Colombo, S. Vargiu, A. Preda, A. Frontera, L. Gigli, and P. Mazzone
Asst Grande Ospedale Metropolitano Niguarda

A 34–year–old woman with a known spontaneous type 1 Brugada ECG pattern presented to the emergency department after a syncopal episode. Her medical history included a likely pathogenic SCN5A gene variant (with both her father and son affected) and a family history of sudden cardiac death. She was admitted for arrhythmic risk stratification. Transthoracic echocardiography showed only mild atrioventricular valve regurgitation. According to the 2022 ESC Guidelines on ventricular arrhythmias and sudden cardiac death prevention, an electrophysiological study was performed. Using a drive cycle length of 500 ms and double extrastimuli at 220 ms, ventricular fibrillation was induced and terminated by a single external 200 J DC shock. The patient was therefore considered for defibrillator implantation, preceded by cardiac magnetic resonance (CMR) for morpho–tissue characterization. CMR revealed mild mitral regurgitation due to redundant, prolapsing mitral leaflets, associated with mitral annular disjunction (MAD) of 6 mm, systolic curling of

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the basal inferolateral and anterolateral left ventricular segments, and late gadolinium enhancement (LGE) involving the posteromedial papillary muscle. In addition, tricuspid annular disjunction (TAD) of 4 mm was observed. These findings complicated attribution of the arrhythmic substrate to either the channelopathy or the mitral valve disease. MAD is a structural abnormality frequently associated with mitral valve prolapse, with a reported prevalence of up to 40%. A MAD ≥5 mm has been linked to an increased risk of ventricular arrhythmias, particularly in the presence of myocardial fibrosis. The coexistence of MAD, systolic curling, and LGE defines a high–risk arrhythmic phenotype with important implications for risk stratification and management. Given the patient's young age and the absence of pacing indications, an extravascular ICD (EV–ICD) was implanted, allowing post–shock pacing and antitachycardia pacing while avoiding intravascular components and reducing infection risk. In conclusion, this case highlights the complexity of arrhythmic risk stratification, suggesting the coexistence of distinct but potentially synergistic arrhythmogenic substrates, and supports a multiparametric approach integrating genetics and advanced cardiac magnetic resonance imaging, aimed at optimizing therapeutic management and guiding the selection of the most appropriate implantable defibrillator

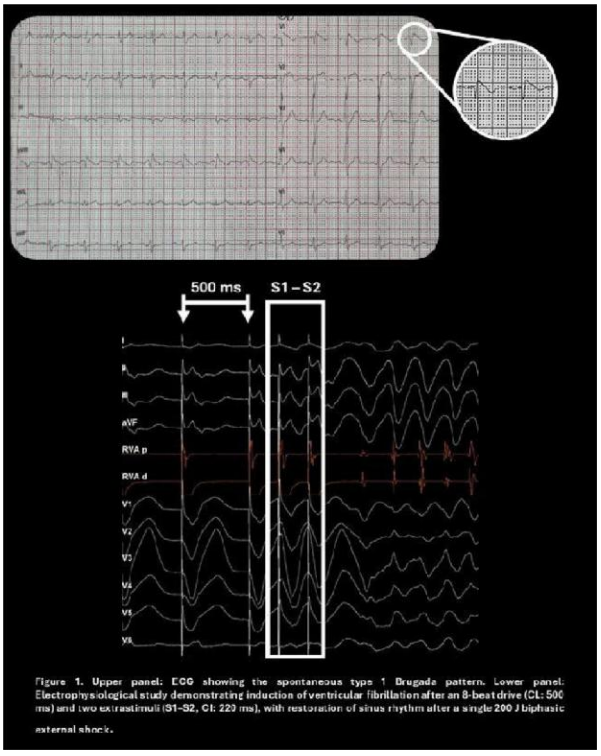


Figure 1. Upper panel: ECG showing the spontaneous type 1 Brugada pattern. Lower panel: Electrophysiological study demonstrating induction of ventricular fibrillation after an 8-beat drive (CL: 500 ms) and two extrastimuli (S1–S2, CI: 220 ms), with restoration of sinus rhythm after a single 200 J biphasic external shock.

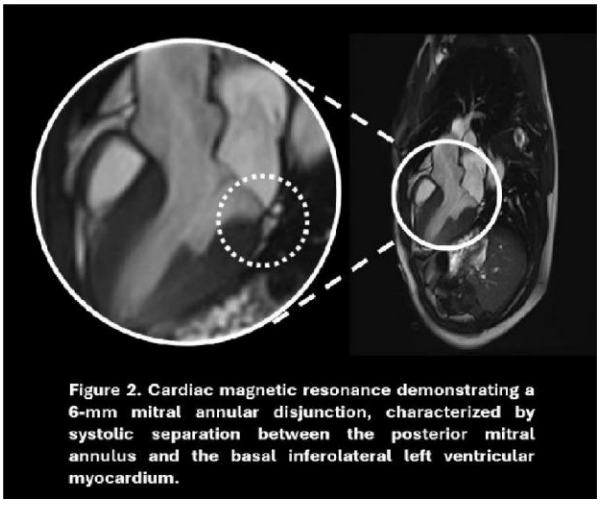


Figure 2. Cardiac magnetic resonance demonstrating a 6-mm mitral annular disjunction, characterized by systolic separation between the posterior mitral annulus and the basal inferolateral left ventricular myocardium.

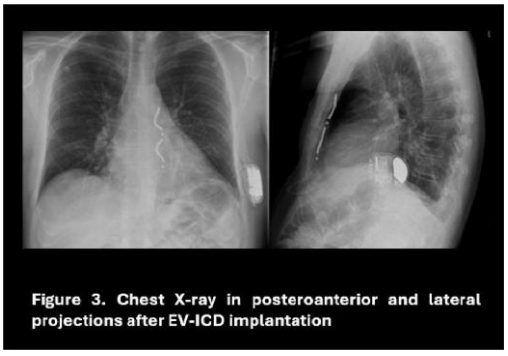


Figure 3. Chest X-ray in posteroanterior and lateral projections after EV-ICD implantation

Abstract citation ID: suag058.136

CASE SERIES: JERVELL AND LANGE–NIELSEN SYNDROME IN PRESCHOOL CHILDREN – TWO CASES WITH CLINICAL AND FAMILIAL IMPLICATIONS

M. Cardillo, C. Vullo, M. Sanfilippo, and C. Comparato
Ospedale Dei Bambini, G. Di Cristina, Palermo.

Background: Jervell and Lange–Nielsen syndrome (JLNS) is the autosomal recessive form of long QT syndrome characterized by congenital deafness and a high risk of malignant arrhythmias in early childhood.

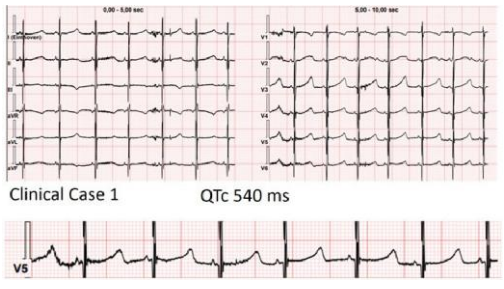
We report 2 cases of preschool children highlighting clinical presentation and differences in arrhythmic triggers.

Case 1: A 2–year–old boy, followed since birth for JLNS. Parents were first–degree cousins with a tragic family history of long QT syndrome and sudden cardiac death (SCD. Serial evaluations consistently showed a markedly prolonged QTc, poorly responsive to maximal propranolol therapy, despite no major arrhythmias. During follow–up, he experienced a syncopal episode in the context of severe iron–deficiency anemia. ECG at that time showed QTc ~640 ms, which return to his normal levels (~520 ms) after red blood cell transfusion. No major arrhythmias were documented, but the event was considered facilitated by anemia on a high–risk substrate. Subsequent follow–up showed clinical stability.

Case 2: A 3–year–old girl, followed since infancy for JLNS. The parents were first–degree cousins, both affected by long QT syndrome. Serial ECGs showed persistently prolonged QTc (~530 ms) without major arrhythmias. She was treated with maximal–dose nadolol. During follow–up, she experienced syncope associated with severe hypoglycemia, likely induced by beta–blocker therapy. Inadequate nutrition, including frequent omission of breakfast, was identified. The event resolved after dietary counseling with subsequent stability.

Discussion: These cases reflect the high arrhythmic risk in JLNS, consistent with literature reporting life–threatening events in ~30% of children within the first 6 years. Despite identifiable and potentially modifiable triggers, the intrinsic arrhythmic risk led to consideration of implantable loop recorder. In both cases, small body size precluded implantation, highlighting a critical limitation in device availability.

Conclusions: Key similarities include parental consanguinity, family history of SCD, persistently prolonged QTc despite maximal beta–blocker therapy, and the need for close monitoring. Differences lie in the triggers of syncope: severe anemia and beta–blocker–induced hypoglycemia. These cases underscore the importance of a multidisciplinary approach, combining optimized pharmacologic therapy, family education, continuous monitoring, and management of extracardiac factors to reduce the risk of lethal arrhythmic events.



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Abstract citation ID: suag058.137

FLUOROSCOPY–FREE SUBCUTANEOUS ICD IMPLANTATION IN PREGNANT WITH CONGENITAL LONG QT SYNDROME

G. Sirico, P. Nocerino, T. Crisci, A. Mazzanti, S. Buono, F. Nocerino, and M. Boccalatte
Po S. Maria Delle Grazie; Istituti Clinici Scientifici Maugeri; Università Degli Studi Della Campania 'Luigi Vanvitelli'

We present the case of a 31–year–old woman, affected by congenital long QT syndrome (LQTS) diagnosed at ten weeks of pregnancy. Family history showed a case of sudden cardiac death (SCD): a paternal uncle died suddenly at the age of 40 years. The patient had experienced recurrent episodes of syncope since adolescence, incorrectly labeled as absence–type epilectic seizure and treated with lamotrigine for many years, with no benefits. Syncope events were frequently triggered by acoustic stimuli, particularly during early morning hours, followed by autonomic symptoms including palpitations and vomiting. Patient was admitted to our cardiology department on 15th July 2025 for recurrent syncope and chest discomfort. ECG revealed marked QT prolongation (QT 628 ms, QTc 540 ms, RR 740 ms) with abnormal T–wave morphology (Figure 1). For confirmation of LQTS, patient underwent genetic testing in a tertiary center. Awaiting the test results (almost two months), patient was treated with nadolol 40 mg daily and discharged with a wearable cardioverter–defibrillator (Life Vest, Zoll) as a temporary protective measure. After two months, genetic test confirmed LQT2 syndrome, based on a mutation in gene KCNH2. Given the history of recurrent syncope, marked QTc prolongation ≥ 500 ms and a family history of SCD, the patient was scheduled for subcutaneous ICD (S–ICD) implantation, as primary prevention. In the context of ongoing pregnancy, X–ray and general anesthesia were not used during S–ICD implantation. Under regional anesthesia with ultrasound–guided serratus anterior plane block and parasternal block, Emblem S–ICD (Boston Scientific) was successfully implanted with no peri–procedural complications (Figure 2). Shock impedance was 80 Ohm. Post–procedural maternal and fetal courses were uneventful (Figure 3) and patient was discharged after 3 days on nadolol, with planned multidisciplinary follow–up. After 6 months of follow up, patient was asymptomatic, any arrhythmic events were recorded and pregnancy was progressing well in the third trimester. LQTS is a potentially life–threatening inherited arrhythmia disorder, with risk of malignant ventricular arrhythmias during specific physiological conditions, including pregnancy and the postpartum period. This case highlights several clinically relevant aspects: diagnostic delay of LQTS due to misinterpretation of symptoms, LQTS risk stratification in pregnancy and feasibility of fluoroscopy–free subcutaneous ICD implantation.

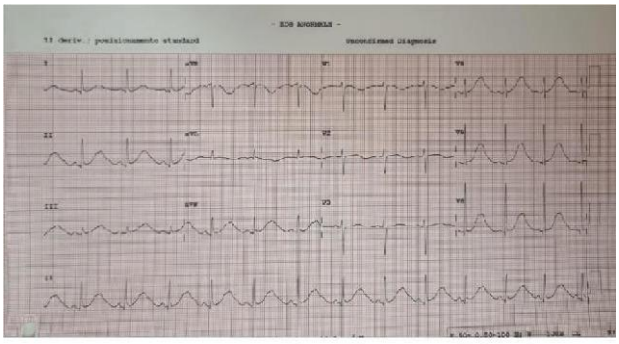

Fig 1. Twelve-lead electrocardiogram showing marked Q

Figure 2. Lateral surgical incision for fluoroscopy-free subcutaneous implantable cardioverter-defibrillator (S-ICD) implantation performed during pregnancy.

Figure 3. Post-procedural fetal ultrasound examination showing normal fetal cardiac activity and absence of procedure-related complications.

Abstract citation ID: suag058.138

BEYOND BRUGADA SYNDROME: A NEW SCN5A FRAMESHIFT MUTATION UNVEILING SEVERE CONDUCTION SYSTEM DISEASE

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A 55–year–old Caucasian male presented to the emergency department for syncope. His past medical and familiar history was unremarkable. ECG showed sinus rhythm with Brugada–like V1–V2 pattern (no diagnostic type 1 pattern in standard and high intercostal leads). Laboratory tests, echocardiography, and chest X–ray were normal. Continuous ECG monitoring revealed intermittent left bundle branch block (LBBB), junctional bradycardia, and type 1 second–degree AV block. Coronary angiography excluded obstructive disease. Cardiac MRI showed normal findings. Electrophysiological study was negative for ventricular arrhythmia induction. The patient was discharged after loop recorder implantation. Subsequent genetic testing identified a heterozygous SCN5A mutation (p.Ile1510Serfs*5, previously unreported in literature), prompting a presumptive diagnosis of Brugada Syndrome (BrS). This variant involves a single–nucleotide deletion causing a frameshift and premature stop codon in exon 26, consistent with a loss–of–function mechanism.

Two years later, another syncopal event occurred and a critical sinus atrial block (SAB, 8–second R–R interval) was documented. The clinical dilemma was whether to implant a pacemaker (indicated for symptomatic bradyarrhythmia) or an ICD (indicated for symptomatic BrS). Ajmaline challenge was performed under temporary transvenous pacing backup: the test was negative for type 1 Brugada pattern but induced worsening conduction abnormalities (LBBB, frequent sinus atrial blocks). BrS was excluded, and a dual–chamber pacemaker with left bundle branch area pacing was implanted for symptomatic SAB and progressive conduction disease. Family screening revealed the same SCN5A mutation in one of the patient's children, with clinical and electrocardiographic investigations being negative.

SCN5A mutations account for up to 20% of BrS cases but are also implicated in other phenotypes, including Long QT Syndrome type 3, cardiomyopathies, and conduction system disease (CSD). Overlap syndromes pose significant diagnostic challenges, but BrS diagnosis remains primarily clinical and ECG–based rather than genetic. SCN5A–related BrS and CSD share a common pathophysiological substrate, with phenotypic expression likely depending on complex interactions between SCN5A and other regulatory factors rather than the degree of current reduction alone. Integrating clinical, genomic, and proteomic data is essential to unravel the complexity of SCN5A–related conditions.

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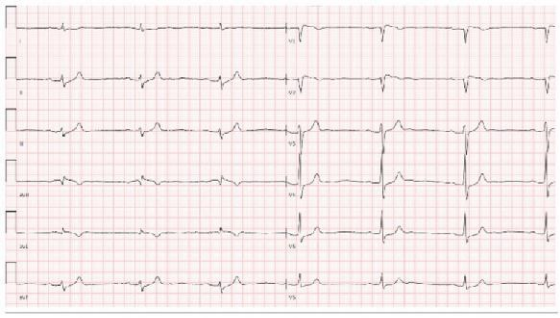

Figure 1. Patient's ECG showing Brugada-like pattern in V1-V2 leads (not diagnostic) and first-degree atrioventricular block.

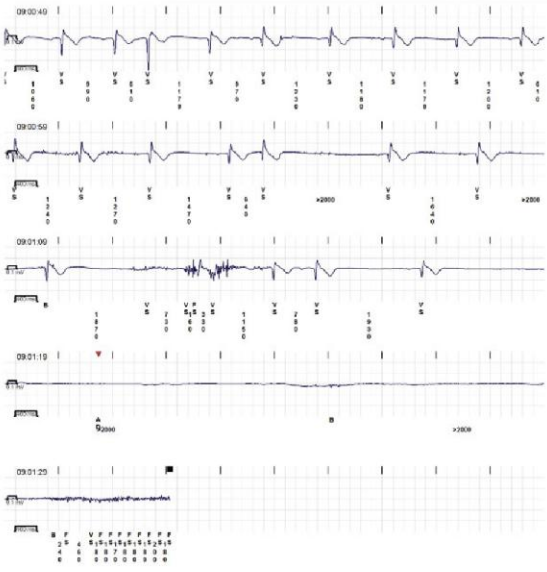

Figure 2. Patient's Implantable Loop Recorder monitoring showing a critical sinus atrial block (8-second R-R interval).

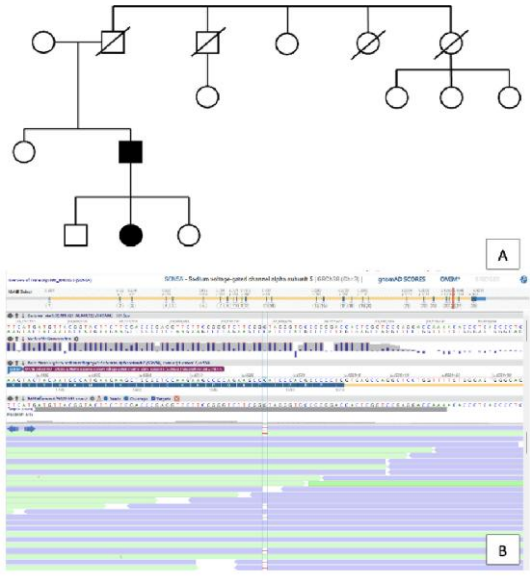

Figure 3. A: patient's family tree. B: patient's SCN5A gene sequencing showing a single-nucleotide deletion causing a frameshift and premature stop codon in exon 26.

Abstract citation ID: suag058.139

KCNQ1 P.ARG231HIS–ASSOCIATED EARLY–ONSET ATRIAL FIBRILLATION WITH MILD LONG QT SYNDROME PHENOTYPE: A FAMILIAL CASE HIGHLIGHTING OPPOSITE ATRIAL AND VENTRICULAR ELECTROPHYSIOLOGY

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Background: Early–onset isolated atrial fibrillation (AF) is often characterized by a complex genetic substrate, including rare variants with incomplete penetrance and variable expressivity, related to channelopathies or cardiomyopathies. We describe a familial case.
Cases: The proband is a competitive male athlete evaluated in 2012 at age 10 for asymptomatic AF detected during sports eligibility screening. Holter ECG confirmed AF with a normal QTc. Electrical cardioversion (ECV) was performed after anticoagulation and flecainide therapy, restoring sinus rhythm (QTc 400 ms). Flecainide was stopped after six months, and sports eligibility resumed. In 2016, AF recurred asymptomatically and ECV was repeated. Cardiac MRI and Brugada–lead Holter monitoring were unremarkable, and an implantable loop recorder was placed. Over the following years, three additional asymptomatic AF recurrences occurred, culminating in pulmonary vein isolation (PVI) by radiofrequency ablation in July 2022. Voltage mapping during AF showed no low–voltage areas and a very short atrial cycle length (90–100 ms). Ambulatory ECG monitoring under flecainide (100 mg bid) showed suboptimal QTc adaptation at night with T–wave notching. Genetic testing revealed the KCNQ1 p.Arg231His variant, a missense change in the S4 segment of IKs, associated with both early–onset AF and a mild LQT1 phenotype. In atrial myocardium, the variant exerts a gain–of–function effect, shortening action potential duration and atrial refractoriness, thereby promoting AF, as opposed to the conventional loss–of–function effect in the ventricular myocardium. Maximal exercise testing showed largely preserved QT behavior with transient maladaptation during early phases and after standing. Nadolol was initiated and up titrated. The proband's father had AF onset at 16 and an asymptomatic recurrence at 42 treated with ECV. In 2025 he underwent PVI with cryoablation and ECV for tachycardiomyopathy (LVEF ~30%, NT–proBNP 9826 pg/mL). QTc remained upper–normal to mildly prolonged at times (448 ms in AF at 130 bpm, 447 ms post–ablation in sinus rhythm).
Conclusions: This case underscores that early–onset AF may reveal actionable genetic etiologies. The KCNQ1 p.Arg231His variant drives opposite atrial and ventricular electrophysiology. Genetic testing in young patients with isolated AF has diagnostic, therapeutic, and familial implications, guiding rhythm management and cascade screening.

Abstract citation ID: suag058.140

TRANSIENT EARLY REPOLARIZATION PATTERN AND RECURRENT VENTRICULAR FIBRILLATION IN A YOUNG SURVIVOR OF SUDDEN CARDIAC ARREST: DIAGNOSTIC CHALLENGES IN SUSPECTED MALIGNANT CHANNELOPATHY

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Malignant early repolarization syndrome (ERS) and inherited cardiac channelopathies are important causes of sudden cardiac arrest (SCA) in young individuals with structurally normal hearts. Diagnosis remains challenging due to dynamic electrocardiographic findings and the absence of overt structural abnormalities. We report the case of a 22–year–old male with no prior medical history admitted after out–of–hospital cardiac arrest due to ventricular fibrillation (VF), successfully resuscitated with bystander basic life support and two automated external defibrillator shocks. Total resuscitation time was 21 minutes. After return of spontaneous circulation, the patient was comatose with generalized tonic–clonic seizures, requiring deep sedation and mechanical ventilation. Baseline ECG showed sinus rhythm with slurred QRS downstroke and J waves without ST–segment elevation in inferior and lateral leads (Figure 1). Toxicological screening was positive for cannabinoids. Extensive diagnostic evaluation excluded structural heart disease: transthoracic echocardiography showed normal biventricular function; coronary angiography ruled out coronary artery disease; cardiac magnetic resonance imaging demonstrated no myocardial edema or fibrosis. Neurological assessment, including EEG and brain CT, was unremarkable. During hospitalization, transient ECG features consistent with malignant early repolarization were documented on a single tracing but were absent on subsequent recordings. Continuous monitoring revealed frequent monomorphic premature ventricular complexes with short coupling intervals, followed by recurrent episodes of polymorphic ventricular tachycardia and VF requiring

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external defibrillation. Given the recurrence of malignant ventricular arrhythmias in the absence of structural heart disease, a diagnosis of suspected inherited arrhythmogenic syndrome was established. After appropriate evaluation, a subcutaneous implantable cardioverter–defibrillator (S–ICD) was implanted for secondary prevention (Figure 2). Genetic testing is currently ongoing. This case highlights the diagnostic complexity of malignant ERS and inherited channelopathies when ECG abnormalities are transient. In survivors of unexplained VF, a structured diagnostic pathway including advanced imaging, prolonged rhythm monitoring, and comprehensive genetic evaluation is essential. Early ICD implantation and genetic counselling remain key strategies for secondary prevention according to current guidelines.

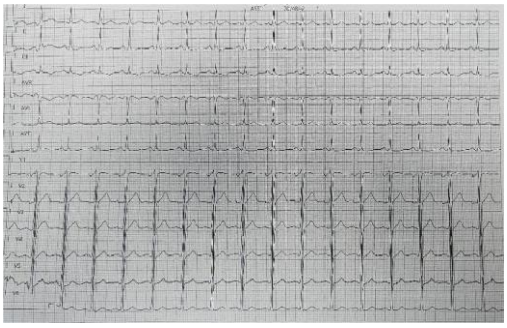

Figure 1

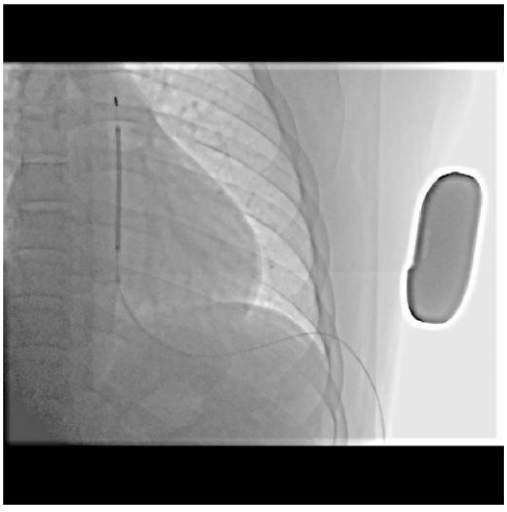

Figure 2

Cardiac Surgery

Abstract citation ID: suag058.141

HEART TRANSPLANTATION IN NON–OPERABLE MULTIPLE GIANT CORONARY ARTERY ANEURYSMS: A CASE REPORT

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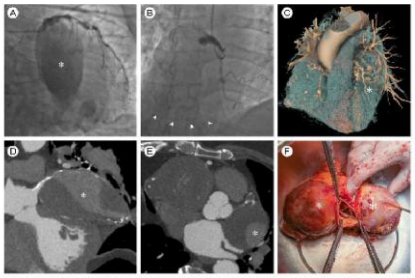
Background: Coronary artery aneurysms (CAA) are uncommon (0.3–5% in angiographic series). Giant forms—defined as dilations ›8 mm or ›4× the normal adjacent diameter—are exceptional and lack standardized management. In adults with complex anatomy, therapeutic options (medical, percutaneous, or surgical) may be limited. To date, no cases of heart transplant as primary treatment for giant CAAs in adult patients have been reported.
Case report: We describe a 62–year–old man with chronic ischemic cardiomyopathy presenting with angina and dyspnea on minimal exertion. Coronary angiography and computed tomography angiography revealed giant aneurysms of the right coronary artery (77×71 mm, Figure 1B)) and circumflex artery (59×61 mm, Figure 1A, 1D), both with extensive thrombosis and compressive effects on adjacent structures (Figure 1C, 1E). The left anterior descending artery was chronically occluded. The absence of distal graftable vessels made coronary artery bypass grafting unfeasible, and the massive aneurysm size precluded percutaneous intervention. Following a multidisciplinary evaluation, the patient underwent orthotopic heart transplantation (Figure 1F) in June 2024. The postoperative course was complicated by transient renal failure requiring temporary dialysis, but the patient was discharged after five weeks with preserved graft function. At follow–up, endomyocardial biopsies excluded rejection, echocardiography confirmed preserved biventricular function, and exercise tolerance significantly improved.
Discussion: Giant CAAs involving multiple vessels with extensive thrombosis represent a rare and challenging condition. Literature mainly includes isolated reports describing surgical resection or bypass when suitable distal targets are available, or percutaneous exclusion using covered stents in selected anatomies. These strategies are not feasible with very large aneurysms, absence of graftable branches, and compressive effects. Pediatric experience includes transplantation for ischemic cardiomyopathy due to Kawasaki disease, but evidence in adults is virtually absent. This case suggests that heart transplantation may be a viable therapeutic option in extreme scenarios.
Conclusions: When conventional revascularization is impossible; heart transplantation may represent an effective strategy for adults with non–operable giant CAAs. This case underscores the role of multidisciplinary assessment, the importance of multimodality imaging, and the need to expand the scarce evidence on this rare condition.



(A) ICA caudal view showing a GCA of the LCX and the anterior descending artery with multiple small aneurismatic tracts interrupted by subocclusive stenosis. (B) 30° right anterior oblique view of a GCA of RCA with arrowheads marking its inferior border. (C) 3D reconstruction from CCTA of both aneurisms. (D) CCTA double oblique view of the LCX aneurysm. (E) CCTA axial view of both aneurisms corresponding to the anatomical specimen in panel (F). Asterisks (*) marks the LCX aneurysm across all panels.

Figure 1

Abstract citation ID: suag058.142

COMBINED TRANSFEMORAL AORTIC VALVE REPLACEMENT AND MINIMALLY INVASIVE DIRECT CORONARY BYPASS GRAFTING – A GOOD CHOICE FOR SELECTED HIGH–RISK PATIENTS

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Aou Delle Marche

Background: Severe aortic stenosis (AS) and coronary artery disease (CAD) commonly coexist in elderly patients and pose a therapeutic challenge, particularly in the presence of frailty and high surgical risk. Conventional surgical approach may be associated with prohibitive perioperative risk, whereas a fully percutaneous strategy may be limited by complex coronary anatomy. Hybrid approaches integrating minimally invasive surgical and transcatheter techniques may represent an alternative in selected patients.
Case Summary: An 85–year–old man presented with symptomatic severe AS (NHYA class III) and complex CAD. Echocardiography showed severe aortic valve stenosis (area 0.7 cm^2; indexed 0.39 cm^2/m^2; mean gradient 56 mmHg) with preserved left ventricular ejection fraction. Coronary angiography revealed critical distal left main disease with aneurysmatic involvement extending to the origin of the left anterior descending (LAD) artery; left circumflex artery was a small vessel supplying limited area. Surgical risk was elevated (EuroSCORE II 6.87%, STS score 6.54%). After Heart Team discussion, a hybrid strategy was chosen. MIDCAB was preferred over percutaneous coronary intervention due to extensive calcification and unfavorable coronary anatomy, while AS was treated with a transfemoral transcatheter approach to avoid cardiopulmonary bypass. MIDCAB was performed via left anterior mini–thoracotomy with off–pump left internal mammary artery–LAD anastomosis. During the same session, TF–TAVI was successfully performed using a 26–mm Edwards Sapien 3 Ultra™ valve. The procedure was completed in a hybrid operating room by a single cardiac surgical team, with on–table extubation according to an ERAS protocol.

The postoperative course was uncomplicated except for transient new–onset atrial fibrillation. At discharge and at 12–month follow–up, echocardiography confirmed optimal valve performance, and the patient was in NYHA class II without angina.

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Discussion and Conclusion: This case demonstrates the feasibility of an hybrid approach combining MIDCAB and TF–TAVI in a selected elderly, high–risk patient with severe AS and complex CAD. The strategy allowed effective treatment of the most prognostically relevant lesions while minimizing surgical trauma and avoiding cardiopulmonary bypass. Careful patient selection, multidisciplinary Heart Team evaluation, and performance in a specialized center were essential for a favorable outcome.

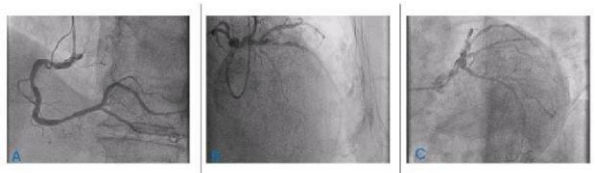
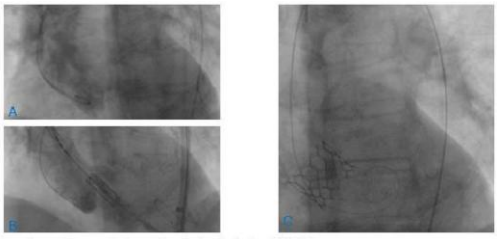


Figure 1. Coronary angiography.
(A) Angiographic view of the right coronary artery showing no significant obstructive lesions.
(B) Angiography of the left coronary system demonstrating severe disease involving the left-sided branches and the left anterior descending artery.
(C) Detailed view of the critical lesion of the left main coronary artery, with distal extension and aneurysmatic disease.



Transfemoral transcatheter aortic valve implantation (TF-TAVI).
(A) Intraoperative view of the pigtail into the aortic root during transfemoral TAVI.
B) Fluoroscopic image showing positioning of the transcatheter heart valve device within the aortic root prior to deployment.
(C) Final fluoroscopic result after successful deployment of the transcatheter aortic valve, demonstrating correct positioning and expansion.

Abstract citation ID: suag058.143

CLINICAL AND ECHOCARDIOGRAPHIC FEATURES AND OUTCOMES IN A COHORT OF LVAD–SUPPORTED PATIENTS: A SINGLE–CENTER RETROSPECTIVE STUDY

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Ospedale San Luca, Salerno; Ospedale Monaldi, Napoli

Background: Left ventricular assist devices (LVADs) are an established therapy for advanced heart failure, yet long–term outcomes remain heterogeneous. Identifying the main predictors of mortality, heart transplantation, and hospitalization is essential to improve post–implant management.
Methods: We conducted a single–center, retrospective observational study including adult patients who underwent LVAD implantation between 2014 and 2024. Clinical, echocardiographic, laboratory, device–related, and pharmacological data were collected from electronic medical records and follow–up visits. Prognostic associations with mortality, heart transplantation, hospitalizations, and right heart failure (RHF) were evaluated using univariate and multivariate analyses.
Results: Thirty–one patients (median age 65 years, 93.5% male) were included. Baseline comorbidities and INTERMACS class were not predictive of adverse outcomes. In contrast, chronic kidney disease at implantation emerged as a strong predictor of mortality, heart failure–related hospitalizations, and arrhythmic events. Moderate–to–severe post–implant aortic insufficiency was significantly associated with reduced survival, worse functional status, and increased likelihood of heart transplantation, indicating LVAD failure. Post–implant right ventricular dysfunction was the strongest prognostic determinant: reduced right ventricular fractional area change (RVFAC) predicted late RHF, which showed robust associations with mortality and cardiovascular hospitalizations. Among medical therapies, RAAS inhibition was associated with left ventricular reverse remodelling and fewer hospitalizations, while SGLT2 inhibitors correlated with improved functional status. Levosimendan use was strongly associated with late RHF and heart transplantation, reflecting severe hemodynamic instability.
Conclusions: In LVAD recipients, long–term outcomes are primarily driven by post–implant right ventricular failure, renal dysfunction, and development of significant aortic insufficiency rather than baseline comorbid burden. Late RHF and severe aortic insufficiency represent the most powerful predictors of death and need for transplantation, highlighting the importance of dynamic risk stratification and targeted post–implant management.

Abstract citation ID: suag058.144

ROLE OF NON–INVASIVE BIOMARKERS AND CORONARY INTRAVASCULAR IMAGING IN PREDICTING CARDIAC ALLOGRAFT VASCULOPATHY (CAV) DETECTED BY CORONARY ANGIOGRAPHY

S. Covino, A. El Kaouri, O. Piro, I. Mattucci, C. Amarelli, E. Pezzullo, B. Liccardo, F. Natale, G. Cimmino, C. Marra, E. Di Lorenzo, P. Golino, and F. Loffredo
Azienda Ospedaliera San Pio–Po G. Rummo; Università Di Torino; UOC Cardiologia, Ospedale Monaldi; UOC Cardiochirurgia E Trapianti, Ospedale Monaldi; UOC Cardiologia "Vanvitelli", Ospedale Monaldi; UOC Cardiologia "Vanvitelli", Università Degli Studi Della Campania "Vanvitelli"; UOC Cardiologia "Vanvitelli", Università Degli Studi Della Campania "Vanvitelli", Ospedale Monaldi

Background: Cardiac allograft vasculopathy (CAV) is the most common form of late rejection after heart transplantation. Early detection and monitoring of CAV are crucial for improving long–term outcomes.
Aim of this work is to investigate pros/cons of each imaging modality and the potential of selected non–invasive biomarkers in predicting the presence and severity of CAV.
Methods: We retrospectively analysed clinical reports and angiographies of 63 living patients transplanted in Ospedale Monaldi. Levels of NT–proBNP, creatinine, LDL,Lp(a),IL–2R, IL–6, C–Reactive protein were statistically analysed.
Results: sample was stratified as follows:56% CAV0, 9% CAV1, 11% CAV2 and 24% CAV3 disease. IVUS(n=29) resulted positive in 67% cases of CAV0group, identifying a pre–clinical stage of disease. OCT (n=2) resulted positive in both patients, showing in one case a fibrotic infiltration of the vessel wall, diffusely involving the entire analysed segment (Figure1A), and in the second case lipid accumulation at multiple sites along the vessel (Figure1B). Results about biomarkers are summarized in Figure 2. CRP, NT–proBNP, and serum creatinine were significantly correlated with angiographically confirmed CAV (Figure3), whereas IL–2R and IL–6 showed a trend toward higher values in the CAV group. No statistically significant difference was found in mean LDLand Lp(a) levels between CAV0 and CAV–positive patients. No difference was found for all the aforementioned parameters between IVUS–pos and IVUS–neg patients.
Discussion: The main findings of our study are the following:

(1) Intravascular imaging currently remains the sole system for preclinical diagnosis of the disease; while IVUS discriminates the presence of disease, OCT can reveal different disease phenotypes;
(2) CRP showed a statistically significant correlation with disease presence, while IL–2R and IL–6 exhibited an increasing trend with disease severity, confirming the role of inflammation in the development of CAV;
(3) no statistically significant differences were found for LDL or Lp(a) levels between groups, which underscores that CAV is not purely an atherosclerotic process;
(4) higher creatinine and NT–proBNP levels may reflect allograft dysfunction or ongoing vascular pathology in CAV patients.

Conclusions: This study highlights the potential clinical value of inflammation, renal dysfunction and myocardial stress biomarkers in CAV patients, and advocate for an expanded use of intravascular imaging, especially OCT, for early CAV detection.

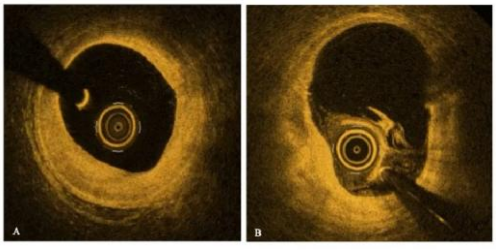

Figure 1

	CAV 0 (%)	CAV ≥ 1 (%)	p- value
IL2R (UI)	524,5 ± 270,6	800,4 ± 884,4	0,14
IL6 (pg/ml)	6,96 ± 4,96	42,4 ± 127,17	0,15
CRP (n)	17 (48)	21 (75)	**0,03**
proBNP (pg/ml)	1153 ± 565,7	7377± 16802,3	**0,03**
Creatinine (mg/dl)	1,44 ± 0,52	2,14 ± 1,62	**0,01**
LDL (mg/dl)	85,9 ± 30,9	73,3 ± 30,4	0,15
Lp(a) (mg/dl)	23,48 ± 19,6	35,09 ± 31,2	0,11

Figure 2

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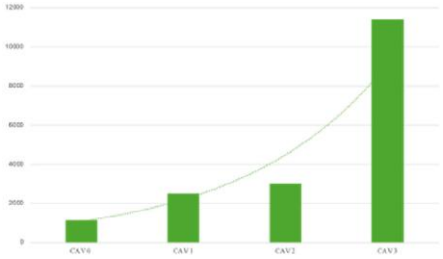

Figure 3

Abstract citation ID: suag058.145

THE RISK OF ACUTE KIDNEY INJURY AND ELECTROLYTE DISORDERS IN CARDIAC SURGERY IN RELATION TO THREE DIFFERENT TYPES OF CARDIOPLEGIC SOLUTION: A RETROSPECTIVE ANALYSIS

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Policlinico Tor Vergata, Roma

Background and Aim: Cardioplegia is a pharmacological approach essential for heart protection from ischemia–reperfusion injury. Acute kidney injury (AKI) is a serious complication after cardiac surgery. We sought to determine the possible onset of AKI in patients undergoing cardiac surgery with different cardioplegic solution during extracorporeal circulation including Custodiol solution (CS), cold crystalloid St. Thomas extracellular cardioplegia (CCC) and warm blood cardioplegia (WBC).
Methods: We retrospectively collected data from 186 patients undergoing cardiac surgery between June 2022 and December 2023. Three groups of patients, based on the above mentioned three different types of cardioplegic solutions administered, were established. We analysed pH, sodium, potassium, calcium, chlorine, lactates before cardiac surgery (T0), after the first dose of cardioplegic solution infusion (T1) and at the end of cardiopulmonary bypass (CPB) (T2), at 48 hours (T3) and 7 days after cardiac surgery (T4). The severity of renal injury was defined as a creatinine serum increase between 0.3 and 1.9 mg/dl and an increase ›/= 2 mg/dl.
Results: Preoperative serum creatinine level, lactate level at weaning from cardiopulmonary bypass › 3 mmol/L, sodium level imbalance during CPB, and male gender were statistically significant predictors of AKI in our population. Type of cardioplegia was not detected as an independent risk factor at the multivariate analysis. However, WBC was associated with a significantly higher risk of AKI at the univariate analysis.
Conclusions: There is no evidence concluding which could be the safest cardioplegic solution to prevent AKI occurrence.

Abstract citation ID: suag058.146

N–ACETYLCYSTEINE IN ADULT CARDIAC SURGERY: AN UMBRELLA REVIEW OF RANDOMIZED EVIDENCE ON POAF AND AKI

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Clinica San Carlo, Milano

Background: Postoperative atrial fibrillation (POAF) and acute kidney injury (AKI) remain frequent complications after adult cardiac surgery. N–acetylcysteine (NAC) has antioxidant and anti–inflammatory properties, but clinical results have been heterogeneous.
Methods: We conducted an umbrella review of meta–analyses of randomized controlled trials (RCTs) evaluating perioperative NAC in adult cardiac surgery. Outcomes were POAF and AKI (primary) and short–term mortality (secondary). We summarized the most comprehensive evidence across overlapping meta–analyses and quantified overlap using corrected covered area (CCA).
Results: Ten meta–analyses of RCTs were included. Across the evidence base, NAC was consistently associated with lower POAF risk (pooled estimates typically around RR ~0.6) (Figure 1), with the signal appearing stronger in protocols using prolonged intravenous administration (48–72 h). In contrast, effects on AKI were neutral overall (pooled estimates around RR ~0.9), with any potential benefit mainly confined to intravenous–only subgroups in larger (Figure 2) datasets. No clear mortality reduction was observed, and event numbers were limited.
Conclusions: In adult cardiac surgery, NAC shows the most consistent evidence for reducing POAF, whereas benefits for AKI and mortality remain uncertain. Future trials should standardize POAF surveillance and AKI definitions, prespecify NAC dose/duration, and focus on high–risk phenotypes in whom an intravenous, prolonged regimen may be most biologically plausible.

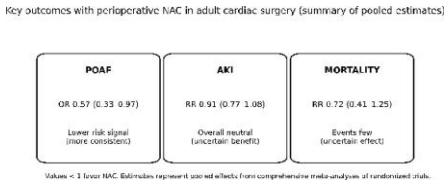

Figure 1

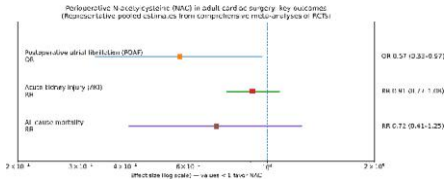

Figure 2

Cardiac Surgery - Coronary Surgery

Abstract citation ID: suag058.147

ACUTE AND CRONIC COMPLICATIONS AFTER ACUTE MYOCARDIAL INFARCTION: A WATCHFUL WAITING STRATEGY

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Mechanical complications after acute myocardial infarction still have high mortality and morbidity rates despite advances in medical and surgical therapy. The gold standard of care is cardiac surgery although percutaneous strategies may be used in selected patient with contraindication and/or prohibitive surgical risk. However, in most cases cardiological management represents the best choice like a bridge to elective operation, the last associated with higher survival rates. We analysed the management of two cases of mechanical complication after acute myocardial infarction, that is subacute left ventricular free wall rupture (figure 1a, arrow) and pseudo–aneurysm after interventricular septum rupture (figure 2b, asterix). In both of them, we have demonstrated how the wait–and–see strategy associated with optimal cardiological management represents the successful therapy in this class of patients.

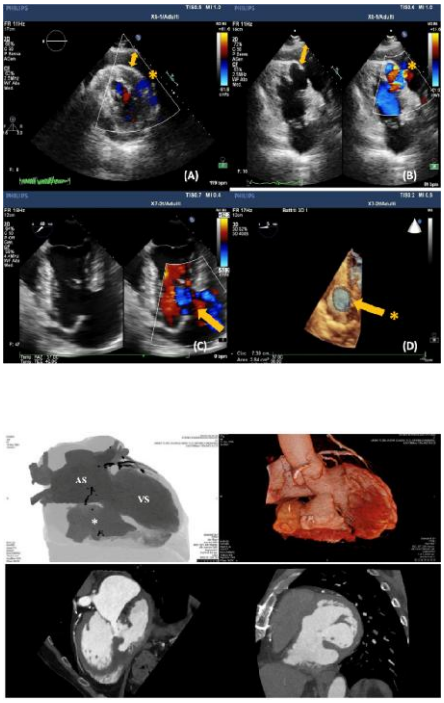

Figure 1-2

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Abstract citation ID: suag058.148

PERCUTANEOUS CORONARY INTERVENTION OR MINIMALLY INVASIVE CORONARY BYPASS FOR ISOLATED LEFT ANTERIOR DESCENDING ARTERY DISEASE

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The optimal revascularization strategy for isolated left anterior descending (LAD) artery disease, minimally invasive direct coronary artery bypass (MIDCAB) and percutaneous coronary intervention (PCI), remains a subject of debate. This updated meta–analysis aimed to compare the long–term outcomes of MIDCAB versus PCI for patients with isolated LAD artery disease.

Three databases were systematically searched to identify randomized controlled trials (RCTs) and adjusted studies. Primary outcomes included long–term survival and repeat target vessel revascularization (TVR). The secondary endpoint was long–term major adverse cardiovascular events (MACEs). Hazards ratios (HR) and Confidence Intervals (CI) were calculated for long–term outcomes and a random effects model was used.

Sensitivity analyses included subgroups analysis of stent–type. Nine articles, comprising 4 RCTs, totaling 2,168 patients (MIDCAB = 1,086 and PCI = 1,080) were included. The weighted mean follow–up was 4.35 ± 4.9 years. Long–term survival was comparable between MIDCAB and PCI (HR = 0.76; 95% CI, 0.58 to 1.00; p = 0.05). MIDCAB was associated with a significantly lower rate of repeat TVR (HR = 0.35; 95% CI, 0.25 to 0.49; p ‹0.0001) and a reduced risk of MACEs (HR = 0.59; 95% CI, 0.43 to 0.81; p ‹0.0001), although the difference was not evident in subgroup analysis comparing MIDCAB and PCI with drug–eluting stent (HR = 0.66; 95% CI, 0.46 to 1.06; p = 0.09).

In conclusion, this meta–analysis of RCTs and adjusted studies shows that in patients with isolated LAD lesion, MIDCAB and PCI exhibit comparable long–term survival.

Abstract citation ID: suag058.149

ACUTE CORONARY SYNDROME COMPLICATED WITH IATROGENIC INTRAMURAL HEMATOMA: WHEN 1 PLUS 1 DOES NOT EQUAL 2

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A 52–year–old male patient, with no relevant cardiovascular risk factors or cardiac history, collapsed during a padel match. He was rescued by lay bystanders with CPR and a shockable rhythm, achieving ROSC after one shock. On hospital arrival, ECG showed diffuse ST–segment elevation; the patient remained alert and conscious, with BP 100/60 mmHg, HR 80 bpm, and an unchanged ECG. An IABP was placed, and coronary angiography was performed (Figure 1). The right coronary artery presented non–occlusive disease. During cannulation of the left coronary artery, contrast extravasation was observed, with the diagnosis of acute intramural hematoma. The non–contrast phase confirmed the presence of an iatrogenic intramural hematoma, and the on–call cardiac surgery team was contacted to evaluate the case. The patient's condition rapidly worsened with sudden cardiac arrest. He was therefore rushed to the operating room under CPR. "Blind" myocardial revascularization was performed on the left coronary system using two venous grafts to the LAD and OM, under cardiopulmonary bypass (CPB). The intramural hematoma, assessed as limited and without interference with aortic valve function or antegrade/retrograde progression (TEE assessment), was left in situ. Due to ischemic damage, the patient had severe myocardial stunning and was weaned off CPB with femoro–femoral veno–arterial ECMO + IABP + inotropic support. Considering the lack of early contractile recovery, in the next hours a vent cannula was placed in the left ventricular apex to optimize ventricular unloading. With increased mechanical support and reduced inotropic support, preserved neurological status, and normal right ventricular function, the patient was progressively weaned from VA–ECMO in favor of univentricular support. The femoral cannulas were removed, and the biventricular support setup was converted to paracorporeal left ventricular assistance via the placement of an outflow cannula in the right axillary artery (utilizing the left ventricular apical vent as the drainage cannula) (Figure 3). With this setting, the patient was awakened and subsequently extubated. In the following days, despite observing no recovery of LV function, it was possible to refer the patient to the transplant center, where he subsequently underwent heart transplantation. In conclusion, the patient's priority is established by revascularization, regardless of the presence of other lesions that may modify the surgical strategy

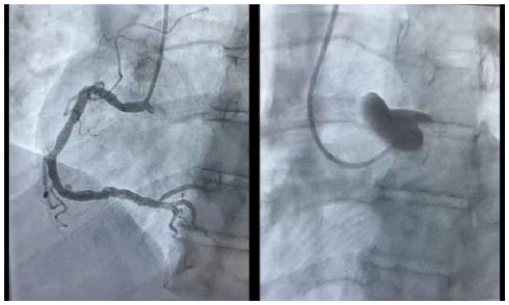

Figure 1

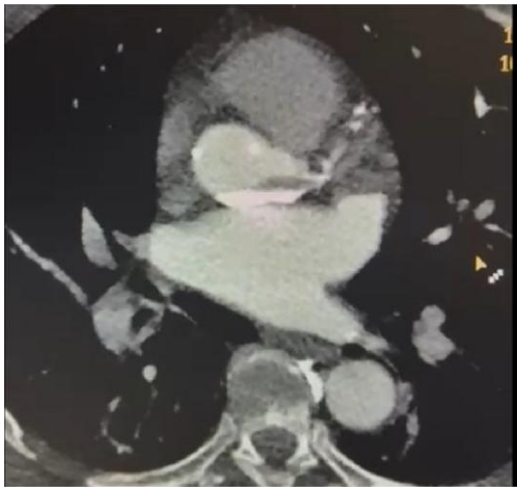

Figure 2

Figure 3

Abstract citation ID: suag058.150

CLINICAL IMPACT OF PREOPERATIVE CHEST COMPUTED TOMOGRAPHY IN CORONARY ARTERY BYPASS GRAFTING: A PROPENSITY–MATCHED ANALYSIS

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Introduction: Neurological complications pose significant risks in coronary artery bypass grafting (CABG). This study explores the potential benefits of preoperative chest computed tomography (CT) in optimizing outcomes and reducing neurological events in high–risk CABG patients.

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Methods: From January 2017 to June 2023, a retrospective cohort study of CABG patients categorized groups based on preoperative chest CT use. Multivariate analysis evaluated the associations between CT imaging and patient characteristics, followed by propensity match analysis to balance preoperative features across groups.
Results: The study included 1786 patients, with 435 having undergone preoperative CT and 1351 without. Propensity matching created two well–balanced groups of 413 patients each. At multivariate analysis, CT patients were elderly (71.1±8.9 years; p=0.03) with a higher incidence of pulmonary disease (19.5%; p‹0.01), peripheral arterial disease (29.2%; p‹0.01) and previous cerebrovascular disease (23.4%; p=0.02). In the matched CT cohort, the perioperative cerebral stroke rate was 0.7% (vs 1.9% in WCT cohort; p=0.223) and 30–days mortality rate was 0.2% (vs 1.7% in WCT cohort; p=0.069). Patients who had a preoperative CT study presented a higher prevalence of porcelain aorta (6.3% vs 1.5%; p=0.0003) and required more often a no–touch aorta procedure (20.3% vs 14.5%; p=0.035).
Conclusions: Patients undergoing preoperative chest CT before CABG were typically older and had systemic atherosclerosis and pulmonary disease. Propensity matched analysis indicated low mortality and perioperative cerebral stroke rates in these high–risk patients. These findings support the integration of chest CT into preoperative evaluations for high–risk patients to develop tailored strategies in coronary artery bypass surgery.

Abstract citation ID: suag058.151

LONG–TERM OUTCOMES AND VEIN GRAFT PATENCY AFTER ENDOSCOPIC VERSUS CONVENTIONAL VEIN HARVESTING: A PROPENSITY SCORE ANALYSIS

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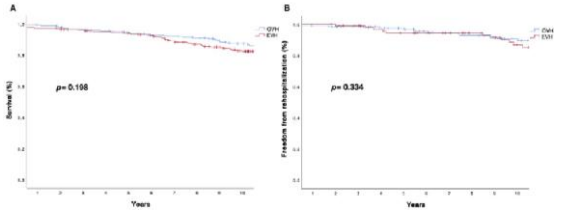
Azienda Ospedaliero Universitaria Delle Marche

Objective: The endoscopic saphenous vein harvest (EVH) has been shown to reduce post–operative pain, risk of infection and ameliorate patients' recovery compared to conventional open harvest technique (OVH). However, long–term graft patency remains unclear. The aim of this study was to evaluate long–term clinical outcomes and venous graft patency of patients undergoing EVH vs OVH.
Methods: We retrospectively analysed 1189 consecutive patients (OVH: 931 patients; EVH: 258 patients) who underwent isolated coronary artery by–pass graft surgery (CABG) between 2008 and 2010. All EVHs were performed by expert harvesters (›100 EVHs with ‹5% conversions to OVH). Patients were propensity–score matched in a 1:1 ratio. Follow–up was 97.8% completed and the median follow–up was 12.1 years (interquartile range 9.7–13.3 years). Vein graft patency was evaluated with the use of a 384–slice computed tomography in 71 asymptomatic patients (ongoing follow up study).
Results: In the unmatched population, the EVH patients were elderly (EVH: 70.2 ±7.8 years; OVH: 68.5±0.1 years, p=0.004) with a higher incidence of pre–operative peripheral vascular disease (p‹0.05) and diabetes (p=0.017). After matching, 255 well balanced pairs were identified. On Kaplan–Meier analysis, 1 – 5 and 10 years survival (98.8%, 93.9%, and 86.9% respectively in the OVH group and 96.8%, 93.6%, and 82.3% respectively in the EVH group; Log–rank p=0.198) and freedom from re–hospitalization (98.4%, 96.6%, and 89.5% respectively in the OVH group and 98.9%, 94.3%, and 85.3% respectively in the EVH group, Log–rank p=0.334) were similar (Figure–1: A. Kaplan–Meier estimate of survival; B Kaplan–Meier estimate of freedom from rehospitalization). In 71 asymptomatic patients, coronary CT scan revealed a total vein graft occlusion in 15.5% of the cases (11/71 patients: 3/22 OVH; 8/49 EVH, p=1.000), and a partial occlusion of the terminal end–to–side anastomosis of sequential bypass grafts in 5.6% of the cases (4/71 patients: 0/22 OVH; 4/49 EVH, p=0.30
Conclusions: In our experience, going behind its short–term benefits, EVH has translated in very encouraging long–term clinical and (preliminary) coronary–CT results compared with OVH. Further larger clinical trials are needed to validate our preliminary observations.

Figure 1:
A. Kaplan-Meier estimate of survival; B Kaplan-Meier estimate of freedom from rehospitalization. EVH, endoscopic vein harvest; OVH, open vein harvest.



Abstract citation ID: suag058.152

CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH REDUCED LEFT VENTRICULAR EJECTION FRACTION: INSIGHTS FROM A SINGLE–CENTER EXPERIENCE

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Cardiochirurgia A.O.U. Delle Marche

Introduction: Reduced left ventricle ejection fraction (LVEF) identifies a frail, high–risk population undergoing coronary artery by–pass grafting (CABG) whose benefit remains debated. We assessed the impact of baseline ventricular dysfunction on early outcomes, long–term prognosis, and ventricular function recovery after isolated CABG.
Methods: Retrospective single–center study of 2230 consecutive patients undergoing isolated CABG (2017–2024). Patients were stratified by baseline LVEF: ≤35%, 36–49%, ≥50%. Early postoperative outcomes, complications, and rescue after complications were recorded. Survival and cardiovascular rehospitalization were assessed using Kaplan–Meier analysis; predictors were identified by Cox regression. Recovery of ventricular function was evaluated in 1092 survivors with follow–up echocardiography (ΔLVEF).
Results: Patients with lower LVEF had a higher baseline comorbidity burden (diabetes 46%, CKD 29%, COPD 21%, NYHA ≥III 52%) and more frequent urgent presentation (41%). Postoperative complications were more common in reduced LVEF: respiratory failure (5.8%), atrial fibrillation (25.2%), sepsis (1.8%), and transient neurologic deficits (8.4%), with longer ICU and hospital stay. In–hospital mortality was low (0.6%) and did not differ significantly across LVEF groups. At follow–up, patients with LVEF ≤35% showed lower 8–year survival (55%) and lower freedom from cardiovascular rehospitalization (34%) (log–rank p‹0.001). At multivariable analysis, advanced age, diabetes, renal failure, COPD, NYHA class ≥III, acute coronary syndrome, and major postoperative complications were independent predictors of mortality. LVEF recovery was assessable in 1092 survivors; improvement occurred in ~88% of those with LVEF ≤35%, with a mean LVEF increase of +14.0 percentage points (p‹0.001).
Conclusions: CABG can be safely performed in patients with reduced LVEF, with very low operative mortality. Although reduced baseline LVEF remains associated with worse long–term outcomes, surgical revascularization yields substantial recovery of ventricular function in most patients with severe dysfunction, supporting surgical revascularization in ischemic cardiomyopathy.

Cardiac Surgery - Heart Valve Surgery

Abstract citation ID: suag058.153

POSTISCHEMIC LEFT VENTRICULAR PSEUDOANEURYSM WITH SEVERE FUNCTIONAL MITRAL REGURGITATION TREATED WITH MINIMALLY INVASIVE BEATING HEART TECHNIQUE AND GEOMETRIC LV REMODELING

A. Nenna, C. Dominici, S. Manganiello, A. Francescato, G. Surace, M. Lanfranchi, T. Toscano, M. Commodo, R. Patanè, and G. Casali
Aou Maggiore Della Carità, Novara

A 66–year–old female presented to the Emergency Department following an incidental finding of a large pseudoaneurysm supplied by the inferoposterior left ventricular (LV) wall during an outpatient echocardiogram. The condition was associated with severe mitral regurgitation (MR) and reduced ventricular function (LVEF 35%). The patient's history included a subacute anterior myocardial infarction two years prior (in Bulgaria), complicated by an apical–mid ischemic ventricular septal defect (VSD). Coronary angiography at the time revealed occlusion of the LAD. An IABP was placed, and she underwent emergency surgical VSD closure with a patch. Months later, she underwent a second surgery due to VSD recurrence. One year later (in Germany), she was hospitalized for dyspnea and recurrent myocardial infarction; angiography showed circumflex artery disease, which was treated with PCI. The day before the current admission, she underwent outpatient echocardiography due to reported recent syncope and dyspnea on minimal exertion. The echo revealed a thinned posterior LV wall with a 2 cm breach traversed by flow, communicating with an extensive 5 cm pericardial collection. Preoperative workup included coronary angiography, which showed no revascularizable coronary disease. The diagnosis was confirmed via CT angiography (Figure 1). Following a right mini–thoracotomy at the 4th intercostal space and establishment of femoro–femoral cardiopulmonary bypass, the pseudoaneurysm was visualized. Upon opening the external chamber, repair was performed using a circumferential Prolene suture followed by interrupted Prolene U–stitches reinforced with pledgets (Figure 2). This technique allowed for the relocation of the papillary muscles, reducing interpapillary muscle distance and achieving good leaflet coaptation as confirmed by real–time transesophageal echocardiography (Figure 3). The postoperative course was uneventful; the patient was extubated

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on postoperative day 1 and discharged to a rehabilitation facility the following week. Postoperative echocardiography demonstrated the absence of residual mitral regurgitation due to the modification of ventricular geometry and indirect relocation of the papillary muscles. In conclusion, chronic mechanical complications of myocardial infarction require a multidisciplinary strategy to tailor high–risk, complex interventions to the specific patient profile in order to minimize procedural risks.

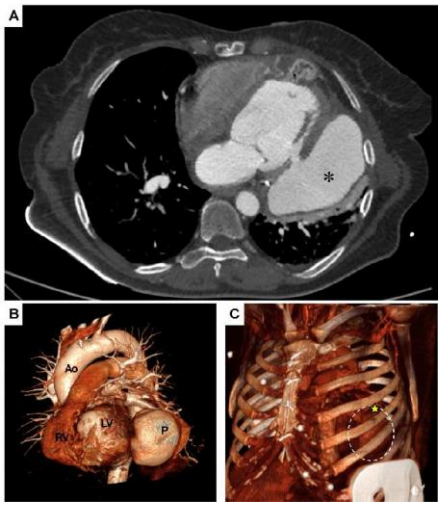

Figure 1

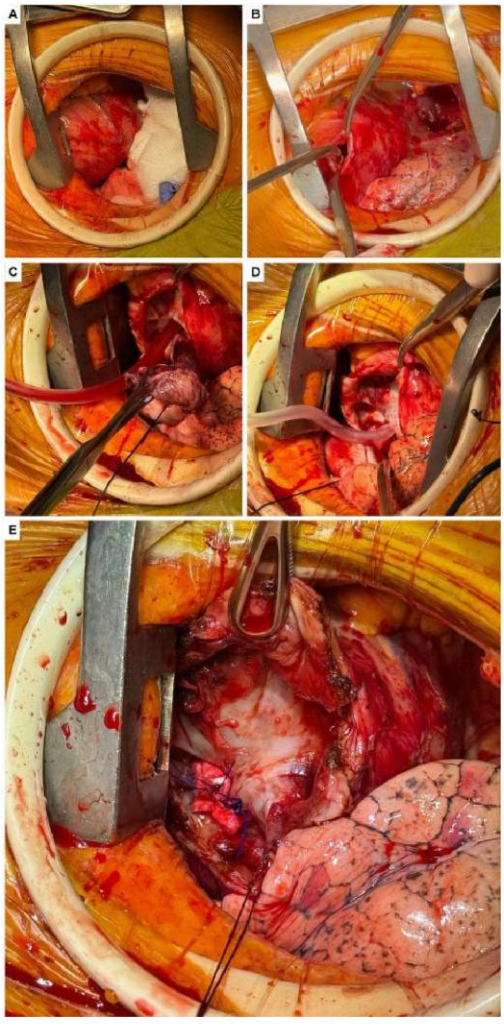

Figure 2

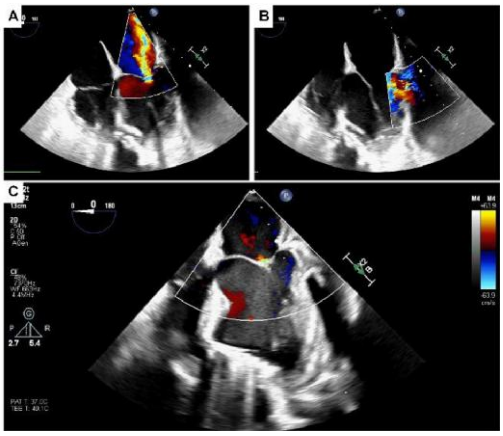

Figure 3

Abstract citation ID: suag058.154

MEDIUM–TERM RESULTS OF TRIFECTA BIOPROSTHESIS IN COMPARISON WITH PERCEVAL BIOPROSTHESIS IMPLANTATION: ANALYSIS FROM THE "PERFECTA" STUDY

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Aim: To compare follow–up results of the aortic valve replacement with the implantation of Perceval sutureless bioprosthesis and St. Jude Trifecta sutured bioprosthesis (the single–center Perfecta Study), specifically evaluating the following end–points: survival, event–free survival rates, and the impact of the structural valve deterioration (SVD) on the freedom from reintervention.
Methods: Between December 2014 and June 2023, 280 patients underwent aortic valve replacement with Trifecta implantation (n=220, mean age 75.2 ±6.5 years) and Perceval implantation, when indicated (n=60, mean age 77.9 ±5.1 years). Two–hundred and seventy–four survivors (Trifecta=214, Perceval=60) were evaluated during the follow–up.
Results: At 7 years for both types of prosthesis, Trifecta vs Perceval, survival (68%±4.1% vs 89%±4.8%, P=0.19), freedom from cardiac death (90±2.3% vs 94±1.7%, P=0.38), from endocarditis (96%±1.4% vs 94%±3.0%, P=0.99) and from reintervention (98%±1.4% vs 100%, P=0.13) were similar. Chronic pulmonary disease (HR: 2.3), advanced age (HR: 1.2), three–vessel coronary disease–left main stem disease (HR: 2.9) were independent predictors of reduced survival and freedom from cardiac death. Overall SVD was observed in 60 Trifecta implants, of which its initial stages in 53 cases, and in one Perceval implant. Freedom from overall SVD was 74%±4.2% vs 93%±6.4% (P=0.09). Moderate patient–prosthesis mismatch (PPM) was more frequently observed in the Trifecta vs Perceval group (n=38 [17.3%] vs n=5 [8.2%], P=0.004). Independent predictors of SVD, both in the initial stages and overall, were Trifecta implantation (HRs: 20.5, 22.4) and moderate PPM (HRs: 2.5, 2.3). NYHA functional class was significantly improved compared to preoperative in both groups (P<0.001).
Conclusions: Both bioprostheses appear to confer equally satisfactory late outcomes. Although Trifecta prosthesis carries a higher risk of SVD, starting from the medium–term follow–up, this risk does not seem to be significantly associated with worse clinical conditions and need for redo operation, at least during a medium–long term period. Close clinical and outpatient echocardiographic patients' monitoring may allow to prevent the progression of SVD over time, thus reducing risk of reoperation. Perceval prosthesis can be considered a reasonable option in the context of the latest generation biological prostheses.

Abstract citation ID: suag058.155

TWO LUMENS: COMPARING BLOOD PRESSURE BEHAVIOUR AFTER TYPE A VS B AORTIC DISSECTION

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Aous Le Scotte, Siena

Objective: Early blood pressure behaviour after acute aortic dissection differs from type A and type B dissections and this may reflect either intrinsic disease differences or the effect of divergent management pathways.

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This study compared early blood pressure behaviour during the first post–dissection period (up to 15 days after dissection) and evaluated the clinical and anatomical factors shaping instability in these two settings.
Methods: We retrospectively analysed 86 patients (45 residual type A, 41 type B) using window–specific hypertension burden, extreme hypertensive events, and qualitative BP control classes. Additional variables included number of antihypertensive drugs, duration of intravenous antihypertensive therapy, renal artery dissection, renal malperfusion, and residual supra–aortic trunk (SAT) dissection. Early adverse events—rupture and 30–day mortality—were recorded.
Results: Type B patients showed pronounced early instability with rapid improvement after 72 hours, whereas residual type A patients demonstrated persistent but lower–amplitude postoperative instability. Very–early and 30–day mortality was low (3 deaths), and early TEVAR occurred in 6 patients, equally distributed. Yet, no early, late, or completion–related survival differences emerged, and multivariable analyses did not identify independent predictors.
Conclusions: The differences between type B and residual type A dissection do not necessarily represent two distinct diseases but rather two clinical phenotypes shaped by anatomy, residual aortic architecture, and management strategy. BP behaviour appears to reflect these contextual factors more than the A/B morphological classification itself. Integrating anatomical features, treatment intensity, and continuous BP metrics yields a realistic early–risk profile that may inform individualized hemodynamic management across both groups.

Abstract citation ID: suag058.156

EVEN IN EMERGENCY, DETAILS MEAN THE DIFFERENCE: FACING TYPE A AORTIC DISSECTION AT 22 WEEKS OF PREGNANCY

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S.C. Cardiochirurgia E Del Trapianto Di Cuore – Dipartimento Cardiotoracovascolare – Asst Grande Ospedale Metropolitano Milano Niguarda

Type A aortic dissection (AAD) is one of the most challenging emergencies in cardiac surgery with an early high mortality rate if untreated. It is a very rare complication during pregnancy, favored by systemic hypertension, hypervolemia and hormonal changes weakening the aortic wall. A 22–weeks (w) pregnant woman experienced sudden left lower limb paresthesia and isolated motor aphasia. Clinical history revealed prior gestational hypertension and familiarity for AAD. At our Emergency Dept echocardiography and CT revealed AAD extending from aortic root to all the supra–aortic trunks and both the femoral arteries. A moderate aortic valve regurgitation was observed. Uterine arteries were not involved with a good placental perfusion. Multidisciplinary evaluation led to emergency cardiac surgery aimed to preserve mother's life first, considering prohibitive the gestational age for a preoperative emergency c–section, and judging the risk of hemorrhage from pregnancy interruption as unacceptable. Due to the status of the peripheral vessels, cardiopulmonary bypass (CPB) was established through bicaval and left ventricular apex cannulation. Ascending aorta and proximal arch were replaced and aortic valve commissures were resuspended. Cerebral and splanchnic protection were guaranteed by moderate systemic hypothermia during the circulatory arrest, antegrade cerebral perfusion and NIRS monitoring. Myocardial protection consisted of retrograde cold blood cardioplegia repeated every 20 minutes, alternated to hematic retrograde cold perfusion and left ventricular venting. Specific strategies were employed to ensure also fetal preservation during the procedure: strict control of blood potassium level to avoid fetal cardiac arrest, 22°C systemic hypothermia, short period of circulatory arrest. Particularly, we maintained systemic CPB flow at 130% of the target flow according to mother's body size, in order to guarantee adequate placental perfusion. Obstetric ultrasound confirmed fetal vitality both at the start and completion of surgery and no other monitoring was indicated due to the small gestational age. The subsequent course of the pregnancy was uneventful, resulting in safe delivery via c–section at 35w. This case demonstrates that even in high–risk emergency cardiac surgery, the implementation of tailored surgical and perfusion strategies can successfully preserve the lives of both the mother and the fetus.

Abstract citation ID: suag058.157

MASSIVE INTRACARDIAC THROMBOSIS POST EXTRACORPOREAL CIRCULATION FOLLOWING ASCENDING AORTIC REPLACEMENT AND NATIVE AORTIC VALVE RESUSPENSION (TIRONE DAVID). A PARTICULAR CASE

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Nuovo Ospedale Di Sassuolo

Extracorporeal circulation is associated with a hypercoagulable state that cannot always be controlled with heparin. We present the case of a patient with a massive right atrial thrombosis diagnosed approximately 6 months after ascending aortic valve replacement surgery with native aortic valve resuspension (Tirone David).**Case Report:** A 60–year–old man, 190 cm tall and weighing 102 kg, with dyslipidemia, arrived in the emergency room after a postoperative chest CT scan showing a right atrial mass described as a "filling defect" and a periaortic rim approximately 4 cm long (Fig. 1). His medical history included thyroidectomy for multinodular goiter and COPD with CPAP. Six months earlier, he had undergone valve–sparing surgery without complications. The ECG and laboratory tests were normal, particularly the complete blood count and inflammatory markers. A fast echocardiogram (TTE) showed a right atrial mass floating in the ventricle, measuring approximately 3.5 x 2 cm, with an enlarged ascending aorta, normal left ventricular systolic function, and non–dilated atria. Elective TTE and transesophageal echocardiogram (TEE) revealed that the pedunculated mass was anchored to the atrial wall adjacent to the insertion of the tricuspid valve septal leaflet (Fig. 2). The patient was asymptomatic and feverless, making an endocarditic etiology unlikely, although not entirely excluded. After a cardiac surgery consultation (CCH), it was decided to proceed with the mass removal (Fig. 3) with histological confirmation of its thrombotic nature. Normal surgical outcomes were observed in the ascending aorta and the patient had a good clinical recovery.

The literature reports cases of deep vein thrombosis after CCH with possible pulmonary embolism, and rare cases of left atrial thrombosis in patients with AF and dilated atria. A possible cause, heparin–induced thrombocytopenia (HIT), present in 1.9% of cardiac surgery patients, was ruled out due to a consistently normal platelet count.

This case highlights how intracardiac thrombosis can develop even in the absence of obvious risk factors or symptoms. The atrial location, not directly related to the aortic surgery but still close to the surgical site, raises questions about the origin of the thrombus. The late diagnosis and atypical location underscore the importance of more patient–tailored preventive strategies and possible extension of anticoagulant therapy in patients undergoing complex procedures or at increased risk.

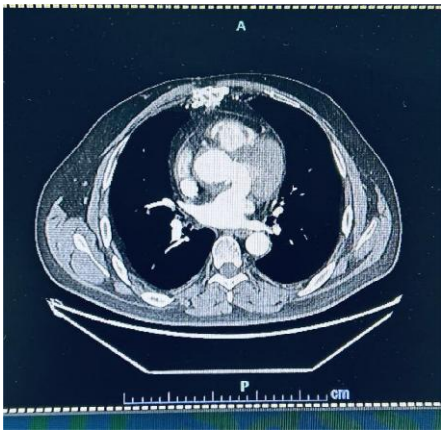

Figure 1

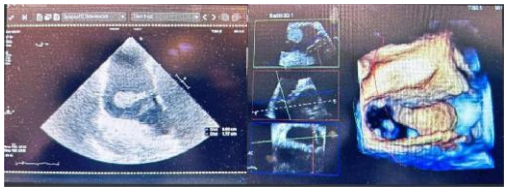

Figure 2

Figure 3

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Abstract citation ID: suag058.158

RETURN TO WORK AFTER MITRAL VALVE SURGERY

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Degenerative mitral valve disease is a widespread significant disorder, defined by a spectrum of different lesions. Surgical repair is the gold standard treatment, achieving outstanding results and improving long–term outcomes. Advances in surgical techniques have led to reduce recovery times and postoperative morbidity in mitral valve surgery. Nevertheless, despite these improvements, after surgical procedure, patients may experience a temporary reduction in physical abilities and work capacities, potentially requiring changes in their work employment or reduction in working hours. We investigated patterns of employment status before and after isolated mitral valve surgery focusing on demographic and clinical factors associated with a lower likelihood of returning to workforce within three months after surgery and possible work restrictions. Three–hundred and forty–four patients aged 18–65 years who underwent first–time isolated mitral valve surgery for degenerative mitral valve disease between January 2017 and June 2024, were included. The median age was 56 (50–61) years old; 253 (73.5%) were male. The median operative risk estimated by EuroSCORE II was 0.67 (0.5–0.9). Surgical access was achieved through trans–axillary minithoracotomy in 206 patients (59.9%) and full sternotomy in 138 (40.1%). According to mitral valve disease, repair was performed in 290 patients (84.3%). The overall 30–day mortality was 0%. No postoperative cerebrovascular events occurred. Three–hundred and seven patients (92.5%) return to workforce after mitral valve surgery; in 252 cases (75%), the return to work occurred within three months after discharge. Work related restrictions were implemented in 29.3% of patients (n=96), primarily among workers involved in manual material handling (n=68) and night shift (n=6) respectively. In the univariate analysis, perioperative rehospitalizations was significantly associated with a low likelihood of returning to the workforce (p=0.05). Manual material handling was identified as a predictor of work restrictions (p‹0.001). Actively employed and low–risk patients undergoing isolated mitral valve surgery, successfully returned to work, with early resumption and limited need for work restrictions. Manual material handling and perioperative unplanned hospital readmissions were associated with work limitations and delayed return.

Clinical Cardiology - Diabetes

Abstract citation ID: suag058.159

CARDIO–DIABETOLOGY CARE PATHWAY: A MULTIDISCIPLINARY APPROACH FOR PATIENTS WITH HIGH CARDIOVASCULAR RISK

G. Carpinella, F. Sessa, V. Taglialatela, A. Bellis, F. Furbatto, F. La Rocca, F. Serino, D. D'andrea, M. Russo, N. Verde, M. Liguori, and C. Mauro
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Background: Type 2 diabetes mellitus (T2DM) is a major health issue worldwide due to its increasing prevalence and strong association with cardiovascular morbidity and mortality. Chronic hyperglycemia and insulin resistance cause endothelial dysfunction, vascular inflammation, and accelerated atherosclerosis. In T2DM patients, plaques tend to have higher lipid content, increased inflammation, and greater thrombotic burden, which increases vulnerability and the risk of acute cardiovascular events. Additionally, insulin resistance leads to myocardial alterations, contributing to heart failure and diabetic cardiomyopathy, even in the absence of coronary artery disease (CAD) or hypertension. Recent ESC guidelines highlight the need for early cardiovascular risk stratification and integrated management in T2DM. The SCORE2–Diabetes algorithm introduced in 2023 is a significant tool for predicting 10–year cardiovascular risk in these patients.
Methods: A multidisciplinary cardio–diabetology pathway was implemented for patients with T2DM, with or without established atherosclerotic cardiovascular disease (ASCVD). Patients underwent comprehensive cardiovascular risk assessment using the SCORE2–Diabetes algorithm, classifying them into low, moderate, high, and very high–risk categories. The pathway involved systematic screening for coronary, cerebrovascular, peripheral, and aortic disease, including clinical evaluation, laboratory tests (HbA1c, natriuretic peptides, renal function), transthoracic echocardiography, and carotid ultrasound. Further imaging and tests were prescribed based on risk profiles, and management was coordinated by an integrated cardiology–diabetology team, with nursing staff supporting procedures and follow–up.
Results: This pathway allowed early identification of high–risk patients, optimizing cardiovascular and glucose–lowering therapies. It also improved continuity of care, reducing unnecessary hospitalizations and emergency visits through structured outpatient monitoring.
Conclusion: A structured cardio–diabetology pathway offers a personalized approach to cardiovascular prevention and treatment in T2DM, potentially improving patient outcomes and supporting healthcare sustainability.

Abstract citation ID: suag058.160

REAL–WORLD IMPLEMENTATION OF AN INTEGRATED CARDIO–DIABETOLOGY PATHWAY: A 1.5 YEARS EXPERIENCE IN CARDIOVASULAR RISK PROFILING AND MANAGEMENT

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Background: Patients with diabetes mellitus represent a heterogeneous population with a wide range of cardiovascular (CV) risk, from primary prevention to advanced atherosclerotic cardiovascular disease (ASCVD). Despite increasing evidence supporting integrated cardio–diabetology models, real–world data on the longitudinal impact of structured care pathways on patient profiling and risk factor control remain limited. We report real–world results of a cardio–diabetology pathway implemented in a tertiary cardiovascular center, with outcomes projected over a 2.5–year observational period.
Methods: All consecutive patients referred to a dedicated cardio–diabetology outpatient clinic were prospectively evaluated. Demographic characteristics, diabetes type and duration, prevention setting, and cardiometabolic risk factor control were systematically collected. Clinical assessment included age, sex, diabetes type (type 1 vs type 2), diabetes duration (‹10 vs ≥10 years), and indication for primary or secondary CV prevention. Risk factor control was assessed by low–density lipoprotein cholesterol (LDL–C ‹70 vs ≥70 mg/dL) and glycaemic control (HbA1c ‹7% vs ≥7%). Observed 1–year data were proportionally extrapolated to estimate pathway impact over 2.5 years.
Results: Over the projected 2.5–year period, approximately 225 patients were managed within the pathway. Most were male (69%) and older than 60 years (65%). Type 2 diabetes accounted for 87% of cases, while 55% had a diabetes duration ≥10 years. Primary prevention represented 63% of patients, whereas 37% had established ASCVD. At follow–up, LDL–C ‹70 mg/dL was achieved in 45% of patients and HbA1c ‹7% in 50%. The integrated pathway enabled comprehensive cardiovascular phenotyping, optimization of lipid–lowering and glucose–lowering therapies, and structured follow–up, particularly in older patients and those with long–standing diabetes or ASCVD.
Conclusions: In a real–world setting, a structured cardio–diabetology pathway allows effective longitudinal management of a large and clinically complex diabetic population. Integrated care supports systematic risk stratification and optimization of cardiometabolic targets in both primary and secondary prevention, confirming cardio–diabetology as a key component of contemporary cardiovascular care.

Abstract citation ID: suag058.161

ANGIOGRAPHIC PROFILE AND MANAGEMENT OF CORONARY AND PERIPHERAL ARTERY DISEASE IN A CARDIO– DIABETOLOGY COHORT: A 1.5 YEAR OBSERVATIONAL ABSTRACT (MEDICAL)

G. Carpinella, F. Sessa, V. Taglialatela, V. Fioretti, F. Furbatto, F. La Rocca, G. Nicoletti, F. Serino, D. D'Andrea, M. Liguori, and C. Mauro
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Diabetes mellitus increases the risk of atherosclerotic cardiovascular disease (ASCVD). Diabetic patients often present with diffuse, calcified, and multivessel disease, complicating diagnosis and revascularization strategies. Critical stenoses of the left anterior descending (LAD) artery and left main coronary artery (LM) are associated with poor prognosis. Peripheral arterial disease (PAD), including involvement of iliac–femoral and carotid arteries, is also common and contributes to limb ischemia and cerebrovascular risk. However, contemporary data on the combined coronary and peripheral angiographic burden in cardiodiabetology outpatient populations are limited. A retrospective study was conducted involving 60 consecutive patients with type 2 diabetes mellitus attending a cardiodiabetology outpatient clinic, who underwent diagnostic coronary and/or peripheral angiography between May 2024 and December 2025. Demographic data, CV risk factors, angiographic findings, and treatment strategies were collected from electronic medical records. Critical coronary stenosis was defined as ≥70% luminal narrowing (≥50% for LM), while critical peripheral stenosis was defined as ≥70% narrowing of iliac–femoral or carotid arteries. Multivessel coronary disease was defined as involvement of ≥2 major coronary territories.ResultsThe mean age of patients was 65 years (±9), and 70% were male. Hypertension was present in 75%, dyslipidemia in 68%, smoking history in 35%, and the average duration of diabetes was 10 years (±5). Critical LAD stenosis was found in 30 patients (50%), while LM disease was present in 6 patients (10%), half of whom were referred for coronary artery bypass grafting (CABG). Multivessel coronary disease was identified in 27 patients (45%). Critical PAD was found in 15 patients (25%), with involvement of iliac–femoral arteries in 7 and carotid arteries in 8. Most isolated coronary and peripheral lesions were treated percutaneously, while surgical referral was reserved for complex multivessel and LM disease cases. Notably, 20% of patients with multivessel coronary disease also had critical peripheral lesions.ConclusionsIn this high–risk cohort,

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critical coronary and PAD was highly prevalent, with frequent multivessel involvement reflecting advanced systemic atherosclerosis. An integrated coronary and peripheral assessment, along with individualized revascularization strategies, is essential to optimize management and outcomes in patients with diabetes.

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TIRZEPATIDE TREATMENT AND ACHIEVING WEIGHT REDUCTION ›5%, SBP REDUCTION ›5 MMHG AND NON–HDL CHOLESTEROL REDUCTION › 10%: A POST–HOC ANALYSIS FROM THE SURMOUNT–1 3–YEAR TRIAL

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Introduction: This post–hoc analysis evaluated the proportion of participants with obesity and prediabetes who met the combined goal of weight reduction ›5%, systolic blood pressure (SBP) reduction ›5 mmHg and non–HDL cholesterol reduction ›10% from baseline to Week 176 in SURMOUNT–1 3–year trial.
Methods: Post–hoc analyses included participants with obesity and prediabetes who completed treatment with tirzepatide (n=454) or placebo (n=114) at Week 176 and had measures for weight, SBP and lipids. Shifts in HbA1c (‹5.7%; ≥5.7%), body mass index (BMI) (≤27; ›27 kg/m2) and waist:height ratio (WHtR) categories (‹0.53; ≥0. 53) from baseline to Week 176 were calculated for those who met the combined clinical goals.
Results: 145 (25.5%) participants met the combined goal at Week 176. Significantly more tirzepatide–treated participants (n=139, 30.6%) met the combined goal vs. placebo participants (n=6, 5.3%) (p‹0.0001). 94.2% (n=131) of tirzepatide participants who met the combined goal also had an HbA1c ‹5.7%, while 41.0% (n=57) had a BMI ≤27 kg/m2 and 28.8% (n=40) had a WHtR ‹0.53.
Conclusion: In this post–hoc analysis, participants treated with tirzepatide were significantly more likely to achieve a combined clinical goal of weight reduction ›5%, SBP reduction ›5 mmHg and non–HDL cholesterol reduction ›10%. The majority of tirzepatide participants meeting the combined goal also achieved normoglycemia. More than 1/3 participants met the BMI goal, and 1/4 participants met the WHtR goal suggesting a reduction in central adiposity.

Abstract citation ID: suag058.163

IMPROVEMENTS IN CARDIOMETABOLIC RISK FACTORS BY BODY WEIGHT REDUCTION WITH TIRZEPATIDE IN ADULTS WITH OBESITY AND PREDIABETES: A POST HOC ANALYSIS OF THE 3–YEAR SURMOUNT–1 STUDY

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Background: In the 3–year SURMOUNT–1 study, this post hoc analysis assessed changes in cardiometabolic risk factors based on body weight reduction thresholds with tirzepatide.
Methods: Participants (N=458) randomized to receive tirzepatide (pooled 5/10/15 mg doses) and with an on–treatment body weight measurement at Week 176 were included in the analysis. The proportion of participants achieving body weight reduction thresholds (‹5%, 5 to ‹10%, 10 to ‹15%, 15 to ‹20%, 20 to ‹25%, 25 to ‹30%, 30 to ‹35%, and ≥35%) at Week 176 and change from baseline at Week 176 in cardiometabolic risk factors, including blood pressure, lipid profile, and glycemic parameters, by body weight reduction thresholds were assessed.
Results: At baseline, mean waist circumference was 116.5 cm, systolic blood pressure: 126.1 mmHg, diastolic blood pressure: 80.4 mmHg, triglycerides: 8.5 mmol/L, HDL–C: 2.7 mmol/L, non–HDL–C: 7.9 mmol/L, LDL–C: 6.2 mmol/L, and HOMA–2–IR (computed with insulin): 2.1. Improvements in waist circumference (3.2–35.3 cm reduction), HbA1c (0.30–0.76% reduction) and triglycerides (15–48% reduction) were observed among all body weight reduction subgroups. HOMA2–IR, blood pressure and HDL–C, non–HDL–C and LDL–C also improved among participants who lost ≥5% of body weight. Overall, greater improvements in cardiometabolic risk factors were generally associated with greater body weight reduction.
Conclusions: In this post hoc analysis of the 3–year SURMOUNT–1 study, tirzepatide treatment was associated with improved cardiometabolic risk factors, that were generally greater in magnitude with higher degrees of body weight reduction among people with obesity and prediabetes.

Abstract citation ID: suag058.164

COMPARATIVE 12–MONTH CARDIOMETABOLIC: IMPACT OF SEMAGLUTIDE VS TIRZEPATIDE: A SYNTHETIC PROPENSITY–MATCHED ANALYSIS

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Polimedic, Palermo

Background Objective: deliver a 12–month, harmonized comparison of Semaglutide and Tirzepatide across three shared clinical domains: weight reduction, glycemic improvement, and cardiovascular risk reduction. Because individual patient data from original trials are not available, a synthetic cohort and propensity–score matching framework were used to approximate balanced treatment groups.
Methods: A simulated cohort (N=8000) was built using clinical variables aligned with SELECT (Semaglutide) and SUMMIT (Tirzepatide) populations: age, sex, BMI, type 2 diabetes status, cardiovascular disease history, HFpEF, eGFR, and systolic blood pressure. Treatment assignment followed a logistic model reflecting real–world prescribing patterns. Twelve–month cardiovascular events were generated using clinical predictors and a predefined treatment effect. Propensity scores were estimated via logistic regression and matched 1:1 using a caliper of 0.05. Standardized mean differences assessed balance. Outcomes included 12–month indexed reductions in weight, HbA1c, and composite cardiovascular risk.
Results: Matching produced acceptable balance (post–match SMD ‹0.1 for all covariates). In the matched cohorts, 12–month indexed outcomes showed: – Weight reduction: Semaglutide 10%, Tirzepatide 15% – HbA1c reduction: Semaglutide −1.6%, Tirzepatide −2.2% – Cardiovascular risk reduction (composite events): Semaglutide 16.8%, Tirzepatide 12.5% The simulation replicated expected patterns: stronger metabolic effects with Tirzepatide, more pronounced cardiovascular protection with Semaglutide.
Conclusions: A synthetic propensity–matched approach enables a unified 12–month comparison between the two agents, overcoming structural differences in the original trials. Results mirror broader clinical evidence: Tirzepatide delivers higher metabolic impact, while Semaglutide demonstrates stronger cardiovascular risk attenuation. The model is illustrative and not a substitute for analyses based on true patient–level data.

Clinical Cardiology - Endocarditits

Abstract citation ID: suag058.165

REOPERATIVE ROOT SURGERY FOR DESTRUCTIVE AORTIC BIOPROSTHETIC ENDOCARDITIS: SUB–ANNULAR BENTALL

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Reoperative aortic root surgery for infective endocarditis (IE) on a bioprosthesis represents one of the most formidable challenges in modern cardiac surgery. This condition is frequently associated with extensive anatomical destruction, including annular involvement, perivalvular abscesses, pseudoaneurysms, or intracardiac fistulae. Consequently, aggressive surgical management is mandatory to eradicate the infection and restore structural integrity. After radical debridement, aortic root reconstruction typically follows two primary pathways: cryopreserved homografts (allograft) or prosthetic conduits. Homografts are considered the biological gold standard for destructive endocarditis. As human tissue, allografts exhibit superior resistance to recurrent infection and provide excellent hemodynamics. Their inherent flexibility allows for the tailoring of the conduit to cover extensive abscessual defects (e.g., patching of the sinuses of Valsalva). However, limited availability and a long–term tendency toward calcification restrict their universal application. On the other hand, "on–the–shelf" prosthetic grafts for sub–annular Bentall procedure, anchoring the prosthesis deeper than the native annular plane, has immediate availability and a standardized surgical technique. In the current literature, perioperative mortality remains high (15–25%), reflecting the severity of the pathology and the inherent fragility of the reoperative patient population. In our center, from January 2020 to December 2025, 38 sub–annular Bentall procedures for aortic bioprosthetic endocarditis have been performed, paired with various associated planned procedures. Risk profile of those patients is high (median EuroSCORE 35) with a common clinical presentation of septic shock (25%). Procedure remains long and challenging (median cross clamp time 180 min) but no in–theater mortality has been observed. In–hospital mortality has been observed in 5 patients (14.7%), mainly those presenting with septic shock or undergoing more than 2nd procedure. Transfusional support and inotropic support were high as expected (median VIS score 30). Most frequent complications included revision for bleeding (but without identifiable source) in 65%, and need for renal replacement therapy (48%). Despite technically challenging, this sub–annular Bentall might produce an "on–the–shelf" and readily available graft for complex redo procedures, and limitations of homograft might be overcome.

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Abstract citation ID: suag058.166

PROGRESSIVE RIGHT HEART FAILURE IN LOEFFLER ENDOCARDITIS: A CASE REPORT

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We report the case of a 48–year–old male with chronic eosinophilic leukaemia (CEL) complicated by multiorgan damage, including chronic kidney disease (CKD) and liver disease with recurrent ascites. Cardiac follow–up began at CEL diagnosis. The patient remained stable until 2015, when he underwent two atrial tachycardia ablations. Cardiac magnetic resonance imaging suggested Loeffler endocarditis, showing right ventricle (RV) fibrosis, mildly impaired RV systolic function and severe tricuspid regurgitation (TR). The left ventricle (LV) remained preserved (Figure 1-2). Cardiac computed tomography excluded coronary disease. In June 2025, despite guideline–directed medical therapy, the patient developed severe dyspnea, massive ascites and acute kidney injury on CKD. Transthoracic (TTE) and transoesophageal echocardiography showed torrential TR not amenable to percutaneous repair. Laboratory results showed normal blood count, serum creatinine 5.5 mg/dL, bilirubin 2 mg/dL, NT–proBNP 7950 pg/mL. Electrocardiography showed junctional rhythm. On admission, intravenous furosemide was continued. A 5–L paracentesis yielded negative cytology and microbiology. TTE confirmed severely dilated RV and atrium, paradoxical septal motion, hypokinetic RV and torrential TR (Figure 3). LV function was normal. Right heart catheterization revealed reduced cardiac index (2.04 L/min/m²), mildly elevated pulmonary capillary wedge pressure (14 mmHg), normal pulmonary pressures (24/15/19 mmHg), normal pulmonary vascular resistance (1.3 WU) and elevated right atrial pressure (19 mmHg). Low dose dopamine (2 mcg/kg/min) improved perfusion and diuresis, leading to clinical stabilization with weight loss (–19 kg), waist reduction (–11 cm), and improved labs. Multisystem evaluation was undertaken. Portal hypertension and decompensated liver disease were excluded. Liver biopsy revealed extensive fibrosis without cirrhosis or malignancy. MELD–XI was 48. Haematology confirmed longstanding CEL remission. Imatinib was discontinued, with monthly molecular monitoring. Renal function normalized under inotropes, with no further tests needed. Extracardiac and serologic workup was negative. Blood type: B Rh+. The case was reviewed by the transplant team. No absolute contraindications to heart transplantation were found. Combined heart–liver transplantation was deemed unnecessary given the absence of cirrhosis. LVAD was excluded. On August 1st, 2025, the patient was listed for urgent heart transplantation (Urgency level 2).

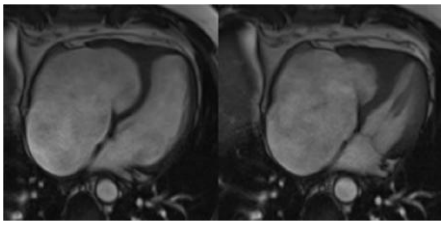

Figure 1

Figure 2

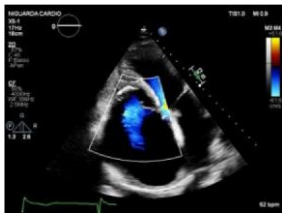

Figure 3

Abstract citation ID: suag058.167

UNMASKING HIDDEN ENDOCARDITIS: A NON–STANDARD APPROACH TO SAM AND LVOTO MANAGEMENT

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Aor Villa Sofia–Cervello P.O. Cervello; Aou Policlinico P. Giaccone; Maria Eleonora Hospital

Introduction: dynamic left ventricular outflow tract obstruction (LVOTO) due to systolic anterior motion (SAM) causes various grades of mitral regurgitation (MR), potentially hiding structural valve disease.
Case report: we present a case of an 82–year–old patient admitted to cardiac intensive care unit (CICU) due to cardiogenic shock and acute respiratory failure caused by severe MR, hiding mitral valve vegetation. MR resulted from flail and perforation of posterior mitral leaflet (PML), combined with dynamic LVOTO due SAM of anterior mitral leaflet (AML).
Discussion: careful avoidance of same therapy and devices indicated in MR, like sodium nitroprusside and intra–aortic balloon pump (IABP), is essential to avoid worsening of LVOTO and thus hemodynamic stability. Instead, the use of drugs to obtain pressure equalization and negative chronotropism, such as norepinephrine and selective beta–1 receptor blockers, significantly reduce LVOTO and thus the MR, achieving hemodynamic stability and showing valve anatomy.
Conclusion: our case–report underscores the importance of a multidisciplinary approach in the management of complex valvular dysfunction, particularly when dynamic LVOTO complicates the clinical presentation. Careful hemodynamic modulation can not only improve patient stability but also facilitate accurate diagnostic assessment, ensuring timely and appropriate therapeutic interventions.

Keywords: dynamic left ventricular outflow tract obstruction, systolic anterior motion (SAM), mitral regurgitation, endocarditis, shock, valvular heart disease.
Contribution type: case report

Figure 1: trans-thoracic echocardiography apical 4-chamber view in the acute phase, showing the flail of the posterior scallop of the mitral valve with mid-ventricular obstruction.

Figure 2: trans-oesophageal echocardiography during mid-oesophageal 3-chamber view in the acute phase, showing the flail of the systolic anterior motion (SAM)

Figure 2: trans-oesophageal echocardiography mid-oesophageal 4-chamber view after patient extubation, showing the flail of the posterior leaflet of the mitral valve and endocarditis vegetation

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ENDOCARDITIS: A SINGLE DISEASE WITH MULTIPLE DANGEROUS COMPLICATIONS

R. Badellino, D. Cocco, A. Pilleri, and S. Del Giacco
Aou Policlinico Universitario Duilio Casula – Monserrato; Arnas G. Brotzu; Aou Duilio Casula – Policlinico Universitario Di Monserrato

A 51 years–old man presented to the ED for dysarthria and left hemiparesis of sudden onset, dating back to approximately an hour. His past medical history included a deep venous thrombosis, currently under anticoagulant treatment, and a pancreatic cancer with hepatic metastases. Vital signs were normal and the physical examination was unremarkable except for the neurological part.

The clinical suspicion of ischaemic stroke due to the occlusion of the internal left carotid artery was promptly confirmed through a CT scan and the patient successfully underwent a mechanical thrombectomy. The following day, to further investigate the nature of his thromboembolism, a TTE was performed: which surprisingly revealed two massive vegetations on the aortic and tricuspid valves. The subsequent TEE showed a circumferential three–cusp aortic involvement with a high–risk 18 mm–filamentous vegetation protruding into the left ventricular outflow tract (Figure 1); severe valvular insufficiency was also detected together with another large vegetation involving the subvalvular tricuspid apparatus (Figure 2-3). A total body CT–scan highlighted bilateral pulmonary embolism and splenic embolism, as further complications of the endocarditic process. During the stay the patient presented fever and blood exams were consistent with a diagnosis of sepsis; hence, upon the infectious disease specialist advice, he was started on a high–dose–ceftriaxone–and–vancomycin empirical antibiotic therapy. Eventually, blood cultures turned out negative.

After a multidisciplinary meeting involving the core of the Endocarditis Team and the hospital oncologists, a conservative approach was chosen over the heart surgery, due to the patient's critical conditions and poor prognosis. Therefore, he was transferred to the Oncology service to start palliative chemotherapy. Infective Endocarditis is frequently a difficult disease with non–specific systemic symptoms and late diagnosis; however, the onset can also be abrupt, with life–threatening complications, such as our patient's.

Multimodality imaging is key to make a prompt diagnosis of the disease and its complications and to timely plan the therapeutic strategy. A multidisciplinary management through a dedicated Endocarditis Team remains the mainstay to obtain the best clinical outcome.

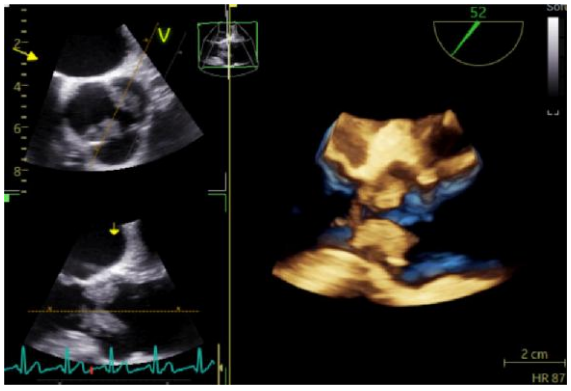

Figure 1

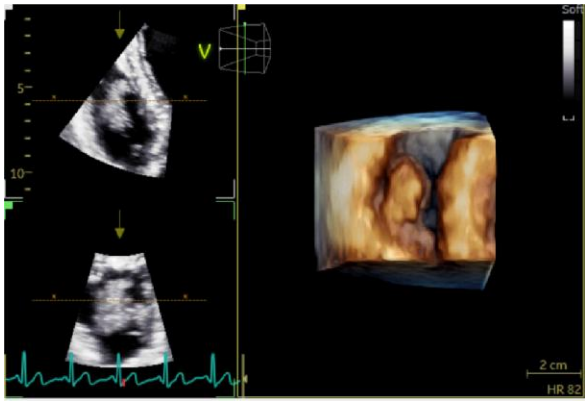

Figure 2

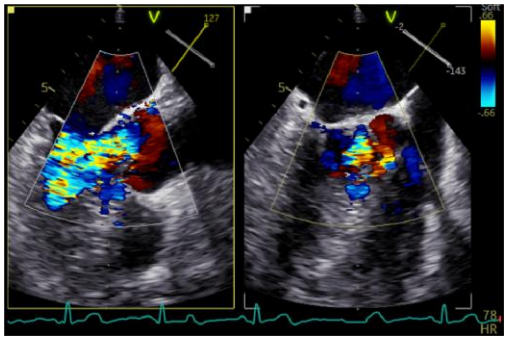

Figure 3

Abstract citation ID: suag058.169

THE EMBOLIC BURDEN OF ENDOCARDITIS: DIAGNOSIS AND MANAGEMENT OF A RARE SITE OF EMBOLISM

R. Badellino, D. Cocco, A. Pilleri, and S. Del Giacco
Aou Policlinico Universitario Duilio Casula; Arnas G. Brotzu; Aou Duilio Casula – Policlinico Universitario Di Monserrato

A 74–years–old woman presented to the ED referring weight loss and lack of appetite in the last weeks together with a two–days–history of tachycardia unresponsive to supportive therapy at home. No fever was reported. She also complained of worsening left leg pain since a couple of days, which turned into unbearable that morning. Past medical history included a mammalian cancer in complete remission. No CV risk factors were reported. Physical examination and laboratory exams were normal.

While in the ED, she underwent a vascular surgery visit and an arteriovenous echography showed a clear reduction of the arterial flux associated with pain and limb hypothermia. A diagnosis of acute limb ischaemia due to common femoral artery occlusion was made and an urgent percutaneous revascularization was performed with a good final result.

Due to the tachycardia, a suspicion of silent atrial fibrillation led to a cardiological evaluation. The EKG showed a synus rhythm and precordial T–waves inversion; the echocardiogram showed an apical hypokinesia and a mass in the left atrium, consistent with a mitral endocarditis. A TOE clearly revealed a thick, highly mobile 20mm pedunculated mitral mass on the posterior mitral leaflet which was associated to a severe valvular regurgitation. Due to the absence of signs of sepsis, a possible diagnosis of atrial myxoma was made. A total body CT–scan exclude further sites of thromboembolism and a coronary angiography detected a three–vessels coronary disease with no culprit artery.

The patient consequently underwent a mitral valve replacement the day after: a large vegetation was removed, the following cultures turned out positive for Staphylococcus lugdunensis (MSSA) and histology was consistent with infective endocarditis. A cefazoline–based antibiotic regimen was introduced.

At the two–month follow–up no valvular vegetations were found with a TEE. Endocarditis bears a wide spectrum of systemic complications. Some of them, as in the presented case, may not immediately suggest the underlying disease. Surprisingly, our patients showed one of the rarest but still highly symptomatic ones and, in a singular way, the initial clinical presentation was not indicative of an infectious disease. Multimodality imaging is of great help, but laboratory still plays a crucial role in the diagnosis of infective endocarditis. Hence a high grade of suspicion must always be kept by the physicians.

Abstract citation ID: suag058.170

FROM CONDUCTION DELAY TO COMPLETE BLOCK: ANNULAR ABCSESS IN PROSTHETIC AORTIC VALVE

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Background: Prosthetic valve endocarditis (PVE) is associated with high morbidity and mortality. Periannular extension with abscess formation is a severe complication that may result in atrioventricular (AV) conduction disturbances due to involvement of the conduction system, often requiring urgent surgical management.

Case report: A 75–year–old man, who underwent bicuspid aortic valve replacement with a bioprosthesis in 2014, was admitted with progressive dyspnea, orthopnea, and peripheral edema. ECG showed sinus rhythm with PR 180 ms and ventricular bigeminism (FIG. 1). Transesophageal echocardiography (TEE) revealed thickened bioprosthetic cusps with mild

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regurgitation. During hospitalization, fever and decompensated heart failure developed, blood cultures grew S. Caprae and a repeat echocardiogram documented severe intraprosthetic regurgitation (PHT 300 ms, abdominal aortic flow reversal). Serial ECGs monitoring showed progressive PR prolongation (360 ms) (FIG. 2) and episodes of 2:1 AV block. Follow–up TEE demonstrated increased thickening and echogenicity of the non–coronary cusp, with perivalvular thickening and a maximum hyper–echogenic area of 8 mm involving the right coronary sinus and the mitro–aortic junction, consistent with endocarditis complicated by annular abscess formation (FIG. 3). During the following days, the patient developed bradyarrhythmic atrial fibrillation with complete AV block (HR 20 bpm) (FIG. 4), requiring temporary pacing. The conduction disorder was considered secondary to annular abscess extension. Given the rapid clinical deterioration, after having discussed the case in Heart Team, a urgent redo aortic valve replacement with annular debridement was performed. Postoperatively, sinus rhythm was restored with residual first–degree AV block without episodes of advanced conduction abnormalities.
Conclusion: This case report illustrates the possible rapid progression of a prosthetic valve endocarditis complicated by annular abscess and advanced conduction disturbances. This emphasizes the need for prompt diagnosis, Heart Team evaluation, and early surgical intervention.

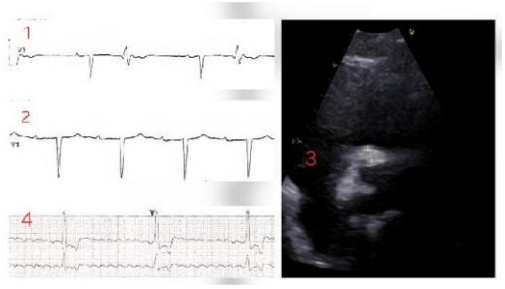

Figure 1, 2, 3, 4

Abstract citation ID: suag058.171

INFECTIVE ENDOCARDITIS–ASSOCIATED GLOMERULONEPHRITIS (IEAGN): A FEARSOME ENTITY

R. Badellino, D. Cocco, A. Pilleri, and S. Del Giacco
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A 55–year–old man was sent to the ED of our hospital from a Nephrology DH for a relapsing–remitting fever dating to almost a year, associated with exertional dyspnoea during mild efforts. He reported a partial response to antibiotic therapy during the past months.

His past medical history included hypertension, an endoscopic prostatic resection for a benign hypertrophy and recurrent pericarditis in the past twenty years; he was also recently admitted to the Internal Medicine service for a likely vasculitis–related acute kidney injury. Physical examination and vital signs were normal, while blood exams showed high creatinine (9.60 mg/dl), anaemia and inflammatory markers elevation. The patient was admitted to the Nephrology service and blood cultures were sent to the laboratory.

Due to his history of dyspnoea, he underwent a Cardiology consult and a TTE detected a 11–mm mobile filamentous vegetation on the ventricular side of the non–coronary aortic cusp, with a globally thickened valve and a 12–mm oval mass on the atrial side of the anterior mitral leaflet. Severe aortic and moderate mitral valve regurgitations were also found. Because of the high suspicion of endocarditis a TOE was performed, which confirmed the findings and displayed a mitroaortic junction involvement, with two small abscesses that were perforated both on the ventricular and the atrial side. Blood cultures were positive for multisensitive Streptococcus mutans, the immunological panel highlighted severe hypocomplementemia, positivity for ANA, ANCA and rheumatoid factor; cryoglobulins were also detected together with blood at urinalysis.

A CT scan excluded septic embolism and given the high risk of embolization and the local cardiac complications, the patient underwent a double valve replacement with mechanical prosthesis and a ceftriaxone–based antibiotic course is also started. At 4–months follow up the patient is in excellent clinical status and the renal function completely recovered.

This case emphasises how endocarditis is a disease with a high impact not only per se, bearing the risk for local cardiac and systemic complications, but also because of the possible immunological burden. Our patient suffered a likely endocarditis–associated cryoglobulinaemic glomerulonephritis (IEAGN), entity known to entail a poor prognosis despite prompt antibiotic therapy. A multidisciplinary management is crucial for the correct management of such complex cases to achieve the best clinical outcome.

Clinical Cardiology 1

Abstract citation ID: suag058.172

POST–COVID ERA AND CARDIOVASCULAR OUTPATIENTS: A MULTIVARIABLE EVALUATION OF BLOOD PRESSURE, HEART RATE, PHYSICAL ACTIVITY AND STRESS

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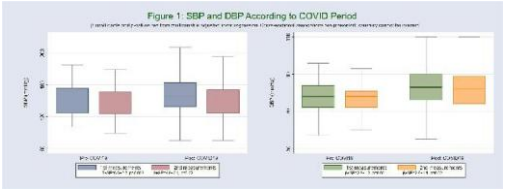
Abc Study On Heart Disease Foundation E.T.S.

Background: The COVID–19 pandemic has had long–term effects on cardiovascular health and behavior. In a real–world outpatient setting, we examined how the post–COVID period is associated with changes in blood pressure, physical activity, and stress status.
Methods: We analyzed data from 472 cardiovascular outpatients enrolled between 2018 and 2024. Patients were categorized into pre–COVID (n = 130) and post–COVID (n = 342) groups. Outcomes included resting heart rate (RHR), systolic (SBP) and diastolic (DBP) blood pressure (two timepoints each, 5 minutes apart), physical activity status (yes/no), and stress status (yes/no). We performed t–tests and chi–square tests for univariate comparisons and multivariable linear and logistic regressions adjusted for age, sex, and antihypertensive therapy (beta–blockers, calcium channel blockers, ACE inhibitors). Statistical analysis was performed using Stata 18 (StataCorp, College Station, TX, USA).
Results: The mean age was 66.7 ± 15.5 years, with 44% females. Mean SBP and DBP were 147.9 ± 22.4 mmHg and 80.8 ± 11.3 mmHg, respectively, and mean heart rate was 72.9 ± 13.8 bpm. Compared to the pre–COVID group, post–COVID patients had significantly higher blood pressure (SBP1: β±SE=6.6 ± 2.2 mmHg, p = 0.003; SBP2: β±SE=4.9 ± 2.1 mmHg, p = 0.02; DBP1: β±SE=2.8 ± 1.2 mmHg, p = 0.02; DBP2: β±SE=2.6 ± 1.1 mmHg, p = 0.02) in fully adjusted models. Physical activity was less frequent post–COVID (from 68% to 53%, p = 0.002), and logistic regression confirmed an independent association (OR = 0.51 ± 0.11, p = 0.002). Lower physical activity was also independently associated with higher stress perception (OR = 0.64 ± 0.13, p = 0.03). No significant differences in heart rate between pre– and post–COVID were observed.
Conclusion: In a cardiovascular outpatient cohort, the post–COVID period was independently associated with increased blood pressure and reduced physical activity. Moreover, reduced physical activity was linked to increased stress status. These findings highlight the long–lasting physiological and behavioral impact of the pandemic, and the importance of restoring healthy lifestyle habits in at–risk populations.



Abstract citation ID: suag058.173

TAFAMIDIS AND FUNCTIONAL CAPACITY: ANALYSIS OF CARDIOPULMONARY EXERCISE TESTING PARAMETERS IN PATIENTS WITH TRANSTHYRETIN AMYLOID CARDIOMYOPATHY

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Background: Tafamidis improves survival and slows functional decline in transthyretin cardiac amyloidosis (ATTR–CM), but early changes in cardiopulmonary performance are poorly characterized.
Objective: We evaluated whether the same cardiopulmonary exercise testing (CPET) variables previously shown to improve at longer–term follow–up, together with 4–m gait speed, already improve after 6 months of tafamidis without further therapeutic changes, thereby isolating the drug effect.
Methods: In this prospective single–centre study, patients with a new diagnosis of ATTR–CM and indication for tafamidis underwent CPET on cycle ergometer and a 4–m gait–speed test at baseline (T0) and after 6 months of therapy (T6). Peak oxygen consumption (VO_2 peak), ventilatory efficiency (VE/VCO_2 slope), VO_2/work slope, heart rate/VO_2 slope, oxygen pulse, respiratory exchange ratio (RER), maximal workload and gait speed were measured. Background medical therapy was kept unchanged whenever possible. Paired tests and linear mixed–effects models were applied to compare T0 and T6.
Results: Fifteen patients completed both assessments (five additional patients are still in follow–up). At 6 months, VO_2 peak increased from 16.9±3.7 to 18.4 ±4.1 mL/kg/min (p=0.03) (File 2), oxygen pulse from 11.0±2.8 to 12.0±3.1 mL/

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beat (p=0.03) and maximal workload from 79.9±25.7 to 90.9±30.4 W (p=0.02). VE/VCO_2 slope decreased from 35.9±6.7 to 33.8±6.4 (p=0.02), with a modest improvement in VO_2/work slope. The increase in VO_2peak correlated with the reduction in VE/VCO_2 slope (File 3). Gait speed rose from 0.83±0.22 to 1.03 ±0.25 m/s (p=0.01) (File 1); in 60% of patients the gain exceeded the threshold for clinically meaningful improvement (≥0.10 m/s).
Conclusions: In patients with ATTR–CM, tafamidis was associated with early, clinically relevant improvement in cardiopulmonary performance and physical function, detectable 6 months after treatment initiation despite stable background therapy. CPET combined with gait speed appears to be a sensitive strategy to capture therapeutic benefit and may complement imaging and biomarker–based follow–up in ATTR–CM. Larger multicentre studies are warranted to confirm these findings and to define the prognostic value of early CPET changes under tafamidis therapy.

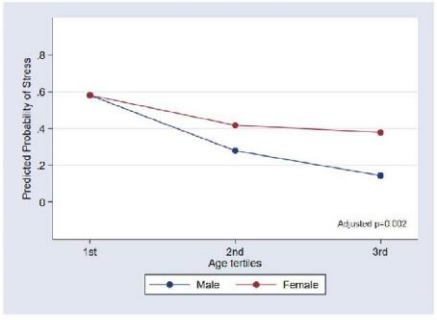
Abstract citation ID: suag058.174

AGE AND GENDER DIFFERENCES IN CARDIOVASCULAR AND PSYCHOSOCIAL PROFILES OF CARDIAC OUTPATIENTS: A CROSS–SECTIONAL ANALYSIS

H. Mahmoud, D. Merotto, M. Dario, M. Mahmoud, P. Visentin, A. Dal Bo, R. Cordiano, E. Selvestrel, and G. Berton
Abc Study On Heart Disease Foundation E.T.S.

Background: Gender–related differences in cardiovascular risk factors and psychosocial stress may influence long–term outcomes; however, their interaction with age in outpatient cardiology populations remains understudied.
Methods: To explore that, we analyzed 649 consecutive cardiac outpatients (362 males, 287 females). Clinical parameters included systolic and diastolic blood pressure, heart rate, diabetes, smoking, and antihypertensive therapy. Psychosocial factors included physical activity, stress, and psychotropic drug use. Multivariable linear and logistic regression models were applied; age–gender interactions for stress were examined via logistic regression and predictive margins, with age categorized into tertiles.
Results: Heart rate did not differ significantly between men and women. Men had higher systolic (149±21 vs 144±23 mmHg, p=0.003; adjusted β=3.7, p=0.019) and diastolic blood pressure (83±11 vs 80±11 mmHg, p‹0.001; adjusted β=3.1, p‹0.001). Smoking (40% vs 22%, p‹0.001; OR 2.2, p‹001), hypertension (60% vs 48%, p=0.001; OR 1.5, p=0.019), and diabetes (14% vs 7%, p=0.002; OR 2.1, p=0.006) were more prevalent in men. Women reported higher psychological stress (OR 1.8, p‹0.001) and psychotropic drug use (OR 2.9, p‹0.001). Physical activity was lower among women (OR 0.7, p=0.02) and was inversely associated with stress across genders and age groups. Significant age–gender interaction was observed for stress, with older women showing disproportionately higher stress levels (3rd age tertile: females 38% vs males 14%, p‹0.01).
Conclusion: These findings highlight clinically relevant age– and gender– specific patterns in cardiovascular and psychosocial profiles among cardiac outpatients. Men present a higher burden of traditional cardiovascular risk factors, whereas women, particularly at older ages, experience greater psychological distress. These findings support the need for age– and gender–tailored strategies in outpatient cardiovascular and psychosocial risk management.

Figure 1. Adjusted predicted probabilities of psychological stress according to age tertiles and gender.



Estimates derived from multivariable logistic regression, showing a stronger age-related increase in stress among women.

Abstract citation ID: suag058.175

IMPACT OF VISCERAL FAT AND PHYSICAL ACTIVITY ON AUTONOMIC FUNCTION IN CARDIAC OUTPATIENTS

H. Mahmoud, D. Merotto, M. Dario, M. Mahmoud, A. Dal Bo, P. Visentin, S. Mastrosimone, F. Pieropan, A. Russo, and G. Berton
Abc Study On Heart Disease Foundation E.T.S.

Background: Excess visceral fat is metabolically active and linked to chronic inflammation, insulin resistance, and autonomic dysregulation, which may elevate resting heart rate (RHR) and blood pressure (BP). Lifestyle factors, such as physical activity, could influence these autonomic effects in cardiac patients.
Objective: To examine the association between visceral fat and markers of sympathetic activation in cardiac outpatients, and to evaluate whether physical activity modifies these relationships.
Methods: In this single–visit, cross–sectional study, 203 consecutive cardiology outpatients were assessed. Visceral fat was measured using the OMRON BF511 device. SBP, DBP, and RHR were recorded twice in the clinostat position and averaged. Demographic, clinical, pharmacologic, and lifestyle data —including physical activity— were collected. Multivariable linear regression analyzed associations of visceral fat (continuous and tertiles) with RHR, SBP, and DBP, adjusting for age, sex, comorbidities, and medications. Interaction terms tested effect modification by physical activity.
Results: Mean age was 62.7 ± 12.5 years; 53% were male. Patients in the highest visceral fat tertile showed significantly higher RHR (p = 0.022), SBP (p ‹ 0.001), and DBP (p ‹ 0.001). After adjustment, visceral fat remained independently associated with RHR (β = 0.71 bpm per SD; 95% CI 0.26–1.16; p = 0.002and DBP (β = 0.47 mmHg per SD; p=0.012). Sport activity showed a significant negative interaction with visceral fat on SBP (β = –1.99 mmHg, p = 0.021) and a trend toward attenuating the effect on DBP (β = –0.81 mmHg, p = 0.085), indicating that exercise mitigates the hemodynamic impact of visceral adiposity (Figure 1).
Conclusion: Visceral adiposity contributes to higher RHR and DBP in cardiac outpatients. Regular physical activity attenuates its effect on systolic, and potentially diastolic, blood pressure. These findings highlight the protective role of regular exercise in reducing the cardiometabolic risks linked to visceral adiposity.

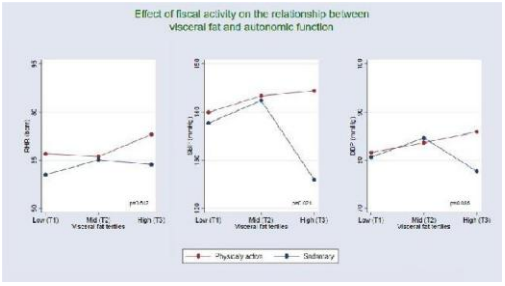


Figure 1

Abstract citation ID: suag058.176

EOSINOPHIL–LINKED HYPERDYNAMIC CIRCULATION IN EGPA IMPROVES UNDER ANTI–IL–5 THERAPY: A LONGITUDINAL STUDY

P. Carlucci, M. Marozzi, F. Corvasce, S. Noviello, F. Spataro, V. Desantis, M. Montagnani, R. Ria, S. Cicco, and A. Vacca
Ospedale San Paolo; Policlinico Di Bari

Background: Eosinophilic granulomatosis with polyangiitis (EGPA) is a systemic vasculitis characterized by marked eosinophilia and potential cardiovascular involvement. The impact of eosinophil burden on early pulmonary vascular and right ventricular–pulmonary artery (RV–PA) function remains poorly defined.
Objectives: To assess the association between peripheral eosinophil count (PEC) at diagnosis and subclinical echocardiographic markers of pulmonary vascular dysfunction, and to evaluate the longitudinal effects of anti–IL–5 therapy.
Methods: Twenty–seven patients with EGPA underwent comprehensive echocardiographic evaluation, including pulmonary artery systolic pressure (PAPs), tricuspid annular plane systolic excursion (TAPSE), TAPSE/PAPs ratio, and tricuspid regurgitation velocity (TRV). Associations between PEC at diagnosis and echocardiographic parameters were analysed. Patients treated with anti–IL–5 agents (mepolizumab or benralizumab) were evaluated at diagnosis, at treatment initiation (T0), and after 24 months (T24). Multivariable regression and ROC analyses were performed.
Results: At T0, 33% of patients showed elevated PAPs (›25 mmHg) in the absence of clinical pulmonary hypertension. Higher PEC was independently associated with increased PAPs (p=0.04) and reduced TAPSE/PAPs ratio (p=0.03). PAPs and TRV significantly worsened between diagnosis and T0, followed by significant improvement at T24 after anti–IL–5 therapy (PAPs Δ –7.89 mmHg, p=0.001; TRV Δ –0.35 m/s, p‹0.001; TAPSE/PAPs Δ +0.41, p=0.005). A PEC threshold of 3,465 cells/μL predicted elevated PAPs (AUC 0.696, 95% CI 0.47–0.92; sensitivity 91.7%).
Conclusions: In EGPA, higher eosinophil burden is associated with early pulmonary vascular dysfunction and RV–PA uncoupling, which appear partially reversible with anti–IL–5 therapy. These findings support early cardiovascular screening in eosinophil–rich EGPA phenotypes.

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Abstract citation ID: suag058.177

END OF LIFE ISSUES IN A CORONARY CARE UNIT: A SHARED PROCESS BETWEEN CARDIOLOGY AND PALLIATIVE CARE TEAMS

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Ssd Cure Palliative Ravenna; Direttore UOC Cardiologia Ravenna; Direttore Rete Locale Cure Palliative Di Ravenna; Utic Dell'UOC Cardiologia Di Ravenna

A proper assessment of end–of–life issues in a Coronary Care Unit such as diagnosis of impending death or administration of palliative sedation (PS) therapy in case of unbereable sufference is essential in terms of supporting patients, families, caregivers, and healthcare professionals to clarify goals of care, promote shared decision–making process, avoid aggressive care, and achieve a good death and the best quality of life possible at the end.

Uncertainty in prognostication in EOL and impending death should be faced with a multi–professional and multi–dimensional approach, where both signs and symptoms must be considered together as parts of a "bigger picture" of a forthcoming death.

Compassionate and proactive communication with patients and family are essential elements in this process of EOL care for patients and families for better clinical outcomes and improving shared decision–making and support values and last wishes.

The main goals of this project are:

- Improvement, through a shared evaluation between Cardiology and Palliative Care Teams, of the diagnosis of impending death.
- Implementation of a proper decision–making process and administration of Palliative Sedation, base on official guidlines of Italian Association of Palliative Care.

Abstract citation ID: suag058.178

CARDIOGENETICS IN PEDIATRIC AGE: USES AND LIMITATIONS

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Introduction: Genetic testing is an increasingly used diagnostic tool in Cardiology, also in pediatric age.
Aim of the study: To evaluate the use and results of genetic testing in the pediatric population referred to our Cardiology Center.
Materials and methods: We retrospectively reviewed 210 patients aged from a few days of life to 17 years who were referred to our Pediatric Cardiology Center and underwent genetic testing between 2015 and 2024.
Results: Genetic testing was performed in 66.2% of cases for suspected cardiomyopathy or channelopathy, in 18.1% of cases for suspected syndromic conditions including extracardiac features, and in 15.7% of cases because of a family history of heart disease, when a pathogenic variant had been identified in a first–degree relative. The type of analysis varied according to the indication: targeted testing for a known familiar variant, SNP array in cases of suspected microdeletion/microduplication syndromes, targeted gene panel sequencing, and clinical exome analysis. According to ACMG criteria, variants are classified into five categories based on pathogenicity score: benign, likely benign, variants of uncertain significance (VUS), likely pathogenic, and pathogenic. In patients evaluated for suspected syndromes, genetic testing was positive in 36.8% of cases and showed variants of uncertain significance in 5.3%. In patients with suspected cardiomyopathy or channelopathy, genetic testing was negative in 36.7% of cases, positive in 28%, and revealed variants of uncertain significance in 35.3%. In one case, a variant initially classified as uncertain for long QT syndrome was reclassified as pathogenic after several years. In another case, a pathogenic variant for long QT syndrome was identified in a neonate with a negative phenotype who underwent testing as part of a screening program. Additionally, a 9–year–old patient who underwent exome sequencing for neurodevelopmental disorders was found to carry a pathogenic variant in the RYR2 gene, in the absence of cardiac signs or symptoms.
Conclusions: new sequencing technologies increase the detection rate of genetic diseases but also raise the risk of incidental findings. Conversely, in some cases, despite a strong clinical suspicion of a genetically based cardiopathy, a diagnosis may not be reached due to insufficient data in the literature. In such cases, repeating the analysis after several years and frequently re–querying research databases is recommended.

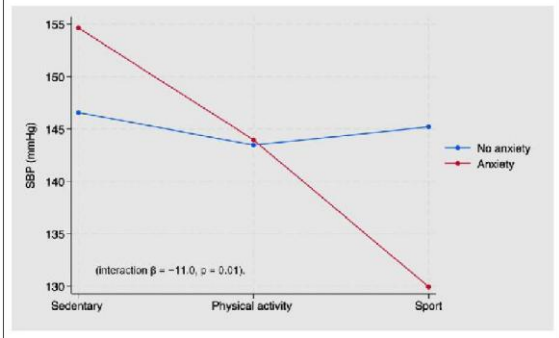
Abstract citation ID: suag058.179

PHYSICAL ACTIVITY, BLOOD PRESSURE, AND ANXIETY IN CARDIOVASCULAR OUTPATIENTS: A CROSS–SECTIONAL ANALYSIS

M. Dario, H. Mahmoud, D. Merotto, A. Dal Bo, P. Visentin, S. Mastrosimone, F. Pieropan, A. Russo, M. Mahmoud, and G. Berton
Abc Study On Heart Disease Foundation E.T.S.

Introduction: Regular physical activity is known to reduce cardiovascular (CV) risk, but its potential role in modulating the impact of anxiety on CV parameters remains underexplored.
Aim: To investigate the role of anxiety and physical activity on CV parameters.
Methods: In this cross–sectional study, 203 consecutive patients presenting to a cardiac outpatient clinic were recruited and categorized into three groups based on their physical activity levels, as assessed according to WHO guidelines. Participants reporting no physical activity were classified as sedentary. Those performing less than 150 minutes of moderate–intensity aerobic activity or less than 75 minutes of vigorous–intensity activity per week were considered practicing physical activity, whereas participants meeting or exceeding these thresholds were classified as sportive ones. Anxiety was assessed using a doctor–administered psycho–emotional questionnaire. Resting systolic (SBP), diastolic (DBP) blood pressure, and rest heart rate (RHR) were evaluated twice, 5 minutes apart, and compared between groups. Data were analyzed using univariable and fully adjusted (by age, sex, BMI, smoke, coffee, alcohol, nocturia, BMI, visceral fat, diabetes, hypercholesterolemia) linear regression models (Figure 1). In the present abstract only fully adjusted results are shown.
Results: Mean age was 62.7 ± 12.5 years; 53% were male; 81 (40%) were hypertensives. Mean BP was 144±21/84±10 mmHg and RHR 67±12 bpm. Sedentary participants: 54 (26%), physical activity ones: 109 (54%), sportive ones: 40 (20%). Presence of anxiety was reported in 68 patients (34%), more frequently in females (χ^2=10.5, p=0.001) with no differences across activity groups. At univariable and fully adjusted model, physical activity/sport was found to be associated with lower SBP (β=–3.8±1.9, p=0.04) and anxiety with higher RHR (β=4.5±2.0, p=0.02). When a formal interaction between anxiety and physical activity was set, anxiety was found to be associated with higher SBP (β=10.1±4.8, p=0.03) while physical activity reduced the impact of anxiety on SBP (interaction β=–11.0±4.4, p=0.01). No significant interactions were found for DBP or HR. Results kept very similar at the second measurements.
Conclusions: In the present study physical activity was found to be associated to lower SBP values, chiefly in the patients with anxiety. Physical activity might be recommended to improve cardiovascular function, particularly in those with psychological anxiety.

Figure 1. Adjusted predicted systolic blood pressure according to anxiety status, stratified by physical activity.



Anxiety was independently associated with higher SBP.
Regular physical activity significantly attenuated the adverse effect of anxiety on SBP, as demonstrated by the significant anxiety × physical activity interaction in multivariable linear regression.

Clinical Cardiology 2

Abstract citation ID: suag058.180

FROM HYPERTENSIVE SURGE TO SHOCK: PHEOCHROMOCYTOMA–TRIGGERED TAKOTSUBO REQUIRING IMPELLA AND VA–ECMO

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Background: Takotsubo syndrome may follow an abruptadrenergic discharge; pheochromocytoma–related forms are uncommon but tend to be severe, with ischaemia/vasospasm, pulmonary oedema, arrhythmias and shock.
Case presentation: A 57–year–old woman with long–standing paroxysmal hypertension and a 5–cm right adrenal mass wasadmitted for morpho–functional assessment of suspectedpheochromocytoma. During the diagnostic pathway, shortly after corticosteroid exposure, she suddenly developed a fulminantadrenergic crisis (extreme hypertension, tachyarrhythmias), rapidly progressing to acute pulmonary oedema, severe lacticacidosis, hyperosmolar coma and cardiogenic shock. ECG showeddiffuse repolarization abnormalities with deep T-wave inversionand QTc prolongation. Transthoracic echocardiographydemonstrated mid–apical akinesia with basal hyperkinesis(Takotsubo pattern) and LVEF ~25%; coronary angiographyexcluded obstructive disease. Despite vasoactive support, she

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required Impella left–ventricular assistance and escalation to veno–arterial ECMO. The course was complicated by sustainedventricular tachycardia and ventricular fibrillation, treated with lidocaine, esmolol and defibrillation, and later by an episode of atrial fibrillation. Emergent adrenalectomy under mechanicalsupport removed a pheochromocytoma, after which blood–pressure lability eased and ventricular function began to recover(LVEF 35% on step–down). She was discharged stable on guideline–directed heart–failure therapy and scheduled for cardiacMRI.
Conclusions: This case illustrates a clinically relevant "double hit": diagnostic work–up (and potentially steroids) acting as the spark for catecholamine storm and Takotsubo syndrome, with malignant arrhythmias and multiorgan failure.In suspectedpheochromocytoma, clinicians should actively avoid precipitants, ensure early alpha–blockade, and use beta–blockers only after adequate alpha–control. Early transfer to centres able to providerapid mechanical circulatory support and definitive tumourresection can be lifesaving

Abstract citation ID: suag058.181

WHEN THYROTOXICOSIS MIMICS STEMI: A CASO OF ACUTE MYOCARDITIS WITH NON-OBSTRUCTIVE CORONARY ARTERIES

P. Tagliaferri, F. Ribichini, and G. Alberti
Aoui Verona Ospedale Borgo Trento

Background: The association between hyperthyroidism and acute myocarditis has been already reported in literature; however, this case presents an unusual scenario without classical hyperthyroidism symptoms or infective myocarditis features, in which the coexistence with thyrotoxicosis suggests a possible but unproven relationship.
Case presentation: A 26–year–old male presented with acute chest pain: he denied fever, recent infections or prodromal viral symptoms. ECG performed by emergency medical services showed inferior ST–segment elevation with reciprocal anterior ST depression. Therefore, cath–lab was activated; urgent coronary angiography revealed no significant coronary stenosis (Figure 1). Early echocardiography showed preserved systolic function without wall motion abnormalities. Laboratory tests revealed markedly abnormal cardiac biomarkers (hs–TnT peak 3,138 ng/L and elevated CK–MB and CPK) with normal inflammatory markers. Thyroid tests showed nearly suppressed TSH and markedly elevated thyroid hormones (TSH 0.002 mUI/L; fT3 67 pmol/L). Endocrinology consultation prompted further assessment: neck ultrasound demonstrated a normally structured thyroid gland and thyroid autoantibodies (anti–TPO, TRAb, anti–Tg) were negative. The biochemical trend and clinical context made destructive thyroiditis and iodine–induced hyperthyroidism unlikely. Screening for catecholamine excess, porphyria, metabolic and rheumatologic disorders was negative. Further diagnostic assessments are ongoing to investigate a possible underlying endocrinological syndrome. During hospitalization, the patient experienced recurrent chest/epigastric pain with limited response to analgesics; serial ECGs showed dynamic ST–segment elevation with recurrent troponin rises (Figure 3). Cardiac magnetic resonance demonstrated mildly reduced ejection fraction (44%), diffuse myocardial edema and subepicardial late gadolinium enhancement with a ring–like apical pattern, consistent with acute myocarditis(Figure 2). Guideline–directed therapy for ventricular dysfunction and thyrostatic treatment were initiated, with initial improvement. The patient was discharged with indication for strict follow–up; however, subsequent clinical evolution could not be assessed due to loss to follow–up.
Conclusion: This case supports the relevance of a structured diagnostic approach in STEMI–like presentations with non–obstructive coronary arteries and suggests a possible association between thyrotoxicosis and acute myocarditis.

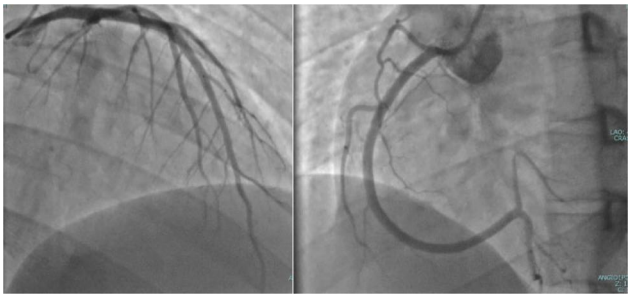

Figure 1

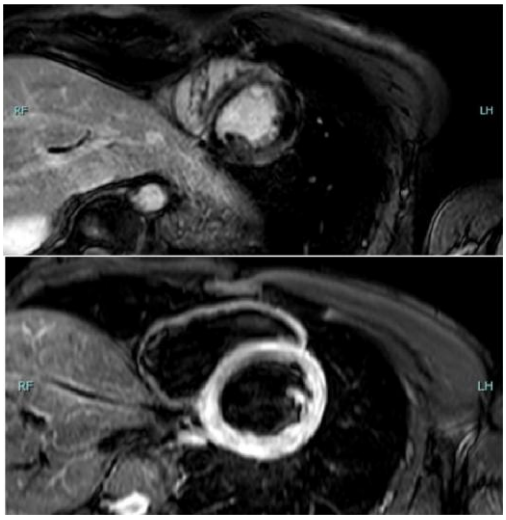

Figure 2

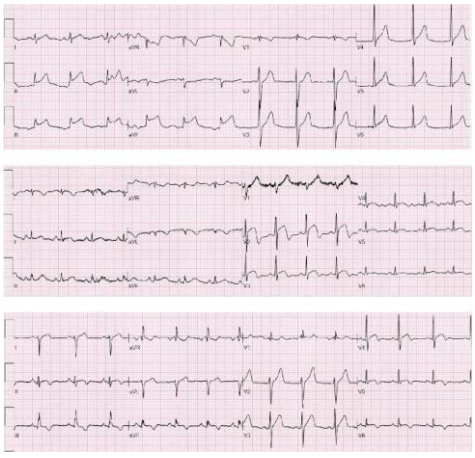

Figure 3

Abstract citation ID: suag058.182

BILATERAL RENAL ARTERY DENERVATION IN CHRONIC ISCHEMIC HEART DISEASE

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Background: Resistant arterial hypertension carries a high cardiovascular risk and remains challenging to control. Renal sympathetic denervation (RDN) is an interventional option for carefully selected patients.
Clinical Case: A 58–year–old man presented with long–standing resistant arterial hypertension. Past medical history included recent NSTEMI treated with drug–coated balloon angioplasty, peripheral artery disease with moderate stenosis at the femoral–iliac bifurcation, dyslipidaemia, obesity, OSAS. At admission, blood pressure remained severely elevated with a non–dipping profile on 24h monitoring. Echocardiography showed preserved systolic function, severe left atrial enlargement, moderate diastolic dysfunction. A comprehensive diagnostic workup excluded secondary hypertension. According to the patient's profile and a multidisciplinary evaluation (Cardiologist, Nephrologist, Anaesthesiologist), bilateral RDN was proposed. RDN was successfully performed using the Symplicity Spyral system (25 ablations on the right and 26 on the left – fig.1a and b), without complications. The in–hospital course was uneventful, with stable renal function and no arrhythmias. Our patient was safely discharged with a follow–up appointment in 3 months with 24h blood pressure monitoring showing good pressure control without hypertensive peaks.

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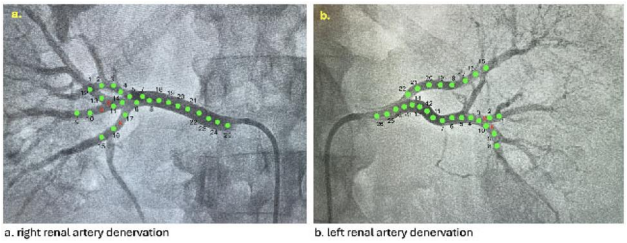
Conclusions: This case highlights the role of RDN as an effective and safe adjunctive therapy in carefully selected patients. In a complex clinical setting characterized by multiple comorbidities, RDN was successfully performed without procedural complications, short–term adverse events or negative impact on renal function. This experience supports the feasibility of RDN in high–risk patients, reinforcing its value as a therapeutic option when conventional strategies fail. DISCUSSION Resistant arterial hypertension remains a clinical challenge, as it is associated with an increased risk of cardiovascular morbidity and mortality. Despite advances in pharmacological therapy, a subset of patients continues to exhibit inadequate blood pressure control, often due to heightened sympathetic nervous system activity. RDN has re–emerged as a promising interventional strategy. Secondary causes of hypertension must be excluded, fulfilling one of the key prerequisites for considering RDN. The decision–making process always involves a multidisciplinary team, underscoring the importance of appropriate patient selection and shared clinical judgment.



a. right renal artery denervation b. left renal artery denervation

Abstract citation ID: suag058.183

SEX AND GENDER–RELATED DIFFERENCES IN POST–MYOCARDIAL INFARCTION NARRATIVES: INTERIM RESULTS FROM THE NARGEN STUDY

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Background: Narrative Medicine captures the lived experience of acute myocardial infarction (AMI) and may reveal sex– and gender–related patterns that shape symptom interpretation, emergency activation, adherence and rehabilitation. NARGEN maps post–AMI narratives to generate actionable targets for personalized secondary prevention.
Methods: NARGEN is an observational, single–centre narrative–medicine study at Santo Stefano Hospital (Prato, Italy), coordinated with the University of Florence. Consecutive patients aged 30–70 years with AMI within the previous 12 months underwent a structured follow–up visit and a psychologist–led semi–structured interview (18 items) on symptoms and delays, emotions/coping, perceived recurrence risk, medication beliefs and adherence, lifestyle change, social support and role/identity.
Ethics approval: Regional Ethics Committee of Tuscany, No. 28624_OSS (08–Apr–2025). Analyses combined thematic mapping with exploratory keyword–density metrics (occurrences/1000 words) and between–sex comparisons. Interviews were audio–recorded, transcribed verbatim and anonymized.
Results: From July 1 to September 30, 2025, 50 patients completed follow–up (mean age 58±7.5 years; 24 women). Self–reported adherence was high (statins 95%, dual antiplatelet therapy 98%). Forty–six transcripts were available. A “minimization/waiting” pattern before calling emergency services emerged in 52% of accounts, often linked to atypical symptoms and competing responsibilities. Fear/anxiety was highly salient in 76% overall (women 95% vs men 63%); fear of recurrence/need for control in 78%; social support in 87%. Requests for clearer and repeated discharge information and post–event psychological support were frequent. Role pressure was often narrated as both a trigger for delay and a barrier to recovery. Women used more help–seeking language than men (median 2.10 vs 1.12/1000 words; p=0.002) and more role–related terms (3.50 vs 2.51; p=0.020), whereas men used more lifestyle–change language (3.64 vs 1.98; p=0.024).
Conclusions: Interim NARGEN findings show that post–AMI narratives consistently foreground uncertainty, emotional burden and information needs, with measurable sex/gender differences in how patients frame illness and recovery. Embedding narrative–informed communication, reinforced discharge education and early psychological support may improve shared decision–making, rehabilitation uptake and sustained adherence in secondary prevention.

Abstract citation ID: suag058.184

TAKOTSUBO CARDIOMYOPATHY TRIGGERED DURING WEANING FROM MECHANICAL VENTILATION IN A PATIENT WITH WEST NILE VIRUS ENCEPHALITIS: A CLINICAL CASE

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Inmi – I.R.C.C.S. L. Spallanzani

Background: Takotsubo cardiomyopathy (TTS) is an acute, typically reversible form of stress–induced left ventricular dysfunction characterized by transient non–coronary wall motion abnormalities. It's often triggered by severe physical or emotional stress, viral infections and neurological disorders. The occurrence of TTS in the specific context of West Nile Virus encephalitis is exceedingly rare, and its development during critical care transitions like sedation weaning warrants clinical attention. A 72 year old man with a history of chronic lymphocytic leukemia was admitted to the Intensive Care Unit due to acute respiratory failure secondary to pneumonia complicated by neuroinvasive WNV encephalitis. The patient required mechanical ventilation and intensive supportive care. On day 6 of his ICU stay, during the weaning from sedation, he acutely developed signs of myocardial injury: new ST–segment elevation on the ECG and elevation of cardiac troponin (peak1235 pg/mL). Urgent coronary angiography was performed, which identified a non–culprit, significant stenosis in the right coronary artery, treated with stenting. The subsequent left ventriculography and echocardiography revealed classic features of TTS: severe left ventricular dysfunction (EF 30%) and apical ballooning.Supportive management led to normalization of ECG, biomarkers and ventricular function. CMR was planned but has been postponed due to his severe respiratory insufficiency.
Discussion: this case highlights the complexity of acute cardiac events in critically ill patients with severe neuroinvasive WNV infection. Although a direct causal link between WNV encephalitis and TTS cannot be definitively established, the patient presented with diagnostic features of TTS, likely related to the neurological stress caused by encephalitis or the physiological stress associated with acute respiratory failure or the sympathetic activation commonly observed during withdrawal of sedation and mechanical ventilation.
Conclusion: TTS is a critical differential diagnosis for acute cardiac events in patients suffering from WNV encephalitis during intensive care. This case emphasizes the interplay of neurological and physiological stressors in the pathogenesis of TTS and warrants heightened clinical vigilance during sedation weaning.

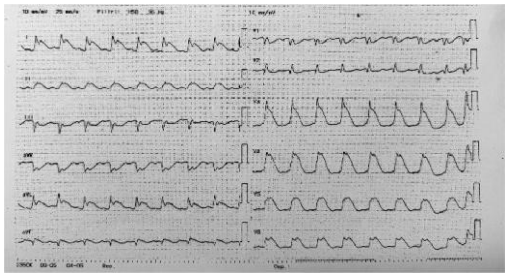

Fig 1A: ECG showing ST elevation (V4–V6,DI,DII,aVL);

Fig 1B: Left ventricular angiography with apical ballooning;

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Fig 1C: tts echo revealing apical and para–apical akinesia with basal hyperkinesis(EF≈30%)

Figure 1A
Figure 1B
Figure 1C

Clinical Cardiology - Pharmacology

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INFLUENCE OF SOLUBLE GUANYLATE CYCLASE ON CARDIAC, VASCULAR, AND RENAL STRUCTURE AND FUNCTION: A PHYSIOPATHOLOGICAL INSIGHT

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The role of nitric oxide (NO), soluble guanylate cyclase (sGC), and the cyclic guanosine monophosphate (cGMP) pathway in cardiovascular and renal health and disease is a complex issue. The impact of these biochemical pathways on the vascular tree is well established: the activation of sGC by NO promotes vasodilation and modulates vascular tone. Indeed, additional characteristics exist that lead physicians to believe there is a pleiotropic influence of this pathway on the functional activities and structural characteristics of human tissues and cells. Recently, sGC stimulators have demonstrated clinical efficacy in patients with worsening heart failure with reduced ejection fraction, improving cardiovascular death risk, re–hospitalization for HF, and all–cause mortality. These new outcome data have increased interest in understanding the potential pathophysiological mechanisms. The NO–sGC–cGMP axis may influence endothelial function, kidney performance, and cardiac muscle cell activity. The synergy of these actions could explain the positive effects of vericiguat on worsening HF. The aim of this narrative review was to provide a comprehensive insight into the pathophysiological mechanisms of action of NO–sGC–cGMP axis stimulators on cardiac muscle, endothelial cells, and kidneys.

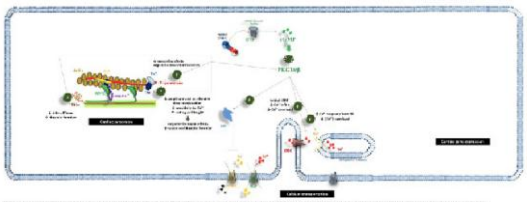

Figure 1. The impact of NO/sGC/cGMP on cardiac cells. The biochemical pathway related to soluble guanylate cyclase (sGC) activation influences the performance of cardiac sarcomere, ion transportation throughout the cardiac muscular cells, and the expression of genes which are crucial for survival, cell growth, and ultrastructural modification of the cell. Abbreviations: Ca^{2+}: calcium ion; cGMP: cyclic guanosine monophosphate; GATA4: GATA Binding Protein 4; GTP: guanosine-5'-triphosphate; H^+: hydrogen ion; LTCC: L-type calcium channel; MAPK: mitogen-activated protein kinase; MEF2: Myocyte Enhancer Factor 2; MHC: myosin heavy chains; mTROC1: mammalian target of rapamycin complex 1; MyBP-C: myosin-binding protein C; Na^+: sodium ion; NCX: sodium–calcium exchanger; NHE-1: sodium–hydrogen antiporter 1; NO: nitric oxide; PKGIα/β: cGMP-dependent protein kinase I α/β; PPI: protein phosphatase 1; Ryr: ryanodine receptor; sGC: soluble guanylate cyclase; SR: sarcoplasmic reticulum; TAB: TGF-Beta-Activated Kinase; TnC: troponin C; TnI: troponin I; TnT: troponin T; TSC2: tuberous sclerosis complex 2.

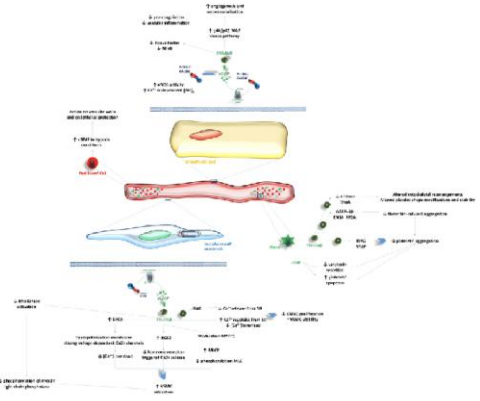

Figure 2. The influence of NO/sGC/cGMP activity on peripheral vascular wall morphology and function. The activation of the soluble guanylate cyclase on peripheral vascular cells might influence the structure and function of endothelial cells, vascular smooth muscle cells, and circulating red blood cells/platelets. Abbreviations: ARPP-19: cAMP-regulated phosphoprotein 19; BKCa: large-conductance Ca^{2+}-activated K^+ channel; Ca^{2+}: calcium ion; cGMP: cyclic guanosine monophosphate; ENSA: endosulfine alpha; GTP: guanosine-5'-triphosphate; GTPase: guanosine-5'-triphosphate hydrolase; IRAG: inositol-1,4,5-trisphosphate receptor-aasociated cGMP kinase substrate; MAP kinase: mitogen-activated protein kinase; MLC: Myosin-light-chain; MLCP: myosin-light-chain phosphatase; MYPT1: myosin phosphatase target subunit 1; NF-kB: nuclear factor kappa-light-chain-enhancer of activated B cells; NO: nitric oxide; eNOS: endothelial nitric oxide synthase; PKGIα/β: cGMP-dependent protein kinase I α/β; PPA2: Protein Phosphatase 2A; RGS2: regulator of G-protein signaling 2; sGC: particulate guanylate cyclase; SR: sarcoplasmic reticulum; VASP: vasodilator-stimulated phosphoprotein; VSMC: vascular smooth muscle cells.

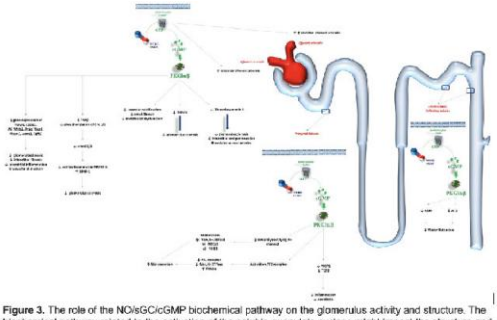

Figure 3. The role of the NO/sGC/cGMP biochemical pathway on the glomerulus activity and structure. The biochemical pathway related to the activation of the soluble guanylate cyclase might impact the structure and function of each part of the glomerulus, thus promoting antiproliferative and antifibrotic remodeling, modification in ultrafiltration skills, and reduction in inflammatory degeneration. Abbreviations: ADH: antidiuretic hormone; AP2: aquaporin 2; AT1: angiotensin 1 receptor; AT2: angiotensin 2 receptor; cGMP: cyclic guanosine monophosphate; Col3a1: collagen type III alpha 1 chain; ERK: extracellular signal-regulated kinases; GTP: guanosine-5'-triphosphate; Icam1: Intercellular Adhesion Molecule 1; Il6: inteleukin-6; K^+: potassium ion; MCP1: monocyte chemoattractant protein-1; MMP2-9: matrix metalloproteinase-2 and -9; Na^+: sodium ion; NBCe1: electrogenic sodium bicarbonate cotransporter 1; NF-kB: nuclear factor kappa-light-chain-enhancer of activated B cells; NHE-1: sodium–hydrogen antiporter 1; NO: nitric oxide; PKGIα/β: cGMP-dependent protein kinase I α/β; PPARα: Peroxisome Proliferator-Activated Receptor α; sGC: particulate guanylate cyclase; smad: small mother egainst decapentaplegic; TGFβ: transforming growth factor-β; TIMP: tissue inhibitor of metalloproteinase; Tnfα: tumor necrosis factor-α; TRPC6: transient receptor potential cation channel subfamily C member 6; Vcam1: vascular cell adhesion protein 1.

Abstract citation ID: suag058.186

AVOIDING INAPPROPRIATE ANTICOAGULANT REGIME: A CASE REPORT ON PERICATHETER FIBROUS SHEATH IN A CANCER PATIENTS

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Case Presentation: We report the case of a 63–year–old female with diagnosis of uterine leiomyosarcoma. Following total hysteroannessectomy, she commenced chemotherapy using a port–a–cath. A transthoracic echocardiogram revealed a 2 cm hyperechoic mass protruding into the right atrium. This finding was confirmed by transesophageal echocardiography, which identified the mass originating from the tip of the intravascular device. While D–dimer levels were mildly elevated, consistent with her neoplastic condition, and electrocardiogram and echocardiogram showed no overt signs of pulmonary embolism, a pulmonary angio–CT scan was performed, effectively ruling out pulmonary thromboembolism.

The patient was subsequently started on anticoagulation with enoxaparin for a presumptive diagnosis of catheter–related thrombosis. However, during low–molecular–weight heparin therapy, she developed a retroperitoneal hematoma complicated by hemorrhagic shock, necessitating embolization of the inferior epigastric artery, the source of bleeding. The port–a–cath was removed during her hospitalization. Subsequent pathological examination of the catheter revealed the hyperechoic formation to be a fibrous sheath.

Discussion: This case underscores a critical diagnostic challenge in managing pericatheter vascular hyperechoic formations. A fibrous sheath is an inevitable consequence of central venous catheter implantation. In asymptomatic patients, a pericatheter hyperechoic structure is approximately five times more likely to be a fibrous sheath than a catheter–related thrombosis. While pericatheter thrombosis can be asymptomatic, it often correlates with vessel wall adherence, ultrasound compressibility, higher echogenicity, a greater thickness–to–length ratio, and demonstrable color doppler flow defects. Given these distinguishing features, color doppler ultrasound offers superior sensitivity and specificity for differentiating between these entities compared to computed tomography.

Conclusion: This case powerfully illustrates the urgent need for prompt differential diagnosis between a fibrous sheath and catheter–related thrombosis. Especially in oncological patients, who are at high risk for both thrombotic and hemorrhagic complications, an accurate diagnosis is paramount to avoid exposing them to potentially inappropriate anticoagulation therapies that could lead to severe adverse events.

Abstract citation ID: suag058.187

THE IMPORTANCE OF LOOKING BEYOND APPEARANCES: A CASE REPORT

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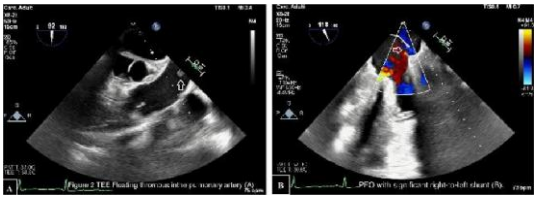
Ospedale Ss. Annunziata, Cardiologia Clinica Ed Interventistica

Introduction: Ischemic stroke (IS) is caused by the obstruction of cerebral blood vessels, resulting in reduced blood flow and impaired oxygen delivery. It can be caused by atherothrombotic occlusion of large arteries, cerebral embolism or non–thrombotic occlusion of small, deep cerebral arteries. Cardioembolic IS can occur in the presence of various cardiac conditions, such as cardiac masses, patent foramen ovale (PFO), endoluminal thrombosis and sometimes as complication of infective endocarditis (IE). We present the case of a patient admitted to Intensive Care Unit (ICU) after non–cardiac surgery (NCS) who developed IS with high suspicioun of cardioembolic origin.

Case presentation: A 67–year–old man admitted to ICU developed right–sided hemiparesis after laparoscopic enterolysis surgery. His past medical history included a previous intestinal resection for ischemia. Computed tomography (CT) confirmed IS (Figure 1), suspicious for embolic origin. Atherosclerosis of large cerebral vessels was excluded. Due to post–operative fever, blood cultures were collected and an infection caused by S. Aureus and M. Morganii was detected. Transoesophageal echocardiogram (TEE) was performed to confirm the suspicion of IE with embolization. TEE showed PFO with a significant right–to–left shunt (Figure 2B). Moreover, a floating thrombus was detected in the pulmonary artery (Figure 2A). No IE was found. CT angiography confirmed pulmonary thromboembolism (PE) (Figure 3). Unfortunately, the patient died because of post–operative complications.

Discussion: The peculiarity of this case is represented by the unexpected aetiology of IS considering the clinical confounding presentation. At first, the most probable expected cause was represented by IE but PE and paradoxical embolization due to large PFO turned out to be responsible of IS. Some studies demonstrate PFO association with increased risk of IS in patients undergoing NCS in different settings. The prevalense of PFO in the general population is estimated at approximately 20–25% but the lack of a systematic screening in patients without IS likely underestimates its prevalence. Currently, PFO closure in addition to anti–aggregation therapy is indicated in patients with IS when a strong causal relationship between PFO and stroke is demonstrated. Further prospective trials are needed to identify a specific population at risk of perioperative IS associated with PFO in order to define systematic screening, prevention plans and improve perioperative outcomes.

Figure 1 Cranial computed tomography (CT) showing an ischemic stroke



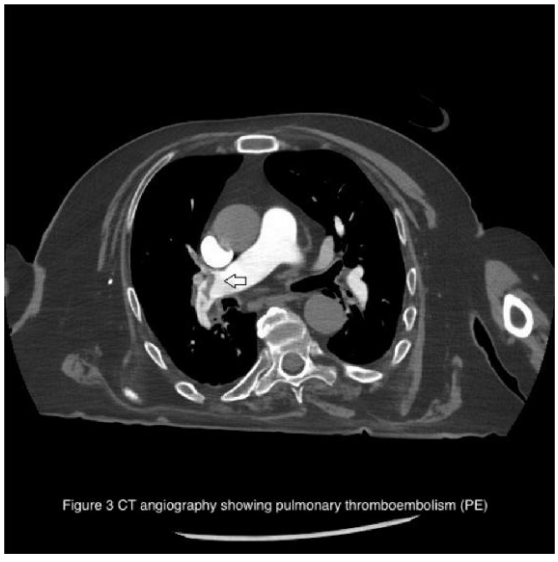


Figure 3 CT angiography showing pulmonary thromboembolism (PE)

Abstract citation ID: suag058.188

IMPACT OF PSYCHOLOGICAL STRESS ON DIASTOLIC BLOOD PRESSURE AND INTERACTION WITH CORONARY ARTERY DISEASE: A MULTICENTER STUDY

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Abc Study On Heart Disease Foundation E.T.S.

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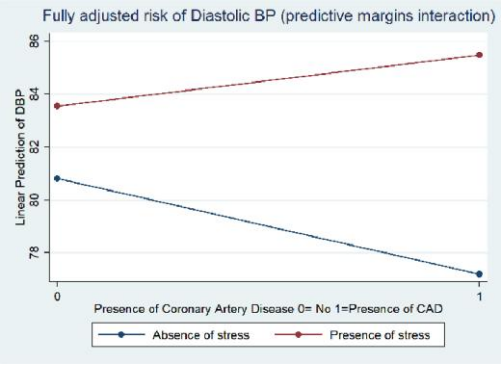
Background: Psychological stress has emerged as a significant non–traditional driver of cardiovascular disease (CVD). Despite its clinical relevance, the quantitative association between stress levels and objective hemodynamic markers in diverse patient populations remains to be fully elucidated. This study aimed to evaluate the relationship between perceived stress and blood pressure parameters within a large, multicenter cohort.
Methods: We conducted a cross–sectional study across three clinical centers, enrolling 685 patients. Stress was defined based on standardized patient self–declaration. Blood pressure (BP) was assessed using the average of two consecutive measurements of systolic (SBP) and diastolic (DBP) blood pressure, taken five minutes apart. Statistical analysis utilized multiple linear regression models. Starting from a full model adjusting for key confounders (age, sex, physical activity, and CV risk factors including smoking, diabetes, and antihypertensive threatment), a parsimonious model was derived to identify the most significant independent predictors of BP. Interaction terms were tested to evaluate the moderating effects of clinical variables. All analyses were carried out using STAT 18.0 StataCorp LLC, (TX) USA.
Results: In the multivariate analysis, perceived stress emerged as a significant independent predictor of increased DBP (β=3.5 ± 0.8; t=4.2; p‹0.0001), whereas no significant association was observed with SBP. While Coronary artery disease (CAD) was not an independent predictor of BP in the initial models, the introduction of an interaction term revealed a significant positive interaction between stress and CAD (β=6.5 ± 02.3; t=2.4; p=0.01). Specifically, the impact of psychological stress on DBP levels was significantly more pronounced in patients with a history of CAD compared to those without (Figure 1).
Conclusions: The specific association between stress and DBP suggests that psychological stress may primarily influence cardiovascular hemodynamics by increasing basal sympathetic activity and peripheral vascular resistance. In clinical practice, screening for stress is essential, particularly in patients with CAD, as they exhibit heightened hemodynamic sensitivity to psychological factors. Stress management should be considered a key component of cardiovascular risk stratification and secondary prevention.



Fgure 1

Abstract citation ID: suag058.189

MANAGEMENT OF HYPERKALEMIA IN REAL–WORLD CLINICAL PRACTICE IN ITALY: IMPACT OF POTASSIUM BINDERS IN PATIENTS WITH CHRONIC KIDNEY DISEASE AND HEART FAILURE

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Hyperkalemia is common in patients with chronic kidney disease (CKD) and heart failure (HF), often affecting prognosis and treatment continuity with renin–angiotensin–aldosterone system inhibitors (RAASi). Potassium (K) binders allow control of K+ serum levels and maintenance of RAASi therapy at proper dosage. Given the scarcity of real–world data in Italy, this analysis focused on patients treated with different K binders, assessing the consistency with data from the US setting, where outcome differences in favor of non–sodium–exchange binders have emerged. From administrative databases of Italian healthcare bodies (~6 million beneficiaries), adults with ≥1 prescription of patiromer or sodium zirconium cyclosilicate (SZC) between Jan–2022 and Jun–2024 were selected. Patients on dialysis, transplant recipients, those treated with ≥1 K binder or with ‹6 months of follow–up from the first K binder prescription were excluded. Demographic and clinical characteristics, treatment adherence at 6 months —estimated using the Medication Possession Ratio (MPR: treatment duration/observation time)— and costs were described. Clinical outcomes were assessed after matching (by age, sex, comorbidities, and co–medications) at 6 months and over the entire observation period (10.7 months for patiromer; 7.5 months for SZC). Among the 636 included patients treated with patiromer (N=249) or SZC (N=387), the mean age was nearly 73 years, with male predominance. The most common comorbidities were hypertension, hyperlipidemia, CKD, diabetes, and HF (Table 1). During the first 6 months of follow–up, the proportion of adherent patients (MPR ≥80%) was significantly higher in patiromer than in SZC users (67.5% vs 20.4%; p‹0.001), a finding confirmed over the entire period (42.5% vs 13.4%; p‹0.001). After matching, the rate of HF–related hospitalizations was lower with patiromer compared with SZC, both at 6 months (5.4 vs 12.8 events per 100 patient–years) and over the entire follow–up (5.3 vs 15.7). Mean per–patient costs were lower with patiromer at 6 months (€3,162 vs €4,119) and at 12 months (€5,645 vs €8,500), mainly due to reduced hospitalization costs (Figures 1–2). Considering pharmaceutical expenses, patiromer users had lower costs for anti–anemic and antidiabetic drugs. In Italian clinical practice, patiromer treatment led to reduced HF hospitalization risk and healthcare costs compared with SZC, supporting its use in hyperkalemia management for patients with CKD and HF.

Table 1. Demographic and clinical characteristics of the patients included in the analysis, stratified by type of K+ binder: treated with patiromer (N=249) and treated with SZC (N=387).

	Patiromer (N=249)	SZC (N=387)
Age at date index (years), mean ± SD	72.7 (12.7)	72.5 (13.4)
Male sex, N (%)	175 (70.3%)	246 (63.6%)
Charlson Comorbidity Index (CCI), mean ± SD	1.3 ± 1.4	1.4 ± 1.4
CCI = 0, N (%)	73 (29.3%)	109 (28.2%)
CCI = 1, N (%)	92 (36.9%)	131 (33.9%)
CCI ≥2, N (%)	84 (33.7%)	147 (38.0%)
Hypertension, N (%)	246 (98.8%)	376 (97.2%)
Dyslipidemia, N (%)	176 (70.7%)	252 (65.1%)
CKD, N (%)	165 (66.3%)	268 (69.3%)
Diabetes, N (%)	137 (55.0%)	205 (53.0%)
Coronary artery procedures, N (%)	66 (26.5%)	93 (24.0%)
HF, N (%)	61 (24.5%)	89 (23.0%)

Figure 1. Average healthcare costs per patient at 6-month follow-up in patients treated with patiromer (cyan bars) and patients treated with SZC (green bars).

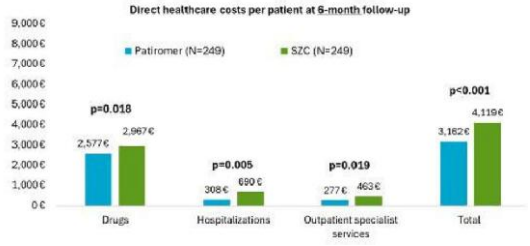
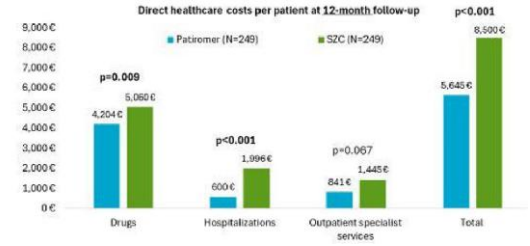


Figure 2. Average healthcare costs per patient at 12-month follow-up in patients treated with patiromer (cyan bars) and patients treated with SZC (green bars).



Abstract citation ID: suag058.190

ASSESSMENT OF LEFT ATRIAL MECHANICS IN PATIENTS WITH CRYPTOGENIC STROKE AND PATENT FORAMEN OVALE

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Ospedale S. Chiara; Casa Di Cura Eremo Di Arco; Ospedale S. Maria Della Misericordia

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Objectives: To identify clinical, radiological and echocardiographic features associated with indication to percutaneous patent foramen ovale (PFO) closure, with a specific focus on left–atrial functional indices, in a real–world cohort of patients with cryptogenic cerebrovascular ischemic event and PFO.
Methods: In this single–centre retrospective study of 225 patients discussed for percutaneous PFO closure by a multidisciplinary team between 2011 and 2023, clinical, radiological and echocardiographic features of both groups with and without indication for PFO closure were compared.
Results: PFO closure was recommended in 54.7% of patients. Independent predictors of indication were relevant interatrial shunt (OR 20.717; p‹0.001) and PASCAL classification as "probable" (vs "possible", OR 6.457; p=0.001). Cortical location of ischemic lesion showed borderline evidence (OR 2.864; p=0.051). The Left Atrioventricular Coupling Index (LACI) was inversely associated with referral (OR 0.933 per 1% increase; p=0.017), whereas conventional left–atrial indices (left atrial maximum and minimum volumes, left atrial emptying fraction, atrial strain and atrial electromechanical delay) did not show association.
Conclusions: In this cohort of patients with criptogenic stroke and patent foramen ovale, selection for percutaneous closure, based on a multifactorial and interdisciplinary assessment, was primarily driven by shunt severity, PFO–stroke causal likelihood (PASCAL) and radiological embolic features. The Left Atrial Coupling Index (LACI) provided complementary functional information as a global indicator of individual cardiovascular and thromboembolic profile, potentially useful for refining patient selection.

Abstract citation ID: suag058.191

ATORVASTATIN/BEZAFIBRATE AND INTENSIVE PHYSICAL EXERCISE–INDUCED RHABDOMYOLYSIS IN A HYPERLIPIDEMIC PATIENT IN SECONDARY PREVENTION

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Background: Cardiovascular diseases are a major global health concern, and statin therapy plays a pivotal role in both primary and secondary prevention. Statin–associated muscle symptoms are relatively common, whereas rhabdomyolysis remains a rare but potentially life–threating complication.
Case presentation: We report the case of a 64–year–old male patient with a history of myocardial infarction and mixed hyperlipemia (total cholesterol 280 mg/dL and triglycerides 350 mg/dL) He was initially treated with atorvastatin 40 mg/dL, with normal creatine kinase (CK) levels. However, after approximately 4 years of treatment, the patient began intensive weight training and subsequently developed marked CK elevation (up to 11,645 U/L). He was hospitalized with a diagnosis of rhabdomyolysis, and lipid–lowering therapy was switched to bezafibrate 400 mg/day. After 5 months, in August 2007, he was readmitted for a milder episode of rhabdomyolysis (CK 4,300 U/L). From September 2007, treatment consisted of colesevelam 625 mg six tablets/day, omega–3 fatty acids 4 g/ day, and ezetimibe 10mg/day. In March 2017, alirocumab 75 mg every other week was initiated, achieving LDL–C levels ‹ 55 mg/dL. In July 2020, a severe episode of rhabdomyolysis occurred following participation in an equestrian competition (CK 16,686 U/L). CK values decreased to ‹ 500 U/L after 10 days of aggressive intravenous hydration. In September 2020, the alirocumab dose was increased from 75mg to 150mg, in order to counteract an apparent loss of lipid–lowering efficacy. A muscle biopsy perfomed in March 2021 yielded normal results. In August 2023, the patient experienced another episode of rhabdomyolysis (CK 5,000 U/L), which was managed at home with intensive oral hydration. In February 2024, bempedoic acid 180 mg/day was added, resulting in a successful LDL–C reduction, to 41 mg/dl.
Conclusion: Individual susceptibility to lipid lowering treatments, particularly statins and fibrates, should be carefully evaluated, especially in patients receiving combination therapy and engaging in intense physical activity. In this case, PCSK9 inhibitors, ezetimibe and bempedoic acid provided a safe and effective lipid–lowering strategy without further severe muscle toxicity.

Abstract citation ID: suag058.192

DOSE–SPECIFIC EFFICACY, SAFETY OF ORAL PCSK9 INHIBITORS: A SYSTEMATIC REVIEW AND META–ANALYSIS OF RANDOMIZED TRIALS

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Background: Oral inhibitors of proprotein convertase subtilisin/kexin type 9 (PCSK9) represent a novel lipid–lowering strategy that may overcome limitations related to injectable therapies. However, the dose–specific efficacy and safety of this emerging drug class have not been comprehensively evaluated.
Methods: We performed a systematic review and dose–stratified meta–analysis of randomized, placebo–controlled trials evaluating oral PCSK9 inhibitors. PubMed, Embase, and CENTRAL were searched from inception to November 2025. Primary efficacy outcomes were percentage changes in LDL cholesterol (Table LDL–C) at the lowest and highest tested doses. Secondary endpoints included apolipoprotein B (Table ApoB), non–HDL cholesterol, and lipoprotein(a) [Lp(a)]. Safety outcomes comprised overall adverse events (AEs), serious AEs, and selected individual AEs. Random–effects models were applied, and interaction testing was used to assess dose–response relationships.
Results: Four trials encompassing 859 participants were included. Oral PCSK9 inhibitors significantly reduced LDL–C at both dose levels, with greater reductions observed at the highest dose (–58.5%) compared with the lowest dose (–42.3%; p for interaction = 0.02). Similar dose–dependent effects were observed for ApoB (–49.7% vs –33.9%) and non–HDL cholesterol, while reductions in Lp(a) were consistent but not significantly dose–dependent. Safety outcomes were comparable to placebo across doses, with no increase in overall or serious AEs. Rates of gastrointestinal, musculoskeletal, and infectious events were low, and no dose–related safety signals were identified (Table 2).
Conclusions: Oral PCSK9 inhibitors provide substantial, dose–dependent reductions in atherogenic lipoproteins with a favorable short–term safety profile. These findings support continued clinical development and highlight the potential role of oral PCSK9 inhibition as an effective and patient–friendly option for intensive LDL–C lowering.

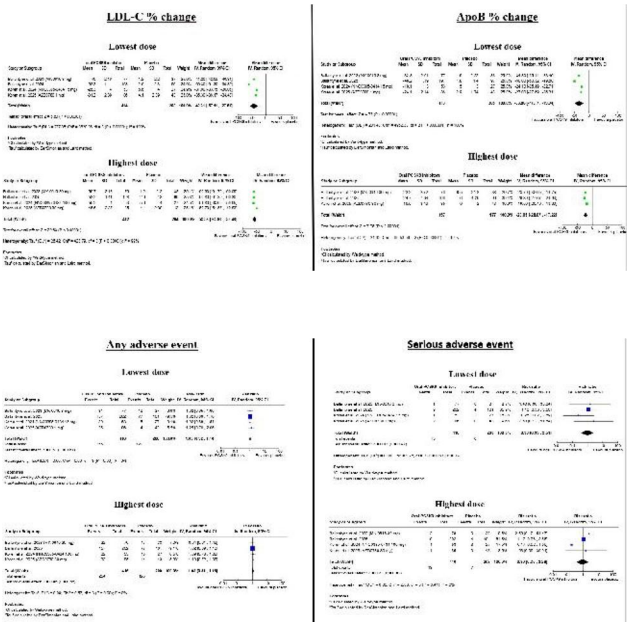

Table 2

Digital Cardiology - Artificial Intelligence

Abstract citation ID: suag058.193

COMPARING CONVOLUTIONAL NEURAL NETWORKS FOR AORTIC ROOT SEGMENTATION: A GEOMETRY–ORIENTED FEASIBILITY STUDY

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Background: Accurate anatomical characterization of the aortic root is a key prerequisite for transcatheter aortic valve implantation (TAVI) planning. Although deep learning–based segmentation techniques have demonstrated high performance in delineating cardiac structures, the translation of automated segmentation into reliable extraction of clinically relevant anatomical landmarks remains a critical and insufficiently explored challenge.

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Aim: To describe and evaluate a two–stage methodological framework for aortic root analysis, combining automated CNN–based segmentation with exploratory strategies for landmark identification relevant to TAVI planning.
Methods: In the first stage, manual aortic root segmentations were used to train a U–Net–based model for automatic segmentation of 100 contrast–enhanced cardiac computed tomography scans. Segmentation quality was assessed against expert–defined references to verify the stability and anatomical consistency of the generated masks. In the second stage, manually annotated anatomical landmarks, including cusp nadirs, coronary ostia height, and sinotubular junction, were used as references to explore automated landmark identification approaches operating on the segmented anatomy. This phase focused on assessing geometric consistency, spatial stability, and sources of uncertainty affecting landmark localization rather than definitive performance metrics.
Results: The CNN–based segmentation model converged stably over the training period and showed a visually adequate definition of the aortic root as an anatomically consistent and accurately observed source between the analyzed scans as a valuable reference for downstream analysis. The automated identification of the target structural landmarks showed varying behaviors based on the type and location of the landmarks. Landmark localization was strongly influenced by local geometrical variability, curvature, and partial volume effects, indicating that there may be a methodological rift between strong segmentation and accurate landmark measurement.
Conclusions: This study confirms the reliability of model's aortic root segmentation but limited threshold for the complete automatic extraction of clinically pertinent landmarks in TAVI planning. Clearly delineating segmentation and landmark identification as separate methodological stages may be important for building clinically sensitive AI–based imaging pipelines.

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THE VIRTUAL HOSPITAL MODEL IN CARDIOLOGY: CLINICAL OUTCOMES, KEY PERFORMANCE INDICATORS, AND COST EFFECTIVENESS

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The virtual hospital is an emerging care delivery model designed to address the increasing clinical complexity and economic burden of cardiovascular diseases. By integrating artificial intelligence (AI), digital proximity care, and hospital–supervised remote management, this paradigm extends cardiovascular care beyond the physical hospital while maintaining clinical oversight. In this model, patients are enrolled into structured digital care pathways supported by humanoid medical avatars that facilitate standardized anamnesis, symptom surveillance, therapy adherence monitoring, and scheduled follow–up interactions. Longitudinal data derived from patient–reported outcomes and remote physiological monitoring are processed by AI algorithms to support dynamic risk stratification and clinical prioritization. Alerts are generated based on predefined thresholds, enabling timely clinician intervention and escalation of care when appropriate. Preliminary real–world implementations of virtual hospital pathways in cardiology have been associated with favorable clinical and organizational outcomes. Reported benefits include reductions in unplanned hospital admissions ranging from approximately 15–30%, decreases in 30–day readmission rates of 10–25%, and reductions in non–urgent emergency department visits of up to 20–35% among stable cardiovascular patients. Improvements in adherence to guideline–directed medical therapy and follow–up compliance have been observed in the range of 10–20%, particularly in chronic care settings. Key performance indicators (KPIs) relevant to this model include improved outpatient visit appropriateness, reduced time to clinical decision–making, and enhanced continuity of care. Operational efficiency gains may include a reduction in clinician time per patient of approximately 15–25% (Figure 1) and increased capacity to manage larger patient cohorts without proportional workforce expansion. From an economic perspective, the virtual hospital model shows potential for meaningful cost containment. Estimated direct cost savings related to reduced hospitalizations and optimized outpatient management range between 10–20% per patient–year, with additional indirect benefits linked to improved resource allocation. The virtual hospital represents a scalable and outcome–oriented evolution of cardiology care, aligning clinical quality improvement with health system efficiency and value–based healthcare principles.

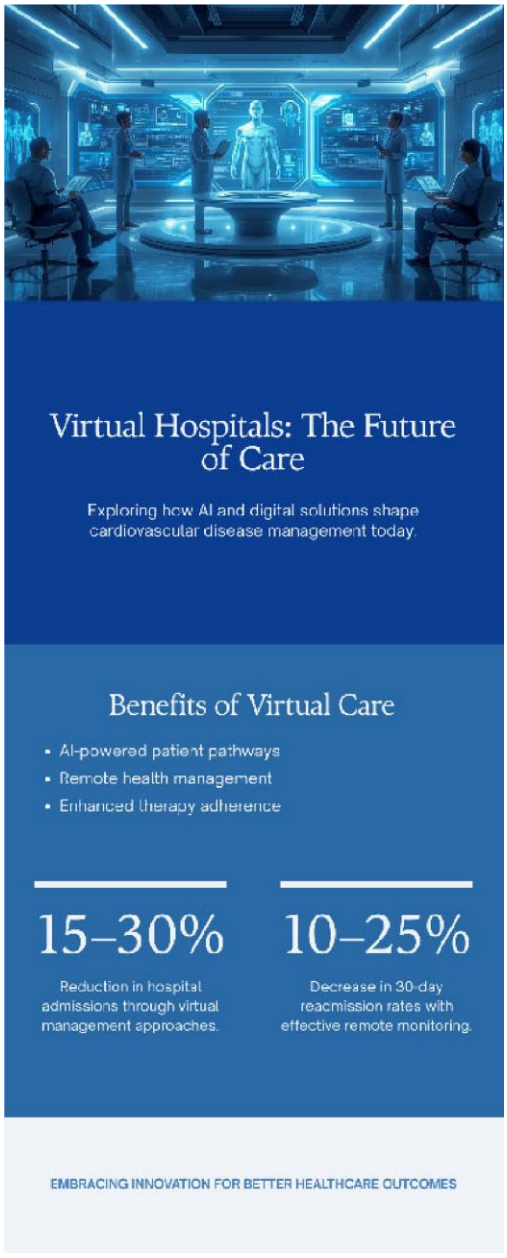

Figure 1

Abstract citation ID: suag058.195

FROM DISCHARGE LETTERS TO STRUCTURED CARDIOVASCULAR DATA: DEVELOPMENT AND FEASIBILITY OF AN INTERPRETABLE NLP PIPELINE

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Background: In cardiovascular research and quality assessment, structured clinical data is often limited. A great deal of clinically relevant material remains embedded in unstructured discharge summaries. This is an important barrier

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to performing real–world outcome analysis, especially given the evaluation of procedural and postoperative complications.
Aim: To describe its development and feasibility of a natural language processing (NLP) pipeline designed to derive clinically meaningful postoperative information from cardiovascular discharge letters.
Methods: We proposed a modular NLP pipeline comprising rule–based pattern recognition using concept–level retrieval method. The system was tailored to discharge summaries of coronary artery bypass grafting (CABG) patients and applied to 2,569 CABG discharge summaries retrieved from the publicly available MIMIC database. The pipeline captures the postoperative trajectory with clinically relevant textual anchors and extracts predefined complication–related events. Development addressed heterogeneous narrative structures, variable section headers, and ambiguous temporal references. Transformer–based language models (BERT) supported identification of complication–related information within postoperative sections. A systematic approach is made for interpretability, traceability and reproducibility instead of black–box predictions
Results: Using anchor–based identification alone, 59% of discharge summaries were classified as containing postoperative complications. Subsequent characterization of complication–related content highlighted variable degrees of explicitness and temporal clarity across different event types. Clearly documented postoperative complications were consistently captured, whereas implicit or temporally ambiguous descriptions required additional contextual interpretation or manual review. Qualitative expert assessment confirmed clinically coherent outputs and transparent rule–to–concept traceability, while also identifying recurrent sources of uncertainty inherent to free–text clinical documentation.
Conclusions: This study demonstrates that transparent NLP pipelines can effectively structure unstructured cardiovascular clinical data while explicitly exposing sources of ambiguity and limitation. Such approaches may support real–world research and quality assessment, provided that their constraints are clearly acknowledged and systematically addressed in subsequent validation phases.

Abstract citation ID: suag058.196

EVALUATING LARGE LANGUAGE MODELS IN CARDIOLOGY: INSIGHTS FROM A STRUCTURED BENCHMARKING FRAMEWORK

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Background: Conversational large language models (LLMs) are rapidly entering the medical domain, raising interest in their potential role as information–support tools in cardiology. However, objective, head–to–head evaluations of different LLMs in high–risk cardiovascular scenarios remain limited, particularly with respect to clinical accuracy and contextual adequacy.
Aim: To benchmark the performance of three widely used LLMs (ChatGPT, Claude, and Gemini) when responding to structured cardiology–related queries representative of real–world clinical information needs.
Methods: Seventy cardiology–related prompts were developed to reflect common pre–diagnostic and post–diagnostic scenarios and were framed for two user profiles: patients and general practitioners. Each prompt was submitted to all three models under standardized conditions. Responses were anonymized and independently assessed by three senior cardiologists blinded to model identity. Scientific accuracy, completeness, clarity, and coherence were rated using a 5–point Likert scale. Model comparisons were performed using non–parametric statistical tests, with inter–rater reliability and sensitivity analyses to ensure robustness.
Results: Significant differences emerged across all evaluated domains. ChatGPT consistently achieved higher scores for accuracy, completeness, clarity, and coherence, followed by Claude and Gemini. Agreement among expert reviewers was substantial. Across models, responses to pre–diagnostic and patient–oriented prompts were rated more favorably than those addressing post–diagnostic management or physician–level inquiries. Sensitivity analyses confirmed that results were not driven by individual evaluators.
Conclusions: General–purpose LLMs show heterogeneous performance in cardiology–related tasks, with ChatGPT demonstrating the most consistent outputs among the evaluated models. Nevertheless, none of the systems reached a level of reliability sufficient for autonomous clinical use. These findings support the use of LLMs as adjunctive tools for information delivery and education, while underscoring the necessity of human oversight, continuous validation, and domain–specific optimization in cardiovascular medicine.

Structural Interventional Cardiology - Left Atrial Appendage Closure

Abstract citation ID: suag058.197

EFFECTIVENESS OF RENAL DENERVATIONPREVIOUS MYOCARDIAL INFARCTION AND RESISTANT HYPERTENSION

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Background: Recent trials have confirmed the safety and efficacy of catheter–based renal denervation (RDN) as nonpharmacological treatment in resistant hypertension in the presence of concomitant antihypertensive therapy.
Aim: we report data of preliminary experience with RDN (Symplicity Spyral renal denervation system, Medtronic Inc.) in patients with resistant hypertension and high risk condition (previous myocardial infarction treated with myocardial revascularization).
Methods: We analyzed 8 patients (5 M/3 F) mean aged 70±8 years, with resistant hypertension (treated at least with 4 antihypertensive drugs, including a diuretic, at maximally tolerated doses, without reaching the therapeutic target) who were previously scheduled in follow up (FU) program, after myocardial revascularization, and treated applying radiofrequency energy for blood pressure (BP) lowering. All participants had baseline assessments before RDN and repeat assessment at 3 months including medical history, ambulatory blood pressure monitoring (ABPM), and routine blood and urine tests. We analyzed changes between baseline and at 3 months.
Statistical Analysis: Normally distributed variables are presented as mean ± standard deviation (SD) and were compared by Student's t–test for paired data. A $p \leq 0.05$ value was considered statistically significant.
Results: Median follow–up was 13,7 ± 0,7 months. The antihypertensive drugs used were as follows: beta–blockers, alfa–blockers, calcium channel blockers, angiotensin II receptor antagonists, ACE inhibitors, loop diuretics, thiazide diuretics, canreonate. A total of participants completed FU post–procedure. At 3 months, compared with baseline, systolic BP was reduced by −49,20±12,15 (from 175,15 ± 8,21 to 122,7 ±13,0) mmHg ($P<0.005$) and diastolic BP reduced by −12,23±8,68 (from 88,70± 7,15 to 71,5 ±7,40) mmHg ($P<0.02$). These levels were maintained over time. Renal function assessed by estimated glomerular filtration rate did not change statistically significantly, from 60.21 ± 7,2 to 63,5 ± 7,7 mL/min per 1.73 m2 ($P<0.06$). Mean heart rate remained unchanged. At 3 months, participants were taking at least one less antihypertensive drug than at baseline (from 5 ± 1 to 3 ± 1) (P=0.006).
Conclusions: RDN results in a significant and robust reduction in both office and ambulatory systolic and diastolic BP at 3 months and also during FU after catheter–based RDN on less medication and without evidence of adverse consequences on renal function.

Abstract citation ID: suag058.198

DESATURATION WITH A TWIST: A CASE OF PLATYPNEA–ORTHODEOXIA SYNDROME

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Platypnea–orthodeoxia syndrome (POS) is a rare condition characterized by dyspnea and arterial desaturation in the upright position (orthodeoxia), which resolve or improve in the supine position (platypnea). The pathophysiological mechanism requires two components: an anatomical substrate for a right–to–left shunt, either cardiac—most commonly a patent foramen ovale—or extracardiac, such as pulmonary arteriovenous malformations, together with a functional or dynamic factor that enhances shunt flow in the upright position, including changes in intrathoracic pressure or cardiac geometry.

We report the case of a 62–year–old man with no prior cardiovascular history who presented to the emergency department with severe hypoxemia (SpO_2 74%) despite being eupneic at rest, and with markedly elevated D–dimer levels. One week earlier, he had been hospitalized for acute perforated cholecystitis and had undergone emergency laparoscopic cholecystectomy, followed by discharge after a short, uneventful postoperative course. On clinical evaluation, the patient was asymptomatic despite marked hypoxemia. Arterial blood gas analysis confirmed hypoxemic respiratory failure with a significant postural variation: PaO_2 was 52 mmHg in the supine position and decreased to 37 mmHg when upright, while $PaCO_2$ and lactate levels remained within normal range. Given the recent surgery and elevated D–dimer levels, pulmonary embolism was initially suspected. Contrast–enhanced chest

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CT revealed a subsegmental pulmonary embolism in the left lower lobe, a small peribronchial consolidation, and marked elevation of the right hemidiaphragm, which had not been present on preoperative imaging (figure 1)

However, the limited thromboembolic burden did not adequately explain the severity and positional nature of hypoxemia, raising suspicion of platypnea–orthodeoxia syndrome. Transthoracic echocardiography with contrast suggested a patent foramen ovale (PFO), which was subsequently confirmed by transesophageal echocardiography with bubble study, demonstrating a significant right–to–left shunting (Figure 2). The patient underwent PFO closure, resulting in a marked improvement in arterial oxygenation in both the supine and upright positions.

POS is a rare but reversible cause of positional hypoxemia. Clinical suspicion is key to timely diagnosis. Correction of the underlying anatomical substrate can lead to rapid and sustained improvement in arterial oxygenation and patient outcomes.

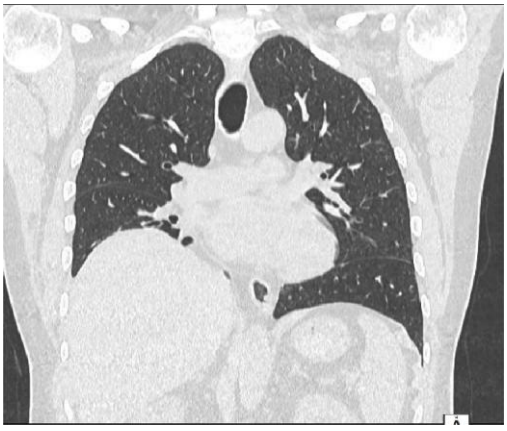

Figure 1

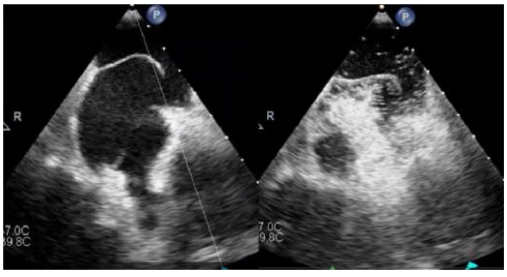

Figure 2

Abstract citation ID: suag058.199

DENERVATE AND REVASCULARIZE: A “DUAL–TARGET” STRATEGY IN RESISTANT RENOVASCULAR HYPERTENSION

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Cardiologia, Università Degli Studi Di Bari "Aldo Moro"; Chirurgia Vascolare, Policlinico Di Bari; Medicina Interna, Università Degli Studi Di Bari "Aldo Moro"; Cardiologia Universitaria, Policlinico Di Bari

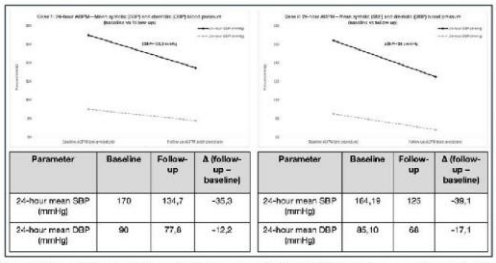
Background: In resistant renovascular hypertension, blood pressure (BP) reduction after renal revascularization may be less than expected, suggesting that restoration of renal blood flow is not always sufficient to switch off the neurohormonal and sympathetic activation induced by renal artery stenosis. Catheter–based renal denervation (RDN), by modulating renal and systemic sympathetic overactivity, may complement the effect of percutaneous transluminal angioplasty (PTA) with possible stent implantation.
CASE SERIES: We report two patients managed within the FEDERICUS registry pathway who underwent a combined strategy of radiofrequency (RF) RDN plus renal PTA/stenting.

Case 1 (54–year–old man) with resistant hypertension on multi–drug therapy underwent RF–RDN (complete on the left and mid–to–distal on the right) and, during the same session, right renal PTA with implantation of two overlapping drug–eluting stents, achieving a good final angiographic result.

Case 2 (75–year–old man) with severe renovascular disease: angiography showed a severe (90%) para–ostial stenosis of the right renal artery with chronic left ostial occlusion; mid–to–distal RDN was performed followed by implantation of a covered stent on the right, with an uneventful course.At 3–month follow–up, ABPM showed a clinically relevant reduction expressed as Δ (follow–up – baseline): Case 1: Δ24–h SBP/DBP −35.3/−12.2 mmHg; Case 2: Δ24–h SBP/DBP −39.1/−17.1 mmHg.

In both cases, treatment de–escalation was observed compared with the pre–admission home regimen: discontinuation of doxazosin in Case 1; discontinuation of nifedipine and dapagliflozin in Case 2

Conclusions: Available evidence indicates that RDN produces a moderate BP reduction, more evident for SBP and on ABPM: in SPYRAL HTN–OFF MED, the between–group difference (RDN vs sham) for the change in 24–h SBP at 3 months was −5.0 mmHg (95% CI −9.9 to −0.2), consistent with an approximately 5 mmHg short–term reduction; in CORAL, the SBP difference favoring stenting was −2.3 mmHg (95% CI −4.4 to −0.2; p=0.03). In our two cases, the combined RDN + PTA approach was associated with a larger SBP reduction than that reported on average in studies evaluating RDN alone or revascularization alone, supporting the hypothesis that PTA and RDN may be synergistic rather than alternative when significant stenosis coexists with neurohormonal/sympathetic overactivation. This observation should be interpreted with caution given the limited sample size (n=2)



Parameter	Baseline	Follow-up	Δ (follow-up – baseline)
24-hour mean SBP (mmHg)	170	134,7	−35,3
24-hour mean DBP (mmHg)	90	77,8	−12,2

Parameter	Baseline	Follow-up	Δ (follow-up – baseline)
24-hour mean SBP (mmHg)	164,19	125	−39,1
24-hour mean DBP (mmHg)	85,10	68	−17,1

Figure 1. 24-hour ABPM comparison between baseline (pre-procedure) and 3-month follow-up in the two cases. Upper panels depict changes in mean 24-h systolic (SBP) and diastolic (DBP) blood pressure; lower panels summarize absolute values and Δ (follow-up − baseline). Case 1: 24-h SBP 170 → 134.7 mmHg (Δ −35.3) and 24-h DBP 90 → 77.8 mmHg (Δ −12.2). Case 2: 24-h SBP 164.19 → 125 mmHg (Δ −39.1) and 24-h DBP 85.10 → 68 mmHg (Δ −17.1).

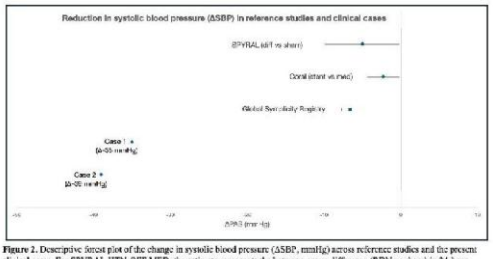


Figure 2. Descriptive forest plot of the change in systolic blood pressure (ΔSBP, mmHg) across reference studies and the present clinical cases. For SPYRAL HTN-OFF MED, the estimate represents the between-group difference (RDN vs sham) in 24-hour ABPM SBP at 3 months (−5.0 mmHg; 95% CI −9.9 to −0.2). For CORAL, the estimate represents the difference in office (clinic) SBP favoring stenting vs optimal medical therapy (−2.3 mmHg; 95% CI −4.4 to −0.2). The Global SYMPLICITY Registry reports the within-group change in 24-hour ABPM SBP at 6 months (−6.6 ± 18.0 mmHg; −8.9 ± 16.9 mmHg in severe hypertension). Negative values indicate SBP reduction. The two clinical cases (Case 1 and Case 2) are shown as individual ASBP at follow-up, calculated from pre-procedure baseline ABPM to 3-month post-procedure ABPM, and derive from larger SBP reductions (−35 and −39 mmHg) than the average effects reported for RDN alone or revascularization alone, suggesting a possible synergistic effect of combined RDN + PTA when significant stenosis coexists with sympathetic/neurohormonal overactivation; these observations should be interpreted cautiously given the very small sample size (n=2).

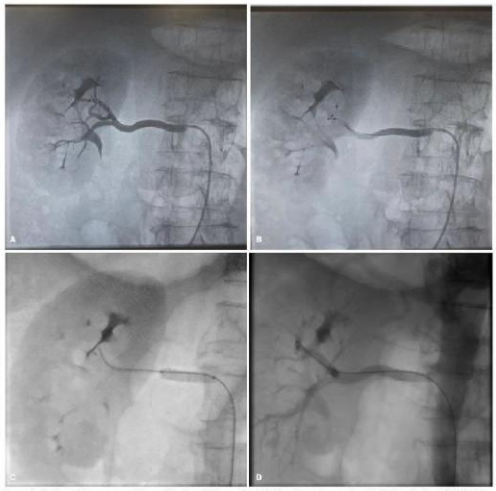


Figure 3. Angiographic sequence of the combined renal denervation (RDN) and percutaneous transluminal angioplasty (PTA) with renal artery stenting procedure. (A–B) Radiofrequency energy deliveries for RDN in two different segmental branches of the renal artery, with positioning of the dedicated catheter and distal-to-proximal, stepwise applications according to a "branch-first" technique. (C) Treatment of renal artery stenosis by PTA followed by stent implantation, after lesion predilation and optimization of the angiographic result; (D) Final angiographic control: patent vessel with restoration of lumen caliber and flow, without immediate angiographic complications (no dissection, embolization, or significant residual stenosis).

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Abstract citation ID: suag058.200

"CLOSE UP THE GAP": A RARE CASE OF AORTO–ATRIAL FISTULA

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Azienda Ospedale Universitá Padova

Background: aorta–right atrial fistulas are rare extracardiac vascular channels, also termed aortocameral fistulas. Their natural history, clinical presentations, and eligibility for percutaneous treatment remain unclear.
CASE SUMMARY: we present the case of a 61–year–old male with an unremarkable medical history who was admitted to the ICU of another centre, on June 19, 2025, with acute heart failure. The final diagnosis was achieved through a comprehensive multimodal workup, which revealed a left–to–right shunt between the non–coronary sinus of Valsalva and the right atrium, consistent with an aorto–atrial fistula (Figure 1), an exceedingly rare condition most likely due to the rupture of a small aneurysm of the non–coronary sinus. This anomaly resulted in right–sided chamber dilation with preserved left ventricular systolic function. The case was discussed within the multidisciplinary Heart Team to evaluate the most appropriate therapeutic strategy. Surgical correction was initially considered the first–line treatment. However, the patient firmly refused surgery, expressing a strong preference for a less invasive approach. In light of this decision and the favorable anatomical features, the Heart Team agreed to proceed with a percutaneous solution, therefore the patient was referred to the Our Cardiology Department. Here transesophageal echocardiography confirmed a fistulous tract originating from the non–coronary sinus of Valsalva and draining into the right atrium, without associated septal defects or coronary involvement. Right–heart catheterization documented a significant left–to–right shunt (QP/QS › 2.5) with preserved pulmonary vascular resistance. Thus, a percutaneous closure was successfully performed with the implantation of a 10 mm Duct Occluder device (Figure 2). The procedure was uneventful, with immediate almost total shunt abolition and stable device positioning (Figure 3). Dual antiplatelet therapy (aspirin plus clopidogrel) was initiated for 1 month. At 1–month follow–up, the device was correctly positioned and functioning normally with no residual shunt.
Discussion: a noncoronary sinus of Valsalva–right atrium fistula is a rare cardiac defect with incompletely understood etiopathogenesis that requires a multidisciplinary approach. In appropriately selected patients with small defects, minimal aortic regurgitation, and no complex associated cardiac abnormalities, transcatheter closure represents a viable therapeutic option with encouraging short– and mid–term outcomes.

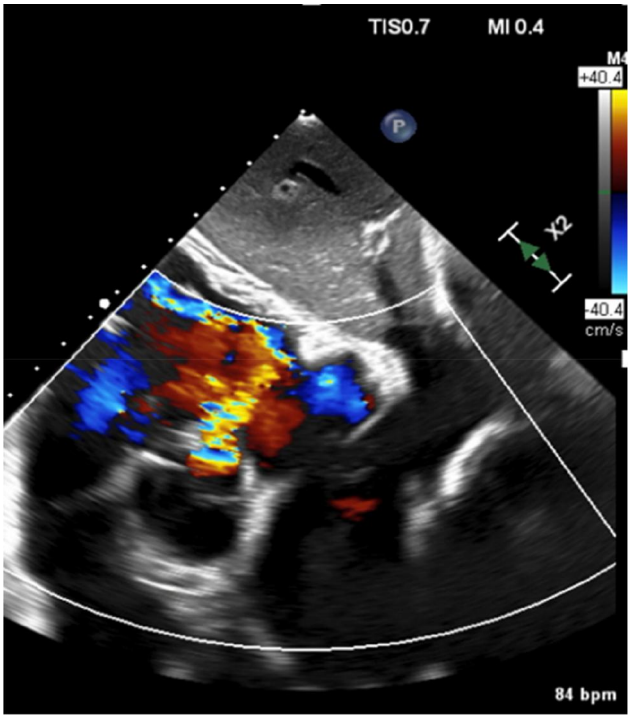

Figure 1

Figure 2

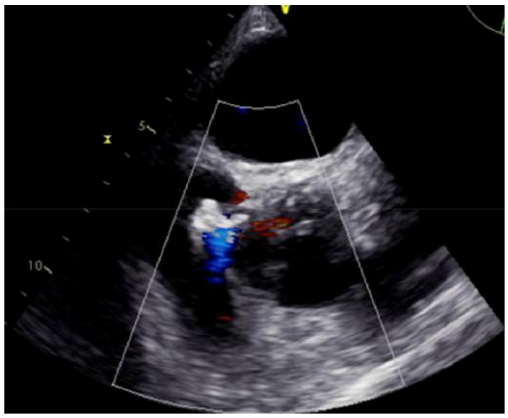
Figure 3

Abstract citation ID: suag058.201

A HOLE IN THE PLOT OF A LEFT ATRIAL APPENDAGE OCCLUSION

D. D'Andrea, A. Bellis, G. Carpinella, V. Fioretti, F. Furbatto, G. Nicoletti, M. Russo, F. Serino, V. Taglialatela, N. Verde, and C. Mauro
Aorn Cardarelli, Napoli

R. A., 73–year–old female patient with medical history of paroxysmal atrial fibrillation (CHADS2–VASc2 4), hypertension, diabetes and dyslipidemia. She had been admitted to ER because of hematuria, discovering with subsequent exams a papillary carcinoma of the bladder, treated with TURB. Immediately after the procedure a STEMI occurred and pPCI was performed, implanting a DES in middle LAD. DAPT was started with aspirin and clopidogrel, LMWH was added for stroke prevention and after 2 days dabigatran 110 mg bid was added to therapy. After 2 days Hb dropped to 7.5 g/dl (starting from 9.7 g/dl) and 2 red blood cell transfusion packs were needed to restore Hb levels to 10,1 g/dl, but in a few days of NOAC+DAPT HB felt again to 7.1 g/dl. She accepted our proposal LAAO on account of increased bleeding risk. Anticoagulation therapy with dabigatran was discontinued 48 hrs before the procedure, and the patient was maintained on LMWH. Cardio CT was performed as per our protocol before procedure, demostrating a LAA without thrombi. While tenting of inter–atrial septum puncture at TEE suddenly appears a filamentous formation adherent to atrial septum, with proximal edge embedded in PFO. After many failed attempts (snare, pigtail) to remove or reduce this formation we decided to perform a trans–septal puncture near PFO in order to perform LAA occlusion and subsequent PFO closure using the same 9F catheter, avoiding multiple pass through a potential dangerous situation. This will allow trapping and immobilization of the filamentum through fossa ovalis while performing LAA occlusion, avoiding possibility of migration, programming of jailing it into PFO closure device, achieving immediately closure of both PFO and delivery catheter hole. R.A. was discharged at 5 days after LAA + PFO closure with DAPT con ASA 100 mg + clopidogrel 75 mg/die. Hb was 9.2 g/dl. TEE at discharge and at 30 days FU showed devices in situ in absence of pericardial effusion; Hb raises up to 10.2 g/dl. Once you started a procedure you may have plan A, B, C and even D if it occurs to manage all kind of complications

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Structural Interventional Cardiology - Interatrial Septum Defects

Abstract citation ID: suag058.202

A RARE BUT NOT IMPOSSIBLE FINDING

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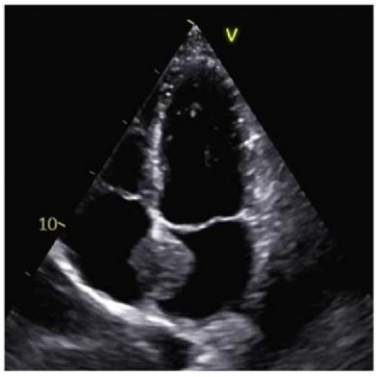
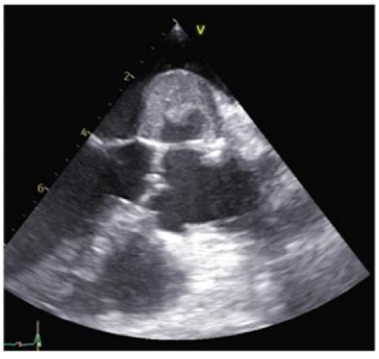
A 68–year–old woman was referred to our attention due to dyspnea on exertion. She denied cardiovascular risk factors, chest pain, syncope, and palpitations. 2D–transthoracic echocardiography (TTE) showed normal systolic and diastolic function of the left ventricle with mild aortic regurgitation and a partially vacuolated mass (31x33 mm) attached to the interatrial septum (Figure 1). The hypothesis of atrial myxoma was tested by transesophageal echocardiography (TEE), which revealed an echo–dense and partially liquefied structure at the level of the non–coronary sinus of Valsalva, compressing and deviating the interatrial septum; mild aortic regurgitation was confirmed (Figure 2). 3D analysis showed an aneurysmatic sac on the non–coronary sinus of Valsalva, suggesting the hypothesis of a pseudoaneurysm. Negative inflammatory markers and blood cultures excluded aneurysmal evolution of a septic abscess. Thoracic CT revealed a large pseudoaneurysm (34x28mm) of the non–coronary sinus, with eccentric thrombotic stratification, impinging on the interatrial septum; additionally, a small and focal outpouching was noted at the level of the left sinus of Valsalva and at the aortic isthmus. The case was evaluated by the Heart Team, and the decision to perform surgery for pseudoaneurysm exclusion was made. A large defect was detected in the aortic wall, at the level of the non–coronary sinus of Valsalva, creating a huge pseudoaneurysm with extensive thrombus. Exclusion of the pseudoaneurysm was performed, with reconstruction of the aortic wall with a heterologous pericardial patch (Figure 3). The postoperative course was uncomplicated. Since secondary causes were not observed, genetic evaluation has been indicated, but results are still ongoing. Aneurysms of the sinus of Valsalva are rare (estimated prevalence of 0.09% in the general population). The right coronary sinus is most frequently involved, followed by the non–coronary and left coronary sinus. Endocarditis and acute aortic syndromes are responsible for acquired aneurysms. Congenital aneurysms result from an incomplete fusion of the aortopulmonary septum with the interventricular septum and are often associated with Marfan syndrome or other genetically determined connective tissue disorders. This clinical case indicates that spontaneous pseudoaneurysms are a rare but not impossible finding. After ruling out infectious or traumatic cause, a genetic origin should be considered even in patients without clear features of collagen disease.





Abstract citation ID: suag058.203

BALLOON–TRAPPING RETRIEVAL OF A FRACTURED FEMORAL SHEATH DURING PULSED FIELD ABLATION FOR ATRIAL FIBRILLATION

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Ospedale Santa Maria Goretti; Università La Sapienza Di Roma

Background: Catheter ablation for atrial fibrillation (AF) is technically demanding, and vascular access complications remain among the most frequent and clinically important adverse events. Although ultrasound–guided femoral puncture has improved safety, multiple venous punctures, large–bore sheaths, and full anticoagulation mean that rare, potentially life–threatening complications can still occur.
Case Description: A 69–year–old man with ischemic dilated cardiomyopathy and a prior implantable cardioverter–defibrillator (ICD) was referred for pulsed–field ablation (PFA) for symptomatic AF refractory to maximal medical therapy, with recurrent inappropriate ICD shocks. During acquisition of dual right femoral venous access under ultrasound guidance, a 7–French introducer sheath kinked and ruptured after contact with an advancing SL0 long sheath. Venography confirmed retention of the distal fragment in the right femoral vein. A multidisciplinary team, including an interventional radiologist and a vascular surgeon, was promptly activated, and an endovascular–first retrieval was pursued via contralateral femoral access. After unsuccessful gooseneck snare attempts, balloon–assisted retrieval was performed: an 8–French Cook sheath was advanced from the left femoral vein; a 4–French Berenstein catheter with a 0.035" guidewire engaged the fragment lumen; (Fig.1) the 0.035" wire was exchanged for a 0.014" wire and the catheter for a 4.0 × 30–mm semi–compliant balloon, advanced into the fragment, inflated, (Fig.2) and used to pull it to the left femoral vein for controlled extraction (Fig.3). Final venography demonstrated preserved bilateral venous integrity. PFA was then completed uneventfully through the remaining secure accesses, achieving complete pulmonary vein isolation. At three–month follow–up, the patient remained in sinus rhythm without arrhythmic events or vascular sequelae.
Conclusions: This case illustrates an uncommon but high–risk access complication—introducer sheath rupture with intravascular fragment retention—despite ultrasound guidance. Rapid recognition, venographic confirmation, and multidisciplinary involvement enabled a conservative endovascular strategy, avoiding open venous exploration. Early diagnosis and coordinated management are essential. When feasible, an endovascular–first approach—using balloon–assisted techniques when snaring fails—can be safe and effective, preserving venous integrity.

Figure 1

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Figure 2

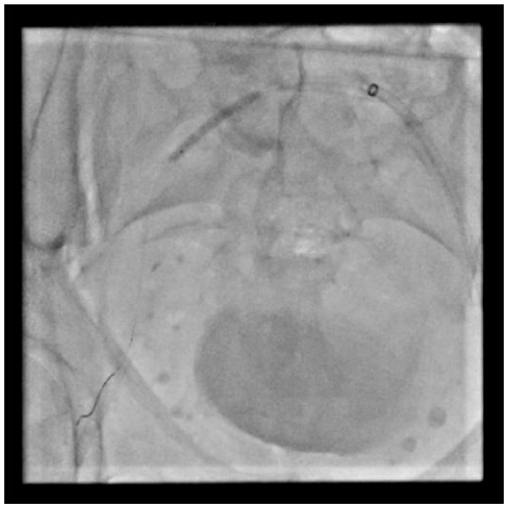

Figure 3

Abstract citation ID: suag058.204

CORONARY EMBOLISM AND ATRIAL MIXOMA: CASE REPORT AND REVIEW OF THE LITERATURE

G. Scherillo, E. Cerrato, S. Ferrua, I. Meynet, M. Lococo, A. Tuccillo, M. Rinaldi, and F. Varbella
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We report the case of a 44–year–old man with no risk factors presenting with chest pain after physical exertion. EKG showed ST–segment elevation in the inferior leads and atrial fibrillation. Coronary angiography revealed occlusion of the distal left anterior descending (LAD) artery and an obtuse marginal (OM) branch, suggesting coronary embolism (Fig. 1). An attempt at balloon angioplasty was ineffective. An abnormal vascular network originating from the right coronary artery (RCA) and the circumflex artery (LCX) and directed toward the left atrium was observed. Transthoracic echocardiography demonstrated a pedunculated mass measuring approximately 3 cm attached to the roof of the left atrium, confirmed by transesophageal echocardiography (Fig. 2). Further medical history revealed previous episodes of transient visual disturbance. We suspected coronary embolism due to atrial myxoma, so dual antiplatelet therapy (DAPT) was withheld to avoid delaying surgical treatment, and the patient was managed with a 24–hour infusion of tirofiban. Surgical resection was performed, and histology confirmed the diagnosis of atrial myxoma. A review of the literature shows that coronary embolism due to atrial myxoma affects men and women equally, with a mean age of 47.7 years. The most frequent presentation is myocardial infarction with non–obstructive coronary arteries (MINOCA, 42.2%). The LAD is most commonly involved (20%), followed by the RCA (17.7%) and LCX/OM (12.2%), while multivessel involvement is rare (7.7%). Percutaneous revascularization is often ineffective (successful PCI in 68.7% of cases); thrombus aspiration may aid etiological diagnosis, stent implantation may delay surgery due to the need for DAPT (Table 1).

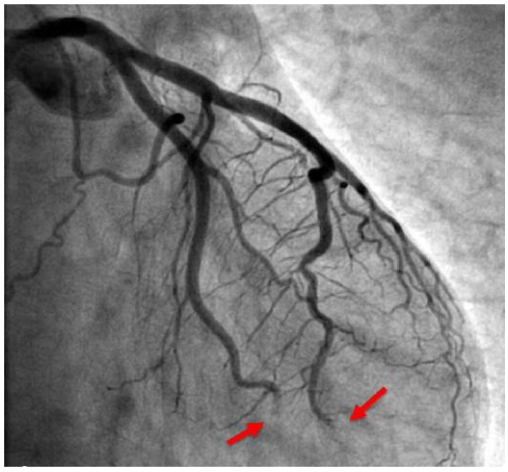

Figure 1

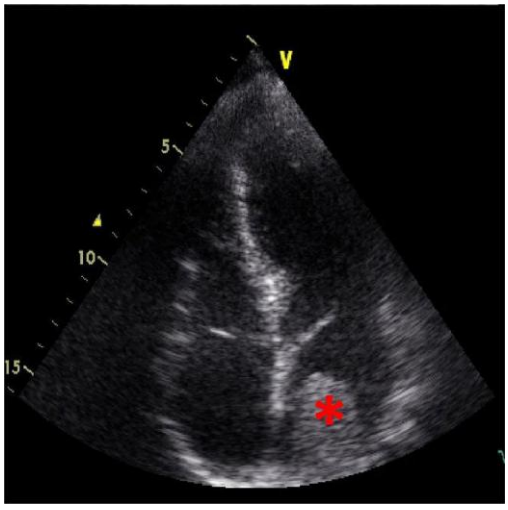

Figure 2

NUMERO DI CASI	91
ETÀ (ANNI)	47.6 ± 16.3
SESSO M (%)	46 (52%)
CORONARIA COLPITA	
MINOCA	42,2%
EMBOLIA MULTIVASALE	7,7%
DISCENDENTE ANTERIORE	20%
CORONARIA DESTRA	17,7%
CIRCONFLESSA	12,2%
NON NOTA	2,2%
PCI	16
SUCCESSO	11 (68,7%)
WIRE CROSSING	1 (9%)
POBA	2 (18,2%)
DIRECT STENTING	2 (18.2%)
TROMBOASPIRAZIONE	6 (54,5%)

Table 1

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Abstract citation ID: suag058.205

A HIGH COMPLEX CALCIFIC LESION TREATMENT: WHEN THE EXCIMER CORONARY LASER ATHERECTOMY IS A GAME CHANGER

N. Verde, D. D'Andrea, F. Furbatto, G. Carpinella, A. Bellis, F. Serino, V. Taglialatela, F. La Rocca, G. Nicoletti, V. Fioretti, M. Russo, and C. Mauro
Aorn Cardarelli

Rationale: The high calcific coronary lesions are one of the hardest challenges for interventional cardiologists, with an adverse impact on both acute and long–term results of percutaneous coronary intervention (PCI). Nowadays, several technologies have been developed to facilitate the plaque modification, particularly in situations where a lesion is balloon–unexpandable or uncrossable. Among these, the Excimer Laser Coronary Atherectomy (ECLA) is a well–established, safe and effective method of plaque modification. The excimer laser is a pulsed xenon–chlorine laser with an ultraviolet wavelength of 308 nm, which relies on absorption into non–aqueous components of the atherosclerotic plaque for the debulking. Tissue ablation is mediated by three mechanisms: photochemical, photothermal and photomechanical. The use of laser at the highest fluence and repetition rate (i.e., 80 mJ/mm2 and 80 Hz) during contrast injection maximizes the photothermal and the photomechanical effect and is called "explosion technique".
Technical resolution: In our case, there was a critical and severe calcific lesion in the middle left anterior descending (LAD) artery. This lesion could not be crossed even with small–diameter balloons (SC balloon 1.5 x 8 mm). In our catheterization laboratory, we have an extensive experience with ECLA use. Thus, we decided to use the laser to perform a plaque modification. After the use of TurboElite 0.9 mm catheter (with the "explosion technique" – fluence/repetition rate 80/80 – 2755 pulses in 30"), we successfully crossed the lesion with NC balloons of increasing diameter. Subsequently, with the support of a guide catheter extension, we implanted three drug eluting stents in overlap from the middle LAD to the ostium of left main (LM). To conclude, we performed a run of IVUS that showed a good stent expansion in LAD and LM without signs of distal dissection.
Clinical implications and perspectives: The ECLA is a plaque modification technique truly useful when the lesion is balloon– or wire–uncrossable. When used by expert operators, it is safe and allows a high rate of procedural success. Unlike other atherectomy methods (i.e. rotational/orbital atherectomy), it does not require a dedicated wire, and the risk of distal embolization is significant lower if compared with them. The main limitations of this technique are costs, time preparation to start the system and the large size of generator, limitations that will surely be smoothed in the future.

Abstract citation ID: suag058.206

TAP (T AND SMALL PROTRUSION) AND CULOTTE STENTING TECHNIQUES VERSUS A REVERSE CRUSH IN CASE OF BAILOUT OF PROVISIONAL STENTING

S. Cangemi, D. Buccheri, V. Virga, M. Benedetto, F. Giannino, F. Stabile, F. Inglese, D. Vinci, and G. Geraci
Po S. Antonio Abate Di Trapani; Policlinico G. Martino; Arnas P.O. Civico E Benfratelli; Aou Policlinico P. Giaccone

In the event of failure of a provisional approach for treatment of coronary bifurcation lesions, many two–stent bifurcation techniques can be performed. Two techniques (culotte and T/TAP) are suggested by the European Bifurcation Club, but a reverse crush is performed by some operators. This study aims to retrospectively compare these two different approaches (EBC–recommended techniques vs. reverse crush). The primary endpoint was MACEs during two years of follow–up. This was a retrospective study. There was a high prevalence of type 2 diabetes mellitus (31%). The most common admission presentation was NSTEMI (69%). There were no significant differences in age, sex, comorbidities, or presentation type between the two comparison groups. The most treated coronary bifurcation was the left main (64.28%), followed by the left anterior descending artery–first diagonal (33.33%). The predominant lesion type was Medina 1.1.1 (88.1%). A significant proportion of the treated bifurcation lesions were classified as complex according to the Definition Criteria (42.85%) and 38.09% were severely calcified (angiographic assessment). The side branch lesion length was longer than 10 mm in many cases (69%). The side branch stenosis was severe in 85.71%. A high SYNTAX score › 32 was present in 30.95%. Regarding the baseline angiographic characteristics, the two comparison groups differed significantly only for the presence of more patients with a high SYNTAX score (›32) in the reverse crush group. During the follow–up, six patients experienced a target vessel acute myocardial infarction (14.28%), often caused by thrombosis at the ostium of the side branch or at the distal edge of previously implanted stents. In total, at 24 months, 10 patients underwent target vessel revascularization (23.81%) and only one patient died (due to an acute pulmonary edema related to a suspected acute myocardial infarction). At two years follow–up, EBC–recommended techniques were significantly associated with a lower incidence of target vessel revascularization (9.37% vs. 30%, p–value = 0.040) compared with the reverse crush group; in the EBC group, there was also a trend toward a lower incidence of CIN after the PCI, but it was not statistically significant (28.1% vs. 60%; p–value = 0.074), and a lower incidence of MACEs was found (18.75% vs. 50%, p–value = 0.094). EBC–recommended techniques should be preferred to reverse crush even if this study ha numerous limitations.

	EBC-Recommended Techniques (TAP and Culotte) (n = 32)	Reverse Crush (n = 10)	p-Value
Hospitalization			
CIN	9 (28.1%)	6 (60%)	0.074
Dialysis after PCI	2 (6.25%)	0 (0%)	0.576
Two-Year Follow-Up			
MACEs	6 (18.75%)	5 (50%)	0.094
Cardiac death	1 (3.12%)	0	0.203
Target vessel MI	3 (9.34%)	3 (30%)	0.135
Target vessel revascularization (comprehensive for target vessel MI)	5 (15.6%)	5 (50%)	0.061

Values are n (%). The p-values are from chi-square tests. CIN, contrast-induced nephropathy; MACEs, major adverse cardiovascular events; MI, myocardial infarction; PCI, percutaneous coronary intervention.

Abstract citation ID: suag058.207

WHEN THE BALLOON SHATTERED: A HIGH–RISK COMPLICATION IN THE CATH LAB

V. Fioretti, D. D'Andrea, F. Furbatto, G. Carpinella, F. Serino, F. La Rocca, V. Taglialatela, A. Bellis, M. Esposito, G. Nicoletti, M. Russo, N. Verde, and C. Mauro
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Background: Percutaneous coronary intervention (PCI) is a cornerstone in the treatment of ischemic heart disease. Despite continuous technological advances, PCI may still be complicated by rare but potentially severe procedural events. Balloon catheter rupture is an uncommon complication that can lead to coronary dissection, perforation, thrombosis, gas embolism, and device entrapment, with possible hemodynamic compromise. Prompt recognition and mastery of bailout techniques are therefore essential. We report a rare case of multi–fragmented balloon catheter shaft rupture occurring during bifurcation PCI.
Case Description and Technical Resolution: A 71–year–old man with multiple cardiovascular risk factors presented with a one–month history of angina. Myocardial perfusion scintigraphy demonstrated significant inducible ischemia involving the anterior and inferolateral walls. Coronary angiography revealed multivessel disease involving the right coronary artery and the left anterior descending artery (LAD). PCI of the right coronary artery was successfully performed with drug–eluting stent (DES) implantation, followed by PCI of the LAD with distal balloon angioplasty and implantation of three DES in the mid segment. Post–procedural ischemia due to significant ostial stenosis of the jailed diagonal branch required proximal optimization technique, side–branch rewiring, and kissing balloon inflation with non–compliant balloons. During this phase, an unexpected multi– fragmented rupture of the balloon catheter shaft occurred within the LAD (Figure 1). The fragments were promptly retrieved using a dedicated snare device, achieving complete removal without distal embolization (Figure 2). Subsequent angiography revealed a proximal LAD dissection, which was successfully treated with additional DES implantation. Final angiography demonstrated optimal results with restoration of TIMI 3 flow and no residual complications (Figure 3).
Clinical Implications and Perspectives: This case shows that balloon rupture, although rare, can occur during routine PCI. Prompt recognition, operator expertise with retrieval devices, and timely management of associated complications are essential for procedural success and patient safety. Adequate training, planning, and access to bailout devices remain key to managing unexpected mechanical failures in complex PCI.

Abstract citation ID: suag058.208

WHEN "LEAVE–NOTHING–BEHIND" FAILS: ACUTE THROMBOTIC VESSEL OCCLUSION AFTER DCB–ONLY PCI IN A PATIENT REQUIRING ULTRA–SHORT DAPT – A CASE REPORT

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Aou Careggi, Firenze

Background: Drug–coated balloon (DCB)–only percutaneous coronary intervention (PCI) represents a "leave–nothing–behind" strategy that may allow very–short dual antiplatelet therapy (DAPT), an appealing option in high–bleeding–risk patients requiring urgent non–cardiac surgery. However, acute vessel occlusion following DCB treatment of de–novo lesions remains an uncommon but potentially catastrophic complication.
Case summary: A 73–year–old man with prostate cancer awaiting urgent surgery underwent coronary evaluation, which revealed sub–occlusive stenoses of the mid–left anterior descending artery (LAD) and the proximal first obtuse marginal branch (OM1) (Figure 2). To minimize DAPT duration, a DCB–only strategy was selected. After lesion preparation with semi–compliant

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balloons, both vessels were treated with paclitaxel–coated balloons, achieving an apparently optimal angiographic result without visible dissection. Fifteen minutes after leaving the catheterization laboratory, the patient developed chest pain, hypotension, and anterolateral ST–segment elevation. Urgent repeat angiography demonstrated acute thrombotic occlusion of the LAD and sub–occlusion of OM1 at the treated segments (Figure 1). Bail–out drug–eluting stent implantation restored coronary flow with rapid clinical stabilization.

Conclusion: This case highlights that acute vessel occlusion may occur very early after DCB–only PCI despite angiographic success, particularly in complex de–novo lesions. Rigorous lesion preparation, careful patient and lesion selection, consideration of intracoronary imaging, and preparedness for immediate bail–out stenting are essential when adopting a stent–free strategy in patients requiring ultra–short DAPT.

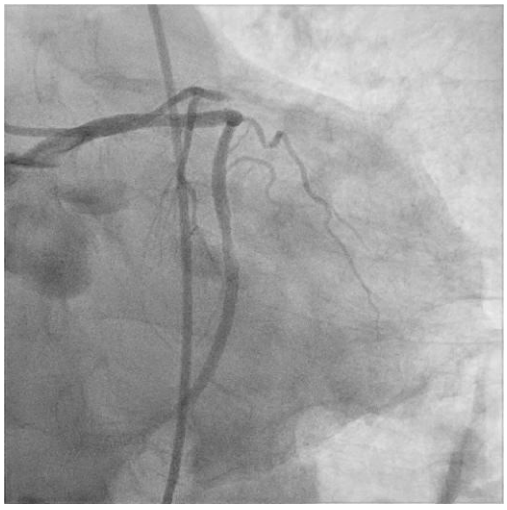

Figure 1

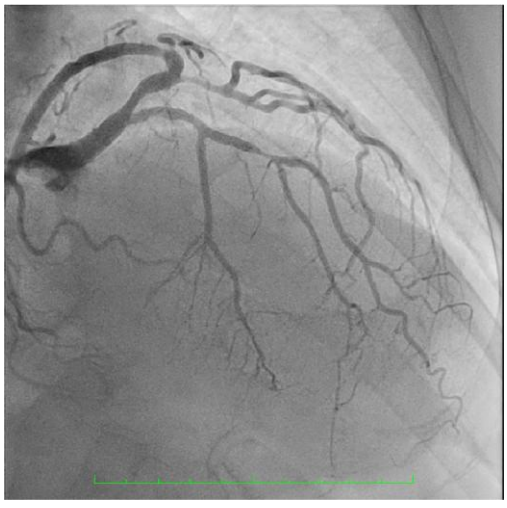

Figure 2

Structural Interventional Cardiology - Aortic Valve

Abstract citation ID: suag058.209

EARLY SIGNIFICANT THROMBOCYTOPENIA AFTER TAVI IN A PATIENT WITH A MECHANICAL MITRAL VALVE: WHEN A PROCEDURAL PATTERN MIMICS HIT

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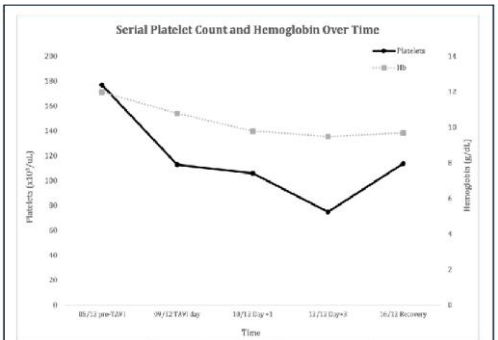
Background: Thrombocytopenia is common after transcatheter aortic valve implantation (TAVI) and is often a self–limited procedural phenomenon. In patients requiring peri–procedural heparin bridging, the early platelet drop may raise concern for heparin–induced thrombocytopenia (HIT) and prompt potentially hazardous changes in anticoagulation.

Case presentation: A 73–year–old man with permanent atrial fibrillation and a mechanical mitral valve on vitamin K antagonist (VKA) underwent transfemoral TAVI for symptomatic severe paradoxical low–flow/low–gradient aortic stenosis. Unfractionated heparin (UFH) bridging was started 4 days before TAVI. The procedure was uncomplicated. Platelets declined from 177x10^3/μL (pre–TAVI) to 113x10^3/μL on day 0, 106x10^3/μL on day +1, with a nadir of 75x10^3/μL on day +3 (–58%), then recovered to 114x10^3/μL by day +7. Haemoglobin decreased from 12.0 to 9.5 g/dL without overt bleeding; vascular access ultrasound excluded haematoma, pseudoaneurysm and arteriovenous fistula. Fibrinogen remained within the normal range (about 230–400 mg/dL). Clinical probability for immune HIT was low (4Ts ≤3) and an anti–PF4/polyanion immunoassay was negative. Given the very high thrombotic risk, UFH was continued as bridging while VKA was restarted, then UFH was stopped after reaching the therapeutic INR. Post–procedural echocardiography confirmed a normally functioning transcatheter valve without significant leak.

Conclusions: An early, marked platelet fall after TAVI—especially with day 0–3 nadir and rapid recovery—may represent a procedural “pseudo–HIT” pattern rather than immune HIT. Integrating timing, pre–test probability and anti–PF4 testing can avoid unnecessary heparin discontinuation or unsafe anticoagulation interruptions in patients with mechanical valves.



CLINICAL SETTING	Hb (g/dL)	Platelets (×10³/μL)	ΔPTL vs baseline (%)	Anticoagulation
Baseline pre-TAVI (05/12)	12.0	177	—	UFH started
TAVI day (09/12)	10.8	113	-36%	UFH
Day +1 (10/12)	9.8	106	-40%	UFH+VKA
Day +3 nadir (12/12)	9.5	75	-58%	UFH+VKA
Recovery (16/12)	9.7	114	-36%	VKA

Normal reference limits: Hb 11.9-15.4 g/dL; Platelets 151-304×10³/μL

Figure 1. Serial trends of platelet count and haemoglobin throughout the TAVI pathway and in relation to the anticoagulation strategy. The upper panel shows the temporal dynamics of platelet count (left axis) and haemoglobin (right axis) at the main clinical timepoints: pre-procedural baseline (05/12), day of implantation (Day 0 = TAVI, 09/12), Day +1 (10/12), nadir at Day +3 (12/12), and recovery phase. Platelet count decreases from baseline (177×10³/μL) to the nadir (75×10³/μL, −58% vs baseline), with subsequent recovery during convalescence (114×10³/μL). Haemoglobin shows a moderate and relatively stable reduction (12.0 → 9.5–9.7 g/dL). The lower panel summarises the numeric values, the percentage change in platelets versus baseline, and the ongoing anticoagulation regimen (start of UFH, periprocedural discontinuation and resumption of UFH, VKA initiation on 10/12 and UFH+VKA overlap until therapeutic INR, then VKA monotherapy). Laboratory reference ranges: Hb 11.9–15.4 g/dL; platelets 151–304×10³/μL. Abbreviations: UFH = unfractionated heparin; VKA = vitamin K antagonist.

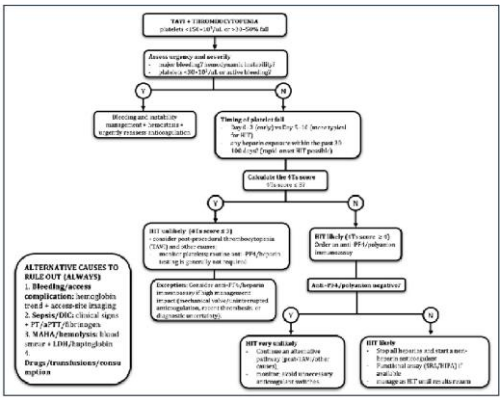


Figure 2. Algorithm for thrombocytopenia after TAVI and suspected HIT. Applicable to post-TAVI patients with PLT <150×10³/μL or a >30–50% decline from baseline. First assess urgency/severity (major bleeding, haemodynamic instability, PLT <30×10³/μL, or active bleeding): if present, initiate haemostatic management and immediately reassess anticoagulation. In the absence of urgency, consider the timing of the platelet fall (day 0–3 more consistent with post-procedural thrombocytopenia; day 5–10 more suggestive of HIT) and any heparin exposure in the previous 30–100 days (possible rapid onset), then calculate the 4Ts score. With 4Ts ≤3, HIT is unlikely: testing and empiric heparin discontinuation are generally not required if heparin is clinically indicated; in high-impact scenarios or diagnostic uncertainty, an anti-PF4/heparin immunoassay may be considered as a rule-out test. With 4Ts ≥6, perform an anti-PF4/polyanion immunoassay: if negative, HIT is very unlikely; if positive, stop all heparins, start a non-heparin anticoagulant, and consider a functional assay (SRA/HIPA) where available, treating as HIT until clarification. The side box reminds to always exclude alternative causes (bleeding/access-site complications, sepsis/DIC, MAHA/haemolysis, drugs/transfusion/consumption).

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Figure 3. Fluoroscopic and echocardiographic documentation of transcatheter aortic bioprosthesis implantation and immediate function. (A) Intraprocedural check after valve release, assessing correct positioning and absence of peri- and/or intraprosthetic regurgitation. (B) Fluoroscopic view showing the final position of the aortic bioprosthesis in situ. (C–D) Post-procedure transthoracic echocardiography: the bioprosthesis is normally positioned in the parasternal long-axis view (C) and shows a normal antegrade gradient on continuous-wave (CW) Doppler in the apical 5-chamber view (D).

Abstract citation ID: suag058.210

OPTIMIZING TAVR WITH FIFTH–GENERATION SELF–EXPANDING VALVES: A SINGLE–CENTER COMPARATIVE ANALYSIS

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Introduction: Transcatheter Aortic Valve Replacement (TAVR) is becoming the standard of care in the modern era of cardiac surgery to treat patients with aortic valve disease. Continuous technological improvement has recently introduced the fifth–generation of the self–expanding Medtronic platform. The aim of the study was to compare the early outcomes of fifth generation (Evolut FX/FX+) Vs previous generation (Evolut PRO/PRO+) of Medtronic TAVR.
Methods: A single–center retrospective analysis was conducted on 882 TAVR perfomed by our Cardiac Surgery Transcatheter Team between 2018 and 2025. Patients who had undergone a Self–Expanding valve implantation with Medtronic platform were enrolled. Cusp overlap technique was adopted routinely in 2021; patients treated before were excluded.
Results: In the Evolut PRO/PRO+ group, 62.8% of patients were female compared with 71.5% in the Evolut FX/FX+ group. Bicuspid aortic valve was present in 3.5% of Evolut PRO/PRO+ cases versus 5.8% of Evolut FX/FX+ cases (p=0.53), while valve–in–valve (ViV) procedures were performed in 12.9% vs. 11.5%, respectively (p=0.81).Baseline conduction disorders were similar: right bundle branch block (RBBB) and first–degree atrioventricular (AV) block were present in 10.6% and 4.7% of Evolut PRO/PRO+ patients versus 7.7% (p=0.57) and 5.8% in the Evolut FX/FX+ group. Pre–implant valvuloplasty and post–dilatation were performed in 61.2% and 24.7% of PRO/PRO+ cases vs. 67.3% (p=0.47) and 25% (p=0.97) of FX/FX+ cases, respectively. Postoperatively, permanent pacemaker implantation (PPI) occurred in 9.4% of PRO/PRO+ cases vs. 3.8% of FX/FX+ cases (p=0.22). Left bundle branch block (LBBB) occurred in 15.3% vs. 7.7% of cases, respectively (p=0.19). At 30–day echocardiography, paravalvular leak (PVL) ≥2+ was observed in 8.2% of PRO/PRO+ patients vs. 3.8% of FX/FX+ patients (p=0.31). Thirty–day cardiovascular mortality was 1.1% in the PRO/PRO+ group vs. 0% in the fifth–generation group (p=0.43).
Conclusions: The fifth generation of Medtronic platform (Evolut FX/ FX+) provided good clinical outcome with 0% 30–day mortality. The Evolut FX/FX+ group has shown a trend of lower adverse events: reduced incidence of permanent PM implantation, reduced incidence of para–valvular leak (PVL) ≥ 2+, no cases of severe PVL at 30–day echo. The presence of radio–opaque markers leads to a more precise implantation depth, decreasing the risk of new–onset heart block.

Abstract citation ID: suag058.211

VALVE–IN–VALVE TAVI FOR DEGENERATED AORTIC BIOPROSTHESIS IN AN ELDERLY MULTIMORBID PATIENT: A HEART TEAM–DRIVEN APPROACH

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Arnas Civico, Uosd Cardiologia Clinica Per Il Trattamento Dello Scompenso Cardiaco; Aoup "P. Giaccone", UOC Di Cardiochirurgia; Arnas Civico, UOC Di Utic

Population ageing and improved survival after cardiovascular interventions have led to a growing number of elderly, multimorbid patients with complex valvular heart disease (VHD). In particular, structural degeneration of aortic bioprostheses has become an increasingly frequent cause of severe valvular dysfunction and heart failure (HF) in patients with a high burden of comorbidities and previous cardiac surgery. In this complex population, a patient–centred, Heart Team–based approach, integrating clinical status, multimorbidity, frailty, advanced imaging, and life expectancy, is pivotal in guiding therapeutic decision–making. We report the case of an 84–year–old man admitted with signs and symptoms of HF. His medical history included diabetes, hypertension, dyslipidaemia and chronic kidney disease. In 2016, he underwent coronary artery bypass grafting (LIMA to LAD, SVG to RCA) and surgical aortic valve replacement with a Sorin Crown N. 23 bioprosthesis for angina and severe aortic stenosis. The echocardiogram revealed a severe aortic prosthetic regurgitation, a moderately reduced left ventricular ejection fraction (EF) (48%), and a markedly increased pulmonary artery systolic pressure (73 mmHg). NT–proBNP level was 2185 pg/mL. Despite optimisation of medical therapy, the patient's clinical condition did not improve. Although the STS score was 7.8% (intermediate risk), the clinical profile was consistent with the "high clinical complexity" category defined by the 2025 ESC/EACTS Guidelines, in which surgical risk scores may underestimate overall risk and decision–making should be Heart Team–driven. The patient therefore underwent urgent valve–in–valve TAVI with implantation of a 23–mm Evolut FX prosthesis. The post–procedural course was complicated by delirium, an episode of atrial fibrillation, and difficulty in weaning from inotropic support, resulting in a prolonged hospital stay. At 12–month follow–up, the patient showed significant clinical and echocardiographic improvement and improved left ventricular function (EF 60%), reduced pulmonary pressures (sPAP 40 mmHg), and stable prosthetic valve function. This case highlights the growing clinical challenge of managing highly complex conditions in elderly, multimorbid patients, particularly in the presence of previous cardiac surgery. A comprehensive and individualised Heart Team approach is essential to balance procedural risk, comorbidities, and expected clinical benefit.

Abstract citation ID: suag058.212

AN UNUSUAL SIMULTANEOUS KISSING BALLOON INFLATION

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Background: Transcatheter mitral valve–in–valve implantation (TMVIV) into failing surgical bioprosthetic valves has evolved in recent years as a promising therapy to avoid redo cardiac surgery in patients at high surgical risk.
Methods: An 80–year–old female patient with CKD stage 3, hypertension, a permanent PMK and atrial fibrillation was referred to our institution with NYHA Class III symptoms. She has undergone implantation of a bioprosthetic valve (St Jude Epic 29 mm) for severe mitral insufficiency due to chordal rupture in 2017 and transcatheter aortic valve implantation (Edwards 29 mm) for severe aortic insufficiency in 2022.

The patient presented with structural valve degeneration, defined as intrinsic permanent variations of the tissue components of the valve, culminating in the development of severe intra–prosthetic stenosis. Notably her echocardiogram showed LVEF 45% with severe mitral valve deterioration due to calcification (mean gradient 15 mmHg, 3D MVA 0.8 cm^2). TAVI was normally functioning.

Surgical risk for redo procedure was too high after evaluation by our Heart Team (EuroScore II 23,6%, STS Score operative mortality 16,7%). So, we have decided for a TMVIV using Edwards SAPIEN 3 Resilia valve 29 mm, implanted reversely in mitral position.

The pre–procedural assessment for the "sizing" of the valve was performed using computed tomography angiography (CT). The following parameters were evaluated: the mitral annulus area, the aorto–mitral angle, the inverse angle and the distance between the two valves for evaluation of the neo–LVOT. The area of the mitral annulus was 6.2 cm² and thus suitable for a Sapien 3–29 mm (Figure 1-2).

During procedure, angiographic imaging, but no TEE, suggested for a likely interference between the mitral valve balloon and the aortic frame, so we prepared for a simultaneous kissing balloon inflation between the mitral and aortic valves.
Results: The post–procedural TEE showed no gradient, no obstruction in LVOT and no leak for either valves (Figure 3).
Conclusions: To our knowledge, we present a rare case of successful treatment utilizing simultaneous kissing balloon inflation during mitral valve replacement due to bioprosthesis degeneration, employing the Edwards SAPIEN 3 Ultra RESILIA valve. The case was characterized by challenges in visualizing the bioprosthetic valve ring as a reference point due to calcification.

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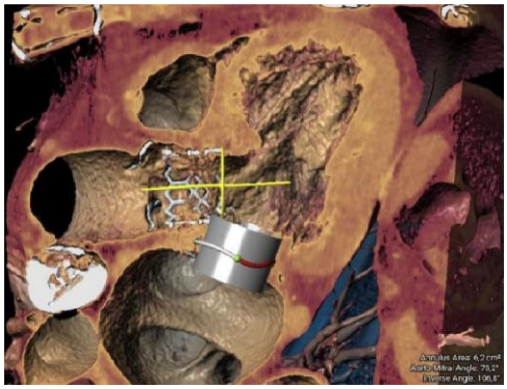

Figure 1

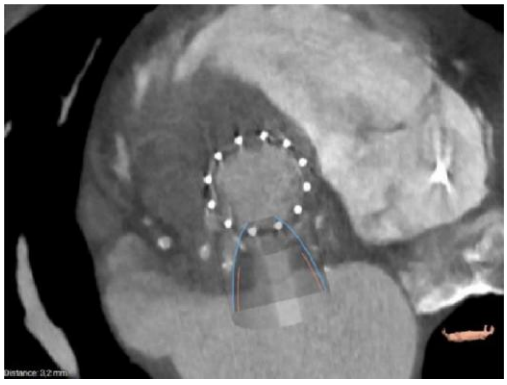

Figure 2

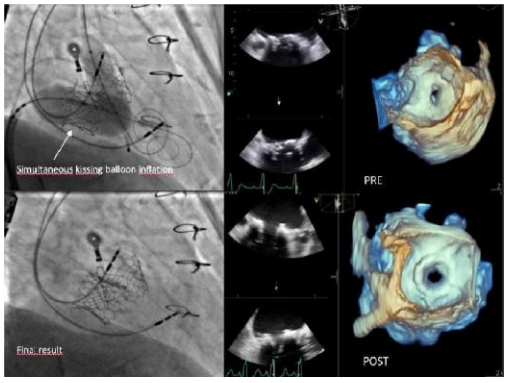

Figure 3

Abstract citation ID: suag058.213

FEASIBILITY AND LATE OUTCOMES OF TAVR IN HIGH–RISK PATIENTS WITH PURE AORTIC REGURGITATION

M. Russo, A. Cammardella, I. Chirichilli, F. Belloni, C. Bismuto, G. Menafra, F. Irace, A. Pergolini, and G. Luzi
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Background and Aim: Transfemoral aortic valve replacement (TAVR) for pure aortic regurgitation (AR) remains under–investigated, with limited data available regarding long–term outcomes.
Methods: From January 2019 to June 2025, 15 patients (median age 71 years; range 47–86; 50% female) undergoing TAVR for pure AR were included in this retrospective study. All commercially available TAVR devices were considered. The primary endpoints were in–hospital and late–term mortality.
Results: Patients treated with TAVR for AR accounted for 1.5% of the overall TAVR volume. Contraindications to conventional surgery included advanced heart failure (33%), porcelain aorta (6%), complex redo surgeries (13%), and multiple comorbidities in the remaining patients. A balloon–expandable transcatheter heart valve (THV) was implanted in 86% of cases. The 30–day mortality rate was 6%. One patient (6%) experienced acute valve embolization requiring surgical intervention, and another required a second THV due to valve migration Postoperative pacemaker implantation in 20%. Median follow–up was 12 months (range 2–78). Three patients died during follow–up (1 cardiac cause, 1 cancer, 1 liver disease). Freedom from cardiac death at follow–up was 83% ± 11% (table 1). No cases of late THV dysfunction or redo procedures were reported (at follow–up mean transvalvular gradient 9 ± 3 mmHg; LVEF 50% ± 9%). One patient was successfully bridged to heart transplantation as intended, after three years (Figure 1).
Conclusions: TAVR for pure AR in selected high–risk patients demonstrated acceptable early and late mortality rates. Despite a non–negligible perioperative complication rate, THV performance at follow–up was favorable, with no cases of recurrent AR, PVL, or valve dysfunction.

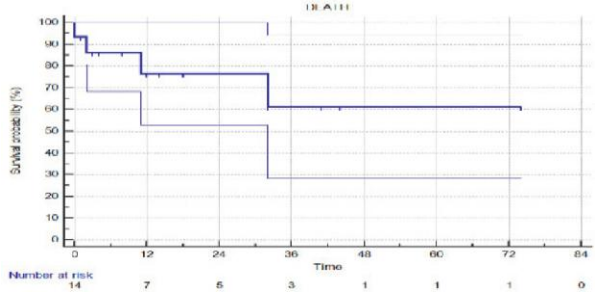

Figure 1

Abstract citation ID: suag058.214

IATROGENIC VENTRICULAR SEPTAL DEFECT FOLLOWING TRANSCATHETER AORTIC VALVE IMPLANTATION: A SINGLE–CENTER EXPERIENCE OF A RARE COMPLICATION

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Introduction: Gerbode's defect dates back to 1857. It generally has a congenital etiology, however very rare acquired forms have been described as complications of cardiac surgery, bacterial endocarditis, thoracic trauma, myocardial infarction or Transcatheter Aortic Valve Implant (TAVI). Diagnosing the communication between the left ventricle and the right atrium post–TAVI is not always easy, but a thorough echocardiography can lead to the correct diagnosis.

We present 2 patients with Gerbode's defects post–TAVI, presumed with post–procedural transthoracic echocardiography (TTE) and validated with transesophageal (TEE) or 3D–ultrasound (3DTTE).
Methods: A single–centre retrospective study of 1309 consecutive with severe aortic stenosis patients, who underwent TAVI from 2020 to 2025, was conducted with 5 types of aortic valve. All patients were evaluated with TTE before and after the procedure; only 23 patients underwent TEE.
Results: Screened patients had a mean age of 82±7 years. Patients had multiple cardiac and non–cardiac comorbidities and high logistic EuroSCOREs and STS scores. Two subjects (0.15%) were found to have a Gerbode–type II septal defect. They were implanted with Medtronic Evolut FX+ valve.

The calcium score of the aortic valve annulus was calculated in the 2 patients with CT (3,296 and 2,395 AU, respectively). Both prostheses were postdilated with a balloon to treat residual moderate paravalvular regurgitation (Figure 1). The cases were diagnosed with TEE/3DTTE to have a restrictive left to right shunt (Qp:Qs=1.4 case 1, 1.2 case 2) (Figure 2-3). The patients were not symptomatic and did not require any further intervention. The mechanisms proposed for ventricular septal defect (VSD) formation: pressure exerted directly by the valve on the membranous septum, severe/asymmetric calcification of native valve, aggressive postdilatation.
Conclusions: The role of TEE/3DTTE in the accurate diagnosis of these VSD suggests that it can be used as an alternative to other diagnostic tools, such as cardiac catheterization, CT and cardiac magnetic resonance imaging. Gerbode's defect is a rare complication of TAVI and was detected more with balloon expandable valves, but can also occur with self–expanding ones. Percutaneous treatment was preferred over open cardiac surgery. Some, but not all, patients survived TAVI and VSD, and had a good prognosis for both patient groups with or without VSD closure. Careful follow–up with a dedicated team is essential in these patients.

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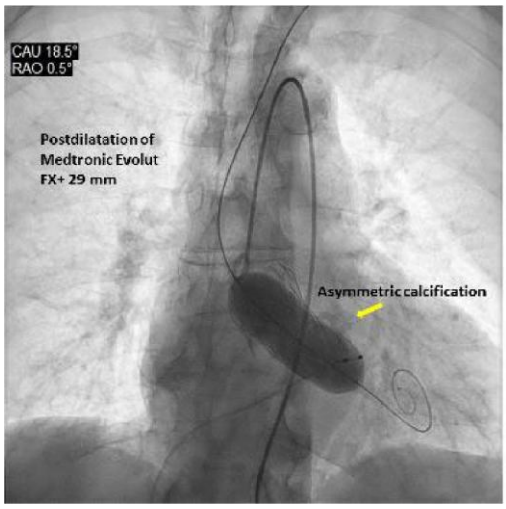

Figure 1

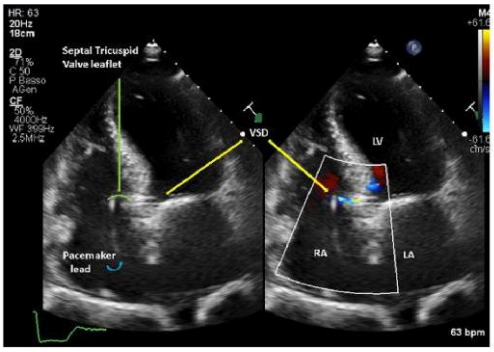

Figure 2

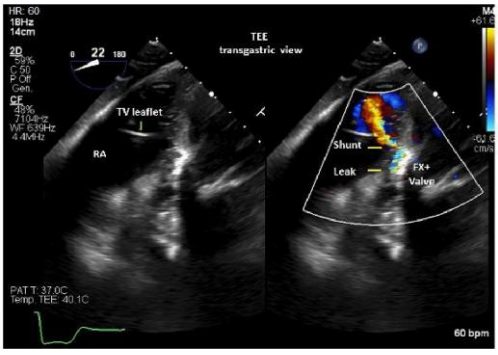

Figure 3

Dilated Cardiomyopathy

Abstract citation ID: suag058.215

FROM ELECTRICAL DISEASE TO STRUCTURAL CARDIOMYOPATHY: A CHALLENGIES IN RISK STRATIFICATION IN ASYMPTOMATIC LMNA VARIANT CARRIERS

M. Frangione, A. Parodi, M. Martini, I. Rigato, L. Iezzi, M. Bueno Marinas, A. Cipriani, M. Perazzolo Marra, D. Corrado, K. Pilichou, and B. Bauce
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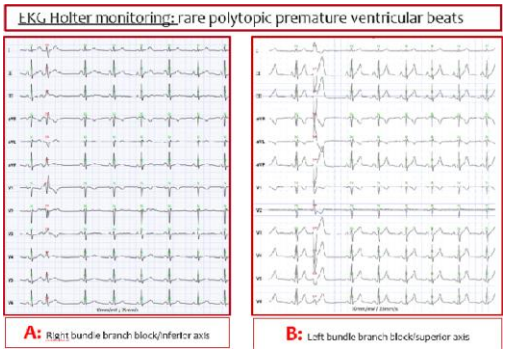
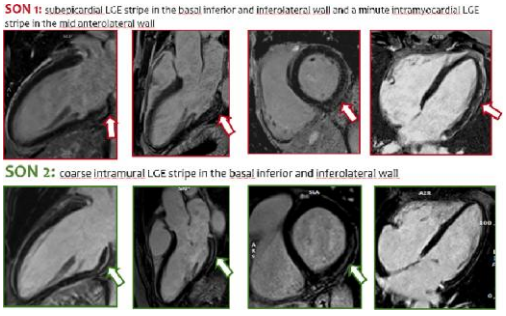
Background: Dilated cardiomyopathy (DCM) related to LMNA mutations is characterized by involvement of the atrioventricular (AV) conduction system, atrial arrhythmias and a high risk of malignant ventricular arrhythmias (MVA), even in the presence of mildly reduced or preserved left ventricular ejection fraction (LVEF).
Case: We report a familial case of LMNA–related DCM involving a 70 years–old male proband and his two sons (aged 37 and 34 years), all carriers of heterozygous LMNA variant. The proband initially presented acute heart failure and atrial flutter. Significant coronary artery disease was excluded and CMR showed non–ischemic myocardial fibrosis, with intramural LGE stripe in the interventricular septum and basal posterior wall (LVEF 15%).

An ICD was implanted and later upgraded to CRT–D. He subsequently experienced MVA, successfully terminated by a single shock, prompting genetic testing and family screening. Both sons, who were asymptomatic, underwent comprehensive evaluation with ECG, Holter monitoring, and exercise testing which showed no MVA (only rare polytopic premature ventricular beats, (file 1), nor AV conduction disturbances. Echocardiogram was unremarkable. CMR showed non–ischemic myocardial fibrosis with preserved LVEF (file 2). The risk prediction score for VTA was low (‹10%), so ICD implantation was deferred. Considering myocardial fibrosis and the dynamic arrhythmic risk, loop recorders were implanted and low–dose beta–blocker was initiated.
Conclusion: In LMNA–related DCM, early electrical manifestations and myocardial fibrosis may precede overt systolic dysfunction. In asymptomatic mutation carriers, an individualized approach combining genetics, CMR tissue characterization, validated risk scores, and prolonged rhythm monitoring may enable more refined prognostic stratification and timely intervention.





Abstract citation ID: suag058.216

RIGHT HEART CATHETERIZATION IN DILATED CARDIOMYOPATHY: HEMODYNAMIC CHARACTERIZATION OF PATIENTS WITH ADVANCED HEART FAILURE AND HIGH–RISK GENOTYPE

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UOC Cardiochirurgia E Trapianti Di Cuore Dell'ospedale San Camillo, Roma

Background Dilated cardiomyopathy is a heterogeneous disease with multiple etiologies and variable clinical expression. Among inherited forms, specific genetic variants are considered high risk due to their association with increased mortality, heart failure progression, and ventricular arrhythmias. However, limited data are available in patients with advanced heart failure, and the hemodynamic expression of different genotypes remains poorly defined.**Objectives:** To investigate hemodynamic characteristics and prognostic implications of different genetic variants in patients with dilated cardiomyopathy and advanced heart failure.
Methods: We conducted a single–center retrospective observational study including patients with advanced heart failure due to non–ischemic dilated cardiomyopathy referred for advanced therapy screening. Only patients

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undergoing genetic testing were included. Ischemic heart disease and end–stage valvular, hypertrophic, infiltrative, and congenital cardiomyopathies were excluded. Clinical, laboratory, echocardiographic, and invasive hemodynamic data obtained by right heart catheterization were collected. The primary endpoint was a composite of death, arrhythmic storm, or urgent heart transplantation.
Results: Twenty–nine patients were enrolled; 13 had a high–risk genotype (HRG +) and 16 a non–high–risk genotype (HRG–). Mean age was 47±12 years and 41% were female; 28% carried an LMNA mutation. HRG+ patients showed lower TAPSE (14.5±3.7 vs 17.5±3.5 mm, p=0.032). At right heart catheterization, HRG+ patients had lower pulmonary vascular resistance (1.99 ±0.75 vs 2.94±1.06 Wood units, p=0.009) and a trend toward higher pulmonary arterial compliance (3.83±1.98 vs 2.73±0.82 mL/mmHg, p=0.079). PAPi values were lower in HRG+ patients without reaching statistical significance. High–risk genotypes were associated with worse outcomes for the primary endpoint (46.0% vs 19.1%, p=0.018).
Conclusions: In patients with dilated cardiomyopathy and advanced heart failure, high–risk genotypes were associated with poorer prognosis. Echocardiography and right heart catheterization suggest impaired right ventricular function as a potential pathophysiological mechanism. Larger prospective studies are needed.

Abstract citation ID: suag058.217

THE SISAGEN–CARDIO PROJECT: A CARE MODEL FOR INHERITED CARDIOMYOPATHIES IN APULIA REGION

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Background: In recent years, growing evidence has highlighted the crucial role of genetic testing in the diagnosis, treatment, and management of patients affected by cardiovascular diseases, particularly cardiomyopathies. However, there is significant variability in the clinical and molecular presentation of these diseases, along with regional heterogeneity in genetic background and disparities in access to medical services. There is a need to develop an operational model that combines technical and molecular diagnostics, imaging, and clinical capabilities tailored to the unique characteristics of different territories.
Aim of the Study: The SISAGEN–CARDIO project is a prospective, non–pharmacological, interventional, multicenter, non–profit study aimed at creating a family–centered network for the diagnosis and management of genetic cardiovascular diseases across the Apulia region.
Methods: Eligible participants include both inpatients and outpatients diagnosed with genetic cardiovascular conditions. Baseline assessments consist of clinical evaluations, ECG, echocardiography, cardiac MRI, and blood sampling for next–generation sequencing (NGS) of disease–related gene panels. Additional –omics analyses and environmental exposure assessments are planned for selected cohorts.

The management protocol will follow the model developed at the Cardiovascular Genetic Disease Center (CMGCV) of IRCCS Policlinico San Matteo in Pavia. A network of regional hubs (Figure 1) will provide standardized workflows and data collection via a shared digital platform. An estimated 250 patients are expected to enroll over a 36–month period. Preliminary and Expected
Results: The study aims to establish a coordinated regional network that integrates hospital and community care systems. Genetic testing and cascade screening are underway, with data collection including multilevel imaging and biofluid analyses. Early–stage implementation has shown the feasibility of harmonizing workflows and expanding access to genetic services. Radiomic and radiogenomic evaluations are being explored for potential biomarker discovery, and environmental analyses are ongoing to assess gene–environment interactions in distinct subpopulations in Apulia.
Conclusion: SISAGEN–CARDIO represents a healthcare initiative addressing genetic cardiovascular diseases by transferring a model that has been successfully operating in Pavia to Southern Italy according to specific needs and diversity of the Apulia region.

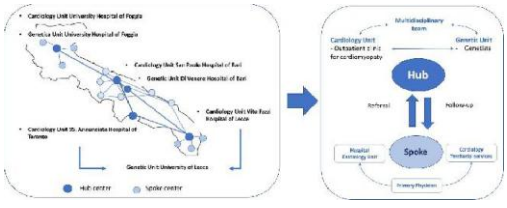

Figure 1

Abstract citation ID: suag058.218

WHEN MILD SYMPTOMS UNMASK A SEVERE CARDIOMYOPATHY

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A 31–year–old man, smoker and asthmatic on inhaled therapy, his first–degree uncle has an ICD for secondary prevention following syncope due to sustained ventricular tachycardia (cardiac MRI suggested previous myocarditis). He undergoes a cardiology examination because he has been complaining of dyspnea and extrasystolic palpitations for two years, along with three episodes of presyncope, not predominantly exercise–induced symptoms. The patient is in good hemodynamic compensation; blood tests are normal. The ECG shows isolated ventricular ectopic beats and low voltages in the peripheral leads. The echocardiogram shows a mildly dilated left ventricle (80 ml/m2), mild left ventricular systolic dysfunction (biplane EF 45%) due to diffuse hypokinesia. The Holter ECG shows a high ventricular ectopic burden (3%), several couples and triplets of ventricular ectopic beats, and a brief burst of non–sustained ventricular tachycardia; the morphology of the ectopic beats (right bundle branch block) suggests a left ventricular origin (Figure 1). An exercise test was performed, revealing apparently benign behavior of the BEVs due to their disappearance at peak exertion. Given the non–clearly benign morphology of the BEVs, the symptomatic nature, and the uncertain family history of heart disease, further investigation with a cardiac MRI was performed, revealing a mildly dilated and hypokinetic left ventricle (EDV 106 ml/m2, EF 51%) (Figure 2), and evidence of subepicardial–mesocardial fibrosis (LGE) of the left ventricle with a circumferential appearance (Figure 3); the right sections were normal. Based on these findings, we made diagnosis of Arrhythmogenic Left Ventricular Cardiomyopathy. Genetic testing revealed a heterozygous variant of the FLNC gene, presumably pathogenic (ACMG class 4). We decided for Implantation of ICD in primary prevention. The patient failed the subcutaneous ICD screening test due to ventricular undersensing related to low QRS voltages; therefore, an extravascular ICD implantation was chosen. Pharmacological therapy with Ramipril 5 mg and Bisoprolol 2.5 mg was initiated. A defibrillator check revealed several rapid, non–sustained ventricular tachycardias (suspected torsades de pointes). A follow–up echocardiogram after three months of drug therapy revealed reverse remodeling of the left ventricle and normalization of left ventricular systolic function (biplane EF 61%).

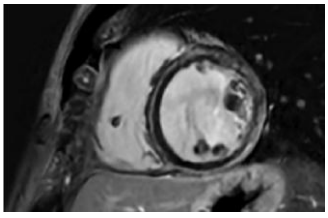

Figure 1. Ventricular ectopic beats from Holter ECG analysis. The right bundle branch block morphology suggest a left ventricular origin. In particular in the red box superior axis, negative QRS in D1 and R/S <1 in V5-V6 suggest possible origin from postero-meedial papillary muscle; in the orange box inferiore axis, negative concordance in precordial leads and positive R wave in V1 suggest possible origine from anterior mitral anulus.

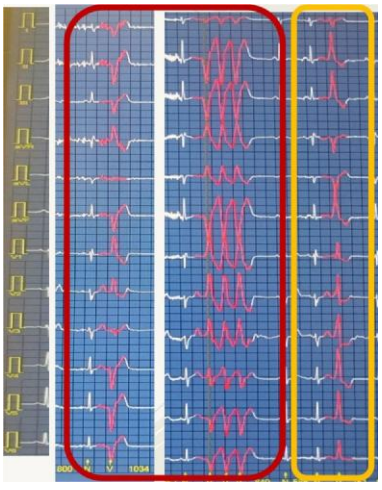

Figure 2. Cardiac MRI, Cine SSFP sequence, four-chamber projection, mildly dilated left ventricle (EDV 106 ml/m2).

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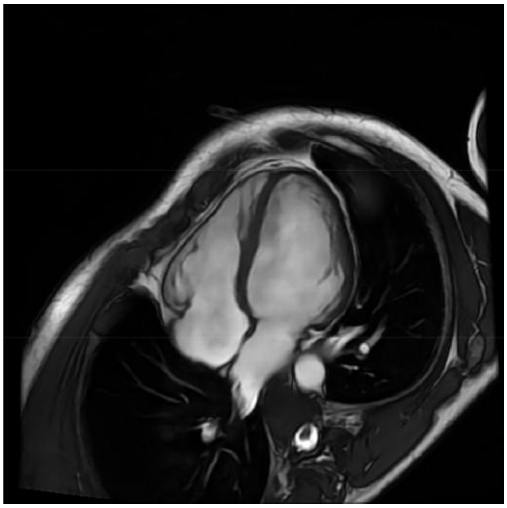

Figure 3. Cardiac MRI, PSIR sequence, short axis projection, subepicardial–mesocardial fibrosis (LGE) of the left ventricle with a circumferential appearance ("ring-like pattern").

Abstract citation ID: suag058.219

A RARE CASE OF HYPOCALCEMIA–INDUCED DILATED CARDIOMYOPATHY

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Dilated cardiomyopathy is conventionally characterized by systolic dysfunction and left ventricular or biventricular dilatation not explained byabnormal loading conditions or coronary artery disease. A 41–year–old man was admitted to the ER with shortness of breath. He complained also flu–like syndrome with productive coughin the previous weeks. He had no history of cardiovascular risk factors, and he wasn't taking anydaily medication. A TTE revealed a left ventricle slightly dilated with global hypokinesis and reduced systolic function, symmetric tethering of mitral leaflets with associated moderate–to–severe mitral regurgitation. The patient was then admitted to our intensive care unit with a diagnosis of suspected myocarditis. In our ward a severe hypocalcemia (2.52 mg/dl, RR 8.60 – 10.20) was found in blood tests, with associated hyperphosphatemia, hypokalemia, hypomagnesemia and reduced PTH. TSH, FT3, FT4, TPOAb, TRAb, urinary calcium and vit–D were normal. Collecting a more detailedmedical history we found that the patient had clinical manifestations compatible with Trousseau's sign for several years, hypocalcemia (6.3 mg/dl) and hyperphosphatemia (7.6 mg/dl) to previous blood tests, and prolonged QT interval to a previous ECG. Coronary angiography showed no coronary stenosis. Cardiac CMR showed severe dilation and diffuse hypokinesiaof both ventricles, without late gadolinium enhancement. Hypocalcaemicdilated cardiomyopathy was diagnosed, probably caused by primary hypoparathyroidism. The patient was treated with high dose of calcium carbonateand calcitriol, with normalization of serum calcium levelsand disappearance of signs and symptoms of hypocalcemia. After two weeks of optimized HFrEF therapywith sacubitril/valsartan, empagliflozin, beta blocker and spironolactone, left ventricle EF did not improve. Therefore, an ICD was implanted. One month after discharge, in the followup echocardiographic evaluation, LV EF and EDVI were improved. Hypocalcemia is a reversible cause of dilated cardiomyopathy that warrants attention, especially in patients with electrolyte imbalances. Regular monitoring of calcium and magnesium levels, especially in patients with hypoparathyroidism or a history of thyroidectomy and prompt recognition and treatment can improve cardiac function and potentially reverse symptoms of DCM, with a favorable outcome. Further studies are needed to better understand the mechanisms linking hypocalcemia and cardiac dysfunction

Abstract citation ID: suag058.220

MITOCHONDRIAL RED FLAGS IN A PATIENT WITH DILATED CARDIOMYOPATHY

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Background: Mitochondrial cardiomyopathies represent an uncommon but clinically relevant cause of heart failure with reduced ejection fraction (HFrEF). Their diagnosis is often challenging due to overlap with idiopathic dilated cardiomyopathy (DCM). The presence of systemic manifestations and maternal inheritance patterns may provide important diagnostic red flags.
Case presentation: A 49–year–old man with obesity, obstructive sleep apnea, sensorineural deafness, hepatic steatosis, cognitive delay and a family history of sudden cardiac death (mother at age 60) presented with abdominal pain and bilateral leg edema. Laboratory tests revealed elevated NT–proBNP, mild troponin rise, and increased CPK. ECG showed sinus rhythm with left axis deviation, borderline atrioventricular conduction, and nonspecific repolarization abnormalities. Echocardiography demonstrated a dilated left ventricle with severely reduced ejection fraction (15–20%) and biatrial enlargement. Coronary angiography excluded obstructive coronary artery disease. Cardiac magnetic resonance confirmed DCM with severe systolic dysfunction and late gadolinium enhancement. Continuous telemetry detected non sustained ventricular tachycardia.
Discussion: The combination of systemic features (sensorineural deafness, mild palpebral ptosis, hepatic involvement), elevated CPK, conduction abnormalities, maternal family history and cognitive delay raised suspicion of mitochondrial cardiomyopathy. Genetic testing for DCM–associated genes was negative. An ICD was implanted given severe LV dysfunction, myocardial fibrosis, and ventricular arrhythmias. At one–year follow–up, the patient remained clinically stable, with persistent LV dysfunction but improved symptoms. Importantly, a multidisciplinary evaluation prompted neurological consultation, which recommended a muscle biopsy to further investigate mitochondrial involvement.
Conclusion: This case underscores the importance of recognizing extracardiac red flags in patients with apparently idiopathic DCM. A multidisciplinary approach, integrating cardiology, genetics, and neurology, is essential to refine diagnosis, with muscle biopsy playing a pivotal role in confirming mitochondrial disease and guiding management.

Sarcomeric Hypertrophic Cardiomyopathy

Abstract citation ID: suag058.221

INTRAFAMILIAL PHENOTYPIC HETEROGENEITY IN HYPERTROPHIC CARDIOMYOPATHY ASSOCIATED WITH A MYL2 MUTATION: DESCRIPTION OF A FAMILY

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Introduction: Hypertrophic cardiomyopathy (HCM) is a cardiac disease characterized by increased ventricular wall thickness in the absence of abnormal loading conditions. Most cases are associated with genetic variants encoding sarcomeric proteins. 964 variants have been identified in over 25 HCM–associated genes, most frequently involving MYH7 and MYBPC3. Variants in the MYL2 gene, encoding the myosin regulatory light chain, are rare (1–2%). Among these, some missense variants are classified as pathogenic, while others remain unclassified due to the variable penetrance in HCM expression.
Case description: We identified a family carrying a mutation for MYL2 gene (not described in the Literature, but defined "likely pathogenetic") to show how the same mutation can determine a heterogeneous spectrum of HCM–related clinical manifestations within the same family nucleus. The father, proband, (Fig1.Gen1A) affected by HCM with a phenotype that evolved into a dilated form, underwent heart transplantation in 1998 and died on day 21 from post–surgical complications, while his sister (Fig1.Gen1B) died suddenly at age 10. The three children (Fig1.Gen2) manifested HCM around age 16 (IVS › 20 mm), but with different phenotypes: a son (Fig1.Gen2A) presented, at age 28, a non–obstructive arrhythmogenic form with over 5 episodes of atrial fibrillation, treated with electrical cardioversion and subsequently with catheter ablation; a daughter (Fig1.Gen2B) at age 35 developed a severe obstructive form with recurrent syncopal episodes requiring myectomy and mitral plasty; another daughter (Fig1.Gen2C) remains asymptomatic without therapy. Of the two grandchildren (Fig1.Gen3), one (Fig1.Gen3A) is genotype–positive but phenotype–negative at age of 17, while the other one (Fig1.Gen3B) at 10 years showed rapid ventricular thickening (› 10 mm in one year) with development of obstructive phenotype (Gmax at rest › 150 mmHg) with chest pain for which Mavacamten therapy at nominal use was started.
Conclusions: This family case highlights that a single MYL2 mutation can result in marked phenotypic variability even within the same family. It raises several questions: Can the environmental factors play a role in the development of a given phenotype? Can there be mutations at other gene loci that played a pejorative role in the manifestation of the pathology? In conclusion, HCM requires a personalized clinical approach and specific follow–up, even when the mutation is shared.

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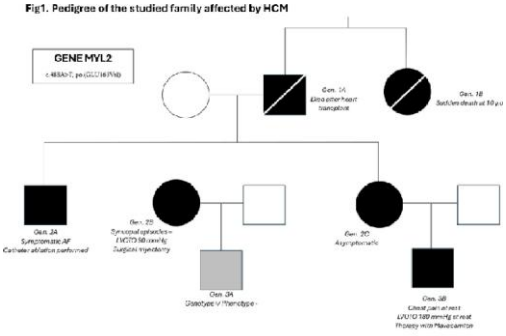
Fig1. Pedigree of the studied family affected by HCM



Black boxes: patients with manifest HCM . Grey box: patient with positive genotype/negative phenotype

Table 1. Characteristics of three generation of subjects with the same MYL2 mutation

Proband		Age of manifestation	Current age	LVOTO §	NYHA	Syncope	Arrhythmias	Heart Failure	LGE *
	Gen1A	ND	Dead	ND	IV	ND	ND	YES (HTX)	ND
Sister	Gen1B	10	Dead	ND	ND	ND	SCD	NO	ND
Son	Gen2A	13	44	NO	II	NO	AF	NO	YES
Daughter	Gen2B	14	47	YES	III	NO	NO	YES	NO
Daughter	Gen2C	15	35	NO	I	YES	NO	NO	YES
Granchild	Gen3A	-	17	NO	I	NO	NO	NO	NO
Granchild	Gen3B	10	12	YES	III	NO	NO	NO	YES

HTX: cardiac transplantation; *LGE*: late gadolinium enhancement; *LVOTO*: left ventricular outflow tract obstruction; *NYHA*: New York Heart Association

*Presence of LGE at RMN defined as fibrosis >15%

§LVOTO defined as LVOT gradient >30 mmHg

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ASYMPTOMATIC HYPERTROPHIC CARDIOMYOPATHY WITH SEPTAL PREDOMINANCE IN A 24–YEAR–OLD ATHLETE: DIAGNOSTIC ROLE OF CARDIAC MRI AND GENETIC TESTING

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Background: Hypertrophic cardiomyopathy (HCM) is a genetically determined myocardial disorder defined by unexplained left ventricular hypertrophy. Although frequently asymptomatic in the early stages, it remains one of the leading causes of sudden cardiac death in young individuals and athletes. Detecting subtle manifestations of the disease during routine screening plays a pivotal role in preventing adverse outcomes and guiding clinical decisions.
Case Presentation: A 24–year–old competitive male athlete with no known cardiac history underwent a routine sports eligibility evaluation. Despite excellent physical conditioning and complete absence of cardiologic symptoms, his resting electrocardiogram (ECG) (Figure 1) revealed unexpected nonspecific repolarization abnormalities. Given his athletic profile, these findings prompted further investigation. Exercise stress testing was performed and completed without chest pain, arrhythmias, or hemodynamic abnormalities. However, due to the suspicious baseline ECG, a transthoracic echocardiogram was obtained. Imaging disclosed disproportionate hypertrophy of the interventricular septum, with preserved systolic function—an unexpected result in an otherwise asymptomatic and highly trained athlete. To refine the diagnostic assessment, cardiac magnetic resonance imaging (CMR) was conducted. CMR not only confirmed septal hypertrophy but also demonstrated mid–wall late gadolinium enhancement (LGE) localized to the septum, indicating the presence of myocardial fibrosis—a finding associated with increased arrhythmic risk in HCM. A 24–hour Holter ECG showed no clinically significant arrhythmias, but genetic testing identified a pathogenic sarcomeric mutation, definitively establishing the diagnosis.
Conclusions: This case underscores how a seemingly routine sports evaluation may unveil early–stage HCM in a completely asymptomatic athlete. The combination of ECG, echocardiography, CMR, and genetic testing enabled precise characterization of the disease phenotype, including the detection of myocardial fibrosis with potential prognostic implications. Early diagnosis allowed timely risk stratification, individualized guidance regarding competitive athletic activity, and initiation of family cascade screening. This case exemplifies the critical role of a multimodal, multidisciplinary approach in identifying concealed cardiac disease and preventing potentially life–threatening events in young athletes

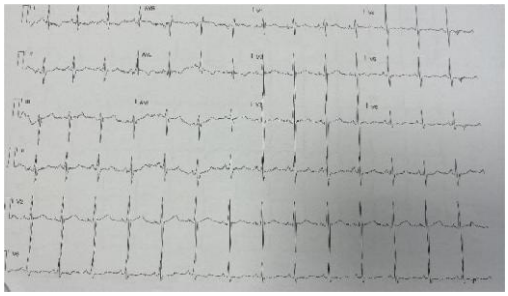

Figure 1

Abstract citation ID: suag058.223

A SINGLE–CENTRE EXPERIENCE WITH COMPASSIONATE USE PROGRAM WITH MAVACAMTEN IN A REAL–WORLD POPULATION OF PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY: MID–TERM OUTCOME AND ROLE OF EXERCISE ECHOCARDIOGRAPHY

M. Nazziconi, G. Signore, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, E. Paolini, L. Piangerelli, I. Battistoni, M. Francioni, L. Brugiatelli, P. Tofoni, K. Maurizi, A. Massari, G. Furlani, B. Anselmi, C. Gatti, S. Luciani, F. Pietrucci, A. Scavuzzo, M. Di Eusanio, A. Dello Russo, M. Marini, F. Vagnarelli, and C. Lofiego
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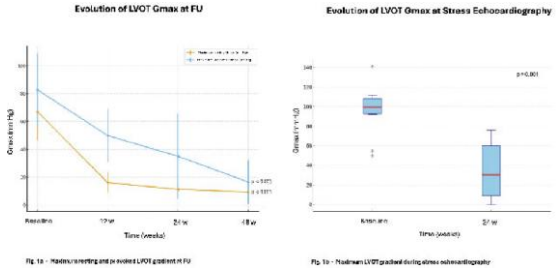
Introduction: Mavacamten, a first–in–class cardiac myosin ATPase inhibitor used as second–line option for treating hypertrophic obstructive cardiomyopathy (HOCM), was introduced in Italy in early 2024 through a compassionate use program.
Aim: To illustrate 48 week (W) follow up (FU) data from compassionate use of Mavacamten in a single centre HOCM population.
Methods: At baseline all patients had a peak LVOT gradient ≥ 50 mmHg, a LVEF ≥55% and were symptomatic at the highest tolerated dose of first–line drugs (NYHA II 72.7%, NYHA III 27.3%). Before starting cytochrome P450 (CYP2C19) was genotypized to select the correct starting dose and uptritation. Following compassionate use protocol, patients underwent to periodic evaluation, EKG, cardiac imaging and laboratory work–up and Mavacamten was progressively uptritated.
Results: Mavacamten was started in 11 patients, with no slow metabolizer. On October 2025, all patients completed the 48W FU assessment with dramatic reduction of LVOT gradients and NT–proBNP serum levels. Maximum resting and provoked LVOT gradients decreased, respectively, from 67.0±20.4 mmHg and 82.7±26.1 mmHg at baseline to 9.18±2.9 mmHg and 16.5±15.7 mmHg at 48 W (p‹0.001,Fig.1a). We integrated stress echocardiography which showed in 24W a reduction of LVOT gradients from 95.7±26.7 to 32.9±29.5 mmHg (p=0.001, Fig.1b). Alongside patients developed diastolic improvement and hypertrophic reduction with lowering interventricular septum thickness (from 21.1±3.0 to 16.8±0.8 mm, p=0.03; Fig.2). Additionaly NT–proBNP serum levels significantly decreased from 913.2±656.1 pg/mL (baseline) to 164.9±105.6 pg/mL (48 W, p‹0.001; Fig.3a) and EKG showed statistically significant reduction of Sokolow–Lyon index (from 28.0±12.7 to 19.6±5.9 mm, p=0.04) and T Wave depth (from 4.40±2.9 to 0.70±0.97 mm) (Fig.3b). All patients improved their NYHA class at least of one class. Mavacamten was up–titrated to 10 mg/die (6 patients) and 15 mg/die (5 patients) without any major advers event nor dropping of systolic function (LVEF ‹ 55%) requiring discontinuation of treatment.
Conclusions: Mavacamten confirmed in a real–world small cohort of symptomatic patients significant and long–lasting efficacy throughout all 48W FU. Normalization of LVOT obstruction, followed by diastolic improvement and hypertrophic reduction offer a favorable impact on quality of life, patient physical performance and laboratory evidence, without any major adverse event.



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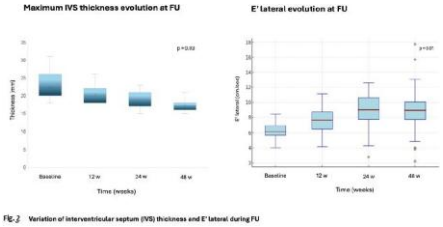
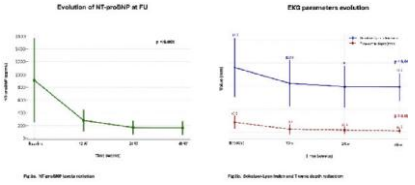


Fig. 2 Variation of interventricular septum (IVS) thickness and E' lateral during FU



Abstract citation ID: suag058.224

OUT–OF–HOSPITAL CARDIAC ARREST IN A 16–YEAR–OLD WITH LPFB AND AUTOPSY–CONFIRMED HYPERTROPHIC CARDIOMYOPATHY

M. Tuzzolino, V. Dusi, P. Meynet, C. Gravinese, G. Branch Del Prever, S. Deaglio, P. Bocchino, C. Giustetto, L. Chiusa, P. Cassoni, M. Zanierato, G. Giannino, C. Raineri, G. De Ferrari, and F. Angelini
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Background: Isolated left posterior fascicular block (LPFB) is rare in youth and may signal underlying LV fibrosis and cardiomyopathy. We report a case of sudden cardiac arrest (SCA) followed by death (SCD) in a previously healthy adolescent with known LPFB and autopsy–proven hypertrophic cardiomyopathy (HCM).
Case: A previously healthy 16–year–old male, only child, with known left posterior fascicular block (LPFB) since age 7 described at a pre sport participation resting ECG, presented with out–of–hospital cardiac arrest (OHCA) while on a chair lift during a ski trip with family. After 8–10 minutes of no–flow, cardiopulmonary resuscitation was started and an automatic external defibrillator delivered two shocks for very low–voltage ventricular fibrillation. On arrival of advanced life support, the patient was asystolic. Intravenous adrenaline and endotracheal intubation were performed, with return of spontaneous circulation (ROSC) after 10 minutes. First 12–lead ECG (at 60 minutes from ROSC) showed sinus rhythm at 120 bpm, LPFB, diffuse ST–segment depression with transient ST elevation in aVR (subsequently normalized), and a QTc of 490 ms. Transthoracic echocardiography showed mild left ventricular (LV) hypertrophy (13 mm) and reduced systolic function (LVEF 43%) due to diffuse hypokinesia. Posterior mitral valve leaflet hypoplasia with mild, asymmetrical mitral regurgitation and elevated LV filling pressures were noted. LVEF nearly normalized within 48 hours. Admission CT angiography showed no lesions; cardiac MRI could not be performed. The patient died two days later. Differential diagnosis included acute myocarditis, supported by a recent febrile episode, channelopathies, which were deemed unlikely given the absence of diagnostic or suspicious ECG features on a 24–hour, 12 leads, Holter ECG performed one-day post–OHCA, cardiomyopathies. Genetic testing revealed a heterozygous variant of uncertain significance (p.Arg56Lys) in MYOZ2 gene, codifying for myozenin 2, a calcineurin–binding sarcomeric protein potentially associated with hypertrophic cardiomyopathy (HCM). Autopsy confirmed concentric LV hypertrophy (17–20 mm) with myocyte hypertrophy and interstitial fibrosis consistent with HCM.
Conclusions: This adolescent case reinforces LPFB as a potential marker of LV fibrosis and SCD risk in youth. The MYOZ2 gene and VUS warrants further study and family evaluation. Post–mortem findings were pivotal in establishing HCM as the etiologic substrate.

Abstract citation ID: suag058.225

EFFICACY AND SAFETY OF MAVACAMTEN IN OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY

D. Rossi, V. Zuardi, R. Magnano, C. Scollo, M. Di Marino, S. Saraullo, A. D'Alleva, L. Pezzi, D. Forlani, P. Vitulli, M. Gravina, L. Stoduto, R. Spina, R. Carnesale, and M. Di Marco
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Obstructive hypertrophic cardiomyopathy (oHCM) is driven by hypercontractility and systolic anterior motion (SAM) of the mitral valve, causing dynamic left ventricular outflow tract obstruction (LVOTO) and symptoms (dyspnea, angina, reduced exercise tolerance). Traditional therapies (β–blockers, non–dihydropyridine calcium–channel blockers ± disopyramide) mainly relieve symptoms; septal reduction therapy (SRT) is considered in refractory cases. Myosin modulators offer a disease–specific approach: mavacamten reduces sarcomeric force and LVOT gradients, requiring serial echocardiographic monitoring of left ventricular ejection fraction (LVEF) per label.**Case:** A 58–year–old hypertensive man, no family history, presented with exertional dyspnea, palpitations, and atypical angina (NYHA II–III). Examination revealed a mid–systolic ejection murmur that increased with Valsalva; BP 120/70 mmHg, HR 72 bpm. Assessment/strategy: Despite optimized β–blocker therapy and lifestyle measures, symptoms and obstruction persisted. Baseline: SAM with moderate mitral regurgitation (MR); LVOT gradient 66 mmHg at rest and 180 mmHg with Valsalva; LVEF 65%; hypertrophy (septum 22 mm, posterior wall 13 mm) with increased LV mass index (LVMi 140 g/m²). ECG showed high voltages (Sokolow–Lyon 48 mm; Cornell 33 mm). Mavacamten was initiated on a compassionate–use basis at 5 mg/day with serial LVEF and gradient monitoring; due to insufficient response, the dose was titrated to 10 mg/day while maintaining LVEF ≥60%. 6–month follow–up: Functional status improved to NYHA I, palpitations resolved, and normal activities were resumed; the murmur became minimal and no longer increased with Valsalva. Echocardiography showed LVOT gradients of 10 mmHg at rest and 30 mmHg with Valsalva, with SAM resolution and MR improving to mild/trivial. Favorable remodeling was observed (septum 17 mm; posterior wall 11 mm; LVMi 110 g/m²) with preserved LVEF (60–65%). ECG voltages decreased (Sokolow–Lyon 36 mm; Cornell 28 mm).
Conclusion: In symptomatic oHCM despite optimized therapy, mavacamten provided substantial clinical and echocardiographic benefit at 6 months—marked gradient reduction, SAM resolution, and functional improvement—while maintaining safe LVEF through echo–guided titration, consistent with EXPLORER–HCM and VALOR–HCM.

Abstract citation ID: suag058.226

THE OTHER SIDE OF THE COIN: ARRHYTHMIC STORM IN NON–OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY

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Introduction: Hypertrophic cardiomyopathy (HCM) is a genetic myocardial disease caused by sarcomeric mutations, most commonly involving MYBPC3 and MYH7 genes. While the obstructive form is prevalent, a minority of non–obstructive patients may progress to a dilated–hypokinetic phase characterized by systolic dysfunction, myocardial fibrosis, and poor prognosis. This advanced phenotype is associated with malignant ventricular arrhythmias, including ventricular tachycardia (VT) and arrhythmic storm, often persisting despite implantable cardioverter–defibrillator (ICD) therapy.
Clinical Case: A 56–year–old man with genetically confirmed non–obstructive HCM (MYBPC3 mutation), evolved to a dilated–hypokinetic phase (LVEF 35–40%), was followed for permanent atrial fibrillation and ICD implantation since 2018 (Figure 1-2). Due to recurrent sustained VT with multiple appropriate ICD therapies, he was admitted in June 2025. During hospitalization, arrhythmic storm occurred and was treated with intravenous lidocaine followed by oral mexiletine and metoprolol. A CRT–D upgrade was performed, and coronary angiography revealed a posterolateral circumflex stenosis treated with percutaneous revascularization. Despite therapy optimization, VT recurred and beta–blocker therapy was switched to nadolol. In August, the patient was readmitted for arrhythmic storm during nosocomial sepsis caused by Pseudomonas oryzihabitans from phlebitis, treated with intravenous antibiotics. Endocardial VT ablation with electroanatomical mapping (CARTO) showed extensive inferolateral scar. Despite acute non–inducibility, early arrhythmic recurrence occurred, and the patient was referred for epicardial ablation, complicated by aortic cusp rupture requiring cardiac surgery.
Conclusions: The dilated–hypokinetic evolution of HCM is a complex and under–recognized condition associated with severe arrhythmic burden. Management often requires a multimodal and multidisciplinary approach. Early referral to specialized centers is essential to anticipate disease progression and consider advanced therapies, including heart transplantation.

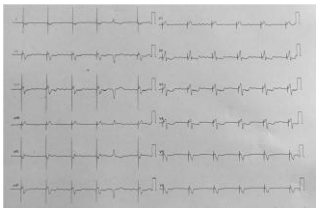

Figure 1: ECG showing atrial fibrillation and biventricular pacing (CRT-D)

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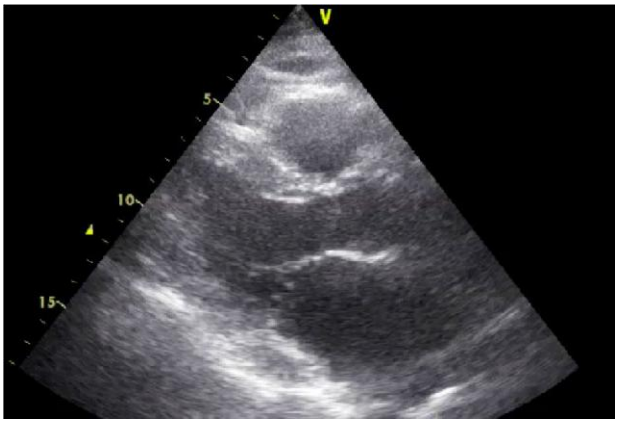
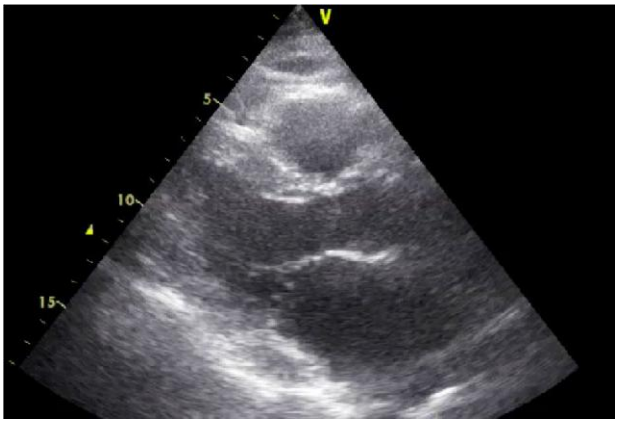


Figure 2: Left ventricular long axis view showing severe LV hypertrophy



Abstract citation ID: suag058.227

HYPERTROPHIC CARDIOMYOPATHY WITH MASSIVE SEPTAL HYPERTROPHY IN A YOUNG PATIENT: A CASE REPORT

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Hypertrophic cardiomyopathy (HCM) is the most common genetic cardiovascular disorder and it has an extremely variable clinical presentation. Here we report the case of a young patient, with no previous cardiac history or cardiovascular risk factors, presenting to the emergency department with chest pain, electrocardiographic changes, and troponin elevation. The diagnosis of hypertrophic cardiomyopathy was immediate following echocardiographic evidence of a massive form of left ventricular septal hypertrophy (44 mm), leading to left ventricular outflow tract obstruction with a dynamic gradient (Figure 1). Characterization of the clinical picture and prognostic risk was further expanded by cardiac magnetic resonance imaging, in particular through tissue characterization (Figure 2), which allowed the identification of diffuse fibrosis through native T1 mapping, edema through T2 mapping, and extensive non–ischemic intramyocardial replacement fibrosis with late gadolinium enhancement (Figure 3). Given the patient's young age, the extensive fibrosis on magnetic resonance imaging, and the documentation of episodes of non–sustained ventricular tachycardia on telemetry monitoring, the patient underwent implantation of an sICD for primary prevention due to a high risk of sudden cardiac death according to both European and American guidelines. A genetic analysis was also performed, revealing pathogenic mutations in the sarcomeric genes MYBPC3 and TNNT2. Subsequent echocardiographic follow–up showed a progressive reduction of the intraventricular outflow tract gradient thanks to medical therapy with metoprolol and disopyramide, as well as an almost complete resolution of the patient's symptoms. This clinical case is therefore particularly noteworthy because of the echocardiographic and magnetic resonance presentation and opens the discussion on the role of the latter in the prognostic assessment of the disease.

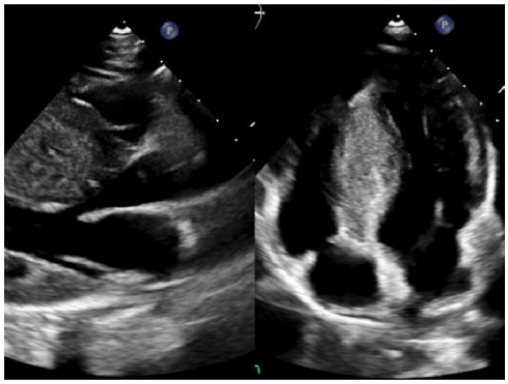

Figure 1

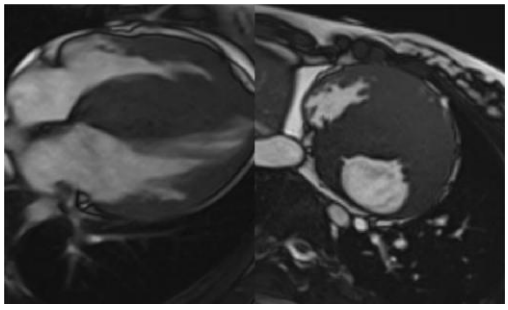

Figure 2

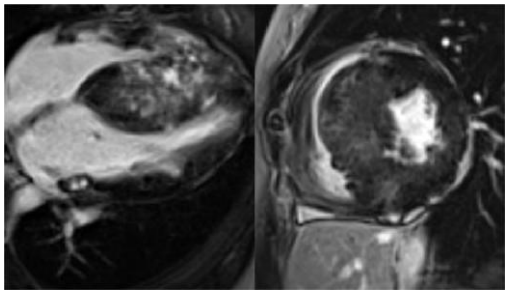

Figure 3

Abstract citation ID: suag058.228

CARDIAC TRANSPLANTATION IN MOTHER AND SON: EXTREME PHENOTYPIC HETEROGENEITY AND MALIGNANT COURSE IN FAMILIAL HYPERTROPHIC CARDIOMYOPATHY

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Background: We report a family affected by hypertrophic cardiomyopathy (HCM) caused by a pathogenic variant (c.3192dup p.Lys1065GlnfsTer12) in the MYBPC3 gene, illustrating remarkable phenotypic heterogeneity and a malignant clinical course.
Case Presentation: The proband (second–born) was diagnosed at age 17 with obstructive HCM. His clinical course was characterized by progression toward a restrictive phenotype, atrial fibrillation, and severe heart failure. Echocardiography (Fig.1) showed a small, obliterated left ventricular cavity, biatrial dilatation, moderate to severe mitral and tricuspid regurgitation, secondary pulmonary hypertension and severe pericardial effusion. Due to refractory heart failure (NYHA class IV), he underwent cardiac transplantation at age 43. The mother was diagnosed at age 58 during family screening. She presented with asymmetric mid–ventricular hypertrophy and mid–ventricular

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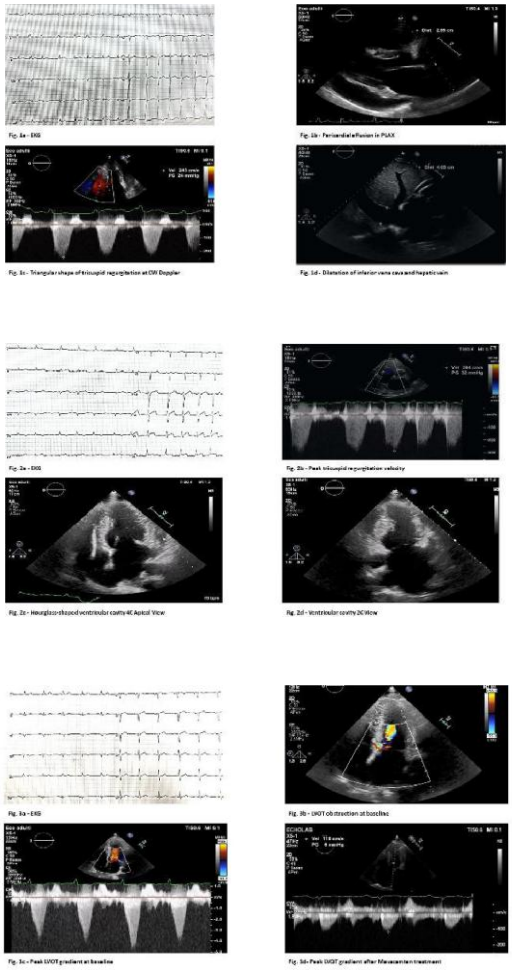
obstruction, leading to apical aneurysm development during follow–up (Fig. 2), confirmed by MRI which showed apical akinesia with transmural late gadolinium enhancement. Following a progressive decline in functional capacity in NYHA class III–IV, she was recently transplanted. The first–born son was diagnosed at age 36 with classic obstructive HCM (Fig. 3) with LVOT obstruction due to systolic anterior motion of the mitral valve. Given the persistence of significant gradients and symptoms despite beta–blocker therapy, he started compassionate treatment with Mavacamten in 2024. Up–titration to 10 mg led to the complete resolution of the LVOT gradient and a significant improvement in functional class and cardiac biomarkers. All three family members were classified as high risk for sudden cardiac death (SCD) and received an ICD for primary prevention. To date, and until the time of transplantation for the first two cases, no appropriate shocks or ventricular arrhythmias have been recorded.

Conclusions: This case highlights how the same MYBPC3 mutation can manifest with extreme phenotypic diversity within a single family—ranging from restrictive evolution, mid–ventricular obstruction with apical aneurysm to classic LVOT obstruction. The clinical course of this family proved to be malignant, requiring cardiac transplantation in two out of three family members.



Cardiomyopathies 1

Abstract citation ID: suag058.229

REAL–WORLD USE OF ARNI AND SGLT2–INHIBITORS IN DUCHENNE–RELATED CARDIOMYOPATHY: INSIGHT FROM THE MOLINETTE–HF REGISTRY

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Background: Cardiomyopathy is a leading cause of morbidity and mortality in Duchenne muscular dystrophy (DMD), yet evidence guiding the use of contemporary heart failure (HF) therapies—particularly angiotensin receptor–neprilysin inhibitors (ARNI) and SGLT2 inhibitors (SGLT2i)—remains scarce, as DMD patients are systematically excluded from randomized trials.
Objectives: To assess the tolerability of ARNI and SGLT2i in adults with DMD–related cardiomyopathy (DMD–CM) and to explore associations between treatment tolerance, cardiac remodelling, and major adverse cardiovascular events (MACE).
Methods: We retrospectively analysed adult DMD patients enrolled in the Molinette–HF ambi–spective registry. Patients were stratified based on tolerance to ARNI and SGLT2i. The primary endpoint was MACE (all–cause mortality, HF hospitalization, arrhythmic storm, ischemic stroke/TIA). Secondary endpoints included individual MACE components and 1–year echocardiographic changes.
Results: Among 40 male patients (mean age 22.9 ± 10.1 years), 28 tolerated SGLT2i and 23 tolerated ARNI. Intolerance to either therapy was strongly associated with a more advanced cardiac phenotype at baseline, including markedly reduced LVEF, larger LV volumes, more significant mitral/tricuspid regurgitation, and impaired RV function. During follow–up, MACE occurred in 83.3% of SGLT2i–intolerant vs. 10.7% of tolerant patients (p ‹ 0.001) and in 71.4% of ARNI–intolerant vs. 12.9% of tolerant patients (p = 0.01). Mortality was significantly higher in intolerance groups for both therapies. Echocardiography at 1 year showed stability of LV volumes and diastolic parameters in tolerant patients, whereas intolerance was associated with progressive ventricular dilatation and worsening filling pressures (Figure 1-2).
Conclusions: In this real–world DMD–CM cohort, ARNI and SGLT2i were generally well tolerated and their tolerability identified patients with markedly improved clinical trajectories, lower mortality, and attenuated cardiac remodelling. Conversely, intolerance was a surrogate of advanced myocardial disease and predicted poor outcomes. These findings support the feasibility and potential benefit of incorporating ARNI and SGLT2i into DMD–CM management and highlight the urgent need for dedicated multicentre randomized trials in this underserved population.

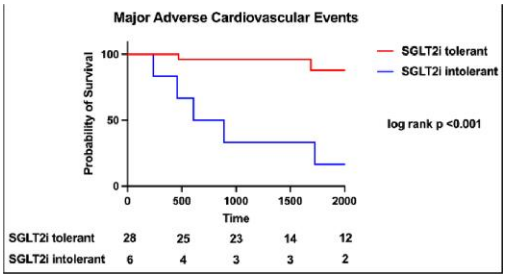

Figure 1

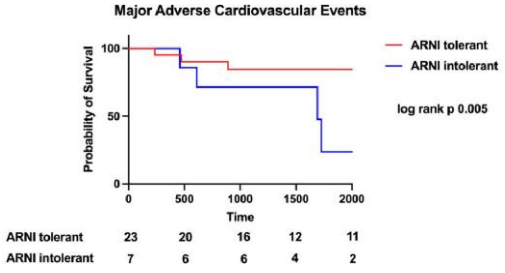

Figure 2

Abstract citation ID: suag058.230

RING–LIKE LGE IN NON–DILATED LEFT VENTRICULAR CARDIOMYOPATHY: IMAGING–GENETIC INTEGRATION FOR EARLY ARRHYTHMIC RISK STRATIFICATION

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Abstract Background: Non–dilated left ventricular cardiomyopathy (NDLVC) is a recently defined entity, often characterized by arrhythmic risk disproportionate to ventricular function. According to the 2023 ESC guidelines, cardiac magnetic resonance (CMR) and genetics are essential for risk stratification. Recent multicenter studies have highlighted the prognostic role of ring–like late gadolinium enhancement (LGE) and pathogenic variants in high–risk genes, such as LMNA.
Case Presentation: A 46–year–old woman, heavy smoker, with a brother affected by LMNA–related dilated cardiomyopathy and implanted with an

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implantable cardioverter–defibrillator (ICD), was admitted for chest pain and palpitations. Continuous ECG monitoring showed frequent non–sustained ventricular tachycardia. Echocardiography documented preserved left ventricular ejection fraction (60%), while coronary CT angiography excluded obstructive disease. CMR revealed a ring–like pattern of LGE, consistent with diffuse fibrotic involvement and an arrhythmogenic substrate. Given the combination of arrhythmic burden, family history, and CMR features, an extravascular ICD was implanted for primary prevention.

Discussion: This case illustrates how the integration of advanced imaging and genetic background can unmask high–risk NDLVC phenotypes even in the absence of overt systolic dysfunction. The ring–like LGE pattern, previously associated with major arrhythmic events and adverse remodeling, coupled with a family history of LMNA mutation–related cardiomyopathy, provided converging evidence for early device therapy.

Conclusion: In NDLVC, integrating CMR tissue characterization with family history and genetic context can refine arrhythmic risk assessment and support timely preventive strategies for sudden cardiac death, particularly when echocardiography appears normal.

Abstract citation ID: suag058.231

EPSILON WAVE IN ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY: UNRAVELING THE ECG PUZZLE

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Background: Depolarization abnormalities represent traditional electrocardiographic (ECG) criteria to diagnose arrhythmogenic right ventricular cardiomyopathy (ARVC). Given the challenges in their reliable detection, the diagnostic significance of epsilon waves has been downgraded to a minor criterion by the European Task Force in 2024. We present a case where the application of specific technical adjustments during ECG recording allowed of identification of epsilon waves, that were not evident on the baseline ECG.

Case presentation: A 56–year–old male patient, listed for heart transplant due to advanced plakophilin–2 (PKP2)–related ARVC, was admitted to our hospital for a ventricular tachycardia (VT) electrical storm, treated with correction of potassium imbalance, left stellate ganglion block, and antiarrhythmic drugs. Despite significant right ventricular dilation and dysfunction, the baseline ECG did not show clear epsilon waves. Their identification had no direct implications, however further technical adjustments were applied to unmask the presumed right ventricular depolarization abnormalities for speculative purposes. A standard 12–lead ECG with different low–pass filter settings was acquired (i.e., 35 Hz, 75 Hz, and 150 Hz – Figure 1), but no evident epsilon waves were documented. ECG recording from right precordial leads (V4R: fifth intercostal space along the right mid–clavicular line; V3R: midway between V1 and V4R – Figure 2) showed no trace of these waves. Consequently, Fontaine bipolar precordial leads (F–ECG) were acquired with the right arm electrode positioned on the manubrium, the left arm electrode over the xiphoid process, and the left leg electrode in the standard V4 position, creating F–ECG with FI, FII, FIII leads. This arrangement is used to specifically record potentials developed by delayed right ventricular fibers, covering the infundibulum, the apex, and the diaphragmatic surface of the right ventricle. FII revealed clear and reproducible epsilon waves (Figure 3).

Conclusions: This case suggests that epsilon wave remains a fundamental hallmark of the 'arrhythmogenic substrate' in ARVC. When standard 12–lead ECG and right–sided leads fail to reveal these signals, the use of Fontaine leads can unmask concealed depolarization abnormalities. Such procedural refinements enhance the sensitivity of surface ECG, confirming that the absence of evidence is not necessarily evidence of absence in complex cardiomyopathies.

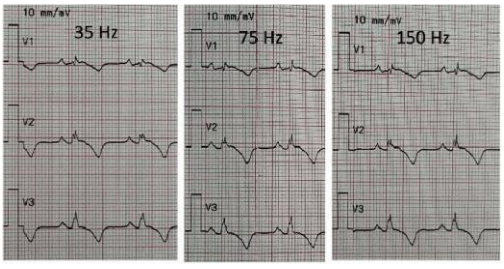

Figure 1

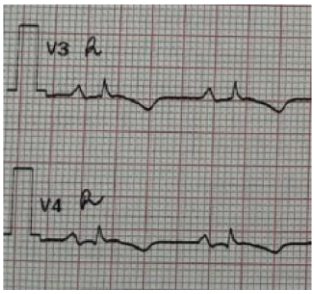

Figure 2

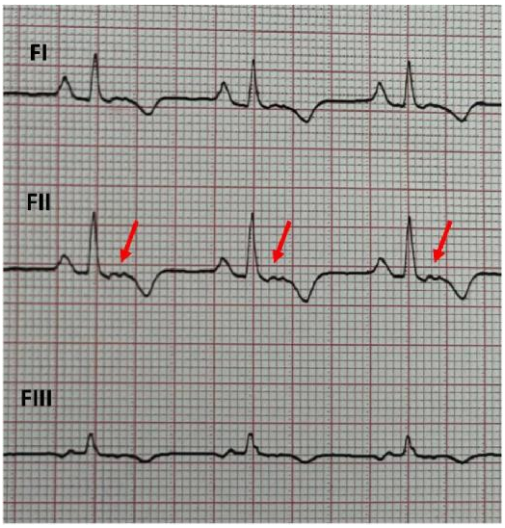

Figure 3

Abstract citation ID: suag058.232

A CASE OF NON–DILATED LEFT VENTRICULAR CARDIOMYOPATHY (NDLVC) SUGGESTIVE OF ARRHYTHMOGENIC LEFT VENTRICULAR CARDIOMYOPATHY (AVLC)

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Gom Niguarda, Milano

A 71–year–old patient with a history of atrial fibrillation (AF), under treatment with flecainide, apixaban and metoprolol, was admitted to the emergency department presenting with dizziness. There was no family history of heart disease. The initial electrocardiogram (ECG) revealed a wide QRS complex tachycardia with a right bundle branch block (RBBB) morphology, lasting a few minutes, which responded promptly to intravenous amiodarone, prompting the discontinuation of flecainide. The patient remained hemodynamically stable throughout.

He was admitted to the cardiology unit for further evaluation. The baseline ECG showed atrial flutter. Transthoracic echocardiography showed mild left ventricular dysfunction without other significant abnormalities. Coronary angiography ruled out significant epicardial coronary artery disease. Continuous electrocardiographic monitoring showed evidence of atrial flutter with variable conduction. Therefore, after excluding left atrial appendage thrombus via transesophageal echocardiography, successful electrical cardioversion was performed.

Due to persistent mild LV dysfunction, cardiac magnetic resonance imaging (CMRI) was scheduled. T1–weighted sequences demostrated extensive subepicardial fat infiltration affecting the infero–lateral and antero–lateral walls of the left ventricle (Figure 1). Late gadolinium enhancement (LGE) revealed widespread subepicardial enhancement in the same regions, partially extending to the mid–inferior and anterior segments, producing a ring–like pattern (Figure 2). The right ventricle appeared structurally normal.

Although no universally accepted criteria currently exists for diagnosing ALVC, the recent European Task Force consensus report, support a diagnosis of ALVC.

The initial arrhythmia was interpreted as a sustained monomorphic ventricular tachycardia with RBBB morphology, a hallmark feature of ALVC. Consequently, an implantable cardioverter–defibrillator (ICD) was placed for secondary prevention.

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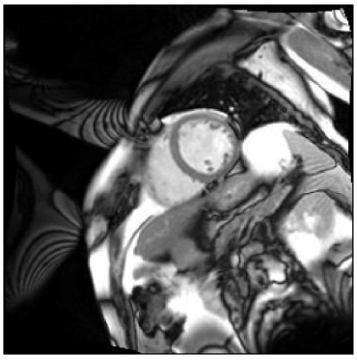

Figure 1

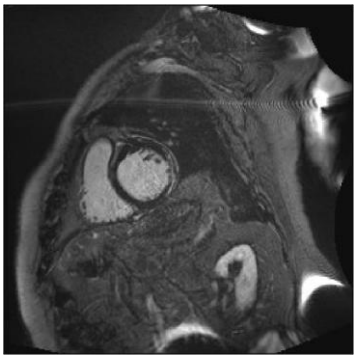

Figure 2

Abstract citation ID: suag058.233

THE BURNING HEART: RECURRENT MYOCARDITIS–LIKE FLARES MARK PROGRESSION IN DSP–RELATED ARRHYTHMOGENIC CARDIOMYOPATHY

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Azienda Ospedaliero Universitaria Di Parma

Arrhythmogenic Cardiomyopathy (ACM) is characterized by progressive fibrofatty replacement, predisposing to ventricular arrhythmias and sudden cardiac death. A distinct manifestation, particularly in Desmoplakin (DSP) mutation carriers, is the acute, inflammatory “hot phase“ which can mimic myocarditis and accelerate structural remodelling.

We report the case of a 28–year–old woman with a pathogenic DSP truncating variant. She had a history of presumed myocarditis (age 18, 2014) with initial Cardiac Magnetic Resonance (CMR) findings of transient edema and Late Gadolinium Enhancement (LGE) that were not suggestive of underlying cardiomyopathy and resolved completely upon subsequent follow–up. Two subsequent uncomplicated full–term pregnancies occurred over the next 10 years (Figure 1). In July 2024, she presented with recurrence (chest pain, elevated troponin, reduced Left Ventricular Ejection Fraction, LVEF 46%). Endomyocardial biopsy was non–specific (low infiltrate, viral/bacterial PCR negative). A follow–up CMR confirmed persistent biventricular myocardial fibrosis (subepicardial ring–like LV LGE, RV involvement). Over the following months, LVEF stabilized at approximately 40%; however, Holter monitoring documented 1,860 ventricular extrasystoles and non–sustained ventricular tachycardia. Genetic testing revealed a heterozygous truncating DSP pathogenic variant. Due to extensive fibrosis, progressive LVEF dysfunction and arrhythmia burden, an Implantable Cardioverter–Defibrillator (ICD) was recommended for primary prevention. She was re–admitted in September 2025 due to an exacerbation of myocardial injury. A repeat CMR demonstrated stability of the LGE pattern, confirming biventricular involvement but crucially, the absence of edema. Consequently, ICD implantation was planned and recently performed.

The proband's father presented with atrial fibrillation (AF) and a LVEF of 35% in 2024. Despite initial suspicion of tachycardia–induced cardiomyopathy and failed AF ablations, a post–procedure sinus node dysfunction and the established family history of ACM led to the indication for ICD implantation during the same hospitalization.

This case underscores the distinct inflammation–driven nature of ACM secondary to a DSP variant, characterized by recurrent “hot phases“ rapid LVEF decline, and extensive biventricular fibrosis. Genetic confirmation enabled accurate risk stratification and timely primary prevention ICD implantation in two affected family members.

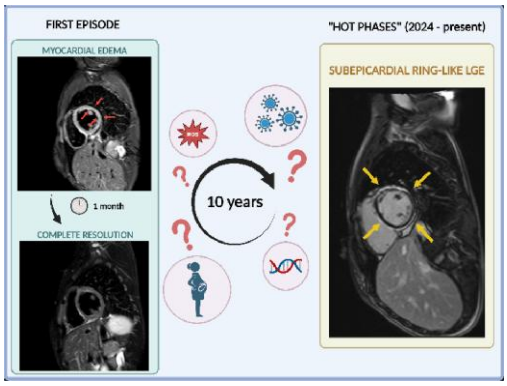

Figure 1

Abstract citation ID: suag058.234

CARDIAC INVOLVEMENT IN A PATIENT WITH LIMB–GRINDLE MUSCULAR DYSTROPHY: HOW TO FIT THE PUZZLE PIECES TOGHETHER, A CASE REPORT

V. Laus, A. Accietto, M. Menozzi, D. Monari, and E. Bagni
Nuovo Ospedale Civile Di Sassuolo

Muscular dystrophies of the limbs are a group of heritable genetic disorders that mainly affect the pelvic or shoulder girdle muscles, causing progressive weakness. Although the underlying genetic origin varies widely, a cardiac involvement has been frequently observed in neuromuscular disorders. Therefore, cardiac imaging is an indispensable part of surveillance and management of muscular disorders. This is the case of a 48 years old man with a recent diagnosis of limb–grindle muscular dystrophy. Initial genetic testing uncovered a variant of uncertain significance in heterozygosis in the MYH7 (myosin heavy chain 7) and SYNE 1 (synaptic nuclear envelope protein 1) genes, negative for dystrophin gene mutation. As part of the diagnostic workup, an echocardiogram, performed despite the absence of specific symptoms and cardiovascular risk factors, revealed the presence of dilated cardiomyopathy with reduction of ejection fraction. To rule out coronary involvement, a coronary CT scan was performed with the curious finding of quadricuspid aortic valve (type II, Nakamura's classification system) and anomalous origin of the left coronary artery from the non–coronary sinus with benign course in the absence of hemodynamically significant stenosis (Figure 1). Given the prognostic value associated with tissue characterization, the patient also underwent cardiac magnetic resonance with evidence of extensive late gadolinium enhancement with a non–ischemic pattern involving the inferior basal segments, the infero–septal mid–ventricular segments, and the apical segments of the anterior and lateral walls (Figure 2). In view of the cardiological findings, optimized heart failure therapy based on the four pillars (angiotensin receptor–neprilysin inhibitors after a period of angiotensin–converting enzyme inhibitors, sodium–glucose co–transporter 2 inhibitors, mineralocorticoid receptor antagonist, beta–blockers) was introduced. The follow–up echocardiogram at three months showed initial reverse remodeling with partial recovery of ejection fraction (Figure 3). Therefore, genetic testing has been undertaken to rule out mutations in genes associated with a high risk of sudden cardiac death (desmoplakin, filamin C, lamin A/C, phospholamban, RNA binding motif protein 20), in accordance with ESC guidelines. Results are not yet available. Given the complex pathophysiology of these disorders, patient management remains a challenge for clinical cardiologists.

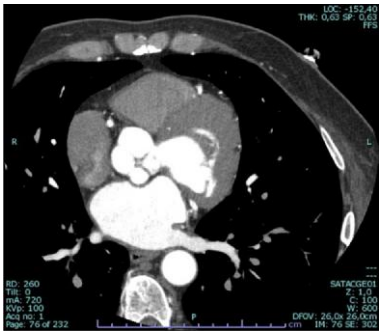

Figure 1

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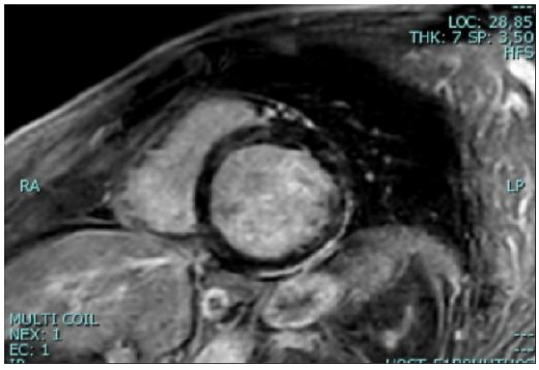


Figure 2

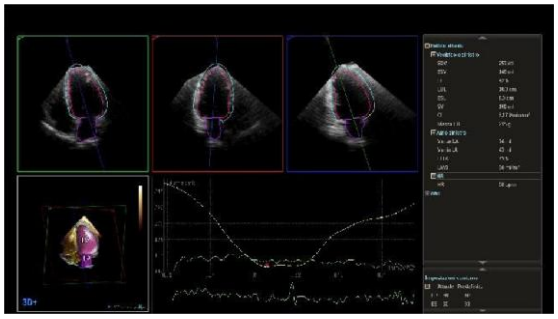


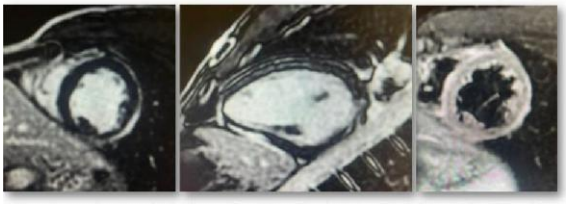
Figure 3

Abstract citation ID: suag058.235

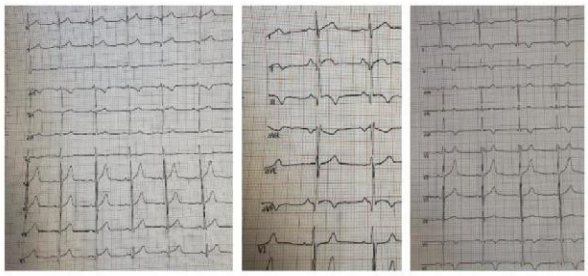
ACUTE MYOCARDITIS IN BECKER MUSCULAR DYSTROPHY: INCIDENTAL FINDING OR "HOT PHASE" OF CARDIOMYOPATHY ONSET?

M. Cardillo, A. Viola, M. Sanfilippo, and C. Comparato
Ospedale Dei Bambini G. Di Cristina, Palermo

Introduction: Becker muscular dystrophy (BMD) is an X–linked disorder caused by mutations in the dystrophin gene, characterized by progressive skeletal and cardiac muscle involvement. Cardiac involvement, often subclinical, affects up to 50% of patients and is typically characterized by myocardial fibrosis and fibro–fatty replacement of the inferolateral walls of the left ventricle. An acute presentation with features suggestive of myocarditis has been only rarely reported.
Case: We report the case of a 15–year–old male patient with BMD, without significant skeletal muscle involvement and with previously normal cardiac evaluations, who presented to the Emergency Department with acute chest pain. The initial electrocardiogram showed nonspecific repolarization abnormalities, while transthoracic echocardiography was unremarkable. Laboratory tests revealed a marked elevation of cardiac troponin levels (2476 ng/L; upper reference limit ‹14), in the absence of fever, elevated inflammatory markers, or recent infectious history. During hospitalization, electrocardiographic evolution was observed, characterized by ST–segment elevation in the inferior leads, development of Q waves, and deep T–wave inversion in the inferolateral leads. Echocardiography showed progressive hypokinesia progressing to akinesia of the infero–apical wall, associated with mild left ventricular systolic dysfunction (ejection fraction 53%). Cardiac magnetic resonance imaging demonstrated left ventricular systolic function at the lower limits of normal (ejection fraction 51%) and the presence of subepicardial late gadolinium enhancement in the inferolateral wall, consistent with a mixed pattern of myocardial edema and fibrosis. Treatment with an angiotensin–converting enzyme inhibitor, beta–blocker, and mineralocorticoid receptor antagonist was initiated, with progressive clinical, laboratory, and imaging improvement.
Conclusions: The absence of systemic inflammatory signs, identifiable infectious triggers, and the presence of pre–existing myocardial fibrosis make the diagnosis of classical acute myocarditis only partially plausible. This case suggests that, in patients with BMD, an acute presentation with chest pain and troponin elevation may represent a "hot phase" of dystrophin–related cardiomyopathy rather than true myocarditis. Recognition of this entity is crucial for accurate interpretation of cardiac magnetic resonance findings, therapeutic management, and long–term prognostic follow–up.



The cardiac magnetic resonance imaging shows a pattern of myocardial involvement predominantly in the subepicardial layer of the inferolateral walls of the left ventricle, with areas of edema associated with late gadolinium enhancement, indicative of fibrosis



Electrocardiographic changes observed throughout the hospitalization

Cardiomyopathies 2

Abstract citation ID: suag058.236

EXPANDING THE RYR2 PHENOTYPIC SPECTRUM: LONG QT SYNDROME AND LEFT VENTRICULAR NONCOMPACTION IN A PEDIATRIC PATIENT

G. Scardino and C. Comparato
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Background: Genetic cardiac overlap syndromes pose significant diagnostic and therapeutic challenges in pediatric patients, particularly when arrhythmogenic and structural phenotypes coexist. Variants in the RYR2 gene are classically associated with catecholaminergic polymorphic ventricular tachycardia and arrhythmogenic cardiomyopathy; however, their involvement in complex phenotypes including long QT syndrome (LQTS) and left ventricular noncompaction (LVNC) remains poorly defined.
Case presentation: We report the case of a 10–year–old boy with incidental detection of QTc prolongation during antibiotic therapy. Although initially considered drug–related, repeat electrocardiography one month later confirmed persistent QTc prolongation up to 480 ms. Cardiac evaluation revealed a globular left ventricle with prominent mid–apical trabeculations, consistent with early–stage LVNC, and preserved systolic function. Cardiac magnetic resonance imaging confirmed LVNC in the absence of myocardial fibrosis or edema. Holter monitoring documented mean QTc values between 460 and 480 ms and a short run of non–sustained ventricular tachycardia. Genetic testing identified a heterozygous de novo RYR2 variant of uncertain significance, with no pathogenic variants detected in genes classically associated with LQTS or LVNC. Beta–blocker therapy was initiated, resulting in QTc normalization (~440 ms) and no arrhythmic events during follow–up. Continuous rhythm surveillance was ensured by an implantable loop recorder.
Conclusions: This case describes a rare pediatric cardiac overlap phenotype combining LQTS and LVNC in association with an RYR2 variant, suggesting a possible pleiotropic effect of this gene. Careful longitudinal follow–up and prolonged rhythm monitoring are essential for risk stratification and for guiding therapeutic decisions, including consideration of implantable cardioverter–defibrillator therapy.

Abstract citation ID: suag058.237

IN THE APEX OF THE CONUNDRUM: A CASE OF SEVERE SEPSIS AND TAKOTSUBO SYNDROME

M. Vacca, D. Cocco, A. Pilleri, I. Flore, and C. Orru'
Medicina Interna Asl Sulcis; Consulenza E Valutazione Cardiologica Arnas Brotzu; Medicina Generale Arnas Brotzu

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A 71–years–old woman presented to the emergency department of our institution. In the last three weeks she had fever with acme at 40 °C associated with general malaise and intense asthenia. The patient also complained of two syncopal episodes which prompted her to go to the hospital. The physical examination was normal. Inflammation indeces were elevated and blood cultures turned positive for E.coli. During the stay she complained of intense asthenia and abdominal pain. An urgent abdominal ultrasound showed three hepatic abscesses. An urgent total body CT scan (figure 1) confirmed the presence of abscess. A diagnosis of sepsis due to hepatic abscesses was done, Meropenem was started and a ultrasound–guided drainage of the hepatic abscesses was done. In order to study the syncope a transthoracic echocardiogram (TTE) was performed revealing a left ventricle normal in size but with a mild systolic dysfunction due to akinesia of the apex, EF 46% (figure 2). Of note, on admission and during the stay the patient did not complaint chest pain. A new ECG showed a normofrequent sinus rhythm and negative T waves in all the leads (figure 3). A differential diagnosis between acute coronary syndrome, acute myocarditis and secondary Takotsubo syndrome had to be done. Serial troponin measurements and a coronary CT were performed. They were normal. After a few days cardiac MRI showed an early recovery of the LV, with only mild and diffuse hypokinesia, EF 49%, and excluded focal structural changes and pathologic delayed–enhancement areas related to myocardial fibrosis/necrosis (figure 4). A diagnosis of Tako–tsubo syndrome (TS) secondary to the sepsis was made. The patient was treated with Bisoprolol, Valsartan, Acetilsalicil acidg, Atorvastatin. Thereafter she experienced a progressive clinical improvement with remission of fever and was finally discharged apiretic, eupnoic and hemodynamically stable. Two weeks later she was in good clinical status and a TTE showed a complete recovery of the LV function and a normal ECG. The diagnosis of TS should be considered in case of stressful physical triggers. Non invasive imaging is the key for every single step of the diagnosis: TTE is essential for the first working diagnosis, cardiac CT for the exclusion of critical coronary artery disease and MRI for the exclusion of an acute myocarditis. The recommended therapy and follow–up are essential to achieve the good clinical outcome and avoid complications.

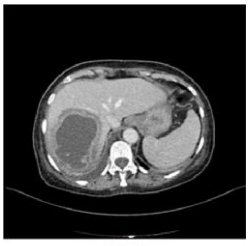

Figure 1

Figure 2

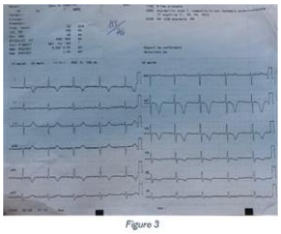

Figure 3

Abstract citation ID: suag058.238

BARLOW CARDIOMYOPATHY CAUSING CARDIAC ARREST: A CASE REPORT

F. Cola, B. Bauce, M. Perazzolo Marra, M. De Lazzari, D. Corrado, and L. Nai Fovino
Azienda Ospedale-Universita', Padova

A 31 years old male patient experienced witnessed cardiac arrest (CA), with ventricular fibrillation (VF) as first detected rhythm. Return of spontaneous circulation (ROSC) was achieved after CPR, administration of adrenaline, amiodarone and 3 direct–current defibrillation shocks. ECG after ROSC was negative for STEMI showing sinus tachycardia, first degree AVB, intraventricular conduction delay, flattened T wave in leads I and aVL. On the same day, the patient was transferred to our cardiology intensive care unit mechanically ventilated and supported with dobutamine, both suspended after the first day of hospital stay. Brain CT and CNGF were negative, while thorax CT showed extensive bilateral posterior consolidation areas plus air bronchogram. Hospitalization therapy consisted of bisoprolol and double antibiotic strategy for febrile episodes and temporary septic state due to urinary tract infection; telemetry monitoring detected no VA episodes. TEE showed LV ejection fraction on the lower limit (52%) with diffuse hypokinesia, moderate MR and a normal right ventricular function. For excluding acute myocarditis with arrhythmic presentation, endomyocardial biopsy was performed, yielding negative results. Cardiac magnetic resonance (CMR) demonstrated normal LV dimensions, mildly reduced LVEF (47%) with hypokinesia of anterior–lateral mid–apical portion, basal hypertrophy with associated adjacent mid–portion thinning, normal RV dimensions with mildly reduced EF (46%) due to diffuse hypokinesia, mild mitral valve prolapses of both not particularly thickened leaflets, MAD with a maximum tele–systolic extension of 11 mm, curling of the inferior–lateral basal region. Tissue characterization showed normal T1 and T2 mapping values and non ischemic, intramyocardial late gadolinium enhancement in the inferior–lateral basal wall. Such findings were contextualized as part of Barlow Cardiomyopathy. Bearing in mind the CA, the young age of the patient and the CMR result, SICD therapy for secondary prevention was adopted. Discharge therapy implied bisoprolol. During post–discharge follow–up visit, neither arrhythmias nor interventions were detected on SICD, TEE showed normal bi–ventricular systolic function with mild MR (F4). ECG showed sinus rhythm, HR 75 bpm, first degree AVB, intraventricular conduction delay, isolated flattened T wave in lead III. The cardiomyopathy genetic panel yielded negative results and drug therapy was not changed till next follow up visit.

Abstract citation ID: suag058.239

EARLY DIAGNOSIS OF CARDIAC HEMOCHROMATOSIS IN A PATIENT WITH THALASSEMIA MAJOR USING T2* CARDIAC MRI

R. Magnano, D. Rossi, S. Saraullo, C. Scollo, L. Pezzi, E. Genovesi, A. D'Alleva, D. Forlani, P. Vitulli, D. Di Clemente, V. Vitullo, M. Di Marino, V. Zuardi, M. Rizzuto, M. Primavera, and M. Di Marco
Cardiologia Utic Ospedale Civile Santo Spirito Pescara; Università G.D'Annunzio Chieti Pescara

Background: Thalassemia major is a chronic hematologic disorder requiring regular blood transfusions and associated with a high risk of iron overload, including myocardial deposition and the development of cardiac hemochromatosis. This condition represents a leading cause of morbidity and mortality, making early detection of structural and functional cardiac alterations essential. Cardiac magnetic resonance imaging (CMR) with T2* technique is currently considered the gold standard for quantifying myocardial iron burden and enabling timely therapeutic action.
Case Presentation: We report the case of a 24–year–old woman with transfusion–dependent thalassemia major, asymptomatic for chest pain, dyspnea, or palpitations, who presented to our outpatient clinic for a scheduled follow–up visit. Resting electrocardiography showed nonspecific ventricular repolarization abnormalities and reduced QRS voltage. Transthoracic echocardiography revealed an increased relative thickness of the interventricular septum, with marked myocardial hyperechogenicity and small punctate hyperechoic areas, findings suggestive of possible myocardial iron overload. Based on these echocardiographic features, CMR with T2* sequences was performed, demonstrating a significant reduction in myocardial T2* values (‹20 ms), consistent with pathological iron accumulation and early cardiac involvement.
Conclusions: This case highlights the essential role of T2* CMR in the early diagnosis of cardiac hemochromatosis in patients with thalassemia major. Early identification of myocardial iron overload allowed prompt intensification of iron chelation therapy and the implementation of a personalized cardiologic follow–up plan, potentially preventing progression toward overt cardiomyopathy. A multidisciplinary approach remains crucial to optimize clinical management in these patients.

Abstract citation ID: suag058.240

WHEN THE PATIENT'S HABITUS SPEAKS LOUD: THE CASE OF A SUSPECTED GH–RELATED CARDIOMYOPATHY

G. Brioschi, J. Bidoglio, D. Conforme Torres, G. Masciocco, A. Verde, P. Sormani, V. Favero, L. Airò Farulla, G. Bartesaghi, A. Moreo, C. Giannattasio, A. Garascia, and E. Ammirati

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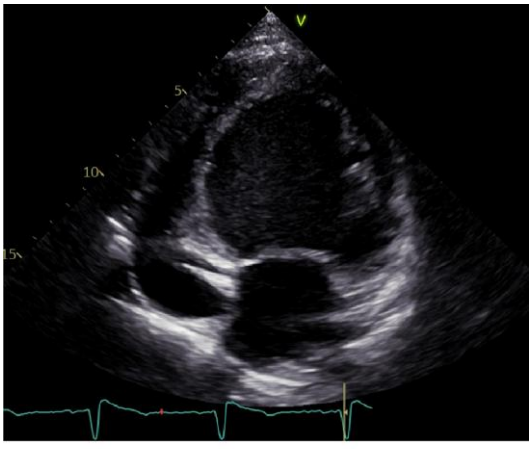
Università Degli Studi Di Milano–Bicocca; De Gasperis Cardio Center, Cardiologia 2, Niguarda Hospital; De Gasperis Cardio Center, Cardiologia 4, Niguarda Hospital; Dipartimento Di Biotecnologie Mediche E Di Medicina Traslazionale, Università Degli Studi Di Milano; Nuclear Medicine, Niguarda Hospital; Ospedale Valduce

A 49–year–old man with unremarkable past medical history presented to the emergency department for chest pain. Echocardiography showed biventricular severe dilatation and dysfunction (left ventricular ejection fraction [FEVS] 19%) with eccentric hypertrophy (Figure 1). ECG did not show acute ischemic issues (Figure 2). Serum biomarkers revealed raised Troponin–I, low NT–proBNP and no inflammation. An episode of sustained ventricular tachycardia was recorded during continuous ECG monitoring. Coronary angiography showed no coronary artery disease. Cardiac MRI was not performed due to patient's claustrophobia. Anti–remodeling therapy for heart failure (HF) was started. Clinical examination revealed signs of acromegaly (prominent nose, protruding brow bones, macroglossia and enlarged hands and feet). Raised levels of Growth Hormone (GH) and Somatomedin were detected and brain MRI showed pituitary macroadenoma. A diagnosis of acromegaly was established, and specific treatment with first–generation somatostatin analog (SSA) was started (octreotide). A differential diagnosis of myocarditis versus acromegalic cardiomyopathy (AC) or an overlap condition was considered. A mild non–focal fluorodeoxyglucose (FDG) uptake in the myocardium was observed on a carbo–free–diet total–body computed–tomography positron emission tomography (Figure 3), thus, together with normalized troponin level, endomyocardial biopsy was deemed unnecessary. The patient was discharged with a wearable cardioverter defibrillator. Despite a 6–month course of optimized medical therapy for both HF and acromegaly, neither cardiac function (FEVS 25%) nor hormonal status improved. A subcutaneous cardioverter defibrillator was implanted and hormonal therapy was upgraded to second–generation SSA (pasireotide). AC is a frequent complication of acromegaly since GH cardiac toxicity involves multiple mechanisms. Differential diagnosis with other causes of cardiac dysfunction may be difficult since imaging features may be nonspecific. Our case shows abnormal myocardial FDG uptake, which may suggest GH–induced altered glucose metabolism or active myocardial inflammation, which could be considered possible pathways of GH–related cardiac damage, even though poor knowledge exists about nuclear imaging patterns in AC. Still, the efficacy of SSA on cardiac dysfunction reversal is unclear, posing significant diagnostic and prognostic challenges in the field of acromegaly and cardiac inflammatory diseases.



e 1: four-chamber echocardiographic view showing severe left ventricular dilatation.

Figure 1

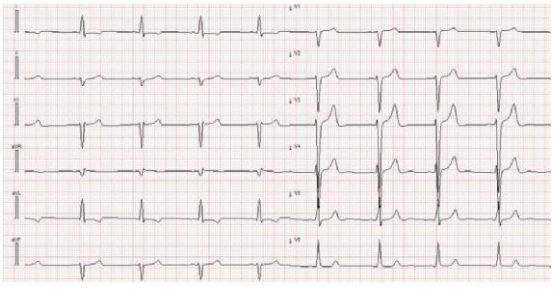


Figure 2: Electrocardiogram showing sinusal rhythm, profound S-waves in the anterior leads, repolarization alterations in high-lateral leads.

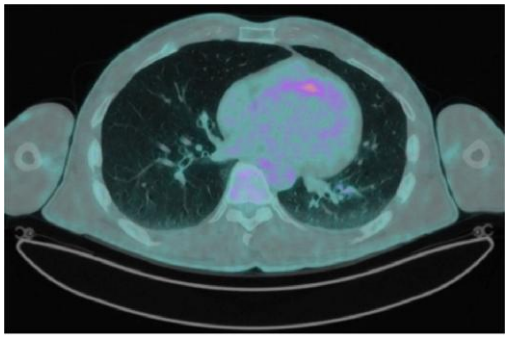


Figure 3: Assial view of total-body computed-tomography positron emission tomography showing mild diffuse left ventricular uptake of fluorodeoxyglucose.

Abstract citation ID: suag058.241

ARRHYTHMIC STORM IN TAKOTSUBO SYNDROME: POTENTIAL CONTRIBUTION OF GENETIC SUSCEPTIBILITY

F. Siddi, M. Marchetti, G. Pinna, R. Cau, D. Boscarelli, A. Peccianti, M. Porcu, A. Follesa, and R. Montisci
S.C. Cardiologia Utic, Aou Cagliari, Università Di Cagliari; S.C. Radiologia, Aou Cagliari, Università Di Cagliari; S.C. Radiologia – Policlinico Universitario Di Monserrato; S.C. Cardiologia Utic – Ospedale San Martino

Background: Takotsubo syndrome is an acute and reversible cardiomyopathy traditionally considered benign; however, growing evidence highlights a significant risk of malignant ventricular arrhythmias. Genetic susceptibility, particularly variants associated with channelopathies, may modulate arrhythmic risk and influence management.
Case Presentation: A 69–year–old woman with a family history of sudden cardiac death and a medical history of arterial hypertension, dyslipidaemia, paroxysmal atrial fibrillation on oral anticoagulation, type 2 diabetes mellitus, and chronic autoimmune thyroiditis presented with non–ST–elevation acute coronary syndrome complicated by hypertensive pulmonary oedema. Previous drug–induced QTc prolongation during amiodarone therapy was reported. Admission electrocardiography showed sinus rhythm with anterior T–wave inversion and prolonged QTc. Transthoracic echocardiography revealed moderate left ventricular systolic dysfunction (LVEF 40%) with apical ballooning and no left ventricular outflow tract obstruction. High–sensitivity troponin I and NT–proBNP levels were markedly elevated. Shortly after admission, the patient developed an arrhythmic storm with recurrent polymorphic ventricular tachycardia without electrolyte abnormalities, requiring electrical defibrillation, intravenous lidocaine, intubation, and deep sedation. Due to persistent electrical instability, the patient was transferred to a tertiary centre. Coronary angiography excluded obstructive coronary artery disease, and ventriculography confirmed Takotsubo cardiomyopathy. After stabilization, QTc progressively normalized, ventricular arrhythmias did not recur, and left ventricular systolic function recovered. Cardiac magnetic resonance supported the diagnosis. Telemetry revealed recurrent atrial fibrillation with rapid ventricular response followed by sinus bradycardia. Given the malignant arrhythmic presentation and pacing requirement, a transvenous implantable cardioverter–defibrillator was implanted. Genetic testing identified a heterozygous RYR2 variant of uncertain significance, prompting genetic counselling. At 6–month follow–up, the patient was asymptomatic, with preserved ventricular function and no arrhythmic recurrences.
Conclusions: Takotsubo syndrome may trigger malignant ventricular arrhythmias in patients with an underlying arrhythmogenic substrate. Genetic evaluation may add value for risk stratification and individualized management in selected patients.

Abstract citation ID: suag058.242

SAW TOOTH CARDIOMYOPATHY: AN INFREQUENT CAUSE OF HFPEF

E. Incalcaterra and M. Caruso
Arnas Civico, Uosd Cardiologia Clinica Per Il Trattamento Dello Scompenso Cardiaco; Arnas Civico, UOC Utic

Saw–tooth cardiomyopathy (STC) is a rare form of left ventricular cardiomyopathy, characterised by an irregular, "saw–tooth" endocardial contour with myocardial projections extending from the lateral walls towards the ventricular cavity. This pattern is distinct from LVNC. It is a newly

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discovered cardiomyopathy, first described in 2009, and to date it is not recognised as a distinct nosological entity in current cardiomyopathy classifications. Its clinical significance and prognostic implications remain incompletely defined. Available evidence, mainly derived from case reports and small series, suggests an association with heterogeneous clinical manifestations.

The potential relationship between this morphological pattern and the development of heart failure with preserved ejection fraction (HFpEF) has been poorly explored. We present the case of a 36–year–old with an unremarkable past medical history. No family history of cardiovascular disease or sudden death. She was admitted to for atrial fibrillation associated with clinical manifestation of heart failure. Laboratory tests were unremarkable, except for NT–proBNP level (1196 pg/mL). The echocardiogram showed a trabeculated appearance of the interventricular septum and inferior wall, with a normal ejection fraction (68%) and increased left ventricular filling pressures. Cardiac magnetic resonance showed a multiple protrusions of the compacted myocardial layer into the ventricular cavity, consistent with a possible “saw–tooth” cardiomyopathy, in the absence of inflammatory myo–pericardial alterations (Figure 1-2-3). Following clinical stabilisation, transcatheter ablation of atrial fibrillation was successfully performed. In the absence of specific evidence from the literature, HFpEF–directed therapy with empagliflozin was initiated. At both six–month and one–year follow–up, the patient remained haemodynamically stable. NT–proBNP levels showed a reduction but remained persistently elevated (medium value 960 pg/mL).

In this case STC may be considered the underlying cause of HFpEF. Advanced cardiac imaging plays a key role in the diagnostic work–up, while management requires an individualised, phenotype–driven approach. Further studies are needed to clarify the clinical significance, optimal management, and prognostic implications of this cardiomyopathy.

Chenaglou M et al. ESC Heart Failure 2020; 7: 325–328 DOI: 10.1002/ehf2.12574 Liu Z et al. Rev. Cardiovasc. Med. 2022; 23(4): 138 doi.org/10.31083/j.rcm2304138

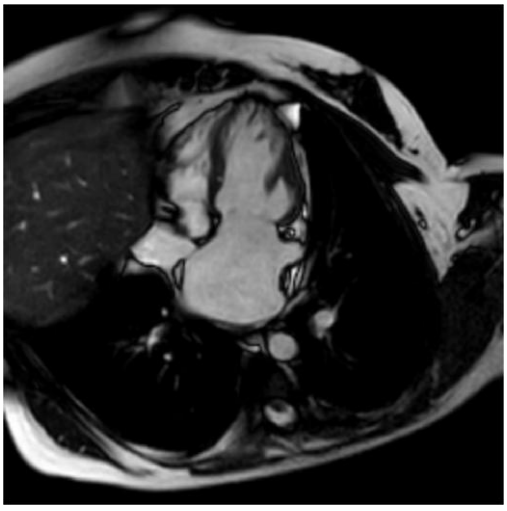

Figure 1

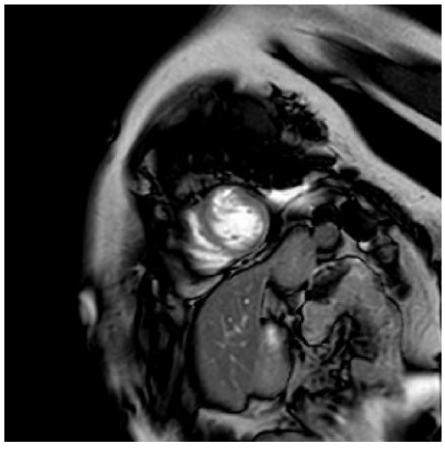

Figure 2

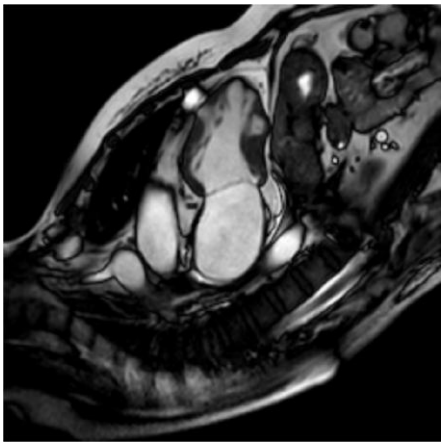

Figure 3

Abstract citation ID: suag058.243

RESTRICTIVE CARDIOMYOPATHY: THE ROLE OF MULTIMODALITY IMAGING AND EXTENDED GENETIC TESTING

S. D'Alesio and F. Perelli
Università Degli Studi Di Milano "Bicocca"; Irccs Auxologico San Luca

An adult patient was referred for cardiological assessment due to a complex family history of cardiac disease. Two of his five children, who had structural cardiac abnormalities, were being followed for suspected long QT syndrome despite negative genetic testing and one of his cousins died suddenly at 44 years of age. In the index patient, baseline ECG showed diffuse repolarization abnormalities with QTc prolongation. Laboratory testing revealed markedly elevated levels of NT–proBNP, while 24–hour Holter monitoring showed no ventricular arrhythmias.

Transthoracic echocardiography (Figure 1) demonstrated small ventricular cavities, severe diastolic dysfunction with elevated filling pressures, mildly reduced systolic function, reduced longitudinal strain with an apical sparing pattern (Figure 2), and severe bi–atrial dilation.

Trabecular myocardial remodeling resulted in an apparent concentric increase in left ventricular wall thickness, consistent with pseudo–hypertrophy rather than true hypertrophic remodeling. Cardiac magnetic resonance (Figure 3) revealed marked biventricular apical trabeculation fulfilling criteria for non–compaction, mildly reduced global biventricular systolic function, severe biatrial enlargement, and areas of non–ischemic myocardial late gadolinium enhancement. Associated pericardial thickening with late enhancement was also observed. Right heart catheterization confirmed isolated post–capillary pulmonary hypertension at rest and during exercise, secondary to left ventricular diastolic dysfunction. Further investigations for infiltrative cardiomyopathies, including iron panel, serum and urinary immunofixation, and free light chain assessment, were negative. Genetic testing using an extended cardiomyopathy panel, including TTR and GLA, was negative. Subsequent analysis by array–CGH identified a duplication in chromosome 7q22.3 involving the KMT2E gene, associated with a rare autosomal dominant neurodevelopmental disorder. This case demonstrates how a restrictive pattern may obscure the underlying complexity of myocardial disease characterized by trabecular remodeling, pseudo–hypertrophy, and a possible syndromic genetic background. A comprehensive diagnostic strategy is essential to ensure accurate characterization and to guide tailored patient management.

Figure 1

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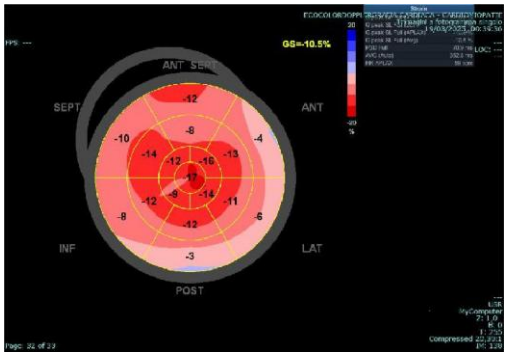

Figure 2

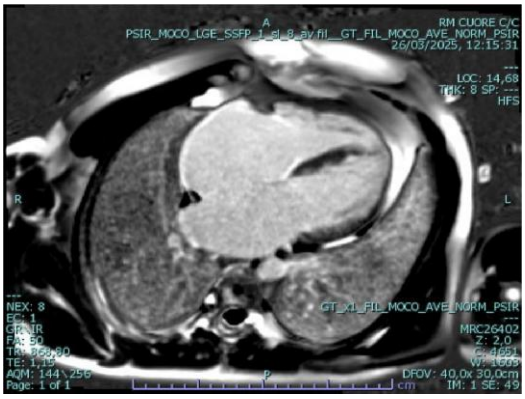

Figure 3

Cardiomyopathies With Hypertrophic Phenotype

Abstract citation ID: suag058.244

HYPERTROPHIC CARDIOMYOPATHY AND VENTRICULAR PRE-EXCITATION. DESCRIPTION OF A CLINICAL CASE

D. Pasqualucci, N. Sanna, S. Mameli, R. Scotto, F. Argiolas, M. Casula, G. Binaghi, P. Ferdinando, and M. Corda
Arnas G. Brotzu, Cagliari

The patient is an 18-year-old young man suffering from cardiomyopathy due to a mutation c.1598>Gp (His530Arg) in the PRKAG2 gene, diagnosed in childhood and characterized by progressive increase in ventricular parietal thicknesses (Figure 1). This pathology represents a metabolic cardiomyopathy due to glycogen storage with a characteristic phenotype: massive hypertrophy, conduction disorders (pre-excitation) (Figure 2)., supraventricular tachyarrhythmias and frequent presence of accessory pathways. In this specific case, despite mildly symptomatic for heart failure, the patient showed a significant structural evolution (2017: 11 y.o, 10 mm; 2021, 14 y.o, 30 mm) for this reason, he underwent a dual-chamber implantable automatic defibrillator (ICD) in primary prevention.

At last assessment in 2025 (18 y.o.), the patient presented 50 mm of thicknesses. In the last months, the device has documented two episodes of high-frequency supraventricular tachyarrhythmia, both recognized as ventricular tachycardia. The first episode resulted in the delivery of an inappropriate shock, while the second was interrupted by anti-tachycardia pacing (ATP) (Figure 2). This behaviour is consistent with the pathophysiology of PRKAG2 syndrome, in which the abnormal atrioventricular conduction and the possible presence of accessory pathways can confound the device's discrimination algorithms, increasing the risk of inappropriate treatments

Considering the arrhythmic events and the severe structural phenotype, an electrophysiological study (SEF) with mapping and possible ablation of abnormal pathway was planned in order to reduce the recurrence of tachyarrhythmias and prevent further inappropriate shocks. At the same time, given the marked hypertrophy, the progressive nature of the disease and the high risk of evolution to advanced heart failure, the patient was sent to transplant evaluation. A family with the same mutation, described above, showed a severe prognosis for decompensation and the need for transplantation. This case represents an example of the management complexity of PRKAG2-related storage cardiomyopathies and the importance of a multidisciplinary approach between clinical cardiologists, electrophysioly and heart failure experts.

Figure 1

Figure 2

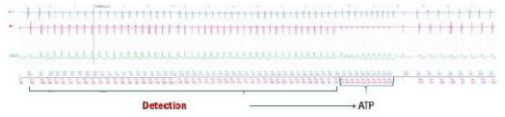

Figure 3

Abstract citation ID: suag058.245

EFFICACY AND SAFETY OF MAVACAMTEN IN NOONAN SYNDROME–ASSOCIATED OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY

G. Marchionni, G. Pecci, M. Alfarano, F. Ballatore, J. Costantino, F. Ciccarelli, S. Stavagna, A. Lattanzio, C. Vizza, and C. Chimenti
Policlinico Umberto I, Roma

In November 2023, a 38–year–old woman was referred to our outpatient clinic for dyspnea. Her medical history included systemic lupus erythematosus complicated by lupus nephritis for which she underwent renal transplantation in 2017. She was in NYHA class III with signs of congestive heart failure. Electrocardiography showed sinus rhythm at 70 bpm with normal atrioventricular and intraventricular conduction, high voltages, and repolarization abnormalities consistent with left ventricular hypertrophy. Transthoracic echocardiography demonstrated asymmetric hypertrophy, left ventricular outflow tract (LVOT) obstruction with a resting gradient of 68 mmHg, increasing to 95 mmHg with Valsalva manoeuvre, left ventricular ejection fraction (LVEF) of 60% and preserved right ventricular systolic function. Cardiac magnetic resonance confirmed asymmetric septal hypertrophy (maximal wall thickness of 18 mm) and diffuse interstitial fibrosis with non–ischemic late gadolinium enhancement in inferolateral, inferior, anterolateral and apical segments. Metoprolol was initiated and later combined with disopyramide, which was soon discontinued due to gastrointestinal intolerance. Mavacamten therapy was initiated at 5 mg daily. After four weeks, the patient reported symptomatic improvement, although LVOT gradients remained unaltered. At week 12, the dose was increased to 10 mg daily. Four weeks later, the patient was in NYHA class II, with complete resolution of LVOT obstruction and a slight reduction in interventricular septal wall thickness (16 mm vs 18 mm). From treatment initiation, a reduction in ECG voltages was observed, with a 13 mm decrease in the Sokolow–Lyon index (Figure 1), alongside a marked reduction in NT–proBNP (973 pg/ml vs. 5000 pg/ml at baseline). At 30 weeks genetic testing revealed an heterozygous PTPN11 mutation (c.184T›A, p.Tyr62Asn, Class 4) consistent with Noonan syndrome. At 60 weeks the patient remained stable in NYHA class II with a preserved LVEF.**Conclusion:** This case illustrates the clinical and structural effects of mavacamten in a patient with obstructive hypertrophic

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cardiomyopathy ultimately linked to Noonan syndrome. In this patient, mavacamten provided symptomatic relief, resolution of LVOT obstruction, initial signs of structural remodelling and a substantial reduction in NT–proBNP, suggesting – despite its unselective mechanism of action – meaningful benefit in this complex setting.

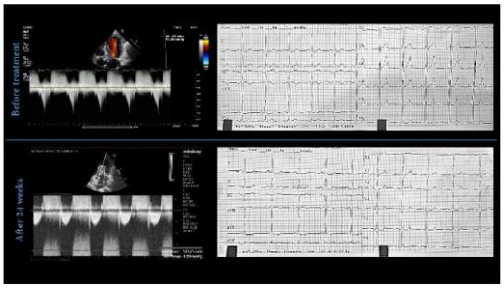

Figure 1

Abstract citation ID: suag058.246

EFFICACY OF NADOLOLO IN RASOPATHIES WITH OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY: A CASE SERIES

S. Di Marzio, N. Cantarutti, A. Novelli, F. Drago, and R. Adorisio
Pediatric Cardiology and Cardiac Arrhythmias Unit, Bambino Gesù Children's Hospital, Ircss, Rome, Italy ; 2. Laboratory of Medical Genetics, Translational Cytogenomics Research Unit, Bambino Gesù Children Hospital, Irccs, Rome, Italy; Heart Failure and Transplant, Mechanical Circulatory Support Complex Unit, Bambino Gesù Children'S Hospital, Irccs, Rome, Italy

Background and aim: Obstructive hypertrophic cardiomyopathy (oHCM) is a common cause of heart failure in children and is often associated with RASopathies, such as Noonan Syndrome (NS). High–dose beta blockers remains the first–line option in patients with OHCM. In this case series, we aim to describe the effect of high–dose of Nadolol on left ventricular outflow tract (LVOT) gradient, NTproBNP levels and functional class.
Methods: We report four pediatric patients (mean age 10 years) with oHCM and NS: two carrying RAF1 mutations, one with a SOS1 mutation, and one with a LZTR1 mutation. Initially three patients were treated with high–dose propranolol (mean dose 7,2 mg/kg/die) and one with bisoprolol (0,5 mg/kg/die). Clinical evaluations were performed at baseline and after 6 months, including measurements of LVOT gradient, NTproBNP levels, and Ross/NYHA functional class. Subsequently patients were switched to nadolol at a median dose of 2,2 mg/kg/die. Follow–up assessments were conducted after an additional 6 months.
Results: At baseline, all patients exhibited elevated LVOT gradients (mean LVOT: 50 mmHg) and increased NTproBNP levels (mean NTproBNP: 3200 pg/mL), with Ross/NYHA class II. After 6 months of Propanolol or Bisoprolol therapy, mean heart rate target (HRT) was 77 bpm, there was no significant improvement in LVOT gradient (mean LVOT: 48 mmHg) or NTproBNP levels (mean: 3100 pg/mL). After transitioning to Nadolol, all patients showed a substantial reduction in HRT with a mean value of 60bpm, descrease in LVOT gradient (mean 25 mmHg, p=0,02), a marked decrease in NTproBNP levels (mean 1200 pg/mL, p=0,03), and an improvement in Ross class (mean class I). No adverse effects were reported during the follow–up period (Table 1-2).
Conclusions: Our findings suggest that high–dose of Nadolol is an effective treatment for oHCM in pediatric patients with NS. The switch from Propranolol/Bisoprolol to Nadolol resulted in significant improvements in clinical, instrumental and biochemical markers. This suggests that Nadolol may be a superior option for managing this condition, warranting further investigation into optimal dosing and long–term outcomes.

Table 1.

PTs	Gender	Genetics	LVOT pre F1 mmHg	LVOTO post F1 mmHg	LVOT pre F2 mmHg	LVOT post F2 mmHg
1	M	SOS1	45	46	46	25
2	F	RAF1	50	60	60	45
3	M	RAF1	55	50	50	35
4	M	LZTR1	35	50	50	48

Table 2.

PTs	Gender	Genetics	NTproBNP pre F1 Pg/ml	NTproBNP post F1 Pg/ml	NTproBNP pre F2 Pg/ml	NTproBNP post F2 Pg/ml
1	M	SOS1	3800	4282	4282	3021
2	F	RAF1	927	1073	1073	669
3	M	RAF1	765		10410476522	705
4	M	LZTR1	2700	5200	5200	3422

Abstract citation ID: suag058.247

LATE–ONSET FABRY DISEASE: AN UNCONVENTIONAL DIAGNOSTIC PATHWAY

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Background: Fabry disease may present with a late–onset phenotype and predominantly cardiac involvement; diagnosis can emerge through cascade screening even in asymptomatic individuals.
Case presentation: A 70–year–old man was referred after Fabry disease was identified through family screening triggered by a positive newborn screening result in a second–degree grandchild. Pedigree–based cascade screening subsequently led to the diagnosis in one of his daughters and two grandchildren. The patient denied cardiac symptoms (angina/equivalents, palpitations, syncope, or dyspnea). Past medical history was notable only for parkinsonism on medical therapy; no cardiovascular risk factors were present. ECG showed sinus rhythm with right bundle branch block and left anterior fascicular block; T–wave inversion in V6 and flattened T waves in the inferior leads (Figure 3). Transthoracic echocardiography demonstrated normal left ventricular volumes and preserved global systolic function, with focal hypokinesia of the posterior wall and a hyperechogenic area in the basal posterior segment extending to the adjacent inferior wall (Figure 1-2). Right ventricular size and function were normal. Mild aortic, mitral, and tricuspid regurgitation were observed. There were no signs of congestion and no pericardial effusion. Biochemical/genetic testing revealed markedly reduced alpha–galactosidase A activity on dried blood spot (0.4 nmol/mL/h) and elevated lyso–Gb3 (18 nmol/L); genetic analysis identified the GLA variant c.337T›C (p.Phe113Leu). Enzyme replacement therapy was initiated (biweekly infusions). The patient reported a recurrent improvement in overall well–being during the first 10 days following each infusion; lyso–Gb3 was decreasing on follow–up assessments. Cardiac MRI is scheduled; the patient undergoes semiannual cardiology follow–up with renal function monitoring.
Discussion/Conclusions: The GLA c.337T›C variant has been associated with a late–onset phenotype with predominant cardiac involvement and has been described in familial clusters. The focal infero–posterior hyperechogenic echocardiographic finding may be consistent with tissue changes reported in Fabry cardiomyopathy, but it is not pathognomonic and requires confirmation/staging by cardiac MRI. This case highlights the value of cascade screening to detect early, paucisymptomatic cardiac involvement. The co–existence of parkinsonism, while not proving causality, may represent an area for future research.

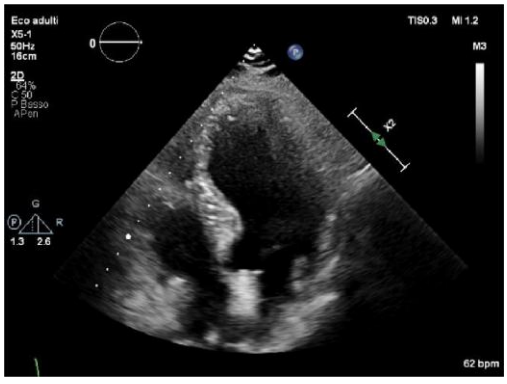

Figure 1

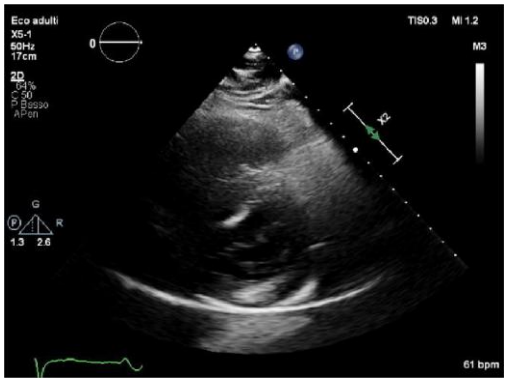

Figure 2

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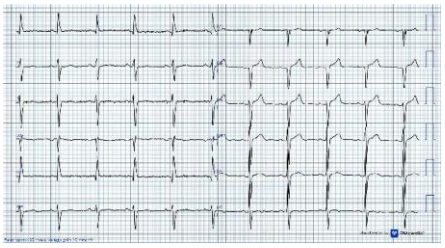

Figure 3

Abstract citation ID: suag058.248

WHEN HYPERTROPHY MISLEADS: UNMASKING FABRY DISEASE

G. Furlani, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, L. Piangerelli, M. Francioni, M. Nazziconi, K. Maurizi, A. Massari, B. Anselmi, C. Gatti, S. Luciani, T. Gaudenzi, F. Pietrucci, A. Scavuzzo, A. Dello Russo, F. Vagnarelli, C. Lofiego, and M. Marini
Lancisi Cardiovascular Center, Azienda Ospedaliero Universitaria Delle Marche

Background: A 71–year–old woman with a history of hypertension, dyslipidemia, diabetes, ischemic heart disease and permanent atrial fibrillation (since 2013) was admitted for post–infectious gonarthritis. A recent evaluation had suggested a hypertrophic phenotype, raising suspicion of infiltrative cardiomyopathy.
Case Presentation: During hospitalization, a cardiological consultation was requested. The echocardiogram showed a non–dilated left ventricle with wall hypertrophy (IVS 14 mm, LVPW 14–15 mm), apicalization and hypertrophy of the papillary muscles, and a severely dilated left atrium (53 ml/m²). Systolic function was preserved (EF 62%). No systolic anterior motion (SAM), dynamic gradients, or significant valvular diseases were noted. The echocardiographic findings (Fig. 1), combined with ECG changes (incomplete LBBB, LVH, and ST depression with T–wave inversion in infero–lateral leads, Fig. 2), were more consistent with a Hypertrophic Cardiomyopathy (HCM) phenotype than an infiltrative pattern. Given the presence of several "red flags" for Fabry Disease —including proteinuria (1 g/day, disproportionate to diabetic nephropathy), bilateral hearing loss, acroparesthesia, and a history of stroke—associated with a family history of early–onset stroke and pacemaker implantation (father), cardiac MRI and genetic testing with DBS were performed.
Results: Cardiac MRI confirmed mild septal hypertrophy (13 mm) and detected subepicardial late gadolinium enhancement (LGE) at the basal inferolateral wall and low native T1 mapping values (Fig. 3). Genetic testing identified a pathogenic mutation (c.680 G›A, p.R227Q) in exon 5 of the GLA gene. Laboratory tests showed normal α–GAL A enzyme activity (as often seen in females), with increased levels of LysoGb3 and cardiac biomarkers (NTproBNP 2204 pg/ml and hs–Troponin I 0.029 ng/ml). A diagnosis of Fabry Disease with multisystemic involvement (cardiac and renal) was made. Management and Outcome: Enzyme replacement therapy (ERT) with agalsidase beta was initiated. An SGLT2 inhibitor was added to her medical treatment (canrenone, irbesartan/HCTZ, apixaban). At follow–up, the patient remains clinically stable.
Conclusions: This case highlights that a definitive etiological diagnosis of Fabry disease requires integrating imaging/ECG findings with family history and extracardiac "red flags" Clinicians must systematically investigate these clues to unmask rare metabolic diseases disguised as common cardiac phenotypes.

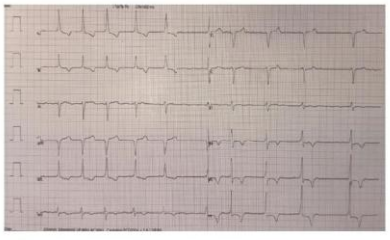

Fig 2 ECG: AF, incomplete LBBB, LVH, ST depression with TWI in the infero-lateral leads.

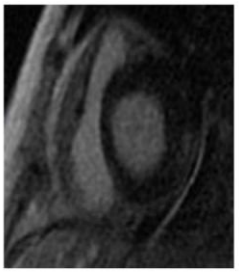

Fig 3 MRI with subepicardial LGE at the basal infero-lateral free wall.

Abstract citation ID: suag058.249

NOT ALWAYS SARCOMERIC HCM: MATERNALLY INHERITED HYPERTROPHIC CARDIOMYOPATHY DUE TO MITOCHONDRIAL DNA MUTATION

B. Anselmi, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, F. Coraducci, G. Pongetti, M. Nazziconi, K. Maurizi, A. Massari, G. Furlani, C. Gatti, S. Luciani, T. Gaudenzi, F. Pietrucci, A. Scavuzzo, A. Dello Russo, F. Vagnarelli, C. Lofiego, and M. Marini
Lancisi Cardiovascular Center, Azienda Ospedaliera Universitaria Delle Marche, Ancona, Italy

A 64–year–old woman with maternally inherited hypertrophic cardiomyopathy (MIHCM) was referred to our Cardiomyopathy Center. She was diagnosed with HCM at age 30 via family screening, initially presenting with moderate hypertrophy (IVS 16 mm, PW 13 mm) and preserved left ventricular (LV) systolic function. Family history was significant for adverse cardiac events: her mother died at age 54 from heart failure (HF) in the hypokinetic phase, and two male cousins required heart transplantation at a young age. Genetic testing previously identified a mtDNA A4300G mutation in the tRNAIle gene, which is specifically associated with MIHCM and isolated cardiac involvement.**Clinical Course:** The patient's follow–up was irregular until January 2025, when she was hospitalized for pulmonary edema. Following stabilization, she presented to our center with NYHA Class II–III dyspnea. Medications included metoprolol, furosemide and canrenone. ECG showed sinus rhythm with a short PR interval, deep Q–waves (DI, aVL, V6), diffuse T–wave inversion, left atrial enlargement, and marked biventricular hypertrophy (Fig.1). Echocardiography revealed concentric hypertrophy—maximal at the mid–anterior septum (24 mm) and posterior wall (13 mm)—with a reduced LVEF of 38%, diffuse hypokinesia, and a GLS of –9%. Diastolic dysfunction was severe (E/e' 27) with a dilated left atrium (55 ml/m²) (Fig.2). Laboratory results showed elevated NT–proBNP (3114 pg/ml) and hs–TnI (103 ng/L). Angiography excluded coronary artery disease; right heart catheterization confirmed hemodynamic congestion and reduced cardiac index (PCWP 20 mmHg; mPAP 26 mmHg; CI 2.2 L/min/m²). Due to claustrophobia, cardiac CT with Late Iodine Enhancement (LIE) was performed instead of MRI, revealing extensive intramyocardial fibrosis in the mid–apical septum and inferolateral wall (Fig.3).
Management and Conclusions: An ICD was implanted for primary prevention. HF therapy was optimized with the addition of an SGLT2 inhibitor and low–dose ARB, though up–titration was limited by symptomatic hypotension. The patient was subsequently referred to the Advanced Heart Failure clinic. This case highlights a specific phenotype of mtDNA–related MIHCM: matrilinear transmission, non–obstructive concentric hypertrophy (often involving the posterior wall) and a high risk of progression to LV dysfunction. Clinicians should consider mitochondrial mutations in patients with "sarcomere–negative" HCM, even in the absence of multisystemic symptoms.

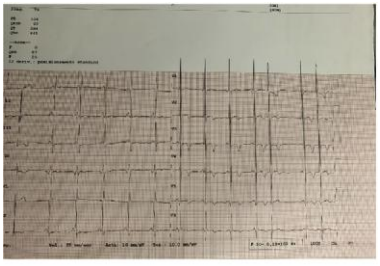

Figure 1

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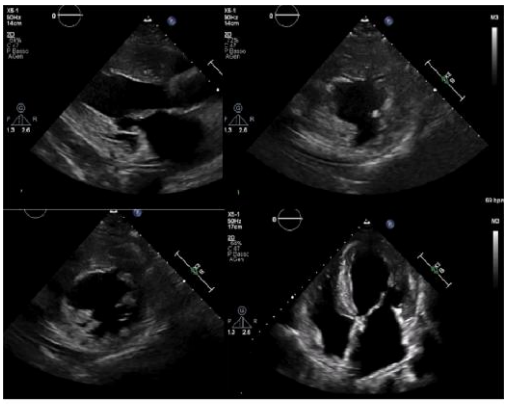

Figure 2

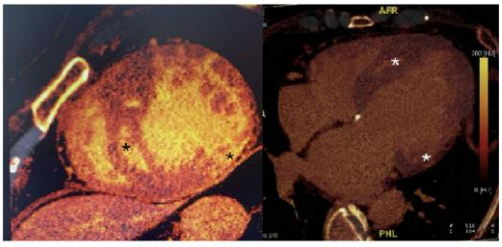

Figure 3. LIE is indicated by the asterisks

Abstract citation ID: suag058.250

CARDIOMYOPATHY AND CPET: A CASE REPORT

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Università Campus Bio–Medico Di Roma; Azienda Ospedaliera San Camillo Forlanin, Roma

Background: Fabry disease is an X–linked lysosomal storage disorder characterized by heterogeneous clinical expression, particularly in female patients, in whom cardiac involvement may be subtle and diagnosis delayed. Cardiopulmonary exercise testing (CPET) provides an integrated assessment of cardiovascular, pulmonary, and peripheral responses to exercise and may help identify early functional abnormalities.
Case summary: A 30–year–old woman was evaluated for unexplained exertional dyspnoea. Her medical history included recurrent febrile episodes in childhood, arthralgia, cold intolerance, hypohidrosis, and mitral valve prolapse with mild–to–moderate mitral regurgitation. Physical examination, resting electrocardiogram, and laboratory tests, including NT–proBNP, were unremarkable. Transthoracic echocardiography showed preserved left ventricular systolic function, normal global longitudinal strain, and no evidence of left ventricular hypertrophy. Cardiopulmonary exercise testing (CPET) revealed reduced peak oxygen consumption (22 mL/kg/min, 62% of predicted), impaired cardiocirculatory efficiency, a mildly increased VE/VCO_2 slope, and a reduced oxygen pulse with a flattened growth pattern, consistent with a primary cardiocirculatory limitation rather than pulmonary disease or deconditioning. These findings prompted further evaluation with cardiac magnetic resonance imaging, which raised suspicion of an infiltrative cardiomyopathy. Subsequent genetic testing identified a heterozygous pathogenic GLA mutation (c.377T›C; p.Phe113Leu), confirming the diagnosis of Fabry disease. Disease–specific therapy with migalastat was initiated. At 6–month follow–up, the patient reported improvement in exercise tolerance, fatigue, and neuropathic pain, along with resolution of proteinuria.
Discussion: This case highlights the pivotal role of cardiopulmonary exercise testing (CPET) in the diagnostic pathway of young female patients with unexplained dyspnoea and preserved resting cardiac function. CPET provided early functional evidence of cardiocirculatory impairment, guiding subsequent targeted imaging and genetic testing. An integrated CPET–based approach may facilitate earlier recognition of Fabry disease and other rare cardiomyopathies, enabling timely initiation of disease–specific therapy. These findings support the inclusion of CPET in the early diagnostic work–up of young patients with suspected cardiomyopathy and preserved resting cardiac function.

FIGURE 1. Cardiac magnetic resonance (CMR) imaging performed prior to the onset of left ventricular hypertrophy.

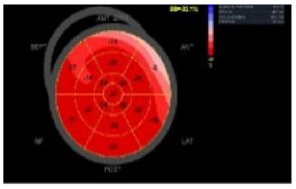

FIGURE 2. Echocardiographic speckle-tracking strain image showing a mild reduction in longitudinal strain in the septal and anterolateral regions

Ischaemic Heart Disease

Abstract citation ID: suag058.251

TRANSIENT ST–SEGMENT ELEVATION CAUSED BY SEVERE INTESTINAL DISTENSION: A PSEUDO–STEMI PRESENTATION

F. Cacciapuoti, S. Crispo, G. Carpinella, R. Gottilla, A. Sasso, and C. Mauro
Aorn Cardarelli, Napoli

Background: ST–segment elevation on electrocardiography is commonly interpreted as a marker of acute coronary artery occlusion. However, extracardiac conditions may occasionally produce pseudo–ischemic electrocardiographic patterns, posing significant diagnostic challenges and increasing the risk of unnecessary invasive procedures.
Case presentation: We report the case of a 68–year–old man with a history of inferior myocardial infarction who presented to the emergency department with severe abdominal distension due to a closed–loop small bowel obstruction. Despite the absence of chest pain or cardiopulmonary symptoms, the admission electrocardiogram showed marked anterolateral ST–segment elevation fulfilling diagnostic criteria for ST–elevation myocardial infarction. High–sensitivity troponin levels were negative. Prompt transthoracic echocardiography demonstrated preserved anterior wall motion, chronic inferior akinesia consistent with prior infarction, and unchanged global longitudinal strain, effectively excluding acute myocardial ischemia. Nasogastric decompression led to rapid resolution of abdominal distension and complete normalization of ST–segment elevation within fifteen minutes. Subsequent abdominal imaging confirmed a closed–loop volvulus requiring urgent surgical intervention, with full bowel viability preserved after adhesiolysis.
Conclusions: This case highlights severe gastrointestinal distension as a rare but clinically relevant cause of transient ST–segment elevation mimicking acute myocardial infarction. Integration of clinical presentation, cardiac biomarkers, and rapid echocardiographic assessment, including strain imaging, is crucial to distinguish pseudo–STEMI from true ischemic events. Recognizing extracardiac causes of ST–segment elevation may prevent unnecessary coronary angiography while ensuring timely management of underlying surgical emergencies.

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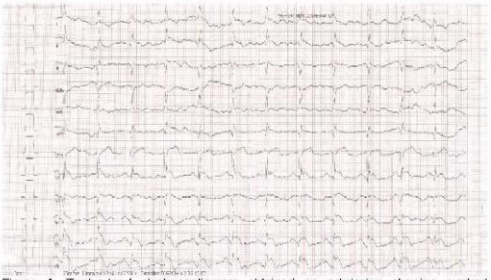

Figure 1. Twelve-lead electrocardiogram obtained on admission showing marked anterolateral ST-segment elevation (leads V4–V6), mimicking acute ST-elevation myocardial infarction, in the absence of chest pain.

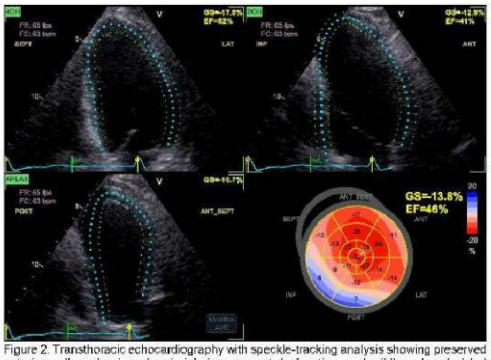

Figure 2. Transthoracic echocardiography with speckle-tracking analysis showing preserved anterior wall mechanics, chronic inferior segment dysfunction, and mildly reduced global longitudinal strain, with no evidence of new ischemia.

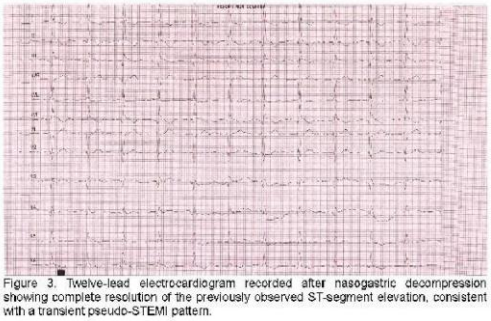

Figure 3. Twelve-lead electrocardiogram recorded after nasogastric decompression showing complete resolution of the previously observed ST-segment elevation, consistent with a transient pseudo-STEMI pattern.

Abstract citation ID: suag058.252

PREDICTING IMPENDING/COVERED HEART RUPTURE AFTER STEMI THROUGH MULTIMODALITY IMAGING: DERIVATION AND PROSPECTIVE ECHOCARDIOGRAPHIC VALIDATION OF THE RUPTURE RISK TRIAD

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Background: Heart rupture (HR) is a rare but highly lethal complication of STEMI, yet the ability of CMR to predict progression to overt rupture in high–risk patients remains unexplored.
Purpose: To derive CMR–based predictors of Impending or Covered Heart Rupture (ICHR) and to prospectively validate whether a composite risk model can be reconstructed using transthoracic echocardiography in high risk STEMI patients.
Methods: We conducted a two–phase study including a multicenter retrospective derivation cohort undergoing early post–reperfusion CMR (n=205) and a single–center prospective echocardiographic validation (n=68). Comprehensive CMR tissue characterization was performed. ICHR was adjudicated as transmural MVO (Figure 2), Extramyocardial thrombus (Figure 1) and Ventricular pseudoaneurysm. In the prospective cohort, the derived Rupture Risk Triad (RRT) was reconstructed echocardiographically (eRRT) (Figure 3), and tested against CMR.
Results: In the retrospective cohort, 26 patients (12%) fulfilled CMR criteria for ICHR. ICHR was associated with universal MVO and IMH, increased infarcted wall thickness, elevated infarcted–to–remote wall thickness ratio, and frequent pericardial effusion (PE). On univariate analysis, max infarcted wall thickness (OR per 1mm increase 1.57, 95% CI 1.30–1.90; p‹0.0001), infarcted–to–remote wall thickness ratio (OR 1.40, 95% CI 1.25–1.63; p‹0.0001), LV thrombus (OR 6.3, 95% CI 2.5–15.0; p=0.001), and PE (OR 45.0, 95% CI 13–161; p‹0.0001) were strongly associated with ICHR. Combined into the CMR–derived RRT, defined by PE, max infarcted wall thickness ›12 mm, and infarcted–to–remote wall thickness ratio ›1.1, a strong association with ICHR (OR 371, 95% CI 68–2036; p‹0.0001) emerged, being the only independent predictor on multivariable analysis (OR 263, 95% CI 28–2512; p‹0.0001; AUC 0.90). In the prospective cohort of high risk STEMI patients with PE, the eRRT demonstrated an overall accuracy of 86.8%, and was strongly associated with CMR–confirmed ICHR (OR 34.4, 95% CI 8.2–144.4; p‹0.0001). Of 21 patients with CMR–confirmed ICHR, 2 underwent urgent ventriculoplasty and 5 required emergent pericardiocentesis for tamponade; all effusions were hemorrhagic.
Conclusions: The CMR–derived Rupture Risk Triad (cRRT) identifies STEMI patients at high risk of progression to overt cardiac rupture and can be reliably reconstructed using routine echocardiography (eRRT), providing a pragmatic bedside tool for early risk stratification and timely escalation of care.

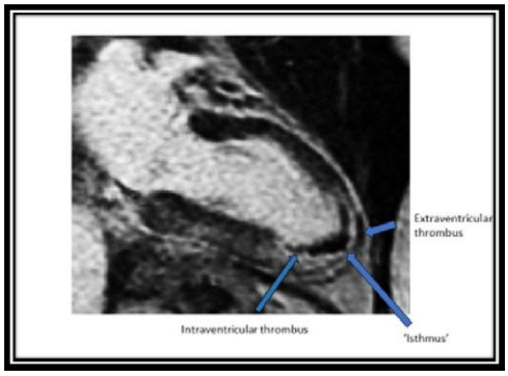

Figure 1

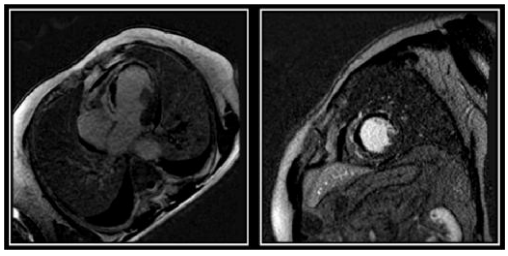

Figure 2

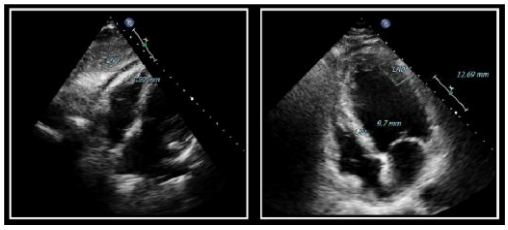

Figure 3

Abstract citation ID: suag058.253

TWENTY–FIVE YEAR TREND IN PATIETNS HOSPITALED WITH ACUTE MYOCARDIAL INFARCTION: AN ANALYSIS BY SEX AND AGE IN THE VENETO REGION

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Cardiologia, Ospedali Dell'Ovest Vicentino, Ulss8 Berica; Azienda Zero, Regione Veneto; Cardiologia, Ospedale Di Padova Sud, Aulss6 Euganea; Cardiologia,

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Ospedale Padova Sud, Aulss6 Euganea; Cardiologia, Ospedale Di Cittadella, Aulss6 Euganea; Cardiologia, Ospedali Dell'Ovest Vicentino, Aulss8 Berica

Aim: The focus on age–adjusted data might conceal the complex relation of sex differences at specific ages. In this study, we aim to examine sex–specific hospitalization rates (HRs) of Acute Myocardial Infarction (AMI) in the following age groups: 0–64 years–old and 65 or older.
Methods: We conducted a retrospective, population–based analysis of all hospital discharge records from 2000 to 2024 in the Veneto. Sex–specific AMI HRs were estimated according to age group and expressed per 100,000 population. The Average Annual Percentage Change (AAPC) and relative 95% Confidence Intervals (CIs) were calculated to identify trends.
Results: From 2000 to 2024, 167,277 patients were hospitalized for AMI in the Veneto Region (mean age: 71.4 ± 13.5 years, 64.3% males). The annual incidence of AMI hospitalizations decreased in the study period among Veneto residents aged 65 or older, both in males [from 744 to 478 per 100,000 population; AAPC –2.21% (95% CI: –2.50 to –1.93), p‹0.0001] and in females [from 423 to 221 per 100,000 population; AAPC –3.30% (95% CI: –3.77 to –2.87), p‹0.0001]. By contrast, a declining incidence of AMI hospitalizations was not observed for residents aged 0 to 64, neither among males [from 83 to 90 per 100,000 population; AAPC +0.09% (95% CI: –0.21 to +0.39), p=0.5299] nor among females [from 17 to 20 per 100,000 population; AAPC +0.21% (95% CI: –0.25 to + 0.68), p=0.3355] (Figure 1). Population aging was evident in both sexes during the study period in the Veneto Region, with the percentage of Veneto residents aged 0 to 64 declining over time relative to the entire Veneto population (Figure 2). However, the annual proportion of AMI admissions attributable to 0–64 patients was steady among males (nearly 40% in each calendar year) and even increasing among females, from 13% in 2000 to 20% in 2024 (Figure 3).
Conclusions: Hospitalizations for AMI decreased in the Veneto Region from 2000 to 2024 among population aged 65 or older, but not among the younger group. Despite aging population, the proportion of AMI hospitalizations attributable to young patients increased from 2000 to 2024 in the Veneto Region among females, but not among males.

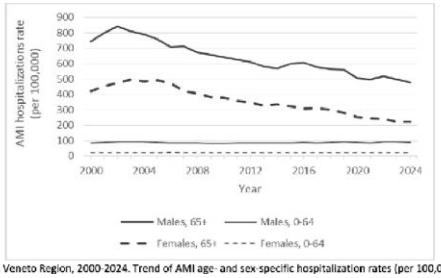

Figure 1. Veneto Region, 2000-2024. Trend of AMI age- and sex-specific hospitalization rates (per 100,000).

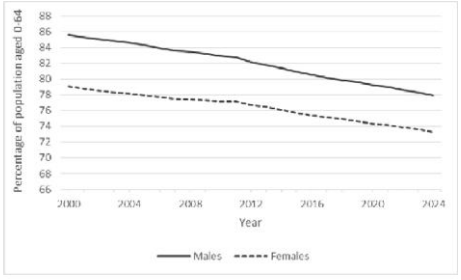

Figure 2. Veneto Region, 2000-2024. Percentage of residents who were young (0-64 years), by sex.

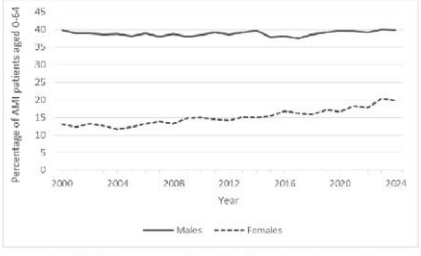

Figure 3. Veneto Region, 2000-2024. Percentage of hospitalized AMI patients who were 0-64 years-old, by sex.

Abstract citation ID: suag058.254

TWENTY–FIVE–YEAR TREND IN EPIDEMIOLOGY AND OUTCOME OF ACUTE MYOCARDIAL INFARCTION

C. Dalla Valle, G. Girardi, M. Zuin, L. Salmaso, E. Schievano, G. Rigatelli, G. Pasquetto, U. Fedeli, C. Bilato, and M. Saia
Cardiologia, Ospedali Dell'Ovest Vicentino, Aluss8 Berica; Azienda Zero, Regione Veneto; Cardiologia, Ospedale Padova Sud, Aulss6 Euganea; Cardiologia, Ospedale Di Cittadella, Aulss6 Euganea; Cardiologia, Ospedali Dell'Ovest Vicentino, Aulss8 Berica

Aim: Trends in acute myocardial infarction (AMI) epidemiology and care at the population level provide insight into the effectiveness of healthcare systems. In this study, we aim to evaluate 25–year trends in AMI hospitalizations, management and outcomes, in the Veneto Region (Italy) population.
Methods: We conducted a retrospective, population–based analysis of all hospital discharge records from 2000 to 2024. AMI cases were classified as ST–Elevation myocardial infarction (STEMI) or Non–ST–Elevation myocardial infarction (NSTEMI) using ICD9–CM codes. Hospitalization rates, key care process indicators and 30–day mortality were estimated. The average annual percentage change (AAPC) and relative 95% confidence interval (CI) were calculated to identify trends.
Results: Over the study period, 167,277 patients were hospitalized for AMI in the Veneto Region. STEMI accounted for 57.3% of cases (mean age: 70.6 ± 13.9 years), and NSTEMI for the remaining 42.7% (mean age: 72.4 ± 12.8 years). Age–standardized hospitalization rates of AMI declined during the study period from 151.1 to 98.8 per 100,000 inhabitants [AAPC: −2.30%, (95% CI: −2.63 to −2.01), p‹0.001], driven by reductions in STEMI [AAPC: −4.72%, (95% CI: −5.20 to −4.34), p‹0.001], while NSTEMI increased [AAPC: +1.05%, (95% CI: 0.25 to 1.86), p=0.011] and became predominant from 2016 onward (Figure 1). Admissions in specialized cardiology wards (ordinary or intensive care) increased over time, especially among STEMI patients [from 68.7% in 2000 to 85.1% in 2024; AAPC: +0.85% (95% CI: 0.68 to 1.03), p‹0.001]. Moreover, same–day PCI among STEMI patients increased markedly from 8.0% in 2000 to 72.3% in 2024 [AAPC: +6.41%, (95% CI: 5.36 to 8.20), p‹0.001] (Figure 2). The age–standardized 30–day mortality rate declined continuously throughout the 25–year period both for STEMI (from 19.3% in 2000 to 13.2% in 2024) and for NSTEMI (from 10.0% to 5.1% in the same period) (Figure 3).
Conclusions: Over 25 years, AMI in the Veneto Region shifted from STEMI– to NSTEMI–dominance, with improved procedural access and outcomes.

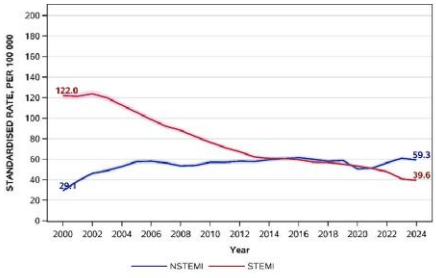

Figure 1. Veneto Region, 2000-2024. Trends of the age-standardized hospitalization rates (per 100,000 population) for STEMI and NSTEMI (reference population: Veneto, 2007). The shaded area indicates the 95% CI.

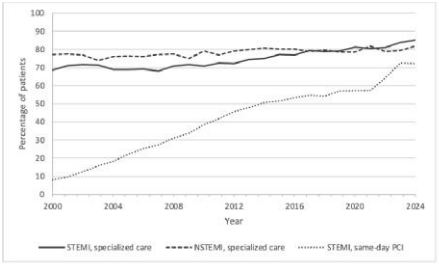

Figure 2. Veneto Region, 2000-2024. Trend of patients hospitalized in a cardiology ward (ordinary or intensive care) by type of AMI, and same-day PCI among STEMI cases.

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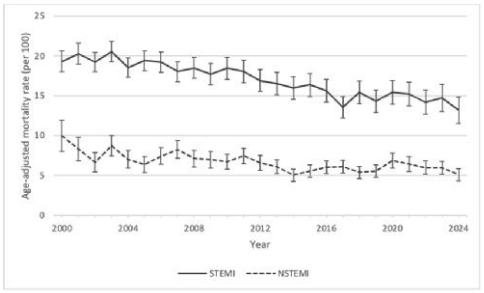

Figure 3. Veneto Region, 2000-2024.Trends of age-adjusted 30-day mortality rate (per 100 patients) according to type of AMI (reference population: Veneto residents hospitalized for AMI in the year 2007).

Abstract citation ID: suag058.255

WHEN A CRYPTOGENIC MYOCARDIAL INFARCTION OPENS A PANDORA'S BOX

V. Illari, I. Pasquino, L. Torlai Triglia, G. Magnani, M. Noni, R. Giacalone, G. Paoli, M. Bianconcini, A. Guidorossi, and G. Niccoli
Azienda Ospedaliero Universitaria Di Parma

A 50–year–old man with obesity, dyslipidemia, and a history of renal calculosis presented to the Cardiology department with an infero–lateral ST–segment elevation myocardial infarction. Emergent coronary angiography revealed a circumflex artery characterized by multiple distal branch occlusions suspected for thromboembolism (Figure 2), with intravascular ultrasound showing partial recanalization of terminal vessels. Echocardiography demonstrated a left ventricular ejection fraction of 50% with basal inferior wall hypokinesia and mild aortic root ectasia. Given the angiographic suspicion of systemic thromboembolism of unknown source, an extensive diagnostic work–up was undertaken. Thrombophilia screening was unremarkable. No episodes of atrial fibrillation were detected during continuous monitoring. Transcranial Doppler identified a significant right–to–left shunt, confirmed by transesophageal echocardiography through a patent foramen ovale (Figure 1). Thoraco–abdominal CT did not show any thrombotic source. However, it revealed a non–calcific pulmonary nodule requiring surveillance, and at least five pancreatic lesions up to 2 cm with arterial–phase enhancement suggestive of neuroendocrine tumors. Laboratory tests showed persistent hypercalcemia and elevated parathormone consistent with primary hyperparathyroidism, while neuroendocrine markers remained within normal limits. Paratiroidectomy has been advised. The coexistence of pancreatic NETs and hyperparathyroidism raised a strong suspicion for multiple endocrine neoplasia type 1. Although no direct association between acute coronary syndromes and MEN syndromes has been reported in the licterature, MEN–related neoplastic disease may increase the overall embolic risk. Hypercoagulability is a clinically relevant concern in MEN1. Recent studies have demonstrated that patients with MEN1 have an increased risk of venous thromboembolism, with incidence rates two–fold higher than the general population. In the absence of a definite embolic source, it cannot be excluded that the increased thromboembolic risk and the anatomical predisposition associated with a patent foramen ovale may have contributed to coronary embolization. The patient was referred for multidisciplinary management. The patient remained asymptomatic on dual antiplatelet therapy. Genetic testing for MEN is ongoing. Patent foramen ovale closure was successfully performed.

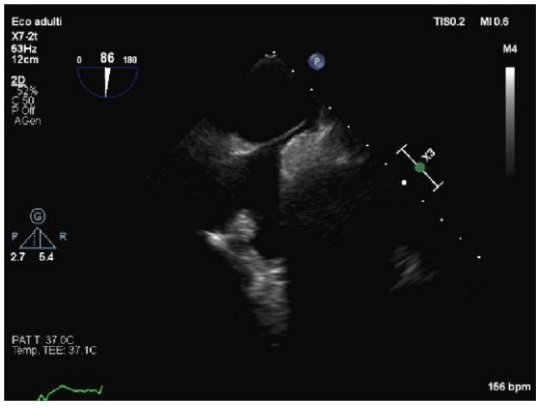

Figure 1

Figure 2

Abstract citation ID: suag058.256

THERAPEUTIC CHALLENGES IN RESISTANT VASOSPASTIC ANGINA: A CASE REPORT

F. Aliberti, M. Maltempi, S. Sforna, E. Bordoni, E. Carluccio, B. Casini, G. Orlando, and E. Colucci
Cardiologia E Fisiopatologia Cardiovascolare Azienda Ospedaliero Universitaria, S. Maria Della Misericordia; Servizio Di Diagnostica Cardiovascolare Avanzata, Ospedale Media Valle Del Tevere, Usl Umbria 1; S.C. Cardiologia, Ospedale S. Maria Della Misericordia

Introduction: Coronary vasospasm is a recognized cause of MINOCA and usually responds to calcium–channel blockers and nitrates. A minority of patients develops severe refractory vasospastic angina with recurrent ischemia.
Case Report: A 55–year–old man presented with resting chest pain and elevated high–sensitivity troponin. Coronary angiography showed non–critical coronary atherosclerosis; cardiac MRI revealed transient edema. A diagnosis of vasospastic MINOCA was suspected and amlodipine initiated. Recurrent episodes in July and October 2024 prompted acetylcholine testing, positive at 50 µg for epicardial vasospasm, with preserved microvascular function. Therapy was progressively intensified (diltiazem, nitrates, dihydropyridine CCBs, ranolazine) with smoking cessation. In January 2025 he developed a new ischemic event complicated by complete atrioventricular block due to circumflex artery spasm (Fig.1). Given rapid progression and refractoriness to maximal therapy, cardiac sympathetic denervation was performed in "Molinette" Hospital in Turin. At follow–up in September 2025, full physiological assessment confirmed normal microvascular indices (Fig.3). Acetylcholine testing remained positive at 50 µg but the patient remained completely free of anginal or ischemic events (Fig.2). Discussion Vasospasm arises from smooth muscle hyperreactivity, endothelial dysfunction and autonomic imbalance. Excessive sympathetic activation may sustain vasomotor instability through stellate ganglion remodeling and cardio–spinal reflex pathways. Sympathetic denervation interrupts these circuits, representing a valuable option in selected refractory cases, as demonstrated in this patient.
Conclusion: This case highlights an exceptional form of coronary vasospasm unresponsive to all available therapies and complicated by recurrent MINOCA and conduction disturbances. Cardiac sympathetic denervation resulted in marked clinical stabilization despite persistent angiographic vasoreactivity. In view of the complete absence of further ischemic episodes, no additional interventions were pursued, and the patient remains under clinical and angiographic follow–up. Future perspectives may include regenerative strategies such as autologous CD34+ stem cell therapy, a promising approach for endothelial and microvascular dysfunction that warrants dedicated investigation.

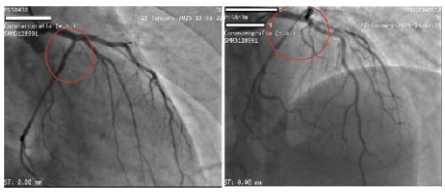

Figure 1

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Figure 2

Figure 3

Congenital Heart Disease

Abstract citation ID: suag058.257

SCIMITAR SYNDROME IN AN ASYMPTOMATIC 46–YEAR–OLD PATIENT DIAGNOSED BY COMPUTED TOMOGRAPHY

F. Nicoli, E. Collaku, R. Mollace, M. Licastro, M. Lo Monaco, M. Brusamolino, F. Frascaro, S. Frittella, G. Agati, E. Corghi, S. Malara, A. Zanello, and E. Bertella
Humanitas Gavazzeni, Bergamo

An asymptomatic 46–year–old man, with a previous childood history of Scimitarra Syndrome, underwent a high–resolution chest CT scan after a cardiological visit with normal EKG and echocardiography. No prior advanced thoracic imaging had been performed after childhood, with no more documentations of the diagnosis.

Echocardiography revealed normal bi ventricular function, no chamber hypertrophy or dilation, no pulmonary hypertension, and no evidence of defects. Contrast–enhanced chest CT showed an anomalous vein draining all the right pulmonary vein into the upper limit of inferior vena cava [Fig.1, axial view]. The characteristic inferomedial course resembled a “scimitar“ on sagittal reconstruction [Fig 2, sagittal view]. Neither hypoplasia of the lung nor mediastinal shift were reported. No evidence of systemic arterial supply anomalies, though there was a mild enlargement of the pulmonary arteries, with evidence of a small interatrial septal defect (ASD) type ostium secundum [Fig.3].

Scimitar syndrome presents with a broad clinical spectrum. The neonatal form is often severe, with respiratory and cardiac failure. In contrast, adult forms, such as in this case, may remain asymptomatic and are discovered incidentally. CT imaging is the gold standard for diagnosis, due to its high anatomical resolution. Although echocardiography has limitations in visualizing anomalous pulmonary venous return, it is useful for excluding associated cardiac anomalies and pulmonary hypertension. In our patient, the absence of symptoms, right chamber dilation or hemodynamic compromise, supports a conservative management strategy, with regular clinical and imaging follow–up.**Conclusions:** Scimitar syndrome can remain asymptomatic until adulthood and may be incidentally diagnosed through CT imaging. Almost the 50% in literature is associated to the left to right shunt, so echocardiography plays a complementary role. Surgery is the definitive treatment for scimitar syndrome. However, it is not always necessary as many patients are asymptomatic, have small left–to–right shunts, and enjoy a normal life expectancy without surgery. This case highlights the importance of thoracic imaging even in asymptomatic individuals and emphasizes the need for a multidisciplinary evaluation to determine the most appropriate management approach.

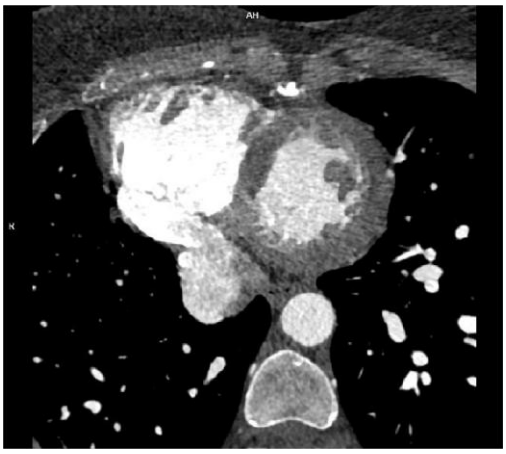

Figure 1

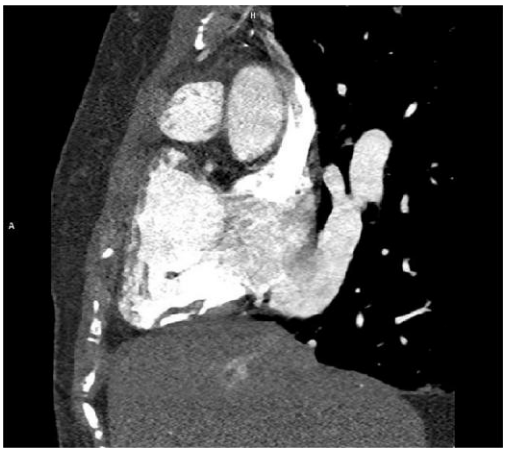

Figure 2

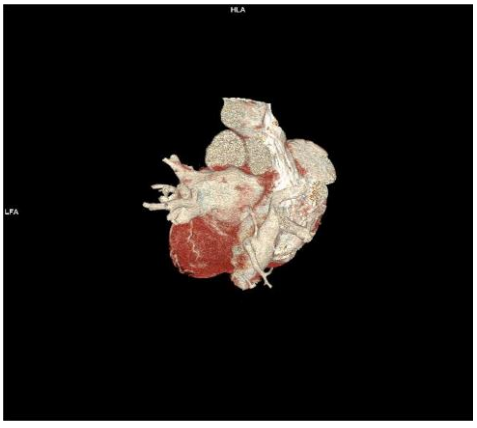

Figure 3

Abstract citation ID: suag058.258

TRICUSPID VALVE OVERRIDING ASSOCIATED WITH A SMALL PERIMEMBRANOUS VENTRICULAR SEPTAL DEFECT: THE ROLE OF MULTIMODALITY IMAGING IN ANATOMICAL DEFINITION AND PROGNOSTIC STRATIFICATION

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Ospedale Dei Bambini, G. Di Cristina, Palermo

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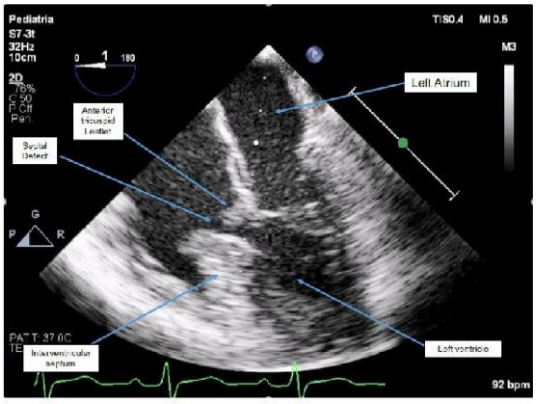
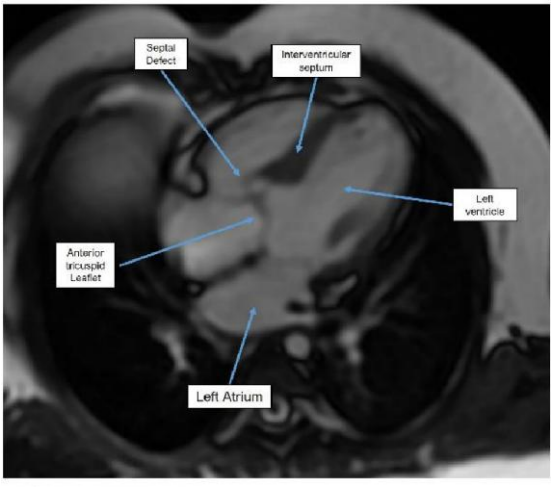
Introduction: Tricuspid valve overriding is a rare congenital anomaly of the atrioventricular junction, frequently associated with a ventricular septal defect. Differentiation from more complex conditions, such as tricuspid straddling or unbalanced atrioventricular septal defects, is crucial for accurate prognostic assessment and to avoid unnecessary therapeutic interventions. In this setting, multimodality imaging plays a central role.
Case report: We report the case of an 8–year–old boy referred to our center after the incidental detection of a cardiac murmur following Parvovirus B19 infection. Electrocardiography revealed sinus rhythm with incomplete right bundle branch block. Transthoracic echocardiography showed posterior interventricular septal malalignment with tricuspid valve overriding and a perimembranous ventricular septal defect partially closed by the tricuspid subvalvular apparatus, associated with a mild left–to–right shunt (Qp/Qs ≈1.4) and mild tricuspid regurgitation. Biventricular systolic function was preserved. Holter monitoring and exercise testing showed no arrhythmias and good age–related functional capacity (Figure 1).

Cardiac magnetic resonance imaging confirmed tricuspid valve overriding with a small perimembranous ventricular septal defect (≈5 mm), a very mild interventricular shunt (Qp/Qs = 1.2), normal biventricular volumes and systolic function, and no evidence of intramyocardial fibrosis. Transesophageal echocardiography definitively excluded tricuspid valve straddling, allowing complete anatomical characterization (Figure 2).
Discussion: Anomalies of the right atrioventricular complex encompass a wide morphological and functional spectrum. In patients with mild shunting and preserved ventricular function, distinguishing simple tricuspid overriding from more complex forms is essential. The integration of transthoracic and transesophageal echocardiography with cardiac magnetic resonance enables accurate anatomical definition, reliable shunt quantification, and appropriate prognostic stratification.
Conclusions: This case highlights the key role of multimodality imaging in the management of rare congenital heart diseases involving the atrioventricular junction. Precise anatomical assessment supports a conservative management strategy and tailored follow–up in asymptomatic patients with mild shunt and normal ventricular function, avoiding unnecessary invasive interventions.



Transesophageal echocardiography

Figure 1



Cardiac magnetic resonance

Figure 2

Abstract citation ID: suag058.259

BIVENTRICULAR DYSFUNCTION IN FETUSES WITH PULMONARY ATRESIA WITH INTACT VENTRICULAR SEPTUM: THE ROLE OF VENTRICULAR INTERDEPENDENCE

J. Luchetti, P. Moras, C. Campanale, M. Masci, S. Ventrella, L. Pasquini, and A. Toscano
Ospedale Pediatrico Bambino Gesù, Roma; Policlinico Universitario Fondazione Agostino Gemelli, Roma

Background: Ventricular interdependence plays a crucial role in the pathophysiology of congenital heart disease (CHD), particularly in fetuses with pulmonary atresia with intact ventricular septum (PAIVS). It may contribute to fetal heart failure and has major implications for perinatal management.

This study aimed to assess biventricular systolic function using speckle tracking echocardiography in fetuses with PAIVS, compared to healthy controls.
Methods: We conducted a retrospective observational study between 2018 and 2024, including two cohorts: 30 healthy fetuses and 30 fetuses with a prenatal diagnosis of PAIVS. In both groups, right and left ventricular systolic function was assessed using speckle tracking analysis, and intergroup comparisons were performed.
Results: Fetuses with PAIVS showed signicantly impaired right ventricular function compared to controls, with a mean right ventricular global longitudinal strain (RV GLS) of –16.8 ± 5%, versus –28 ± 6% in the control group, with a p–value less than 0.001. Right ventricular free wall strain was also reduced, with a mean value of –12.8 ± 7% in the PAIVS group, compared to –25.2 ± 9% in controls, p–value less than 0.001. Left ventricular systolic function was similarly impaired in the PAIVS group, with a left ventricular global longitudinal strain (LV GLS) of –15.0 ± 4%, compared to –32.0 ± 5% in controls, p–value less than 0.001. Left ventricular ejection fraction averaged 55 ± 3% in fetuses with PAIVS, compared to 72 ± 5 % in healthy controls, p–value less than 0.001 (Tab. 1).
Conclusions: These findings demonstrate marked biventricular systolic dysfunction in fetuses with PAIVS, likely reflecting the effects of ventricular interdependence in the setting of severe right ventricular outflow tract obstruction. Speckle tracking assessment may offer valuable functional insight and support prenatal risk stratification and tailored perinatal planning.

Parameter	Controls (n =30)	PAIVS (n = 30)	p value
LV GLS (%)	-32.0 ± 5.0	-15.0 ± 4.0	< 0.001
LVEF (%)	72 ± 5.0	55.0 ± 3.0	<0.001
RV GLS (%)	-28.0 ± 6.0	-16.8 ± 5.0	<0.001
RV FWS (%)	-25.2 ± 9.0	-12.8 ± 7.0	<0.001
RV FAC (%)	55.0 ± 7.0	30.5 ± 5.0	<0.001

Table 1

Abstract citation ID: suag058.260

TRANSIENT JUXTADUCTAL OBSTRUCTION: DIFFERENTIATING RESTRICTIVE DUCTUS ARTERIOSUS FROM TRUE COARCTATION

F. Pierfelice, M. Gravina, S. Di Valerio, R. Cognini, G. Carlone, S. Di Credico, and M. Di Marco
U.O.C. Cardiologia Con Utic, Ospedale "S. Spirito" Pescara; U.O.C. Neonatologia E Tin, Ospedale "S. Spirito" Pescara

Background: Aortic coarctation is a critical congenital heart disease that may present in the neonatal period, often requiring urgent intervention. However, transitional cardiovascular changes after birth, particularly involving the ductus arteriosus, may mimic its echocardiographic features.
Clinical Case: A male neonate was born at 39+2 weeks of gestation via spontaneous vaginal delivery after an uneventful pregnancy. The infant was clinically stable and admitted to the postnatal ward. At 36 hours of life, a routine physical examination revealed a soft systolic murmur at the left upper sternal border. Peripheral pulses were palpable and symmetrical, and oxygen saturation was 98% in both pre– and post–ductal measurements. Blood pressure measurements showed a mild difference between upper and lower limbs. Transthoracic echocardiography demonstrated mild narrowing of the aortic isthmus without a clear indentation (“shelf”), turbulent flow at the juxtaductal region and a peak systolic gradient of approximately 20 mmHg, raising suspicion of aortic coarctation (Figure 1). The ductus arteriosus appeared small with high–velocity left–to–right flow, suggesting ongoing closure (Figure 2). Left ventricular function was normal, and no other structural cardiac anomalies were identified. Given the echocardiographic findings, the infant was transferred to a tertiary neonatal cardiology unit for further evaluation. PGE1 infusion was considered but withheld due to the infant’s stable clinical condition. Serial echocardiographic assessments were performed over the following 72 hours. Progressive complete closure of the ductus arteriosus was observed, accompanied by normalization of the aortic

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isthmus diameter and resolution of the previously noted flow turbulence. The systolic gradient across the aortic arch decreased to less than 5 mmHg. Blood pressure differences between upper and lower limbs resolved, and femoral pulses remained strong and symmetrical. Based on these findings, the diagnosis of aortic coarctation was excluded and the initial echocardiographic features were attributed to transient ductal tissue and altered flow dynamics during physiological ductal closure.
Conclusion: A ductus arteriosus in the process of closing can create a transient functional obstruction that perfectly mimics aortic coarctation, both in symptoms and Doppler measurements. Careful clinical assessment and serial echocardiography are essential to avoid misdiagnosis and unnecessary interventions.

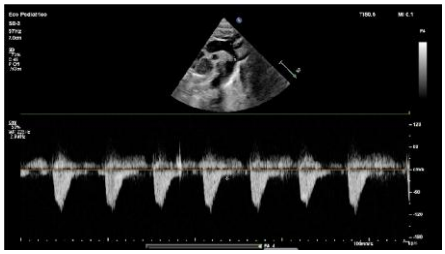

Figure 1

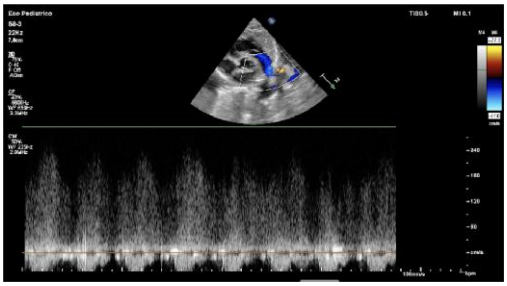

Figure 2

Abstract citation ID: suag058.261

HYPERTROPHYC CARDIOMYOPATHY IN FONTAN PATIENT RELATED TO LATE MID–VENTRICULAR OUTFLOW OBSTRUCTION

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Background: Systemic ventricular outflow obstruction in patients with functionally univentricular heart underwent Fontan procedure promotes myocardial hypertrophy, and this has been shown to be an unequivocal risk factor for poor outcomes.
Methods: A 17–year–old man with congenitally corrected transposition of the great arteries, pulmonary valve atresia and multiple ventricular septal defects and background of modified Fontan operation was regularly followed–up in our center. In 2021, the echocardiogram reveled a dynamic obstruction due to prominent muscle ridge of ventricle septum with a peak gradient of 30 mmHg. Thus, he was referred to CMR which showed unobstructed surgical Fontan connections and normal univentricular size and function. Over the next 4 years, the gradient gradually increased across the systemic ventricular outflow tract (range 60–80 mmHg) and the single ventricle developed a severe concentric hypertrophy with a mild dysfunction and a restrictive filling pattern. These data were confirmed by the transesophageal echocardiogram (Fig1) and the newest CMR (Fig2). The patient was referred to genetic screening for cardiomyopathies and none pathogenetic mutations were detected. Further investigation revelead that the patient had reduced exercise tolerance (VO2 peak 11.1 ml/kg/min). Beta–blocker and SGLT2 inhibitor treatment were introduced and ICD therapy was indicated for frequent non–sustained ventricular tachycardias. Currently, the cardiac transplantation process evaluation is ongoing.
Results: We hypothesized that the hyperthrophic cardiomyopathy was related to systemic ventricular outflow obstruction supported by a prominent muscle ridge of the ventricular septum concurring to narrow the space between the right side–ventriculoinfundibular fold and the infundibular septum.
Conclusions: Systemic ventricular outflow obstruction after the Fontan operation is a progressive lesion. We suggest that patients at risk for progressive ventricular outflow obstruction should be managed aggressively in order to get to the optimal care.

Figure 1:Trans–Oesophageal Echocardiography (transgastric short axis and midesophageal long axis views) showing the concentric hypertrophy and the accelerated flow in the subsystemic outflow tract

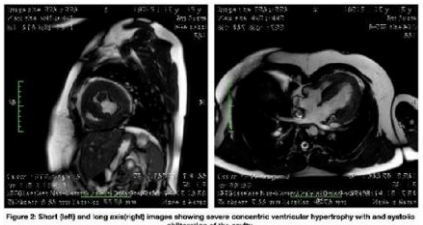

Figure 2: Short (left) and long axis(right) images showing severe concentric ventricular hypertrophy with and systolic obliteration of the cavity.

Abstract citation ID: suag058.262

OUTCOMES OF TRANSCATHETER PULMONARY VALVE–IN–VALVE IMPLANTATION: A SINGLE–CENTRE OBSERVATIONAL STUDY

D. Ceruti, B. Alonzo, S. Linsalata, I. Borzillo, R. Lotti, G. Guglielmi, A. Giordano, F. Bevilacqua, A. D'Aiello, G. Pasqualin, A. Micheletti, D. Negura, L. Piazza, A. Giamberti, and M. Chessa
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Background: as prevalence of patients with congenital heart disease increases, many patients who have previously undergone pulmonary valve replacement develop dysfunction of the bioprosthesis. Transcatheter pulmonary valve–in–valve implantation (TPViV) is an option of treatment of failing pulmonary bioprosthetic valves, but extensive data are not yet available.
Methods: we retrospectively analysed 60 patients who underwent TPViV within a failing surgical or percutaneous valve in our Centre since January 2009 to August 2025, collecting procedural data and echocardiographic findings before and after the procedure. Primary outcome at long–term follow–up was a composite of death or reintervention.
Results: 60 patients were included (mean age 34.1 ±14.6 years; two–thirds male), primarily with an underlying diagnosis of Tetralogy of Fallot (two–thirds) and a history of ≥2 previous cardiac surgeries. The predominant mechanism of valve dysfunction was mixed stenosis and regurgitation. All 60 patients underwent successful TPViV (37 Sapien, 20 Melody and 3 Myval) with no deaths or conversions to open–heart surgery. The procedure significantly reduced peak RVOT gradients (mean reduction 30.7 ±19.5 mmHg, p‹0.001) and right ventricular systolic pressure (mean reduction 25.7 ±19.5 mmHg, p‹0.001), with only one more–than–mild pulmonary regurgitation at discharge. At a mean follow–up of 42.2 months, the composite endpoint of death or reintervention occurred in 17.2% of patients (2 deaths, 8 reinterventions), with infective endocarditis as the main cause. Reintervention–free survival remained ›90% at 1000 days.
Conclusions: TPViV is a safe and effective strategy for managing dysfunctional pulmonary bioprosthetic valves. Long–term follow–up reinforces that while durability is generally high, endocarditis remains a primary mechanism of late failure requiring reintervention.

Congenital Heart Disease and Pregnancy

Abstract citation ID: suag058.263

SUBCUTANEOUS IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (S–ICD) IMPLANTATION IN A PATIENT WITH SITUS INVERSUS: A CASE REPORT

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Abstract: The subcutaneous implantable cardioverter–defibrillator (S–ICD) represents an effective alternative to transvenous systems for the prevention of

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sudden cardiac death, particularly in patients with challenging vascular access or anatomical anomalies. We report the successful implantation of an S–ICD in a patient with situs inversus totalis, a condition with unique technical challenges.
Case Presentation: A 54–year–old female with known situs inversus totalis and no prior cardiac history was admitted due to chest pain. Followed by a diagnosis of NSTEMI, successfully treated with a DES implantation. TTE showed severe hypokinesia of the left ventricle with an EF of 28%. Given the rare combination of situs inversus totalis and SCA, detailed assessment of anatomical implications was essential. The atypical anatomy rendered a S–ICD preferable, considering the young age, the absence of pacing indications and the increased risk of complications with transvenous ICD.
Methods: A preoperative thoracic CT revealed dextrocardia with the apex directed laterally to the right, a left–sided aortic arch, and mirrored positions of both vena cava, that required a reversed implant strategy compared to standard left–sided S–ICD procedures. Pre–implantation ECG screening was performed using a mirrored electrode configuration to replicate the electrical axis pathway. All three sensing vectors were deemed appropriate, supporting the feasibility of S–ICD implantation in this context. Using a standard two–incision technique, the generator pocket was created in the right lateral thoracic, between latissimus dorsi and serratus anterior muscles in the right lateral thoracic region, and the lead tunneled along the right parasternal line, mirroring the conventional left–sided implantation.
Results: The implantation was successful without intraoperative complications. The result of PRAETORIAN score (30) fell within the low–risk category and suggesting an optimal shock vector. The patient tolerated the procedure well, and was discharged in good condition.
Conclusion: S–ICD implantation in patients with situs inversus is both feasible and safe when preceded by detailed imaging and tailored procedural planning, and represents a significant advantage by avoiding the risks associated with transvenous systems in such anatomical variants Thus, this approach should be considered when transvenous ICD implantation poses elevated risks or technical difficulties about non–standard implantations

Abstract citation ID: suag058.264

UNREPAIRED DOUBLE–INLET LEFT VENTRICLE WITH SEVERE PULMONARY ARTERIAL HYPERTENSION IN THE SIXTH DECADE: HEMODYNAMICS, TRIPLE PAH THERAPY, AND ARRHYTHMIC RISK

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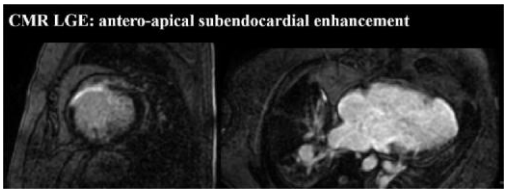
We report a 61–year–old man with unrepaired single–ventricle physiology (double inlet left ventricle, mesocardia, malposed great vessels) and stable chronic cyanosis (baseline SpO2 80–85%). In the absence of a “protective” pulmonary stenosis, lifelong high pulmonary flow and pressure led to pulmonary vascular remodeling and increased resistance, resulting in severe pulmonary arterial hypertension (PAH) with Eisenmenger–type physiology; the single ventricular pump is highly preload – cardiac rhythm–, and systemic pressure–dependent. The course is complicated by acquired ischemic heart disease: an anterior acute coronary syndrome in 2015 in the setting of anomalous coronaries and supply–demand mismatch. Cardiac MRI showed severe dominant–ventricle dilation, EF ~33%, and antero–apical subendocardial late gadolinium enhancement. Right–heart catheterization confirmed severe PAH with PAP 120/22 mmHg (mean 55), PAWP 9 mmHg and PVR 6.2 WU, supporting initiation of triple PAH therapy (macitentan, sildenafil, selexipag) with close monitoring of systemic pressure and volume status. Clinical decompensations were triggered by atrial fibrillation or atrial tachycardia with high ventricular response, managed with rhythm and/or rate control (amiodarone, digoxin, cautious beta–blocker titration) and tailored decongestion. Non–invasive ventilation with positive pressures (BiLevel) was set conservatively given the effects of intrathoracic pressure on venous return and pulmonary circulation. Long survivors with DILV in natural history are exceedingly rare and appear to cluster into two phenotypes: “balanced” circulations with restricted pulmonary flow, and exceptional cases without protection who develop pulmonary vasculopathy. This patient belongs to the latter and is notable for triple PAH therapy; depressed systolic function may have mitigated pulmonary flow overload, contributing to a fragile equilibrium. Arrhythmic/sudden–death risk stratification in a single ventricle with scar led to ICD counselling, which the patient refused. Unrepaired DILV reaching the sixth decade with severe PAH is exceptional; management should remain physiology–driven.



Abstract citation ID: suag058.265

CONGENITAL ABSENCE OF THE LEFT MAIN CORONARY ARTERY IN A PATIENT WITH DILATED CARDIOMYOPATHY

E. Giacomin, C. Cutaia, and A. Congedo
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Background: Congenital absence (agenesis) of the left main coronary artery (LMCA) is an exceptionally rare coronary anomaly. Its coexistence with dilated cardiomyopathy (DCM) is scarcely reported, and the pathophysiological relationship between these conditions remains uncertain.
Case presentation: A hypertensive female patient with multiple cardiovascular risk factors presented with exertional angina, palpitations, dyspnea on moderate exertion, and asthenia. Transthoracic echocardiography revealed mild left ventricular (LV) dilation with borderline systolic function and reduced global longitudinal strain, consistent with hypertensive heart disease. Coronary computed tomography angiography showed congenital absence of the left coronary artery, with compensatory collateral circulation originating from the conus branch supplying the anterior LV wall. Invasive coronary angiography confirmed the absence of the LMCA, a dominant right coronary artery, and collateral flow to a hypoplastic left anterior descending artery and the circumflex artery. Cardiac magnetic resonance imaging demonstrated preserved biventricular volumes and function, mild regional wall motion abnormalities, and subepicardial delayed gadolinium enhancement with a non–ischemic pattern in the mid–basal lateral wall. At follow–up, echocardiography showed progression to mildly reduced LV systolic function (LVEF 45%), consistent with ischemic–hypertensive cardiomyopathy. The patient’s twin sister, affected by dilated cardiomyopathy, underwent coronary CT angiography, which demonstrated anatomically normal coronary arteries. Given the familial occurrence of DCM, genetic testing was performed in both sisters to investigate a possible hereditary etiology.
Discussion and conclusions: This case highlights the diagnostic complexity of concomitant LMCA agenesis and DCM. It remains unclear whether these conditions represent two independent entities sharing a genetic background or whether chronic myocardial hypoperfusion related to anomalous coronary anatomy may have contributed to LV remodeling. The presence of non–ischemic subepicardial fibrosis suggests additional mechanisms beyond epicardial coronary supply. Multimodality imaging and genetic evaluation are essential to clarify the relationship between congenital coronary anomalies, myocardial fibrosis, and ventricular dysfunction.

Figure 1: Coronary CT Angiography (CCTA) with contrast

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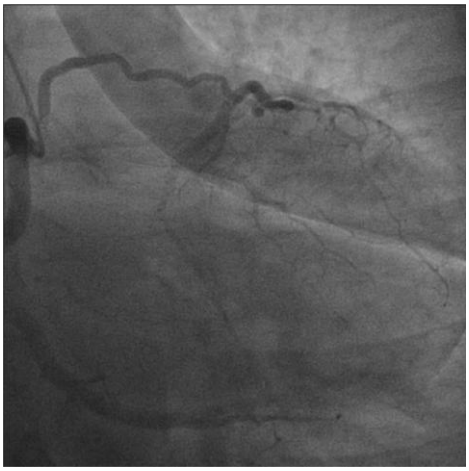

Figure 2: coronary angiography

Figure 3: left ventricular strain

Abstract citation ID: suag058.266

PREGNANCY AND HEART DISEASE: A SINGLE–CENTRE STUDY

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Background: Pregnancy is a crucial moment in women's life, characterized by changes in the cardiovascular system, that may translate into risks for patients with congenital or acquired heart disease.
Methods: In this retrospective observational study, we evaluated the clinical–instrumental trends of heart disease patients referred to a single Centre of Pediatric Cardiology from 1970 to 2024 during pregnancy. Baseline characteristics, maternal gestational complications, obstetrical and fetal complications were studied. Then, the population was divided into three groups based on the modified World Health Organization classification, and the above characteristics and complications were analyzed within each study group.
Results: A total of 287 pregnancies were examined from 139 patients with congenital or acquired heart disease, most of whom were already aware of the condition before gestation. More gestations were carried by patients with mild heart diseases. The rates of clinical–instrumental worsening of maternal heart disease during pregnancy correlate positively with its severity: from 8% worsening in the mild heart disease group to 32% in the moderate group to 46% in the severe group. Similarly, severe heart disease required more often introduction or enhancement of cardiology therapy during gestation. Further features that correlate positively with the severity of maternal heart disease are: the need for postpartum hospitalization of the mother in intensive care, neonatal prematurity, low neonatal birth weight, indication for delivery by cesarean section and abortions. However, the incidence of obstetric complications is similar among the study populations. The recurrence of heart disease in the newborn does not correlate with the severity of maternal cardiopathy.
Conclusions: Today, with the evolution of cardiac surgery and increasing migration flows, more patients with congenital or acquired heart disease are facing pregnancy. Knowledge of cardiovascular adaptation in pregnancy and during childbirth and the pathophysiology of heart disease are fundamental to treat such patients. Adequate preconception counseling, maternal risk stratification, and the establishment of a multidisciplinary medical pregnancy team are crucial in their management.

Abstract citation ID: suag058.267

LONG MYOCARDIAL BRIDGING IN THE LEFT ANTERIOR DESCENDING ARTERY: A CASE REPORT

R. Marzullo, M. Cappelli Bigazzi, R. Basile, M. Giordano, G. Gaio, R. Esposito, S. Dell'Aversana, M. Palladino, G. Limongelli, and M. Russo
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Background: Myocardial bridge (MB) is a tunneled segment of an epicardial coronary artery, running deep and for varying lengths in the context of the myocardial muscle. The clinical picture of MB ranges from the asymptomatic presentation to an acute coronary syndrome and sudden cardiac death.
Case report: We present the case of an 18–year–old patient underwent pulmonary commissurotomy, cleft mitral valve closure and surgical correction of atrial septal defect when he was infant. During the recent follow–up, he experienced frequent ventricular extrasystoles organized into runs of non–sustained ventricular tachycardia during the exercise. Echocardiography demonstrated a normal biventricular function without severe residual valvular sequelae. No cardiomyopathy or late enhancement were detected by cardiac magnetic resonance evaluation. The patient was initially treated with beta–blocker and subsequently with amiodarone due to the persistence of arrhythmic burden during exercise. The diagnostic assessment was completed by coronary CT angiography, which revealed a long intramyocardial course of the left anterior descending artery, with length of 65 mm and maximum depth of about 3 mm (Fig. 1). No significant luminal narrowing was observed during either systolic or diastolic phases; however, a filiform appearance of the vessel was noted in its distal segment. Following this radiological finding, the patient underwent functional evaluation with stress and rest myocardial scintigraphy, which demonstrated mild inducible ischemia involving the basal and parabasilar segments of the inferior and inferoseptal walls. According to the high anatomic risk features, we decide to assess the hemodynamic impact of MB with functional intracoronary evaluation. No systolic luminal narrowing was detected within the bridge segment like as no additional epicardial coronary abnormalities by coronary angiography (Fig.2). The invasive physiological assessment of MB was performed with RFR and FFR that were 0.93 and 0.9, respectively. The value of FFR remained unchanged after dobutamine intravenous infusion (20 μg/kg/min).
Conclusion: This case highlights the use of FFR and RFR in assessing the functional impact of a MB. In this case, the patient was candidated to medical strategy increasing the beta–blocker and reducing the dose of amidoarone. Additionally, we have chosen precautionally to implant a loop recorder for monitoring the arrhythmic events; to date no repetitive events were detected.

Figure 1:Cardiac CT demonstrating a deep and long myocardial bridge over proximal-mid segment of LAD

Figure 2: Coronary angiography of left coronary artery with myocardial bridging. Absence of constriction during systole.

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Abstract citation ID: suag058.268

EXERCISE STRESS ECHOCARDIOGRAPHY IN CONGENITAL HEART DISEASE

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Servizio Cardiologia Meditel Saronno; Servizio Cardiologia Meditel Saronno; Specializzanda Medicina Dello Sport Università Di Varese

Exercise stress echocardiography (ESE) has proven to be a valuable diagnostic tool in various clinical settings, recently, evidence has shown that this technique can also be useful in evaluating patients with congenital heart disease (CHD). We present our personal experience with the use of this method in a cohort of patients with CHD.

From December 2023 to December 2024, we performed ESE in 10 patients (pts) with CHD, 7 males. The mean age was 23 years with 3 pediatric pts. All patients had surgically corrected CHD: aortic coarctation; right ventricular outflow tract obstructive lesions; atrioventricular canal defect; transposition of the great arteries repaired with the Mustard procedure; and congenitally corrected transposition of the great arteries treated with a double switch. Half of the patients were on medical therapy.

The indications for testing were: assessment of the hemodynamic profile or in the presence of mild to moderate abnormalities on instrumental evaluation, or in presence of nonspecific exertional symptoms with a hemodynamic burden not present or only mild at resTests were conducted on a semisupine cycle ergometer using an incremental protocol of 10 or 20 watts every two minutes. Echocardiographic assessments were carried out at baseline, at intermediate workload, at peak exercise, and at the first and fifth minute of recovery. Ventricular function was always evaluated and the behaviour of gradients in the presence of obstructive lesions were also assessed.

All tests were pushed to volitional muscular exhaustion. The mean workload tolerated was 115 watts. Maximal heart rate exceeded 82% of the predicted value in 7 pts. There were no ECG changes and no arrhythmias. In 3 pts the test unmasked severe exercise-induced hemodynamic burden. In the two pts with nonspecific exertional symptoms it was possible to identify the mechanism underlying the symptoms and accordingly adjust medical therapy. In the remaining pts, although exercise increased hemodynamic burden, it was not of a significant degree, and it was possible to provide guidance regarding the intensity of physical activity that could be safely performed.

In conclusion, although numerically limited, our experience confirms that ESE plays a meaningful decision–making role, particularly in cases with ambiguous instrumental burden or symptoms. Another useful application is to provide guidance on the intensity of exercise that can be tolerated in the presence of residual anomalies.

Abstract citation ID: suag058.269

COR TRIATRIATUM SINISTRUM IN A YOUNG WOMAN: A CASE REPORT

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37–year–old female patient came to our attention for episodes of chest pain, modifying with breathing, lasting for hours, always self–limiting, hoarseness, productive cough and hyperpyrexia, only partially responsive to paracetamol. On admission patient was symptomatic with intermittent chest pain, which worsened with coughing and inspiration, partially relieved by sitting in forward leaning position. Admission EKG and chest X–ray were both normal (Figures 1 and 2); urgent troponin T HS, performed on admission, was negative. Blood chemistry on admission: only weakly positive C reactive protein. Transthoracic echocardiogram showed no major alterations in segmental kinetics and preserved global systolic function (EF 55%). In left atrium there was a linear hyperechoic formation, compatible with a fibromuscular membrane, with transverse orientation, which incompletely separated upper and lower portion of left atrial chamber (Figure 3). No significant gradient between interatrial chambers; mild pericardial effusion. So echocardiographic imaging was consistent with cor triatriatum sinistrum (CTS) and mild pericardial inflammation. Moreover, since our young patient had a history of recurrent migraines from a very young age, not previously investigated, given this clinical setting, we decide to perform transoesophageal echocardiography in order to better explore the anatomy of left atrium and adjacent structures and to exclude presence of right–to–left atrial shunt. No interatrial shunt was found. Then, based on type of pain, positive inflammation indices and imaging findings (hyper–refraction of pericardial layer), a diagnosis of pericarditis was made. CTS can occur isolated or in association with other congenital heart diseases. The most widely used classification is Loeffler's one, which distinguishes three different groups: patients without membrane patency, with one or more small membrane patencies; with large membrane patencies. Presence and extent of patency is closely associated with the onset of symptoms. In adults, CTS is often an isolated finding. In previously asymptomatic adults with CTS clinical presentation may also be caused by fibrosis and calcification of the membrane, leading to obstruction, which can mimic mitral stenosis. Moreover, anatomical conformation of left atrial chamber, together with increased incidence of mitral regurgitation with advancing age, may promote arrhythmogenesis thus contributing to the onset of atrial fibrillation.

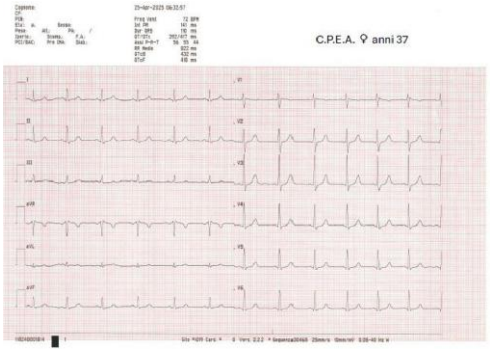

Figure 1: Admission EKG

Figure 2: chest X ray

Figure 3: echocardiography - apical 4 chamber view - zoom on left atrial chamber.

Cardiotoxicity

Abstract citation ID: suag058.270

RENAL ARTERIAL RESISTANCE INDEX IN PATIENTS WITH COLORECTAL CANCER TREATED WITH FLUOROPYRIMIDINES

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Irccs Giovanni Paolo Ii, Bari; Ospedale Miulli, Acquaviva Delle Fonti; Ospedali Riuniti, Ancona

Background: Fluoropyrimidines are the most commonly used drugs in the treatment of colorectal tumors. The fluoropyrimidine–related cardiotoxicity remains a major clinical problem.

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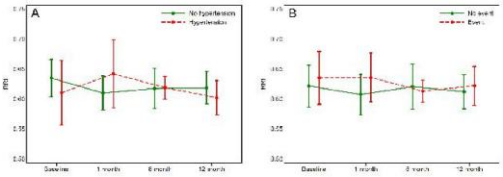
Purpose: The aim of this study was to evaluate the relationship between cardiotoxicity (CT) and Renal arterial Resistance Index (RRI) as marker of renal perfusion.
Methods: One hundred and two outpatients with a first diagnosis of localized or metastatic colorectal cancer were consecutively enrolled. The patients underwent a cardiological evaluation before the beginning of chemotherapy regimen containing fluoropyrimidines. All patients underwent: a clinical evaluation; a routine bloodchemistry to evaluate glomerular filtration rate (GFR) by creatinine (MDRD formula); a blood sample (approximately 3 mL) collected in EDTA–stabilized tubes, according to standard clinical practice, for genetic analysis of variants in fluoropyrimid in metabolism genes known to be associated with cardiotoxicity risk; a transthoracic echocardiogram to assess left ventricular ejection fraction (LVEF) and estimate central venous pressure; a renal echo–Doppler in order to evaluate RRI. Peak systolic and end–diastolic velocity of segmental renal artery was obtained by pulsed Doppler flow and RRI was subsequentely calculated.
Results: The overall mean age was 68±10 years. Of the 108 patients included in the study, 49(48%) were male and 51(52%) were female. In the studied population we observed a mean RRI equal to 0.625±0.081 at baseline assessment. We found a statistically significant inverse correlation between RRI and baseline GFR (Pearson r=–0.272, p=0.030). Thirty-one patients completed the one–year follow–up. Among them, 30% experienced a significant increase in blood pressure; Additionally, acute coronary syndromes requiring revascularization and hospitalizations for heart failure were observed in 6% and 8% of patients, respectively. Figure shows RRI mean values with 95% confidence interval at baseline and at each follow–up by occurrence of hypertension and cardiac events (panel A and B). Although RRI seems higher in patients with events during follow–up, no significant association was detected.
Conclusions: Integrating RRI assessment with fluoropyrimidin e metabolic profiling may enhance the identification of patients at increased risk of cardiotoxicity. Further studies will be needed to clarify the role of the renal resistive index in this setting.



Abstract citation ID: suag058.271

RIGHT VENTRICULAR METASTASIS OF RENAL CELL CARCINOMA AND LATE–ONSET ICI–INDUCED MYOCARDITIS: A COMPLEX CARDIO–ONCOLOGY SCENARIO

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Introduction: Intracardiac metastasis from renal cell carcinoma (RCC) is an infrequent clinical finding. Immune checkpoint inhibitors (ICIs) have revolutionized cancer therapy but are associated with immune–related adverse events (irAEs). Among these, ICI–induced myocarditis is a rare but potentially fatal complication, typically occurring early after treatment initiation. However, vigilance must be maintained for delayed presentations, especially in complex oncological settings.
Case Report: A 75–year–old male with a history of hypertension and previous left nephrectomy (2012) for RCC underwent surgical resection of a 38 mm right ventricular (RV) metastasis in early 2024 (Figure 1-2). In April 2025, due to disease progression, he started combination therapy with Nivolumab and Cabozantinib (baseline LVEF 65%).In November 2025, after six months of therapy, routine oncological follow–up revealed a persistent, asymptomatic elevation of cardiac biomarkers (High–Sensitivity Troponin T 19.9 ng/ml, NT–proBNP 345 pg/ml, CK–MB 7.8 ng/ml). Echocardiography showed a significant decline in systolic function (LVEF 45%) and a reduction in RV longitudinal function (TAPSE 11 mm). To confirm the diagnosis and differentiate from post–surgical sequelae, Cardiac Magnetic Resonance (CMR) was performed. CMR quantitative tissue characterization revealed increased native T1 and T2 mapping values, along with a significantly elevated Extracellular Volume (ECV) fraction. Based on these findings, Nivolumab–induced myocarditis was diagnosed. Therapy was promptly interrupted and high–dose corticosteroid treatment was initiated, leading to clinical stabilization and a gradual downward trend of biomarkers.
Conclusions: This case emphasizes the importance of cardiac monitoring during ICI therapy, even beyond the initial months of treatment. Delayed–onset myocarditis can present subclinically, with subtle biomarker elevations and biventricular dysfunction. A high clinical suspicion and the use of advanced CMR parameters, such as T1/T2 mapping and ECV, are essential for the timely diagnosis and management of this life–threatening irAE, particularly when prior cardiac surgery complicates the clinical picture.

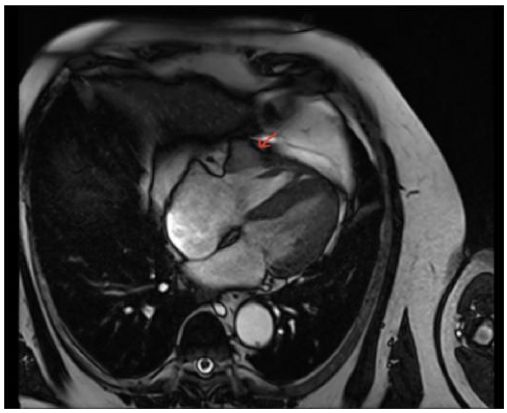

Figure 1

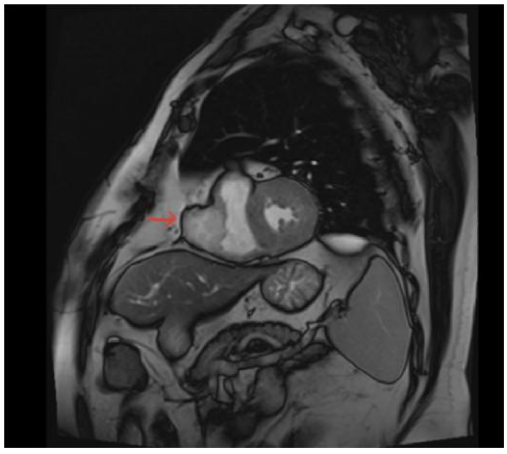

Figure 2

Abstract citation ID: suag058.272

EVIDENCE OF CARDIOTOXIC IMMUNE ACTIVATION BY TRIPLE IMMUNE CHECKPOINT BLOCKADE: A TRANSLATIONAL ALERT FOR CLINICAL SURVEILLANCE IN CANCER PATIENTS

V. Quagliariello, M. Passariello, M. Belardo, A. Esposito, M. Paone, M. Berretta, I. Santagata, M. Barbato, M. Canale, A. Paccone, A. Inno, S. Oliva, C. Maurea, R. Arianna, I. Bisceglia, A. Tedeschi, M. Scherillo, P. Forte, G. Gallucci, L. Tarantini, M. Camilli, A. Camerini, C. Dessalvi, C. De Lorenzo, and N. Maurea
Istituto Nazionale Tumori–Irccs–Fondazione G. Pascale, Napoli

Introduction: Immune checkpoint inhibitors (ICIs) have successfully revolutionized cancer therapy, but their immune–mediated adverse events include rare, often severe myocarditis. While dual ICI blockade is associated with increased cardiotoxic risk, little is known about the potential effects of triplet combinations currently under clinical investigation. We developed a co–culture model of human cardiomyocytes and human peripheral blood mononuclear cells (hPBMCs) to evaluate immune–mediated cytotoxicity induced by ICIs.
Methods: HFCs were exposed for 48h to Nivolumab plus Relatlimab, Ipilimumab, or Atezolizumab, either alone or in triplet combinations. Cell lysis was quantified by LDH release. Cytokine secretion (IL–2, granzyme B, and additional inflammatory mediators including NLRP3 activation pathway) was measured by ELISA. Digital microscopy was used for morphological assessment.
Results: Triplet combinations of Nivolumab–Relatlimab with Ipilimumab or Atezolizumab induced significantly higher cardiomyocyte lysis compared to single agents or doublets (p ‹ 0.001). This effect correlated with a robust increase in IL–2 and granzyme B secretion, as well as activation of pro–inflammatory cytokines and NLRP3 inflammasome–related mediators. Microscopic analyses confirmed immune cell activation and reduced density of HFCs exposed to triplets.

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Conclusion: Our findings demonstrate that ICI triplets elicit potent immune activation against cardiomyocytes, providing the first preclinical evidence of direct cardiotoxic potential in this setting. These results highlight the need for enhanced clinical surveillance and cardio–oncology monitoring in patients receiving triple ICI combinations, as these regimens expand in clinical practice.

Abstract citation ID: suag058.273

CARDIOVASCULAR IMMUNE–RELATED TOXICITY OF IMMUNE CHECKPOINT INHIBITORS: INSIGHTS FROM THREE CLINICAL CASES OF MYOCARDITIS

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Rovigo; Rovgio

Over the past decade, immune checkpoint inhibitors (ICIs) have dramatically transformed the treatment of several solid and hematologic malignancies. Despite their proven clinical benefit, ICIs are associated with immune–related adverse events (irAEs), among which cardiovascular toxicities are increasingly recognized as rare but potentially life–threatening complications. In particular, ICI–associated myocarditis is characterized by high mortality, a frequently fulminant course, and a markedly arrhythmogenic phenotype, often involving conduction disturbances and heart failure with reduced ejection fraction. Concomitant peripheral myositis, occasionally leading to respiratory failure, may further worsen prognosis. We report three cases of ICI–associated myocarditis observed at our hospital, highlighting the heterogeneity of clinical presentation, management and outcomes. All patients were male and had advanced–stage malignancies, including non–small cell lung cancer, clear cell renal carcinoma, and urothelial carcinoma. Cardiovascular symptoms developed shortly after the first or second cycle of immunotherapy. Clinical manifestations ranged from cardiogenic shock and sustained ventricular tachyarrhythmias to high–grade atrioventricular block (Figure 3), accompanied by marked elevation of cardiac and muscle injury biomarkers. In all cases, coronary angiography excluded obstructive coronary artery disease. Two patients, who were not candidates for advanced therapies due to significant comorbidities, experienced rapid clinical deterioration with fatal outcomes; the diagnosis of ICI–associated myocarditis was confirmed at autopsy (Figure 1). The third patient, presenting with overlapping myocarditis and myositis with extraocular muscle involvement, showed clinical and functional improvement following early initiation of high–dose corticosteroids and additional immunosuppressive therapy with tocilizumab (Figure 2). These cases emphasize the critical importance of early recognition, prompt diagnostic evaluation, and timely initiation of immunosuppressive treatment in patients with suspected ICI–related myocarditis. Further research is needed to better define the underlying pathogenic mechanisms, identify high–risk patients, and develop effective preventive and therapeutic strategies to reduce cardiovascular complications associated with immune checkpoint inhibition.

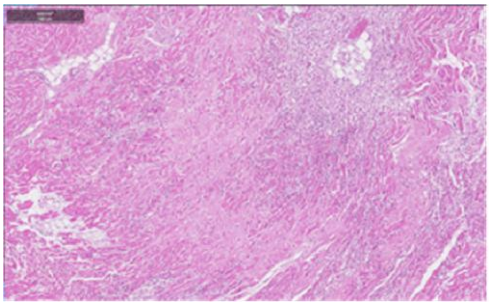

Figure 1

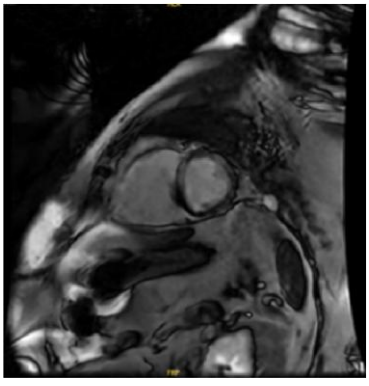

Figure 2

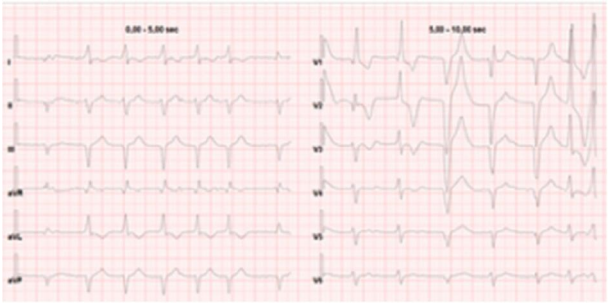

Figure 3

Abstract citation ID: suag058.274

MANAGEMENT OF HEART FAILURE THERAPY IN CANCER PATIENTS WITH ASYMPTOMATIC CANCER TREATMENT–RELATED CARDIAC DYSFUNCTION (CTRCD): THE MATCH SURVEY RESULTS

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Irccs Istituto Tumori "Giovanni Paolo Ii"; Nuovo Ospedale Versilia; Ospedale Civile "Guglielmo Da Saliceto"; Fondazione Irccs Policlinico San Matteo; Irccs Ospedale Sacro Cuore Don Calabria; Asugi UOC Cardiologia Gorizia E Monfalcone; Po Santa Maria Nuova Ausl Re Irccs; Irccs Fondazione Pascale; Ospedale S. Camillo

Background: Cardiovascular toxicity could potentially limit anticancer therapy and its features encompassed many different clinical scenarios. Among others, cancer therapy–related cardiac dysfunction (CTRCD) with left ventricular (LV) systolic impairment could represent a major issue. CTRCD is frequently asymptomatic and often effectively treated with standard heart failure (HF) therapy. Limited evidence is available on the need to stop or continue HF therapy after recovery of LV function. The MATCH survey aimed to investigate the real–world approach of Italian cardiologists to this clinical dilemma.
Results: The survey was conducted during the 56th ANMCO National Congress in May 2025. Among more than 2,000 contacts, 250 complete responses from cardiologists were analyzed. 52% of responders reported the lack of a dedicated cardio–oncology service despite managing a higher weekly volume of cancer patients compared with specialised centers (84 vs 29 patients/week) (Fig 1). Two–dimensional echocardiography (2D Echo) was the preferred diagnostic tool for CTRCD in 85% of cases, mainly based on LV ejection fraction (LVEF) assessment, whereas only 10% relied on biomarkers. Angiotensin–converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), and sodium–glucose cotransporter–2 inhibitors (SGLT2i) were the most frequently prescribed therapies (31%, 26%, and 14%, respectively) (Fig. 2). Only 3% of cardiologists reported discontinuing HF therapy after recovery of LVEF in over 80% of patients (Fig 3), usually ›1 year after recovery. Discontinuation was primarily guided by cardiovascular risk stratification according to the 2022 ESC Guidelines, and 80% recommended reassessment of LVEF 3–6 months after therapy withdrawal. Few patients required re–start of therapy due to recurrent systolic dysfunction, mainly those at high cardiovascular risk or undergoing further potentially cardiotoxic anticancer treatments.
Conclusions: In Italy, discontinuation of HF therapy after asymptomatic CTRCD is uncommon. Patients needs (as pregnancy planning) should be more and more taken into consideration in this challenging decision making. Prospective randomized studies are needed to define the optimal management of patients with stable recovery of LV function after asymptomatic CTRCD.

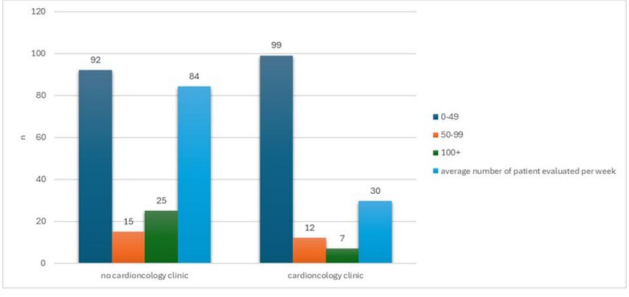

Figure 1

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Figure 2

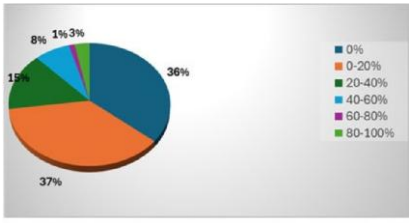

Figure 3

Abstract citation ID: suag058.275

BENEFICIAL EFFECTS OF SGLT2 INHIBITORS IN CARDIOTOXICITY RELATED LEFT VENTRICULAR DYSFUNCTION – A CASE REPORT

A. Guidorossi, E. Canu, B. Albiani, G. Niccoli, F. Russo, F. Barocelli, L. Vignali, and S. Buratti
Ospedale Maggiore Di Parma

Cardiotoxicity is a frequent and clinically relevant complication of cancer therapies and may result in heart failure, even years after oncological treatment. Anthracycline–containing regimens and chest radiotherapy are well–known contributors to cancer therapy–related cardiac dysfunction. Early recognition and optimization of heart failure therapy are essential to improve outcomes. Emerging evidence suggests a potential cardioprotective role of sodium–glucose cotransporter 2 (SGLT2) inhibitors in cardio–oncology.**Case Summary:** We report the case of a 53–year–old male with a history of diffuse large B–cell lymphoma treated with R–CHOP regimen (last in December 2018), followed by chest radiotherapy (RT), who was admitted to the emergency department 5 years later for acute heart failure with secondary respiratory failure. Transthoracic echocardiography revealed severe left ventricular systolic dysfunction. The patient was subsequently enrolled in a cardiology outpatient program, where secondary causes of heart failure were investigated, and guideline–directed medical therapy was progressively optimized, including the introduction of an SGLT2 inhibitor. During follow–up, a marked clinical improvement was observed, with resolution of symptoms and progressive recovery of left ventricular systolic function from severely reduced values to near–normal levels. By August 2024, the left ventricular ejection fraction reached 50%.
Discussion: This case describes left ventricular dysfunction likely related to cancer therapy–associated cardiotoxicity in a patient treated with an anthracycline–based chemotherapy regimen and RT, followed by a meaningful recovery of systolic function after optimization of heart failure therapy. Beyond their established role in heart failure management, SGLT2 inhibitors are increasingly investigated in cardio–oncology due to pleiotropic cardioprotective effects demonstrated in experimental models of anthracycline–induced cardiotoxicity. In this case, the progressive recovery of left ventricular systolic function following optimization of heart failure therapy, including the introduction of an SGLT2 inhibitor, is consistent with the emerging role of these agents as a potential adjunctive strategy in the management of cancer therapy–related cardiac dysfunction (Figure 1). Although causality cannot be established from a single observation, this clinical course supports further investigation in the cardio–oncology setting.

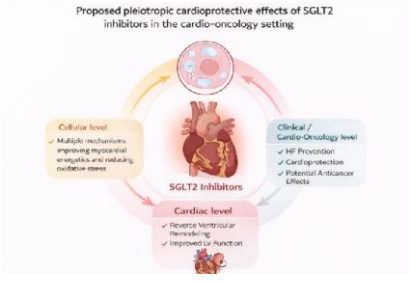

Figure 1

Emerging Risk Factors

Abstract citation ID: suag058.276

"LIPOPROTEIN A COULD PREDICT ACUTE CORONARY SYNDROME BEFORE LDL CHOLESTEROL IN GENERAL POPULATION"

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Ospedale Maria Vittoria, Torino

Background: Coronary artery disease is a global epidemic condition with high mortality. Beyond the well know low density cholesterol (LDL) the recent research is focused on Lipoprotein A [Lp(a)], as protein with key role in atherosclerotic process. Lp(a) is genetically determined and it should be measured once in a lifetime.
Methods: In a single center study, we enroll patients with acute coronary syndrome who were hospitalized in cardiology division of Maria Vittoria Hospital (Torino) in six months, from May to December 2025, and evaluate complete lipid profile of all of them.
Results: We find that pathological value of Lp(a), more than 50 mg/dL, is present in about 26% of our population and this cut–off is associated with younger age of patients if compared with pathological LDL value, although without statistical significance (figure 1), and multivessel disease, mostly bivessel and trivessel. No differences were observed between different kind of acute coronary syndrome.
Conclusion: The increase of Lp(a) should disclose coronary artery disease before LDL cholesterol.

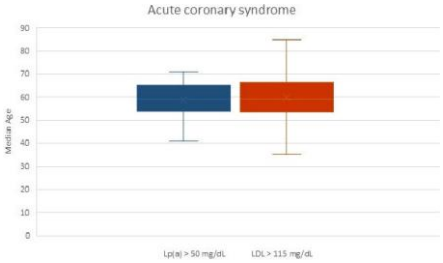

Figure 1

Abstract citation ID: suag058.277

LIPOPROTEIN(A) DOES NOT CORRELATE WITH HYPERTENSIVE MEDIATED ORGAN DAMAGE AND SUBSEQUENT CARDIOVASCULAR EVENTS IN A PRIMARY PREVENTION COHORT

C. Tognola, D. Bernasconi, P. Rebora, R. Intravaia, C. Mancusi, V. Visco, A. Cesaro, E. Golia, I. Fucile, P. Merlini, M. Ardissino, E. Inglese, R. Danesi, F. Oliva, A. Andreano, M. Rognoni, A. Russo, P. Calabrò, N. De Luca, C. Giannattasio, and A. Maloberti
Cardiologia 4, Asst Grande Ospedale Metropolitano Niguarda; Clinical Research and Innovation Department, Asst Grande Ospedale Metropolitano Niguarda; Biostatistics and Clinical Epidemiology, Fondazione Irccs San Gerardo Dei Tintori; Cardiologia, Ospedale Garibaldi–Nesima; Cardiac Rehabilitation Unit, Federico Ii° University Hospital; Dipartimento Di Medicina, Chirurgia E Odontoiatria, Università Di Salerno; Cardiologia, Ospedale S. Anna E S. Sebastiano; Medical Research Council, Laboratory of Medical Sciences, Imperial College London; Dipartimento Di Medicina Di Laboratorio, Asst Grande Ospedale Metropolitano Niguarda; Cardiologia 1, Asst Grande Ospedale Metropolitano Niguarda; Epidemiology Unit, Agency for Health Protection (Ats) of Brianza; Epidemiology Unit, Agency for Health Protection (Ats) of Milan

Introduction: elevated lipoprotein(a) [Lp(a)] levels have been strongly related to cardiovascular (CV) risk. However, its association with Hypertension Mediated Organ Damage (HMOD) and CV events in the primary prevention setting remains unclear.
Aim: to evaluate in these patients, the correlation between Lp(a) levels and: (I) heart, vessels and kidney HMOD and; (II) CV events and all–cause mortality in a primary prevention setting.
Methods: 747 low CV risk subjects were recruited between 2009 and 2014. HMOD was assessed through Pulse Wave Velocity (PWV), carotid Intima–Media Thickness (IMT), presence of carotid plaques, Left Ventricular Hypertrophy (LVH) and Ejection Fraction (EF) and glomerular filtration rate (GFR). All–cause mortality and CV events up to 2021 were retrieved by electronic health records, for a median follow–up time of 10 years (I–III quartiles 9.6–11.1).
Results: Mean age was 50.8 ± 13.0 years and 63.5% of the subjects were men. The prevalence of hypertension was 37.9%, dyslipidemia 67.2%, smoking 17.8%, and diabetes mellitus 8.7%. Median Lp(a) value was 17 mg/dL (5.9–56.0), and

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26.5% of patients had values above 50 mg/dL. Regarding HMOD, 10.3% subjects had arterial stiffness, 7.2% increased IMT, 19.8% carotid plaques while only 0.7% had LVH. No significant correlation was found between Lp(a) levels and indices of subclinical HMOD. Furthermore, no relationship was found between CV events and all–cause mortality and Lp(a) levels.
Conclusions: In this primary prevention cohort, elevated Lp(a) levels were not associated with significant structural damage to the heart, carotid arteries, or increased aortic stiffness and were not associated with CV events and all–cause mortality.

Abstract citation ID: suag058.278

INTERLEUKIN–6, BUT NOT OTHER INFLAMMATORY BIOMARKERS, IS ASSOCIATED WITH CARDIOVASCULAR EVENTS INDEPENDENT OF HYPERTENSIVE–MEDIATED ORGAN DAMAGE IN A PRIMARY PREVENTION POPULATION

C. Tognola, D. Bernasconi, P. Rebora, R. Intravaia, C. Mancusi, V. Visco, A. Cesaro, E. Golia, I. Fucile, P. Merlini, M. Ardissino, E. Inglese, R. Danesi, F. Oliva, M. Rognoni, L. Cavalieri D'Oro, A. Russo, P. Calabrò, N. De Luca, C. Giannattasio, and A. Maloberti
Cardiologia Iv, Asst Grande Ospedale Metropolitano Niguarda, Milano, Italia; Università Degli Studi Di Milano–Bicocca, Dipartimento Di Medicina E Chirurgia, Milano, Italia; Centro Di Bioinformatica, Biostatistica E Bioimaging, Dipartimento Di Medicina E Chirurgia, Università Degli Studi Di Milano–Bicocca, Milano, Italia; Cardiologia, Ospedale Garibaldi–Nesima, Catania, Italia; Cardiac Rehabilitation Unit, Federico Ii° University Hospital, Naples, Italy; Department of Medicine, Surgery and Dentistry, University of Salerno, Fisciano, Italy; Cardiology S. Anna E S. Sebastiano Hospital, Caserta, Italy; National Heart and Lung Institute, Imperial College London, London, Uk; Dipartimento Di Medicina Di Laboratorio, Asst Grande Ospedale Metropolitano Niguarda, Milano, Italia; Cardiologia I, Asst Grande Ospedale Metropolitano Niguarda, Milano, Italia; Dipartimento Di Epidemiologia, Ats Brianza, Monza, Italia; Dipartimento Di Epidemiologia, Ats Milano, Milano, Italia; Cardiologia 4, Asst Grande Ospedale Metropolitano Niguarda, Milano, Italia

Background: Chronic low–grade inflammation is increasingly recognized as a key determinant of cardiovascular (CV) risk, beyond traditional risk factors. However, the relative role of different inflammatory biomarkers in relation to hypertension–mediated organ damage (HMOD) and long–term CV outcomes in primary prevention remains incompletely defined.
Methods: We assessed a panel of inflammatory biomarkers, including high–sensitivity C–reactive protein (hs–CRP), interleukin–6 (IL–6), interleukin–18 (IL–18), osteoprotegerin, calprotectin, and tumor necrosis factor–α (TNF–α), in a primary prevention cohort. Subclinical HMOD was evaluated at the vascular (pulse wave velocity, carotid intima–media thickness and carotid plaque), cardiac (left ventricular mass and function), and renal (estimated glomerular filtration rate) levels. Participants were followed for CV events, all–cause mortality, and the relative composite outcome.
Results: Among 804 participants (mean age 51.1 ± 13.0 years; 62.4% men), none of the inflammatory biomarkers was independently associated with subclinical HMOD after adjustment for age and sex. During a median follow–up of 10.7 years (I–III quartiles 9.7–11.3), 75 CV events and 38 deaths occurred. IL–6 was the only inflammatory biomarker independently associated with CV events (hazard ratio [HR] 1.15; 95% confidence interval [CI] 1.04–1.26), and with the composite outcome of CV events or all–cause mortality (HR 1.13; 95% CI 1.03–1.23), after adjustment for traditional CV risk factors.
Conclusions: In a primary prevention population, IL–6—but not other inflammatory biomarkers—was independently associated with long–term CV outcomes, while no biomarker showed an independent association with HMOD. These findings highlight the central role of IL–6 in residual inflammatory CV risk beyond structural organ damage.

Abstract citation ID: suag058.279

VITAMIN D LEVELS IN A POPULATION OF HEALTHY SUBJECTS AND ITS ASSOCIATION WITH METABOLIC DERANGEMENT AND CARDIAC AND CAROTID TARGET ORGAN DAMAGE

S. Pezzini, C. Tognola, I. Bassi, B. Invernici, M. Bellomare, S. D'Alesio, G. Ruzzenenti, G. Gallone, C. Giannattasio, and A. Maloberti
Università Degli Studi Di Milano–Bicocca, Dipartimento Di Medicina E Chirurgia; Cardiologia 4, Asst Grande Ospedale Metropolitano Niguarda, Milano

Introduction: while vitamin D is primarily recognized for its role in intestinal calcium absorption and bone mineralization, it had numerous extra–skeletal effects also regarding the cardiovascular (CV) systems.
Aim: to evaluate the correlation between vitamin D levels and cardiovascular risk factors and Target Organ Damage (TOD) in a healthy population.
Methods: we enrolled 311 healthy participants from a CV risk assessment program conducted in our hospital. Medical history, physical exams, Blood Pressure (BP), Body Mass Index (BMI) and laboratory tests (glucose, lipids, creatinine, eGFR) were collected. TOD was evaluated by echocardiography and carotid ultrasound.
Results: at multivariable models with age, sex and kidney function as covariates, vitamin D was significantly associated with BMI (β=–0.142, p=0.007), SBP (β=–0.116, p=0.039), triglycerides (β=–0.239, p‹0.001) and HDL (β=0.141, p=0.007). Furthermore, vitamin D deficiency (‹12 ng/mL) was significantly associated with hypertriglyceridemia (› 150 mg/dL) with an HR of 5.984 (p‹0.001). No significant association with TOD was found.
Conclusions: our study found that low vitamin D levels are linked to metabolic disturbances, including lower HDL and higher TG, BP, and BMI, but showed no significant association with heart or carotid TOD. One could speculate that in an otherwise healthy population metabolic derangement determined by low vitamin D levels could precede TOD development.

Abstract citation ID: suag058.280

VITAMIN D AND CARDIOVASCULAR DISEASE: 3 THE "GOOD", THE "BAD" AND THE "UNKNOWN"

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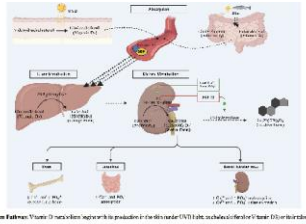
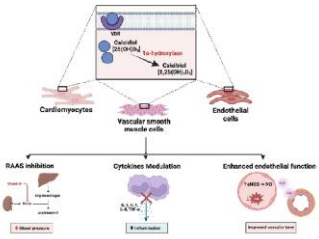
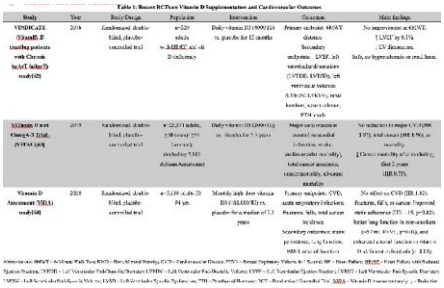
Policlinico Casilino, Roma; Ospedale Santa Maria Goretti, Latina; Università Di Roma La Sapienza; Università Sorbona Parigi; Università Virginia Ny

Vitamin D is a key regulator of calcium and phosphorus homeostasis and the most common nutritional deficiency worldwide. Over the past decades, the discovery of vitamin D receptors and conversion enzymes within the cardiovascular system has fueled growing interest in its potential roles beyond bone health. Preclinical studies have suggested that vitamin D might regulate vascular tone and exert antifibrotic and anti–remodeling effects on the myocardium. Furthermore, a deficit of vitamin D has been associated with an increased risk of hypertension, atherosclerosis, and heart failure. These findings have spurred several interventional studies investigating whether vitamin D supplementation could mitigate cardiovascular risk. However, current evidence regarding its cardiovascular benefits remains inconsistent and inconclusive. In this review, we provided a comprehensive overview of the "good," the "bad," and the "unknown" aspects of the relationship between vitamin D and cardiovascular disease.







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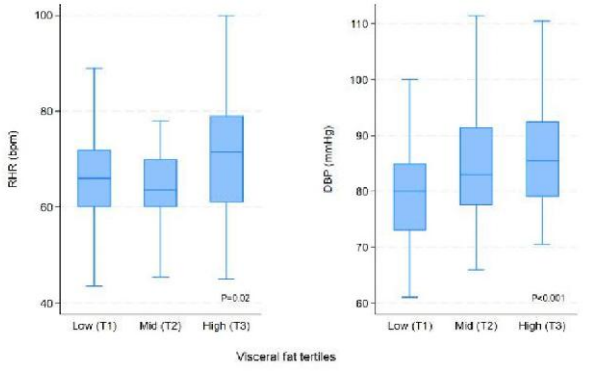
Abstract citation ID: suag058.281

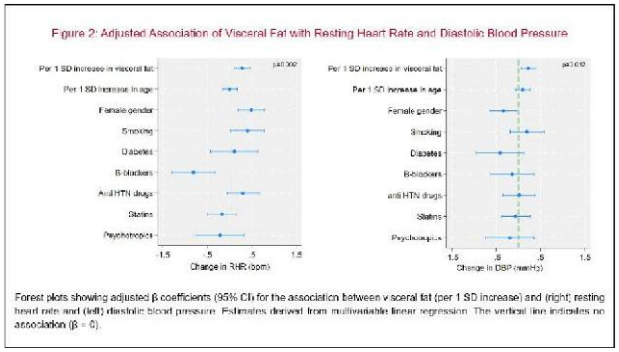
VISCERAL FAT AS A DETERMINANT OF SYMPATHETIC ACTIVATION IN CARDIAC OUTPATIENTS

G. Berton, D. Merotto, M. Dario, M. Mahmoud, A. Dal Bo, P. Visentin, S. Mastrosimone, F. Pieropan, R. Aniello, and H. Mahmoud
Abc Study On Heart Disease Foundation E.T.S.

Background: Visceral adiposity contributes to systemic inflammation and autonomic dysregulation. Elevated resting heart rate (RHR) and blood pressure may reflect increased sympathetic tone. Psychological disturbances such as insomnia or anxiety may further influence autonomic balance in cardiac patients.
Objective: To examine the association between visceral fat and markers of sympathetic activation in cardiac outpatients, and to assess whether insomnia or anxiety modify these relationships.
Methods: We conducted a single–visit, cross–sectional study of 203 consecutive cardiology outpatients. Visceral fat was measured using the OMRON BF511 device. Systolic (SBP) and diastolic blood pressure (DBP) and RHR were recorded twice in the clinostat position and averaged. Clinical, pharmacologic, and psychological data were collected. Visceral fat (continuous and tertiles) was analyzed in relation to RHR, tachycardia, SBP, and DBP using multivariable linear and logistic regression, adjusting for demographic, metabolic, and treatment variables. Interaction terms between visceral fat and insomnia or anxiety were included to test for effect modification. Sensitivity analyses excluded beta–blocker users. Analyses were carried out using STATA 18.0 StataCorp LLC, (TX) USA.
Results: The mean age was 62.7 ± 12.5 years; 53% were male. Patients in the highest visceral fat tertile showed significantly higher RHR (p = 0.022), SBP (p ‹ 0.001), and DBP (p ‹ 0.001). Visceral fat remained independently associated with RHR after adjustment (β = 0.72 bpm per SD; 95% CI 0.26–1.16; p = 0.002). Crude associations with SBP and DBP were positive (β = 1.55 mmHg per SD; p ‹ 0.001 for SBP, β = 0.61 mmHg per SD; p ‹ 0.001 for DBP), but after adjustment only DBP remained significant (β = 0.47 mmHg per SD; p=0.012). No significant interactions were found between visceral fat and insomnia or anxiety. Results were unchanged after excluding beta–blocker users.
Conclusion: Visceral adiposity is independently associated with higher resting heart rate and diastolic blood pressure in cardiac outpatients, supporting its role as a determinant of sympathetic activation. Assessing visceral fat may help identify patients with elevated autonomic burden and potentially modifiable cardiovascular risk.

Figure 1: Resting heart rate and diastolic blood pressure across visceral fat tertiles





Forest plots showing adjusted β coefficients (95% CI) for the association between visceral fat (per 1 SD increase) and (right) resting heart rate and (left) diastolic blood pressure. Estimates derived from multivariable linear regression. The vertical line indicates no association (β = 0).

Atrial Fibrillation - Stroke Prevention and Imaging

Abstract citation ID: suag058.282

A CASE OF CARDIO–THYROTOXICOSIS: WHEN A MULTIDISCIPLINARY TEAM BECOMES ESSENTIAL

M. Dadamo, R. Valecce, G. Incampo, C. Volpe, M. Moramarco, D. Di Nunzio, M. D'Alessandro, M. Cuonzo, V. Minielli, F. Bux, V. De Luca, D. Rizzo, and M. Bonfantino
Po Di Venere, Bari

Introduction: Thyrotoxicosis can significantly affect cardiovascular health. Atrial fibrillation may lead to tachycardia–induced cardiomyopathy with left ventricular dysfunction.
Case report: We describe the case of a 50–year–old woman. In October 2024, she was admitted to the Neurology Department for syncopal episodes and received a first diagnosis of atrial fibrillation, for which she underwent electrical cardioversion. In January 2025, she was hospitalized for an episode of acute heart failure due to severe left ventricular dysfunction in the setting of tachycardia–induced cardiomyopathy caused by persistent atrial fibrillation associated with hyperthyroidism (the patient was already listed for surgery with an extremely high cardiovascular risk). Coronary angiography showed no significant coronary artery stenosis. She was discharged on optimized medical therapy with bisoprolol, ramipril, canrenone, and dapagliflozin. Due to recurrent syncope and dyspnea, the patient subsequently presented again to the Emergency Department and was admitted to our Unit, where atrial fibrillation with a mean ventricular rate of 160 bpm and a LVEF of 20% were documented, despite ongoing therapy with methimazole 1 tablet three times daily and bisoprolol 10 mg/day (Figure 1). Laboratory tests on admission revealed marked hyperthyroidism; therefore, methimazole was up–titrated to 2 tablets three times daily, and an attempt was made to reduce the mean ventricular rate using landiolol, without therapeutic effect. A repeat neck and chest CT scan showed enlargement of the right thyroid lobe, extending into the mediastinal inlet and closely related to the common carotid artery and the right internal jugular vein. Under intensive care support, the patient underwent total thyroidectomy. Postoperatively, she was monitored in our Coronary Care Unit and started on thyroid hormone replacement therapy. Telemetric monitoring showed a progressive reduction in mean ventricular rate, and one week after surgery a gradual improvement in cardiac contractility was observed (LVEF 37%). One month after discharge, the patient underwent successful electrical cardioversion with restoration of sinus rhythm. After one month of optimized therapy, follow–up echocardiography demonstrated a marked improvement in left ventricular systolic function (LVEF 50%).
Conclusions: Recognizing the impact of thyrotoxicosis on cardiac function is crucial, as achieving a euthyroid state may lead to reversal of cardiac dysfunction.

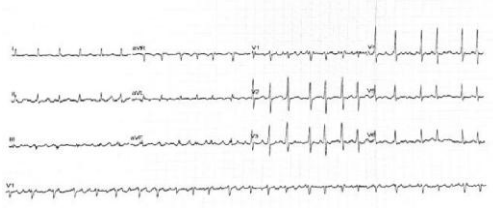


Figure 1

Abstract citation ID: suag058.283

LEFT ATRIAL STRAIN IMAGING AS A MARKER OF EPICARDIAL ADIPOSE TISSUE–RELATED ATRIAL REMODELING

F. Cacciapuoti, S. Crispo, N. Verde, R. Gottilla, C. Materazzi, F. Ziviello, and C. Mauro
Aorn Cardarelli, Napoli

Background: Atrial fibrillation (AF) is a multifactorial arrhythmia in which epicardial adipose tissue (EAT) has emerged as a key contributor to atrial structural, electrical, and functional remodeling. Left atrial epicardial adipose tissue (LA–EAT), through endocrine, paracrine, and mechanical mechanisms, promotes inflammation, fibrosis, and atrial dyssynchrony. Early identification of atrial dysfunction is essential to improve risk stratification and guide therapeutic strategies.
Methods: We performed a narrative review focusing on the pathophysiological relationship between left atrial epicardial adipose tissue and atrial remodeling in patients with atrial fibrillation. Particular attention was given to

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non–invasive imaging techniques, with emphasis on speckle–tracking echocardiography for the assessment of left atrial strain. Strain parameters, including reservoir, conduit, and contractile function, were analyzed in relation to epicardial adipose tissue burden and markers of atrial remodeling. In addition, emerging therapeutic strategies targeting epicardial adipose tissue were reviewed for their potential impact on atrial function and arrhythmia outcomes.
Results: Reduced left atrial strain parameters are consistently associated with increased LA–EAT and advanced atrial remodeling in patients with atrial fibrillation. Strain imaging allows early detection of atrial dysfunction before overt structural changes occur and improves identification of patients at higher risk of AF recurrence. The integration of strain analysis with volumetric atrial assessment enhances diagnostic accuracy and patient stratification. Therapeutic interventions such as weight reduction and GLP–1 receptor agonists show promising effects in reducing EAT volume and mitigating atrial remodeling, potentially improving ablation outcomes.
Conclusions: Left atrial strain imaging represents a valuable non–invasive tool for assessing EAT–related atrial remodeling in patients with atrial fibrillation. Its integration into routine clinical practice may optimize patient selection, guide therapeutic decisions, and improve long–term outcomes in AF management.

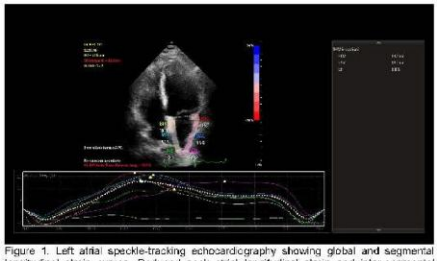
Figure 1. Left atrial speckle-tracking echocardiography showing global and segmental longitudinal strain curves. Reduced peak atrial longitudinal strain and inter-segmental variability are consistent with impaired atrial mechanics and mechanical dyssynchrony.

Abstract citation ID: suag058.284

A CASE OF SUPRAVENTRICULAR TACHYCARDIA IN A NEONATE

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Ospedale Madonna Delle Grazie, Matera; Ospedale San Carlo, Milano

Background: Supraventricular tachycardia (SVT) is the most common neonatal arrhythmia. Rapid recognition and targeted therapy are essential to avert hemodynamic compromise and prevent tachycardia–induced cardiomyopathy.
Case: A term female neonate (3.4 kg; Apgar 9/10) developed sustained narrow–complex tachycardia at 240 bpm within minutes of birth (Figure 1). Vagal maneuvers failed. Intravenous adenosine (0.2 mg/kg) abruptly restored sinus rhythm and unmasked a short PR interval (80 ms). Echocardiography and laboratory testing were unremarkable. During tertiary–center monitoring no recurrences occurred; prophylactic oral flecainide (2 mg/kg/day) was initiated. At two months, the infant remained asymptomatic with sinus rhythm (PR 98 ms). Interpretation. Immediate adenosine termination, coupled with a persistently short PR, strongly supports orthodromic atrioventricular re–entrant tachycardia via an accessory pathway (probable WPW physiology). In this age group, AVNRT is uncommon and does not explain marked PR shortening; atrial flutter typically shows saw–tooth activity and is seldom terminated by adenosine; focal atrial tachycardia usually displays warm–up/cool–down and rarely stops abruptly. Management and implications. Adenosine is both diagnostic and therapeutic in neonatal SVT, helping reveal concealed pre–excitation that informs risk stratification. Current pediatric practice favors inpatient observation after a first episode and selective prophylaxis; flecainide is effective for early–life recurrence prevention. Electrophysiological study/ablation is generally deferred unless drug–refractory recurrences, drug intolerance, or high–risk pre–excitation persists.
Conclusion: This case underscores that prompt ECG–based diagnosis and adenosine–guided management enable safe early stabilization of neonatal accessory–pathway–mediated SVT, with excellent short–term outcomes.

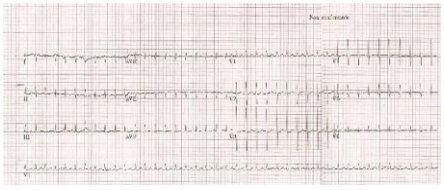
Figure 1

Abstract citation ID: suag058.285

ECHOCARDIOGRAPHY–GUIDED DECISION–MAKING IN PAROXYSMAL ATRIAL FIBRILLATION: A CASE SERIES

F. Cacciapuoti, S. Crispo, R. Gottilla, C. Materazzi, and C. Mauro
Aorn Cardarelli, Napoli

Background: Management of paroxysmal atrial fibrillation (PAF) requires careful selection of rhythm control strategies based on symptom burden and underlying atrial substrate. Clinical risk scores provide useful guidance but do not fully capture atrial structural, mechanical, and electrical remodeling. Advanced echocardiography may offer incremental value for individualized therapeutic decision–making.
Methods: We report a case series of three patients with symptomatic or incidentally detected PAF who underwent comprehensive transthoracic echocardiographic evaluation, including left atrial volume assessment, speckle–tracking–derived atrial strain analysis, and tissue Doppler imaging–derived atrial conduction time (PA–TDI). Echocardiographic findings were integrated with clinical features to guide treatment strategy selection.
Results: In a patient with structurally normal atria, preserved atrial strain, and normal conduction time, early catheter ablation resulted in sustained sinus rhythm during follow–up. In a second patient with obesity, increased epicardial adipose tissue, reduced atrial strain, and prolonged PA–TDI, a substrate–oriented ablation strategy was required after failure of initial pulmonary vein isolation. In an elderly patient with moderate atrial remodeling, minimal symptoms, and relevant comorbidities, a conservative approach with rate control and anticoagulation was favored, with stable clinical outcome. Across cases, atrial strain and PA–TDI correlated with disease complexity and influenced therapeutic decisions.
Conclusions: Advanced echocardiographic assessment of atrial mechanics and conduction provides valuable insights into atrial substrate heterogeneity in paroxysmal atrial fibrillation. Integration of atrial strain and PA–TDI into routine evaluation may support personalized management strategies, optimizing patient selection for catheter ablation and avoiding unnecessary invasive procedures.

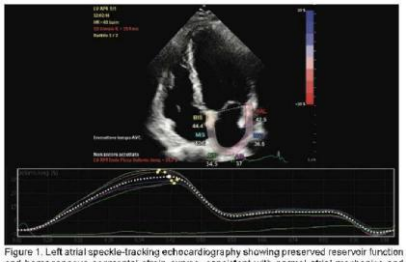
Figure 1. Left atrial speckle-tracking echocardiography showing preserved reservoir function and homogeneous segmental strain curves, consistent with normal atrial mechanics and absence of significant atrial remodeling.

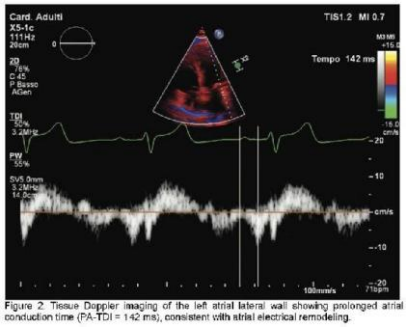

Figure 2. Tissue Doppler imaging of the left atrial lateral wall showing prolonged atrial conduction time (PA-TDI = 142 ms), consistent with atrial electrical remodeling.

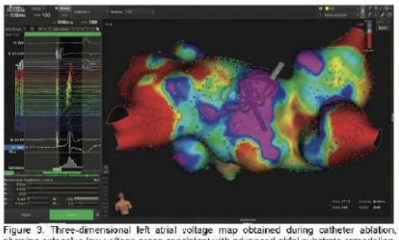
Figure 3. Three-dimensional left atrial voltage map obtained during catheter ablation, showing extensive low-voltage areas consistent with advanced atrial substrate remodeling.

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ATRIAL FIBRILLATION AND PERCUTANEOUS LEFT ATRIAL APPENDAGE CLOSURE: A SINGLE–CENTER EXPERIENCE COMPARING DEVICES AND TECHNIQUES

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Atrial fibrillation (AF) is the most common cardiac arrhythmia in clinical practice and is associated with a significantly increased risk of ischemic stroke and systemic thromboembolic events. Oral anticoagulation (OAC), including vitamin K antagonists and direct oral anticoagulants, represents the gold standard for stroke prevention according to current guidelines. However, long–term OAC is contraindicated or poorly tolerated in a substantial proportion of patients due to high bleeding risk, comorbidities, intolerance, or poor adherence. In these settings, percutaneous left atrial appendage closure (LAAC) may be considered as an alternative therapeutic strategy. The 2024 European Society of Cardiology guidelines assign LAAC a Class IIb recommendation in patients with high thromboembolic risk and contraindications to OAC, while American guidelines upgraded the recommendation to Class IIa in similar patient populations. Additional consensus documents support LAAC in patients with recurrent bleeding, malignancy with high hemorrhagic risk, severe renal or hepatic dysfunction, thromboembolic events despite OAC, or when combined with catheter ablation of AF. This study reports a single–center experience from September 2024 to July 2025 involving 65 patients with non–valvular AF and high hemorrhagic risk undergoing percutaneous LAAC. Thromboembolic and bleeding risks were assessed using the CHA_2DS_2–VASc and HAS–BLED scores. Procedures were guided by transesophageal echocardiography (TEE) or transesophageal intracardiac echocardiography (TE–ICE, "Contarini Technique") (Figure 1), using Watchman FLX or LAmbre devices (Figure 2).

Procedural success was achieved in 100% of cases, with a low rate of major periprocedural complications (1.5%). At three–month follow–up, effective LAA closure was observed in 98% of patients, allowing antithrombotic de–escalation. No ischemic strokes, systemic embolic events, or major bleeding episodes occurred at three or six months. Mild peridevice leaks were observed but did not affect clinical outcomes. Patients treated with TE–ICE showed complete closure, fewer minor leaks, and a 54% reduction in hospital length of stay, suggesting that TE–ICE is a safe and effective alternative to standard TEE, particularly in elderly and frail patients. In conclusion, percutaneous LAAC is a safe and effective strategy for stroke prevention in selected AF patients unsuitable for long–term anticoagulation, with promising results using advanced imaging techniques.

Figure 1

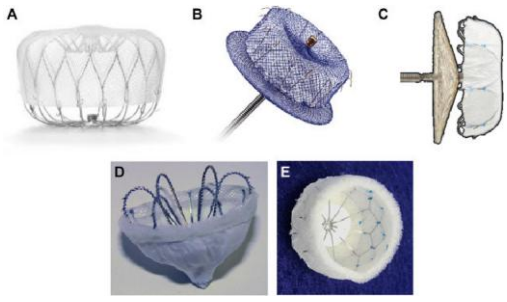

Figure 2

Abstract citation ID: suag058.287

MODIFIED HALLER INDEX IS INVERSELY ASSOCIATED WITH ASYMPTOMATIC STATUS IN ATRIAL FIBRILLATION PATIENTS UNDERGOING ELECTRICAL CARDIOVERSION: A PRELIMINARY OBSERVATION

A. Sonaglioni, G. Nicolosi, M. Lombardo, and M. Baravelli
Ospedale San Giuseppe Multimedica, Milano; Policlinico San Giorgio, Pordenone

Background: No previous study evaluated the possible influence of chest wall conformation on symptoms perception in atrial fibrillation (AF) patients candidates for electrical cardioversion (ECV). We aimed at evaluating the anthropometric and clinical characteristics of patients with persistent AF undergoing ECV, categorized according to the presence or absence of symptoms.
Methods: This study retrospectively analyzed a series of persistent AF patients scheduled for early ECV who underwent pre–procedural clinical evaluation, MHI (the ratio of chest transverse diameter over the distance between sternum and spine) assessment, transthoracic and transesophageal echocardiography implemented with strain analysis of both left atrium and left atrial appendage. Thromboembolic risk and burden of comorbidities were assessed by CHA2DS2–VASc Score and Charlson comorbidity index (CCI), respectively. The independent predictors of "asymptomatic AF" were assessed.
Results: A total of 25 asymptomatic and 90 symptomatic AF patients were retrospectively examined. Compared to symptomatic AF patients, those asymptomatic were significantly older (78.4±3.8 vs 71.0±7.7 yrs, P ‹0.001), predominantly males (84 vs 44.4%, P ‹0.001), with significantly lower MHI (2.0 ±0.1 vs 2.4±0.1, P ‹0.001), higher CHA2DS2–VASc Score (5.8±1.1 vs 3.6±1.1, P ‹0.001) and CCI (6.8±1.4 vs 2.3±0.9, P ‹0.001), and greater impairment in biventricular systolic function and atrio–auricolar myocardial strain indices. On multivariate logistic regression analysis, CHA2DS2–VASc Score (OR 2.65, 95% CI 1.53–4.60) and CCI (OR 2.36, 95%CI 1.16–4.66) were linearly associated with the endpoint "asymptomatic AF", whereas MHI (OR 0.76, 95%CI 0.59–0.97) was inversely associated with the asymptomatic status. A MHI ‹2.2 was the best cut–off for detecting asymptomatic AF patients.
Conclusions: MHI is inversely associated with asymptomatic status in persistent AF patients undergoing ECV. MHI assessment might represent an innovative practical approach to AF patients.

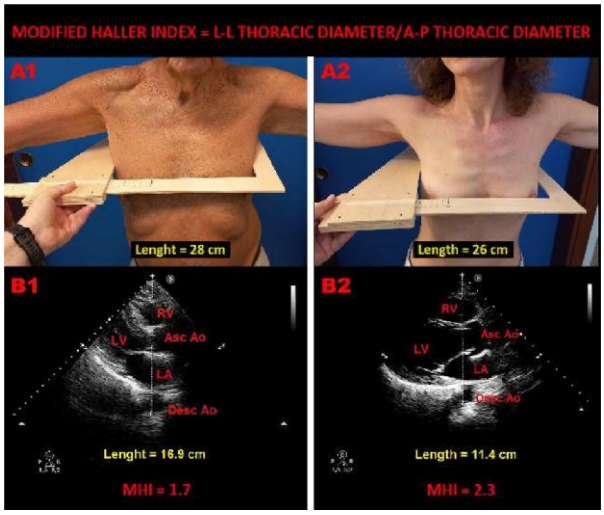

Figure 1 . Examples of MHI (L–L/A–P thoracic diameter) assessment in an asymptomatic elderly male affected by persistent AF (Panels A1 and B1) and in a symptomatic younger AF woman (Panels A2 and B2), included in the present study.

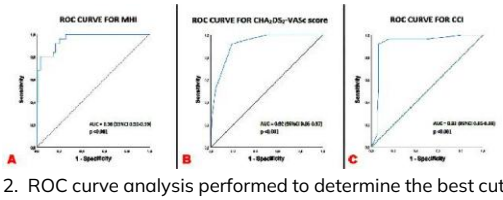

Figure 2. ROC curve analysis performed to determine the best cut–off of MHI (Panel A), CHA2DS2–VASc Score (Panel B) and CCI (Panel C) for predicting the endpoint "asymptomatic AF" in the whole study group.

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NURSE–LED REMOTE MONITORING AND TRIAGE OF PATIENTS WITH IMPLANTABLE LOOP RECORDER FOR CRYPTOGENIC STROKE: EXPERIENCE AT ANNUNZIATA HOSPITAL, COSENZA

R. Bruno, N. Affuso, G. D'Auria, O. Chiarello, D. De Fazio, E. Mazzei, C. Fortuna, C. Tomaselli, A. Talarico, G. Quirino, L. Romano, and A. Curcio
Azienda Ospedaliera Universitaria Di Cosenza

Background: Implantable loop recorders (ILRs) are increasingly used to identify occult arrhythmias in patients with cryptogenic stroke. The active involvement of nurses in device management and data triage plays a pivotal role in ensuring accurate interpretation and timely clinical action.
Methods: This single–center, real–world experience included 84 patients implanted with ILRs for suspected cryptogenic stroke at the Diagnostic Center of Annunziata Hospital, Cosenza, between 2021 and 2025. Nurses managed all stages of care: patient preparation and procedural assistance, remote data monitoring, and systematic data collection through a dedicated digital platform. A structured nurse–led triage workflow was implemented to classify arrhythmic events and coordinate multidisciplinary decision–making.
Results: Subclinical atrial fibrillation (AF) was detected in approximately 29% of patients, while other identified events included sinus pauses, supraventricular tachycardias, and bradyarrhythmias. Nurse–driven review enabled clear differentiation between actionable and non–actionable events, optimizing communication with physicians and facilitating timely initiation of therapies such as anticoagulation, antiarrhythmics, pacing, or ablation. At 24 months, cumulative AF incidence reached 29%, increasing to 37% at 48 months (Figure 1). Event distribution analysis confirmed AF as the predominant finding, followed by pauses and supraventricular tachycardias. (Figure 2)This data confirms the importance of nurse triage in remote monitoring for timely and targeted diagnosis
Conclusion: This experience underscores the essential contribution of nurses in remote monitoring programs for patients with ILRs implanted after cryptogenic stroke. Their expertise in digital surveillance, clinical triage, and multidisciplinary coordination enhances diagnostic yield, supports early therapeutic interventions, and ensures personalized and safe patient management.

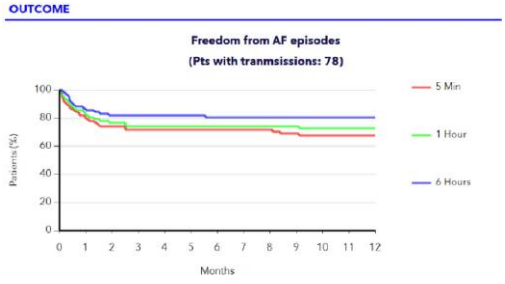

Figure 1. The cumulative incidence of FA in patients monitored with ILR reached 29% at 24 months and 37% at 48 months

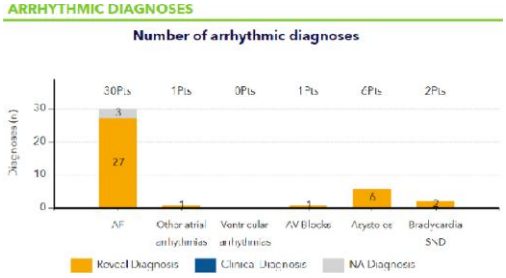

Figure 2. shows the distribution of the main diagnosed arrhythmias. FA represents the majority of events, followed by sinus pauses and supra ventricular tachycardias

Abstract citation ID: suag058.289

EFFICACY AND SAFETY OF EDOXABAN FOR STROKE PREVENTION IN ATRIAL FIBRILLATION IN ELDERLY ED IN VERY ELDERLY

M. Bolognesi, M. Bernazzani, M. Mazzari, A. Tedeschi, L. Rossi, S. Bricoli, M. Granelli, and D. Aschieri
Ospedale Guglielmo Da Saliceto, Piacenza

Background: Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia in adults and it is related to morbidity like ischemic stroke (IS) that is reduced from anticoagulation therapy. Nowadays direct oral anticoagulants (DOAC) are reccomended as a first choice (excluding patients with mechanical heart valve and moderate to severe mitral stenosis) regardless of age. However only one third of patients aged over 75 years were enrolled in the randomized trials and few data of real world are available.
Methods: We retrospectively included all patients aged › 75 years who received edoxaban for IS prevention in AF between january 2016 to december 2023 under an authorized therapeutic plan. We evaluated demographic features, efficacy and safety considering patients older than 75 years and those older than 85 years. We also analyzed prescriptive appropriateness.
Results: Out of 1576 with average age 83 years old (79 – 87), average weight 70 kg (60 – 78) and average CHA2DS2VAsc 4 (4–5), 56 % were females, 89 % suffered from arterial hypertension,18% diabetes mellitus,18% heart failure,36% cognitive impairment,13% previous stroke, 22% previous cancer. After 36 months (12 – 60) of follow up, efficacy endpoint (Stroke, TIA and systemic embolism) was 4,3% without sex difference [males no endpoint (NE) 45% vs endpoint (E) 41% and females (NE) 59% vs (E) 55%; p= 0,5) and without age difference [› 75 years (E) 65% vs (NE) 59%and ≥85 years (E) 35% vs (NE) 41%; p = 0,3). Major bleeding (MB) were 7,8% without sex difference [males no bleeding (NoB) 45 % vs bleeding (B) 48% and females (NoB) 55 % vs (B) 52%; p=0,5) but with prevalent MB in › 85 years' patients [≥85 years: (B)53% vs (NB) 40% vs ‹85 years (B) 47% vs (NB) 60%; p= 0,003). Prescriptive appropriateness was registered in 89% patients at initial evaluation and 90% at last follow up.
Conclusions: Our study confirms efficacy and safety of edoxaban for IS prevention in AF also in elderly and in very elderly. However, a higher incidence of MB was observed in very elderly reletive to the elderly and this finding increased with longer treatment duration. These data highlight the need for more intensive clinical ed laboratory followu in very eldery receiving this therapy.

Imaging - Cardiovascular Tc

Abstract citation ID: suag058.290

STRESS MYOCARDIAL CT PERFUSION EVALUATION OF MYOCARDIAL BLOOD FLOW (MBF) MEAN VALUE, AND CORRELATION OF MBF DEFECT AND MAIN RISK FACTORS

F. Nicoli, R. Mollace, F. Allieri, S. Frittella, E. Collaku, M. Lo Monaco, M. Licastro, G. Agati, M. Brusamolino, S. Di Maio, S. Malara, F. Frascaro, E. Corghi, A. Zanello, and E. Bertella
Humanitas Gavazzeni; Universita' Ingegneria Dalmine; Humanitas Research Universita'

Stress Myocardial CT perfusion has emerged as a noninvasive modality for simultaneous anatomical and functional assessment of coronary artery disease, in a single scan session. This study investigates the relationship between MBF defects and main cardiovascular risk factors, providing reproducible thresholds that may distinguish normal from abnormal perfusion. Methods.A total of 140 patients (mean age 67.9±11.1 years; 75% men, Tab.1) were studied by stress myocardial CT perfusion (regadenoson). MBF stress response was classified as normal (MBF=0) or impaired (MBF=1).

Patients were categorized based on MBF response [Graphic 1], risk factors and Ischemic Heart Disease (IHD) status for statistical analysis (Chi–squared analysis, Pearson correlation coefficient r and Odds Ratio). Results. The mean MBF across all AHA segments was 159.92 ml/100ml/min (n = 2208 segments).

When stratified by perfusion status, segments with a perfusion defect showed a significantly lower mean MBF of 90.46 ml/100ml/min (n = 359, Graphic 1), compared to 171.32 ml/100ml/min (n = 1849) in segments without perfusion defects, with a significant difference (p ‹ 0.01) [Graphic 2.]. These results support the use of these MBF values as potential cut–offs. Stratifying patients based on the presence of known ischemic heart disease (IHD), a moderate positive correlation between MBF impairment and the presence of IHD (Pearson correlation coefficient r = 0.29; chi–squared test $\chi^2 = 8.81$, p = 0.003) suggests that reduced MBF may be more associated with the presence of previous IHD [Graphic 3].

Furthermore, patients with an MBF defect were found to have a fourfold increased risk of having IHD [Odds Ratio (OR) 4.00, 95% C.I 1.57–10.2], suggesting that MBF impairment is a strong noninvasive marker of myocardial ischemia. Furthermore, the data suggest that CT perfusion has a diagnostic relevance in enhancing the likelihood of detecting ischemia in patients with established IHD. Regarding the main clinical risk factors, only Peripheral Artery Disease (PAD) showed a statistically significant correlation with MBF defect (r = 0.194, p = 0.044) [Tab 2., Graphic 4].**Conclusions:** .MBF impairment detected by CT stress perfusion is significantly associated with previous known IHD and PAD. According to our data, stress cardiac CT perfusion evaluation of MBF appears to be more effective in patients with pre–existing IHD and in those with PAD, representing population subgroups at higher risk for inducible ischemia.

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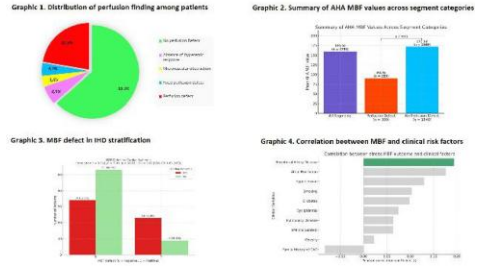

Table 1. Clinical characteristics and risk factors.

	N Total 140 patients
Age, average	67.97
Women, n (%)	35 (25)
Men, n (%)	105 (75)
BMI kg/m², average	27.13
Angina at rest/effort, n (%)	9 (6.4)
Atypical thoracic pain, n (%)	30 (21.4)
Dispnoea, n (%)	16 (11.4)
Asthenia, n (%)	2 (1.4)
Syncope, n (%)	1 (0.7)
Tachycardia, n (%)	3 (2.1)
Hypertension, n (%)	114 (81.4)
Dyslipidemia, n (%)	112 (80)
Diabetes, n (%)	36 (25.7)
Smoke (former/user), n (%)	81 (57.9)
Familiarity for IHD*, n (%)	79 (56.4)
Obesity, n (%)	23 (16.4)
Pulmonary Disease, n (%)	11 (7.9)
Atrial Fibrillation, n (%)	16 (11.4)
Unspecified, n (%)	4 (2.9)
Paroxysmal, n (%)	11 (7.9)
Persistent, n (%)	0 (0)
Permanent, n (%)	1 (0,7)
Ventricular arrhythmias, n (%)	13 (9.3)
Valvular Disease†, n (%)	4 (2.9)
Cardiomyopathies, n (%)	17 (12.1)
PAD†, n (%)	127 (90.7)
Ictus / TIA, n (%)	0 (0) / 1 (0.7)
Ischemic Heart Disease, n (%)	67 (47.8)
Previous SCA, n (%)	28 (20)
STEMI, n (%)	8 (5.7)
NSTEMI, n (%)	7 (5)
UA, n (%)	0 (0)
IMA unknown, n (%)	13 (9.3)
Bypass, n (%)	9 (6.4)
Percutaneous Intervention, n (%)	61 (43.6)

* Familiarity for Ischemic Heart Disease(first degrees: men<55 years, women <65years).
†Valvular Disease, at least moderate. *PAD, *Peripheral artery disease*: stenosis>50% or interventions.

Table 2. Stress MBF Outcome vs Risk Factors.

Variable	Correlation (r)	p-value	Significant (p < 0.05)
Peripheral Artery Disease (PAD)	0.194	0.0441	Yes
Atrial Fibrillation (AF)	0.177	0.067	No
Hypertension	0.130	0.179	No
Smoking	0.103	0.2909	No
Diabetes	0.098	0.3135	No
Dyslipidemia	0.075	0.4381	No
Pulmonary Disease	0.064	0.5082	No
BMI (calculated)	0.063	0.5139	No
Obesity	0.023	0.8105	No
Family History of CAD	-0.083	0.3954	No
Stroke / TIA	—	—	—

Abstract citation ID: suag058.291

MULTIMODALITY IMAGING OF A LARGE CIRCUMFLEX CORONARY FISTULA DRAINING INTO THE CORONARY SINUS

C. Scollo, D. Forlani, E. Genovesi, L. Pezzi, A. D'Alleva, R. Magnano, D. Rossi, M. Di Marino, S. Saraullo, M. Rizzuto, P. Vitulli, and M. Di Marco

Ospedale Civile Santo Spirito, Pescara; Cardiologia Universitaria Università Degli Studi G. D'Annunzio, Pescara

Background: Coronary artery fistulas are rare anomalies; when associated with ectasia/aneurysm of the feeding vessel, anatomic definition and estimation of hemodynamic impact require multimodality imaging.
Case presentation: A 66–year–old asymptomatic man was electively admitted for a follow–up exercise treadmill test, which was considered equivocal for stress–induced ischemia. He had no prior cardiac history; family history was positive for coronary artery disease in his father. Cardiovascular risk factors included arterial hypertension and hyperlipidemia. Invasive coronary angiography showed ectatic disease of the left main coronary artery and circumflex artery, with arteriovenous fistulization that on angiographic projections suggested drainage toward the right atrium or inferior vena cava region (Figure 2-3). A mild stenosis of the proximal left anterior descending artery was also reported; the right coronary artery had no significant stenoses and coronary dominance was balanced. The circumflex supplied only two small obtuse marginal branches and a small posterior interventricular branch.
Coronary CT angiography confirmed ectasia of the left main (10 mm) and circumflex (9 mm) and excluded significant coronary stenoses. Distally, the circumflex gave rise to a large fistula (maximum diameter approximately 20 mm) draining into the coronary sinus (Figure 1). Transthoracic echocardiography showed normal cardiac morphology and function without signs of right–sided volume overload; with color Doppler, the ectatic left main and the circumflex course could be visualized along their trajectory. The patient was discharged in good clinical condition with a plan for clinical and imaging follow–up.
Discussion/Conclusions: Circumflex–to–coronary sinus fistulas are uncommon and may yield positive provocative tests even in the absence of obstructive stenosis, possibly due to coronary steal. Integrating invasive angiography, coronary CT angiography and echocardiography enables accurate delineation of anatomy and hemodynamic relevance of the malformation, supporting individualized management and follow–up.

Figure 1

Figure 2

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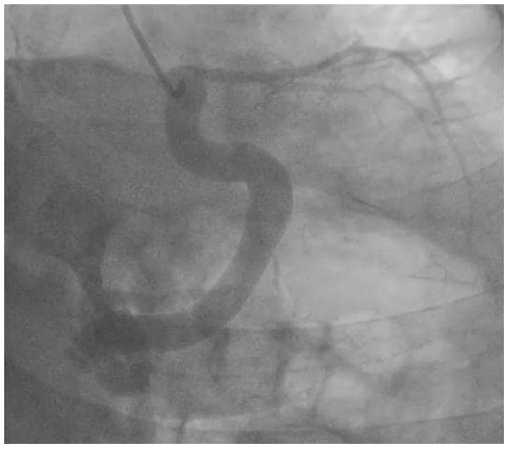

Figure 3

Abstract citation ID: suag058.292

INCIDENCE OF COMPLETE MYOCARDIAL BRIDGE IN PATIENTS AFFECTED BY STABLE TYPICAL ANGINA: A CT CORONARY ANGIOGRAPHY STUDY

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Introduction: Coronary arteries have a typical epicardial course and a myocardial bridge (MB) is considered a variant of the coronary anatomy. The diagnosis is traditionally and largely underestimated by invasive coronary angiography and the occurrence of MBs in anginal patients is usually not evaluated despite being reported as a cause of angina in patients without documented coronary atherosclerosis. Computed tomography coronary angiography (CTCA) that allows the simultaneous visualization of the coronary arteries, myocardium and epicardial fat, is an ideal technique for a non–invasive detection of MBs.
PURPOSE: The aim of the study was to evaluate complete MB incidence, site and atherosclerotic plaques using CTCA in anginal patients.
Methods: 1316 patients (pts; mean age 63,3+12 years, M/F: 882/445) underwent CTCA (light speed, 64 slides–GEHC) for typical anginal pain. A non–ionic contrast medium was always used, the mean volume of the contrast medium was 90+10 ml, the rate of injection ranged from 5 to 7 ml/sec. Risk factors, clinical data, indication to perform a CTCA according to international guidelines, presence and severity of coronary atherosclerotic lesions were stored in a database at the time of the examination.
Results: out of the 1316 pts, 80 of them (6%) complained of angina (86% on effort and 14% at rest) and showed the presence of a totally tunneled MB. Pts with MB, as compared to the remaining 1236 pts, showed a significantly lower age (60.1+12.6 vs 63.5+11.8 yrs, p‹0.01); other clinical and angiographic characteristics were not statistically different even if MB pts had a lower incidence of significant coronary stenosis (›50%) (25.6 vs 36.1%; p=NS) and showed a greater percentage of patients with absence of atherosclerotic plaques (42.3 vs 34.9 %; p= NS). MBs were more frequent in the left anterior descending coronary artery than in the other branches. In these cases, the coronary segments involved in the MB were normal in most cases (94%); an atherosclerotic plaque was found in 6% of them, with a significant stenosis (›50%) in only 1% of these patients.
Conclusions: CTCA is a fundamental technique for the initial evaluation of patients with typical angina, and for the differential diagnosis between MB, coronary atherosclerosis and microvascular disease. The findings of this study agree with the literature data guidelines of stable angina evaluation.

Abstract citation ID: suag058.293

THE IMPORTANCE OF IMAGING IN DIAGNOSIS AND FOLLOW–UP OF CORONARY MALFORMATION

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We present a case of a men fortysix years old, with hypertension and Von Hipple–Lindau syndrome (VHL), rare inherited autosomal dominant genetic disorder, that predisposes to the formation of benign and malignant tumors in various parts of the body, such as angiomas in the retina and cerebellum (hemangioblastomas), renal tumors (renal cell carcinoma), pancreatic and adrenal cysts (pheochromocytomas) and vascular malformation. It is caused by a mutation in the VHL gene, which impairs the control of cell growth, and requires regular monitoring and a multidisciplinary approach for the management. He has undergone bilateral nephrectomy in 2013 for renal neoformation, since then on dialysis.

In 2017 a cerebellar hemangioblastoma was removed. He has also pancreatic neoformation NET G1 in followup. Executed cardiologic evaluation for possible renal transplant; in January 2025 he performed negative maximal ergometric test. Asymptomatic during normal daily activities. Ecocardiogram showed dilated, slightly hypertrophic left ventricle, with preserved systolic and diastolic function, dilated left atrium and normal–sized right chambers, mild ectasia of the aortic root and ascending tract; in parasternal short axis view abnormal flow is detected, apparently direct to the left atrium, referrable to a probable abnormal right coronary artery course (fig. 1); mild mitro–tricuspid regurgitation, normal pulmonary pressure, absence of pericardial effusion.

At the coronary CT scan there was no significant coronary stenosis; from the proximal segment of the right coronary artery emerges a very dilated and tortuous branch that probably flows into the right atrium suspected for arterious malformation. (Fig 2,3) Executed coronary angiography that confirmed epicardial coronary arteries without significant stenosis, voluminous fistula originating from the proximal tract of right coronary artery projecting into the left atrium; distal artery with normal caliber and vascularization.

The case was discussed with clinical indication for imaging follow–up and medical therapy. This interesting case shows how a systemic disease must be studied with a multidisciplinary approach for the possible involvement of multiple organs. This is a rare case of coronary malformation in the context of VHL syndrome, where vascular malformations in other organs are described but not in the heart; ecocardiography and CT scan are essential for diagnostic and therapeutic decision and follow–up.

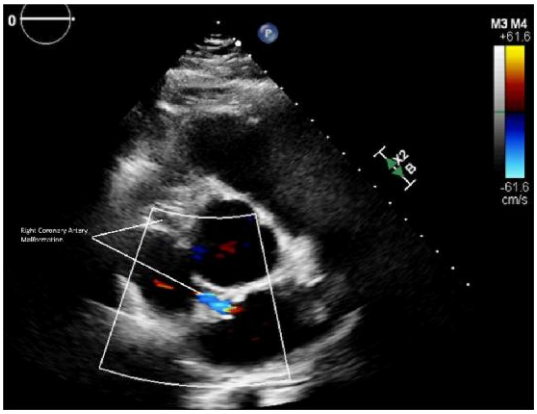

Figure 1

Figure 2

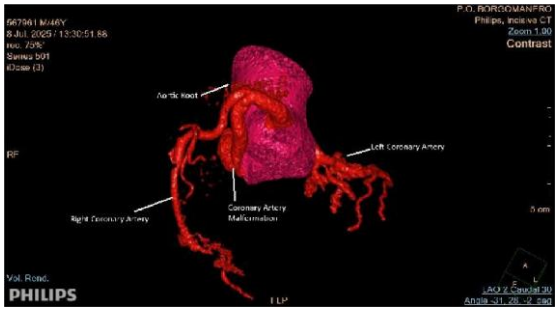

Figure 3

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Abstract citation ID: suag058.294

SUBCLINICAL THYROID DYSFUNCTION IN CARDIAC EUTHYROID PATIENTS AFTER CORONARY CT SCAN

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Introduction: During coronary CT scan, an overload of iodine (15–37 g) is administered by the intravenous contrast mean (ICM) injection. For this reason, international guidelines (ESUR) recommend caution to limit the risk of iatrogenic thyrotoxicosis only in patients with known thyroid disease. After ICM administration, iodine stores remain elevated for up to 4–8 weeks due to its high affinity to plasma proteins. The persistence of iodine overload could alter myocardial contractility as a result of the impaired thyroid metabolism.
Aim of the study:

(1) Assess the presence of thyroid dysfunction in a population of cardiac patients without known thyroid disease, admitted for coronary CT angiography.
(2) Evaluate the temporal changes in thyroid metabolism and urinary iodine excretion during the 12 months after the administration of ICM.

Materials and methods: The study enrolled 14 clinically euthyroid adult patients who perform coronary CT scans. The patients were evaluated by urinary iodine concentration and thyroid function parameters before the CT scan and after 24 hours, 7 – 30 days, and after 3–6–12 months.
Results: All patients showed a dramatic increase of urinary iodine at 24 h (›2000 µg/L) until 1 week; after 1 month the urinary iodine started to decrease to normal values (mean ± SD=211±128 µg/L). The patients with reduced basal urinary iodine concentration showed at 6 months, superimposable value. The TSH value showed an increase above the normal range in 3 patients with a peak at 1 week (› 4 mUI/L). In the others, the TSH value, always in the normal range, showed a not significant increase with the maximum value at 1 week (1.95 ±0.82 vs 2.95±1.8 mUI/L p=0.07). The thyroid hormones showed an inverse physiological modification compared to TSH value with a maximum decrease at 1 week (fT3 4.14±0.59 vs 3.71±0.65 ng/L, fT4 1.14±0.16 vs 1.06±0.2ng/dL, p=ns). All thyroid function parameters showed values in the normal range after 1 month (Figure 1).
Conclusions: According to the recent guidelines, thyroid hormone dosage is not recommended in all patients who perform CT scan with ICM. Our study demonstrates that the iodine overload alters thyroid hormones concentration and urinary iodine excretion mostly after 1 month and it could be dangerous for patients affected by heart diseases. Further studies should better investigate thyroid metabolism in this susceptible group of patients.

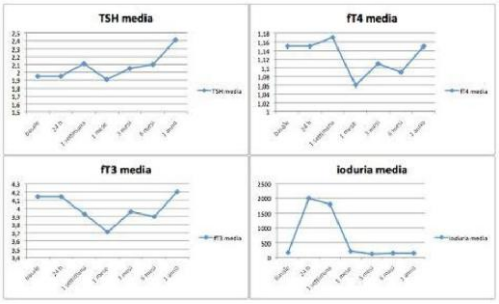

Figure 1

Abstract citation ID: suag058.295

SCREENING CORONARY AND CAROTID ATHEROSCLEROSIS AND LUNG DISEASE BY COMPUTED TOMOGRAPHY ANGIOGRAPHY WITH PHOTON–COUNTING DETECTOR TECHNOLOGY

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Background: Photon–counting computed tomography (PCCT) enables high–resolution, multiorgan vascular and thoracic imaging. We tested whether a single–visit PCCT screen can uncover subclinical, clinically actionable disease in asymptomatic, high–risk adults.
Methods: Prospective, general practitioners (GP)–directed cohort of adult subjects aged 45–75 years meeting ≥1 criterion: type–2 diabetes for ≥10 years, current or former smoking (who had quitted ‹15 years), or Framingham Risk Score for Hard Coronary Heart Disease ≥10%. Key exclusions were typical angina or angina–equivalent symptoms, prior coronary/carotid CT/angiography, cardiomyopathy, iodinated–contrast allergy, and chronic kidney disease. Participants underwent a PCCT protocol covering coronary arteries, thorax, and carotids (effective dose 11–13 mSv). This interim analysis spans enrolment from 11 January to 21 June 2025; outcomes included prevalence/severity of coronary atherosclerosis, carotid plaque burden, Lung–RADS category, incidental findings, downstream referrals, and therapy changes.
Results: PCCT was completed in 172 participants (median age 62 years [interquartile range 54–68]; 56% male) without adverse events. Any coronary atherosclerosis was found in 129 (75%), and obstructive CAD (corresponding to at least one stenosis ≥50%) in 25 (15%). Coronary artery disease was classified as non–obstructive, non–extensive in 32 (19%), non–obstructive, extensive in 71 (41%), obstructive, non–extensive in 1 (1%), and obstructive, extensive in 25 (15%) (Figure 1). Eight participants (5%) were referred for invasive coronary angiography; to date, 4 (2%) underwent percutaneous coronary intervention and 2 (1%) coronary artery bypass grafting. Carotid plaques were identified in 94/170 evaluable scans (55%), and were bilateral in 60/170 (35%) (Figure 2). Thoracic findings included Lung–RADS 3–4 nodules in 21/172 (12%) (Figure 3) and emphysema in 41/172 (24%). Incidental extra–thoracic work–ups included one papillary thyroid carcinoma confirmed after ultrasound–guided evaluation. Following PCCT, antiplatelet therapy was initiated in 62%, lipid–lowering therapy in 45% and up–titrated in a further 22%. No adverse events attributable to PCCT were recorded.
Conclusions: In high–risk asymptomatic individuals, a PCCT screen revealed a substantial burden of clinically actionable atherosclerotic and pulmonary disease, was feasible and safe, and frequently catalysed treatment initiation or intensification with selective invasive assessment.

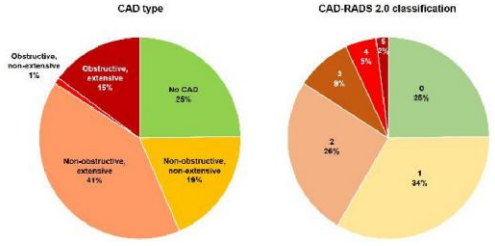

Figure 1

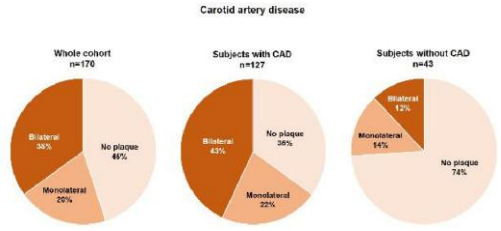

Figure 2

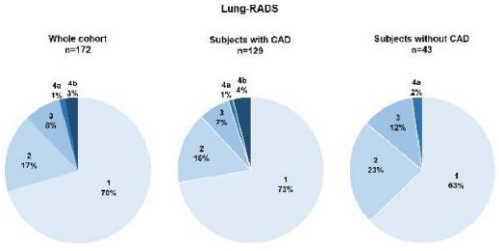

Figure 3

Imaging 1

Abstract citation ID: suag058.296

INFERIOR HYPERTROPHIC CARDIOMYOPATHY: AN UNUSUAL AND SUBTLE LOCATION

D. Pancaldo, E. Armando, G. Amoroso, U. Barbero, A. Battisti, A. Coppolino, L. Correndo, S. Dogliani, C. Iacovino, C. Moncalvo, L. Morena, L. Valeri, E. Canuti, M. Doronzo, M. Ghigliotti, M. Giordano, G. Marengo, A. Rinaudo, C. Rovera, G. Salmè, and M. De Benedictis
Sc Cardiologia Ospedale Ss Annunziata Savigliano; Sc Radiologia Ospedale Ss Annunziata Savigliano

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Intro: Hypertrophic cardiomyopathy (HCM) is defined by an increased left ventricular (LV) wall thickness (≥15 mm) that cannot be explained solely by abnormal loading conditions. Hypertrophy preferentially involves the basal segments of the interventricular septum, it frequently extends to the lateral wall, posterior septum, and the LV apex. Isolated lateral or inferoseptal hypertrophy are considered rare variants, pure or dominant inferior wall involvement is extremely sporadic. Hypertrophy of atypical segments may be overlooked by transthoracic echocardiography and can be difficult to differentiate from intracardiac masses; therefore, advanced diagnostic imaging, such as Cardiac Magnetic Resonance (CMR), is often required. In this article, we report a highly unusual case of isolated inferior hypertrophic cardiomyopathy.
Description: A 64–year–old obese Caucasian female, with no family history of heart disease or sudden cardiac death and no prior diagnosis of hypertension, presented to the Emergency Department with palpitations and lipothymia. EKG revealed a wide–complex tachycardia at a rate of 240 bpm, likely of ventricular origin, which was successfully treated with electrical cardioversion. Bedside echocardiography showed (Fig.1) a left ventricle of normal diameter with hypo–akinesia of the mid–basal inferior wall and mildly depressed global contractility. Subsequent coronary angiography showed no evidence of significant obstructive lesions.

The patient then underwent CMR, which yielded the unexpected finding of isolated involvement of the mid–basal inferior LV wall, characterized by:

a. Marked hypertrophy (wall thickness of 18 mm);
b. Hypo–akinesia with a mild reduction in global contractility;
c. Subendocardial late gadolinium enhancement (LGE) during the perfusion study;
d. Substantially transmural hyperintensity on Late Gadolinium Enhancement (LGE) imaging for fibrosis assessment (Fig. 2);
e. Increased T1 mapping values (1098 ms, compared to ‹ 994 ms in the remaining myocardium).

The examination was diagnostic for hypertrophic cardiomyopathy localized to the mid–basal inferior wall of the left ventricle. Consequently, the patient underwent implantable cardioverter–defibrillator (ICD) placement.
Discussion: This case of hypertrophic cardiomyopathy is unique due to the atypical and focal nature of the affected site. In this clinical scenario, Cardiac Magnetic Resonance plays a diagnostic pivotal role.

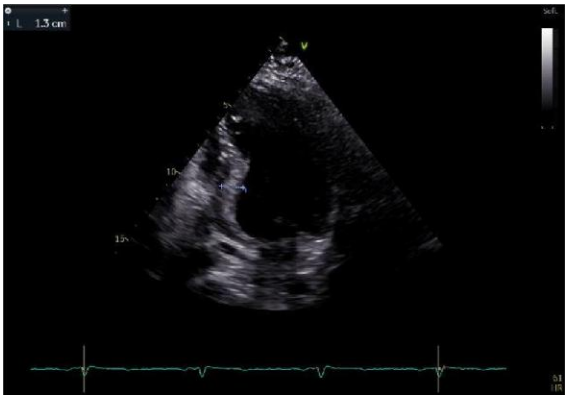

Figure 1

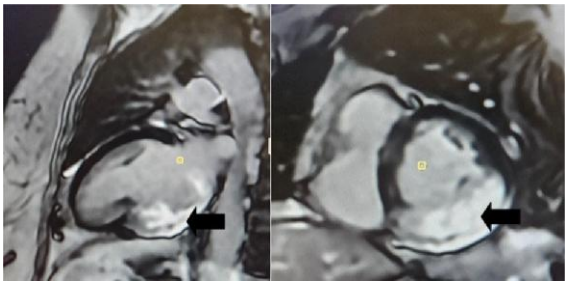

Figure 2

Abstract citation ID: suag058.297

CALCIFIED AMORPHOUS TUMOR (CAT): RECOGNIZING A RARE CLINICAL ENTITY

S. Luciani, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, A. Moraca, M. Shkoza, M. Nazziconi, K. Maurizi, A. Massari, G. Furlani, B. Anselmi, C. Gatti, T. Gaudenzi, F. Pietrucci, A. Scavuzzo, A. Dello Russo, F. Vagnarelli, C. Lofiego, and M. Marini
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Introduction: Calcified Amorphous Tumor (CAT) of the heart is a rare non–neoplastic cardiac mass, characterized microscopically by nodular calcium deposits and amorphous fibrinous material. The pathogenesis remains poorly understood, though some hypotheses suggest a close association with hypercoagulable states and dysregulated calcium–phosphorus metabolism.
Case presentation: We report the case of a 77–year–old male patient with chronic ischemic heart disease, prior coronary artery bypass grafting, reduced ejection fraction heart failure, type 2 diabetes mellitus, and moderate chronic kidney disease, who was admitted to our department for acute decompensated heart failure. Transthoracic (Fig.1) and transesophageal (Fig.2, Fig.3) echocardiography revealed an intracavitary, hyperechogenic, elongated, and mobile cardiac mass measuring approximately 15 mm in length and 3 mm in thickness, arising from extensive calcification of the posterior mitral annulus at the ventricular side. These echocardiographic findings, together with the patient's history of moderate chronic kidney disease and the absence of clinical signs suggestive of endocarditis, raised suspicion for a Calcified Amorphous Tumor (CAT) associated with Mitral Annular Calcification (MAC). Mild mitral stenosis and mild–to–moderate mitral regurgitation was also observed. During hospitalization, diuretic therapy and guideline–directed heart failure therapy were optimized and coronary angiography was performed showing progression of coronary artery disease. Due to high surgical risk the patient was declined for surgical treatment and underwent percutaneous coronary intervention, with a conservative approach regarding the MAC–CAT lesion.
Conclusion: Calcified Amorphous Tumor (CAT) is a rare and benign cardiac mass. Accurate differential diagnosis from other cardiac masses, such as endocarditis, is crucial for guiding appropriate treatment. Additionally, echocardiographic characteristics help assess embolic risk and guide the choice between surgical excision and clinical monitoring.

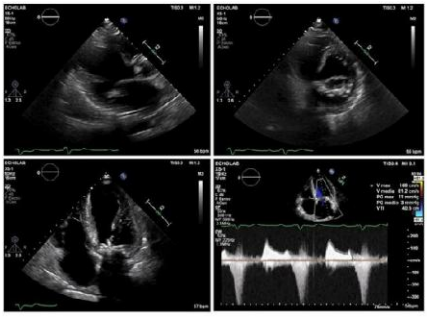

Fig. 1 – Transthoracic echocardiography view

Fig. 2 – Transoesophageal echocardiography view

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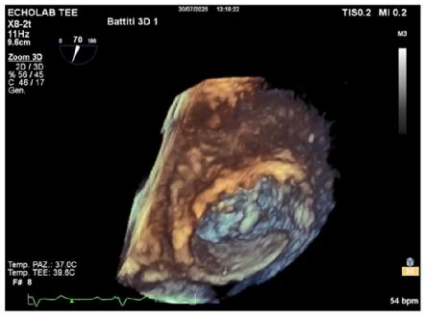

Fig. 3 – 3D Transoesophageal echocardiography view

Abstract citation ID: suag058.298

NOT ONLY AN INFERIOR STEMI: AN INTERESTING CASE OF A LONG–STANDING ATRIAL SEPTAL DEFECT

A. Siracusa, I. Pariggiano, F. Giannetti, E. Golia, M. Rucco, A. Izzo, D. Soviero, R. Sorbo, and P. Calabrò
Asl Napoli 3 Sud – Po S. Leonardo; Aorn S. Anna E S. Sebastiano, Caserta; Casa Di Cura S. Michele, Caserta

We described a case of a 75–year–old man, presented to the Emergency Department with intermittent chest pain. The electrocardiogram showed ST segment elevation in the inferior, posterior and right precordial leads. In consideration of the diagnosis of inferior–posterior STEMI, the patient was urgently transferred to the CathLab where coronary angiography revealed thrombotic occlusion of the mid–right coronary artery, treated with two drug–eluting stents. During the hospitalization, the patient underwent transthoracic echocardiogram which showed direct and indirect signs of pulmonary hypertension: dilated, hypertrophic and hypokinetic right ventricle, left ventricle D–shape (eccentricity index 0.8), dilated right atrium and signs of systemic venous congestion (dilated hypo–collapsible inferior vena cava and pulsatile portal venous flow with a Vexus score of 2). The interatrial septum was aneurysmatic, hypermobile, with a large ostium secundum type defect resulting in a left–to–right shunt (Figure 1-2). The diagnosis was confirmed by transoesophageal echocardiography, which showed bidirectional shunt (Figure 3). Then, the patient underwent right heart catheterization, which showed elevated pulmonary vascular resistances, contraindicating the immediate closure of the atrial septal defect. Therefore, the patient was referred to a tertiary center, where he started pharmacological therapy for pulmonary hypertension. Compared to the left ventricle, the right ventricle has lower afterload and lower wall stress and is infarct–resistant because it consumes a lower oxygen supply and has a higher oxygen reserve. There are some conditions, in which the right ventricle becomes more susceptible to ischemia, such as in right ventricular volume and pressure overload in large atrial septal defect, as it happened to our patient.

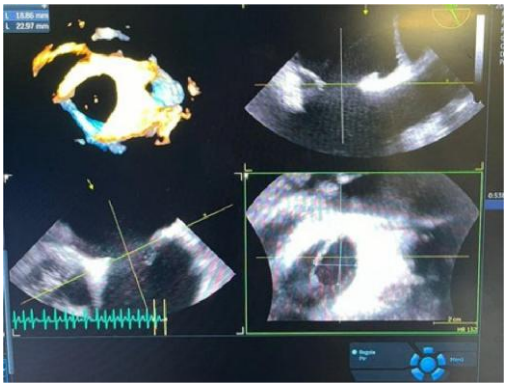

Figure 1

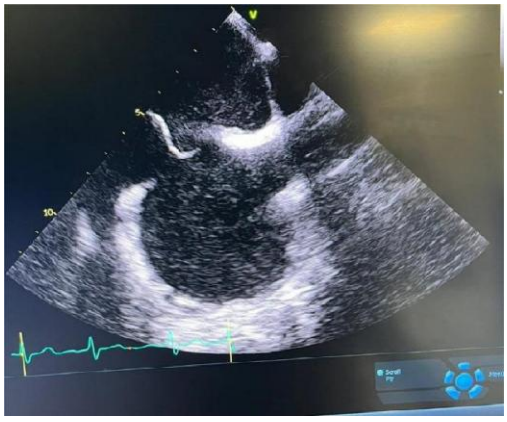

Figure 2

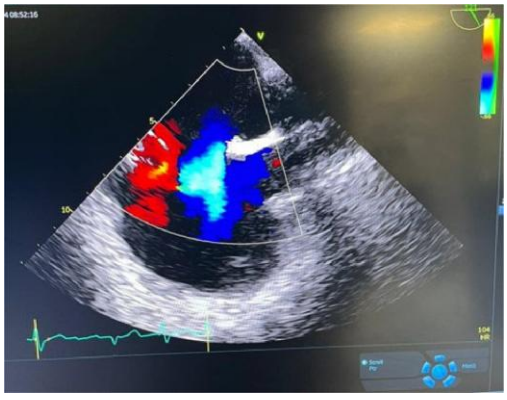

Figure 3

Abstract citation ID: suag058.299

A SILENT GIANT IN THE LEFT ATRIUM: A FATAL CASE OF MASSIVE THROMBOSIS IN VALVULAR ATRIAL FIBRILLATION

M. Maltempi, C. Belardinelli, E. Girella, F. Aliberti, B. Casini, O. Gianvito, S. Censini, and E. Carluccio
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Introduction: Giant left atrial (LA) thrombi are rare but life–threatening complications of valvular atrial fibrillation. Diagnosis may be challenging in complex clinical settings and management remains controversial. We report a case of massive LA thrombosis complicating rheumatic mitral stenosis, subtherapeutic anticoagulation and sepsis.
Case Report: A 63–year–old Albanian woman, with a complete language barrier and a history of rheumatic mitral stenosis, permanent atrial fibrillation on vitamin K antagonists, prior ischemic stroke and peripheral arterial disease, was initially hospitalized for non–revascularizable critical limb ischemia. Two weeks later, she was readmitted with fever and acute cognitive impairment. Laboratory tests showed leukocytosis, elevated C–reactive protein, and subtherapeutic anticoagulation (INR 1.2). Empiric broad–spectrum antibiotics and low–molecular–weight heparin was initiated. Transthoracic echocardiography revealed severe LA dilatation with a large hyperechoic mass (Figure 3); due to suboptimal imaging, transesophageal echocardiography (TEE) was performed. TEE demonstrated a sessile, homogeneous mass occupying over 60% of the LA cavity, with complete occlusion of the left atrial appendage, consistent with a giant thrombus (Figure 1). Marked spontaneous echo contrast was present (Figure 2). The mitral valve was calcified and thickened, causing moderate stenosis (mitral valve area 1.2 cmq). Blood cultures grew Staphylococcus

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aureus and urine cultures isolated ESBL–producing Escherichia coli; targeted antibiotic therapy and optimized anticoagulation were instituted. Despite treatment, the patient developed septic shock and multiorgan failure with fatal outcome.

Discussion: Giant LA thrombosis results from the interaction between atrial fibrillation–related blood stasis, rheumatic valve disease, inadequate anticoagulation and systemic inflammation. In this setting, TEE is crucial for defining thrombus burden when transthoracic imaging is limited. Although anticoagulation is the cornerstone of therapy, surgical thrombectomy may be considered in selected cases; however, severe instability and active infection may preclude invasive strategies.

Conclusion: This case underscores the dramatic course of giant LA thrombosis in high–risk valvular atrial fibrillation and highlights the importance of early multimodality imaging and individualized therapeutic decision–making in critically ill patients.

Figure 1

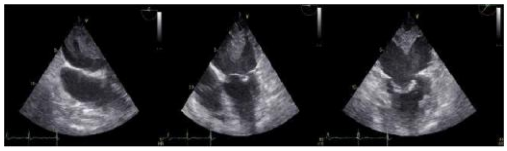

Figure 2

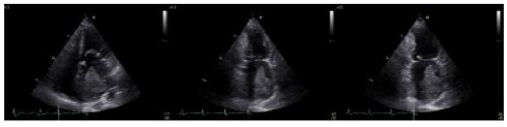

Figure 3

Abstract citation ID: suag058.300

CONCORDANCE AND CLINICAL UTILITY OF THE NEW ASE DIASTOLIC DYSFUNCTION GUIDELINES IN HFREF

G. Lattanzi, I. Di Pietro, F. Fedeli, C. Marino, M. Mascelloni, G. Orlando, R. Lauciello, G. Bardelli, P. Biagioli, F. Fortuni, and E. Carluccio
Azienda Ospedaliera Santa Maria Della Misericordia, Perugia

Background: Novel guidelines for assessing diastolic dysfunction (DD) have recently been published by the American Society of Echocardiography (ASE). Their concordance with prior recommendations and potential clinical advantage remain unclear, particularly in patients with heart failure with reduced ejection fraction (HFrEF). This study aimed to test the concordance between new and previous guidelines and evaluate the clinical utility of the new criteria.

Methods: DD was assessed in 700 stable HFrEF outpatients at our institution using both the 2016 ASE guidelines and the newly published recommendations. Functional capacity was evaluated with six–minute walk test at the time of echocardiography. Associations between DD and functional capacity were tested by comparing walking distance across DD grades. Concordance between DD classifications was analyzed with kappa statistics. The primary endpoint was a composite of heart failure hospitalization and all–cause mortality. Multivariable Cox regression analyses tested the prognostic impact of DD graded according to the new guidelines.

Results: The median age of the cohort was 66 ± 13 years, and 74% were male. By 2016 criteria, all patients had DD (49% grade 1, 19% grade 2, 32% grade 3). With the new guidelines, 14% had no DD, while 31% had grade 1, 27% grade 2, and 17% grade 3 (Figure 1). Concordance between DD classifications was weak (κ = 0.30). Patients with more advanced DD per the new guidelines were older, more often male, more symptomatic, on higher loop diuretic doses, and had higher NT–proBNP. Functional capacity (i.e. 6–min walking distance) did not differ across all grades with the 2016 DD criteria, but showed significant differences with DD classified according to the new guidelines (Figure 2-3). In the 33% whose DD classification were discordant, the old criteria failed to discriminate functional capacity, whereas the new classification did. Both systems stratified prognosis, with more advanced DD grades being independently associated with higher risk of the composite endpoint.

Conclusions: The new ASE DD guidelines showed weak concordance with the 2016 criteria but better discriminated functional capacity and symptom burden. Both predicted prognosis, with the novel guidelines offering potentially greater clinical utility in HFrEF.

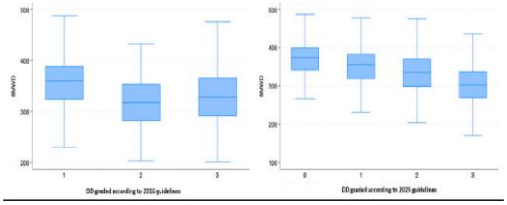

Figure 1

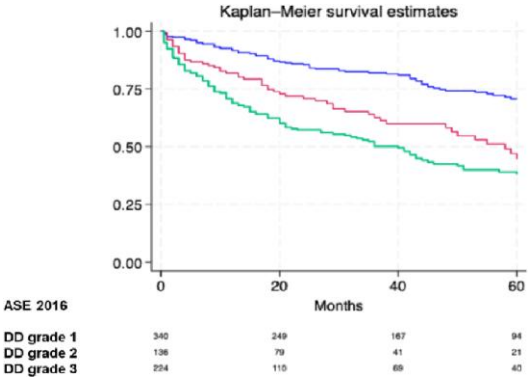

Figure 2

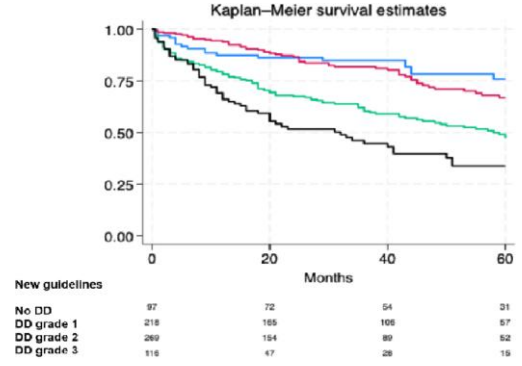

Figure 3

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Abstract citation ID: suag058.301

STOP THAT THROMBOLYSIS!

A. Comunello, E. Bonsante, L. Mattei, C. Ladurner, P. Milewski, P. Canu, A. Ceschini, and R. Cemin
Cardiologia Ospedale Regionale S. Maurizio, Bolzano; Servizio Emergenza E Urgenza Ospedale Regionale S. Maurizio, Bolzano; Neurologia Ospedale Regionale S. Maurizio Bolzano

A 65–year–old woman. Past medical history essentially unremarkable. No home medications. On the morning of 26/11/2025, at around 10:00 a.m., while at work, she developed a sudden motor deficit of the right upper limb and a speech disturbance. Emergency services (112) were alerted for urgent transport (airlifted) to our Emergency Department (ED). The patient arrived at the ED at 11:00 a.m. On medical examination, she was alert, afebrile, hemodynamically stable (BP 140/95 mmHg), with moderate aphasia and mild hypoesthesia of the right hemibody. The ECG showed sinus rhythm without significant ST–T abnormalities. Complete blood count, liver and kidney function tests, blood sugar, PT and aPTT were within normal limits.

Neurological assessment revealed an NIHSS score of 13. The patient was urgently taken to Radiology for a brain CT and CT angiography of the extra– and intracranial vessels. On initial radiological evaluation, no significant acute ischemic or hemorrhagic lesions were detected. Therefore, at 11:30 a.m., systemic thrombolysis with Alteplase was initiated.

At 11:40 a.m., the neurologist was alerted by the radiologist because a more detailed review of the images using dedicated software showed early demarcation of recent ischemic lesions in the left frontal and parieto occipital regions, as well as occlusion of the left posterior cerebral artery in the P2 segment. Thrombolysis was immediately stopped (only the 10 minute bolus had been administered), and the patient was admitted to the Stroke Unit. Over the following hours, she remained hemodynamically stable, though mild aphasia and slight clumsiness on cerebellar testing persisted.

On the morning of 27/11/2025, the consulting cardiologist performed a transthoracic echocardiogram, which revealed a large intracavitary mass (maximum dimensions 8×4 cm) with a likely thin attachment to the posterior wall of the left atrium, highly mobile, with marked systolic–diastolic excursion, occupying almost the entire left atrium in systole and much of the left ventricle in diastole (Figure 1-2-3).

The designated cardiac surgery was therefore alerted, and urgent transfer was arranged for surgical excision of the mass. The mass was successfully removed, without intraoperative or extraoperative complications. The subsequent histological examination confirmed the clinical suspicion of atrial myxoma (despite an implantation base that was atypical compared to the usual).

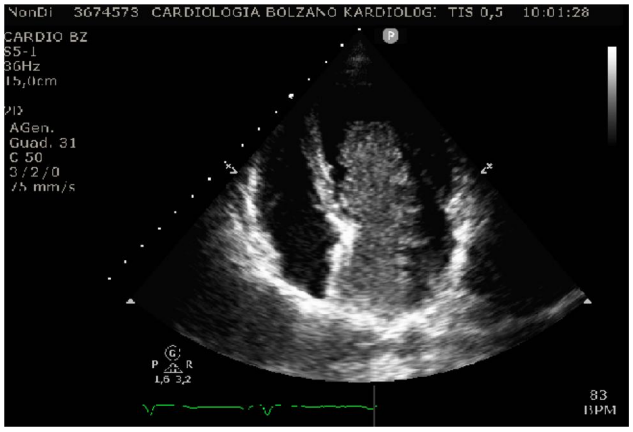

Figure 1

Figure 2

Figure 3

Abstract citation ID: suag058.302

AORTIC VALVE CALCIUM SCORE MEASURE FROM 2–D ECHOCARDIOGRAPHY USING A FREE ONLINE SOFTWARE FOR IMAGE BINARIZATION, CORRELATION WITH AORTIC VALVE AREA, MEAN GRADIENT AND PEAK TRANSVALVULAR VELOCITY

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Asl Napoli 1 Centro Po San Paolo–UOC Cardiologia

Transthoracic Echocardiography is the main imaging technique for severity grading of Aortic Valve stenosis by measuring peak transvalvular flow velocity, peak and mean transvalvular pressure gradient and Aortic valve area, usually through continuity equation. There is often discordance between Aortic valve area and transvalvular peak velocity and pressure gradient, requiring CT derived aortic valve calcium score in order to discriminate true severe Aortic stenosis from pseudosevere, especially in the case of low–flow low–gradient paradoxical severe Aortic stenosis. Previuosly aortic valve calcium measure on TTE image was attempted by 2D image binarization and a grey scale pixel value of more than 130 has been experimentally used to indicate calcium (Gillis K et al PLOS ONE 2015)**Methods:** We enrolled 20 consecutive patients (10 men) admitted to our Hospital from 1th September 2025 to 30th of November 2025 with Aortic valve stenosis (Vmax › 2.6 m/sec). Transvalvular Doppler parameters and Aortic Valve Area were aquired for each patient, moreover on a 2D image frame from parasternal short axis view of the aortic valve (Figure 1) image binarization was performed (Figure 2) using a free online software for image elaboration (ImageJ, https://imagej.net/ij/) and calcium threshold for binarization was determined as 130 + m, where m was mean grey scale value from RVOT "black" blood pool, finally total calcium area of the aortic valve was manually tracked and measured in square cm using the above mentioned software and the so obtained value x 1000 was denominated EAU (echo agatston units), so that 1 cmq corresponded to 1000 EAU.

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Results: mean +/– sd were: EF (59.9 +/– 5.9%), AVA (0.67 + 0.27 cmq), Vmax (4.146 + 0.86 m/sec), mean gradient (45.77 +/– 21.22 mmHg), dimensionless index (0.23 +/– 0.09), EAU calcium score (1240 +/– 792 EAU). A significant negative correlation by Pearson correlation score was found between EAU Calcium Score and Aortic valve area by continuity equation (r: –0.574 p ‹0.01), there was also a significant negative correlation between EAU Calcium score and DVI (r: –0.578 p ‹0.01) and a weak but significant positive correlation between Echo Calcium score and peak velocity (r: 0.483, p: 0.03) and mean gradient (r: 0.470 p: 0.036)
Conclusion: Aortic Valve Calcium Score measure from 2D Echocardiography is feasibile with a free online software and can be used as an adjunctive parameter for severity grading of aortic valve stenosis

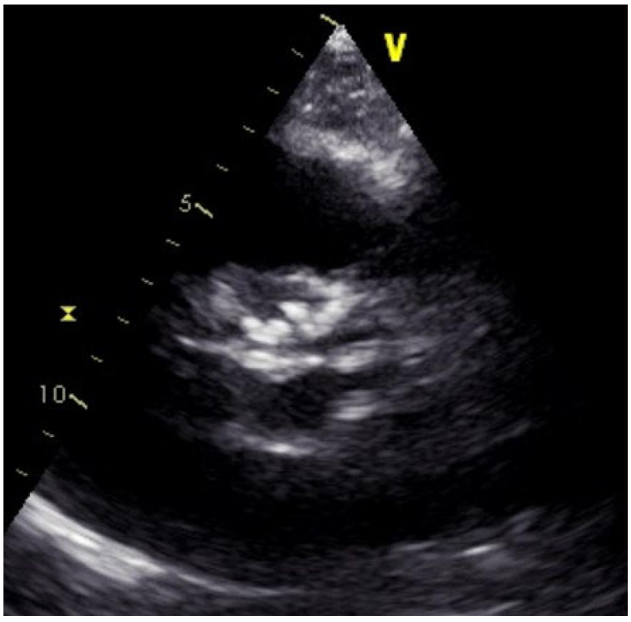

Figure 1

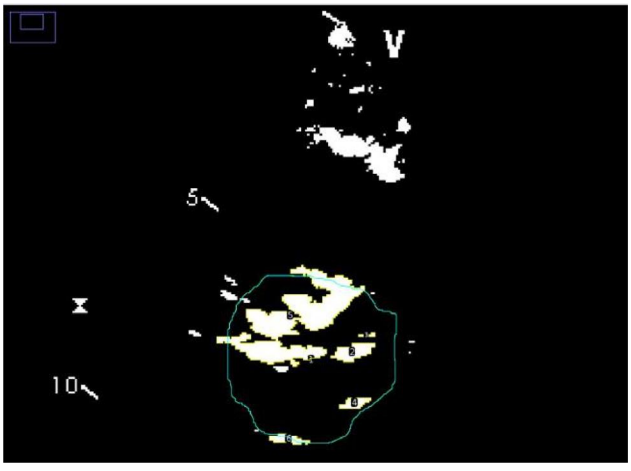

Figure 2

Imaging 2

Abstract citation ID: suag058.303

A GIANT PSEUDOANEURYSM OF LEFT VENTRICLE

F. Cortese, M. Veglia, M. De Francesco, G. D'Addeo, and M. Costantino
Ospedale Madonna Delle Grazie, Matera; Ospedale San Carlo, Milano

The image shows a giant pseudoaneurysm of the basal and mid segments of inferior portion of the septum and of the inferior wall of the left ventricle as a late complication (after about one mount) of a subacute myocardial infarction in 70–year–old woman, underwent percutaneous revascularization of a totally occluded right coronary artery [1]. The patients underwent left ventricular plastic surgery and mitral valve replacement with a biological prosthesis.

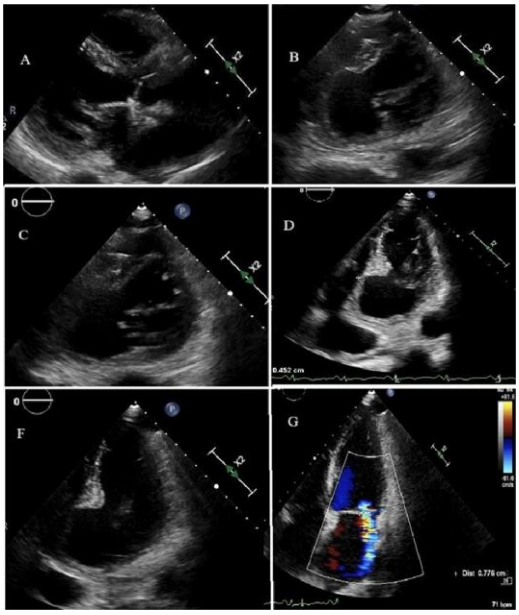

Figure legend: transthoracic echocardiographic images showing in (A) parasternal long axis view on left ventricle, left atrium e the first portion of the ascending aorta. Panels B e C shows in parasternal short axis views the giant pseudoaneurysm involving the inferior portion of the septum and of the inferior wall of the left ventricle and the posteromedial portion of the mitral valve apparatus. It is possible to observe the narrow neck (white arrow), the ventricular free wall rupture contained by localized pericardial adhesions (double white arrow). Pannels D and F show an apical 4 chamber view with the pseudoaneurysm of the mid and basal portion of inferior septum. Severe mitral regurgitation due to the disruption of mitral valve apparatus was also present, as shown in panel G.

Abstract citation ID: suag058.304

CHRONIC RIGHT–SIDED LOCULATED PERICARDIAL EFFUSION MASKING MULTIFOCAL SEGMENTAL PULMONARY EMBOLISM: A CT–ECHOCARDIOGRAPHY INTEGRATED APPROACH

I. Barnaba, M. Lotito, L. D'Onghia, P. Caretto, R. Quatela, D. Scaringi, and M. Ciccone
Cardiologia Universitaria–Policlinico Di Bari; Radiologia–Policlinico Di Bari; Cardiologia Ospedaliera–Policlinico Di Bari

Background: Acute pulmonary embolism (PE) is usually suspected when dyspnoea and acute right–ventricular (RV) dysfunction coexist. Chronic loculated pericardial effusion may compress the right chambers and blunt symptoms and RV imaging markers. We report a case in which pericardial compression dominated the haemodynamic picture while a multifocal segmental PE was initially relatively "silent".
Case presentation: An 86–year–old woman (COPD, hypertension) with a chronic right–predominant pericardial effusion presented with exertional dyspnoea and leg oedema. ECG showed sinus tachycardia with low voltages. D–dimer and BNP were markedly increased, with mild hs–troponin rise and renal impairment (CrCl ~30 mL/min). CT pulmonary angiography showed multiple segmental thrombi in the right upper, middle and lower lobes, plus a partially loculated pericardial effusion (max 38 mm) with right–chamber compression (Figure 1). Bedside echocardiography suggested pre–tamponade (near–virtual RV, non–collapsing IVC) (Figure 2). Echo–guided subxiphoid pericardiocentesis drained ~300 mL haemorrhagic fluid, with rapid recovery and normal RV filling. Anticoagulation was initiated cautiously (reduced–dose enoxaparin, then therapeutic LMWH and edoxaban 30 mg/day). Bilateral proximal DVT was documented; follow–up echo showed mild residual effusion with fibrin and early constrictive physiology (Figure 3).
Conclusions: Right–sided loculated pericardial effusion can mechanically constrain the RV and mask PE–related RV strain. A CT–echocardiography

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integrated strategy, with reassessment after drainage, helps avoid diagnostic anchoring and supports personalised anticoagulation when thrombotic, bleeding and renal risks coexist.

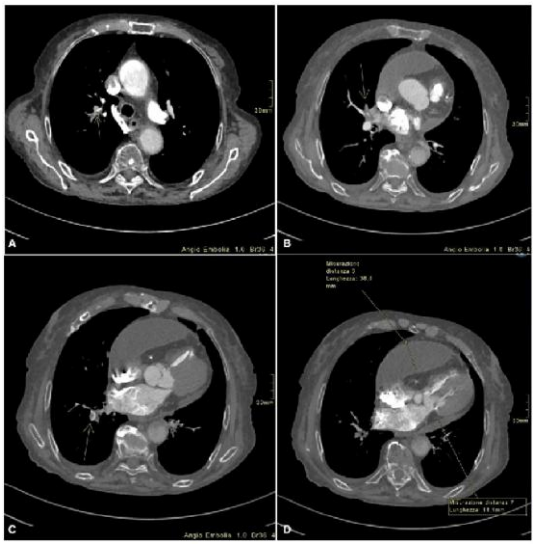


Figure 1

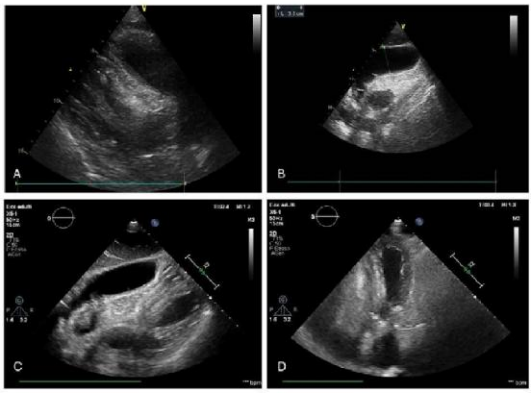


Figure 2

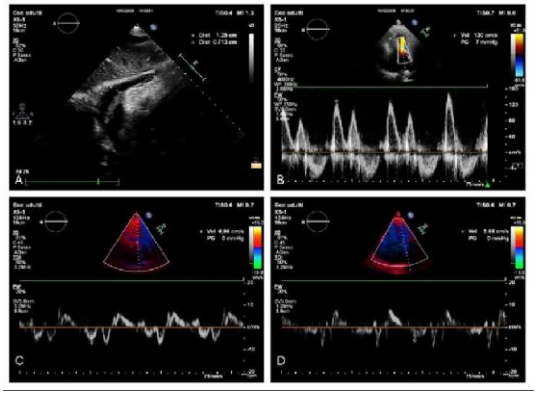


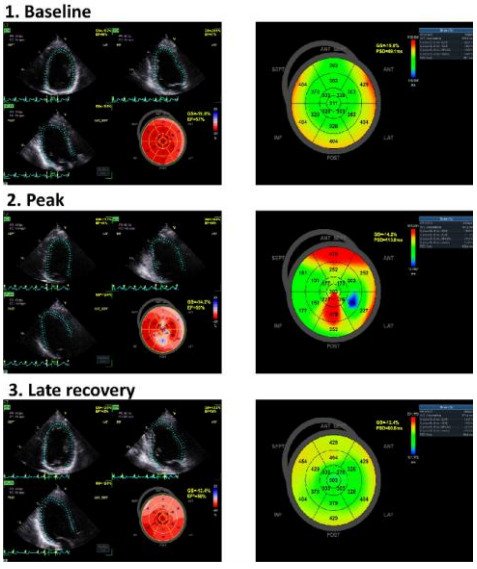
Figure 3

Abstract citation ID: suag058.305

SPECKLE TRACKING ECHOCARDIOGRAPHY: A HINT TOWARD MYOCARDIAL BRIDGE DIAGNOSIS?

S. De Donato, M. Cerchiello, G. Vignati, G. Merati, A. Manente, and S. Bonizzato
Università Degli Studi Dell'Insubria; Bianalisi Meditel; Irccs Policlinico San Donato

Introduction: Myocardial bridges are common congenital coronary anomalies in which a segment of an epicardial artery—most often the left anterior descending (LAD)—takes an intramyocardial course. Systolic compression and delayed diastolic expansion of the tunneled segment may produce dynamic flow limitation, potentially leading to ischemia-related ST–T changes or arrhythmias. Speckle tracking echocardiography (STE) provides angle-independent assessment of myocardial deformation and can detect subtle systolic dysfunction through parameters such as global longitudinal strain (GLS).
Aim: The aim is to evaluate whether STE during stress echocardiography may help raise suspicion of myocardial bridging in athletes by identifying regional strain abnormalities.
Materials and Methods: Ten male athletes (aged 37–65 years) underwent stress echocardiography testing on a on a bicycle ergometer (COSMED), in a semi–supine position. Imaging was performed with a GE HealthCare Vivid S70 system, and STE analysis was conducted using EchoPAC. Exercise protocols were individualized (maximum workload 320 W; mean 240 W), and all subjects reached criteria for maximal testing. Images were analyzed at baseline, peak exercise, and late recovery for GLS, post-systolic delay (PSD), and peak systolic index (PSI).
Results: No wall-motion abnormalities were observed, and ejection fraction was preserved in all subjects. Two athletes showed isolated ventricular ectopic beats and borderline ST–T changes without diagnostic significance. Mean GLS values were borderline relative to reference norms (baseline –17%; peak –15%; late recovery –19%). All patients demonstrated regional strain abnormalities—including PSD and PSI changes—localized to the myocardial territory supplied by the suspected bridged artery.
Discussion: Despite normal wall-motion assessment and absence of clear ischemic ECG changes, STE revealed borderline GLS values and consistent regional strain alterations corresponding to the territory of the tunneled artery (Figure 1-2-3). These findings suggest that STE may provide additional functional insight in athletes with suspected myocardial bridging. Larger studies are needed to determine whether strain-based analysis can enhance early identification and risk stratification of myocardial bridges.



Abstract citation ID: suag058.306

CARDIAC CIRRHOSIS UNMASKING AN ACQUIRED RIGHT SINUS OF VALSALVA PSEUDOANEURYSM WITH DOUBLE FISTULA AFTER BIOPROSTHETIC AORTIC VALVE REPLACEMENT

M. Di Marino, E. Genovesi, R. Magnano, L. Pezzi, A. D'Alleva, C. Scollo, D. Rossi, D. Forlani, P. Vitulli, S. Saraullo, F. Pierfelice, M. Primavera, A. Odoardi, D. Clemente, B. Iadanza Lanzaro, L. Pasquale, and M. Di Marco
Ospedale Civile Pescara

A 76–year–old woman presented with long–standing anasarca. History included chronic ischemic cardiomyopathy with coronary artery bypass (LIMA–LAD), surgical bioprosthetic replacement of severe aortic stenosis and arterial hypertension. Blood tests and abdominal imaging showed liver cirrhosis with marked hypoalbuminemia. Viral, autoimmune, metabolic and alcohol–related causes were excluded, suggesting cardiac cirrhosis.

Transthoracic echocardiography revealed normal left ventricular systolic function, right atrial enlargement, a dilated right ventricle (basal diameter 55 mm) with systolic dysfunction (TAPSE 12 mm, S' 9 cm/s, FAC 25%) and

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torrential functional tricuspid regurgitation due to leaflet tethering. Parasternal short–axis view showed a right sinus of Valsalva aneurysm bulging into the right ventricular outflow tract. Off–axis views (Fig.1) showed a significant paravalvular leak at 3 o'clock, directed into the aneurysmal right sinus, which had a defect with a jet entering the right ventricular outflow tract, consistent with a left–to–right shunt and right–sided overload. Transesophageal echocardiography (Fig.2) confirmed the paravalvular flow to the right chambers. Cardiac CT showed an acquired pseudoaneurysm of the right sinus of Valsalva with double fistulous communication to the right ventricle, likely due to partial dehiscence of the bioprosthesis (Fig.3). Despite optimized medical therapy, the patient remained in severe right–sided heart failure with advanced liver disease. Because of cardiac cirrhosis and frailty, corrective surgery was deemed prohibitive. She later died from sepsis.

This case illustrates how unrecognized sinus of Valsalva pseudoaneurysm with right–ventricular fistula can cause severe right–sided overload and cardiac cirrhosis years after aortic valve surgery. In patients with apparently cryptogenic cirrhosis and prior valve or other heart surgery, a cardiac cause should be actively sought and early multimodality imaging used to detect potentially correctable complications.

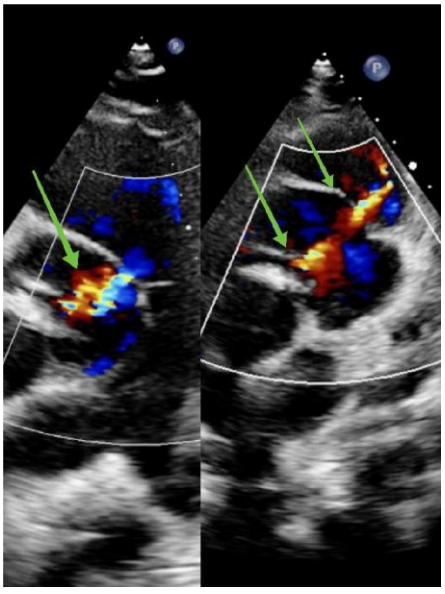

Figure 1

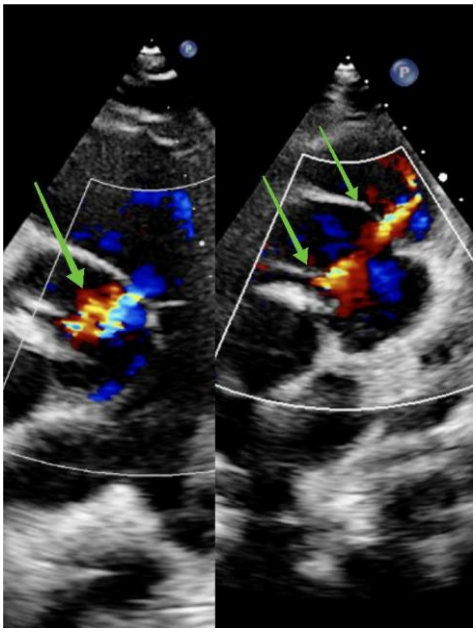

Figure 2

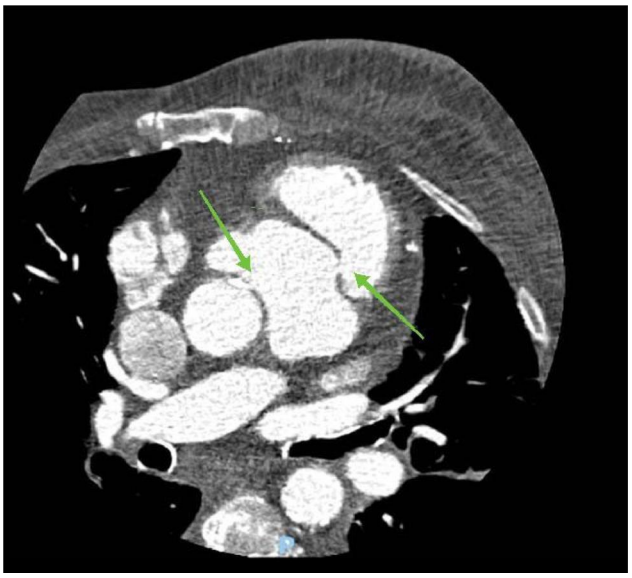

Figure 3

Abstract citation ID: suag058.307

COMPARATIVE EVALUATION OF TRICUSPID VALVE REGURGITATION USING THE GLIDE SCORE: TRANSTHORACIC VERSUS TRANSESOPHAGEAL ECHOCARDIOGRAPHY FOR INTERVENTIONAL SCREENING

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Background: The GLIDE score is a simple five–component scoring system that can be readily obtained during transesophageal echocardiographic imaging and has been shown to predict the likelihood of procedural success with transcatheter tricuspid edge–to–edge repair (T–TEER). Patients with a high GLIDE score (≥4 points) are less likely to benefit from T–TEER and are at increased risk of significant residual tricuspid regurgitation (TR). However, it remains unclear whether transthoracic echocardiography (TTE) alone is sufficient for screening patients considered for transcatheter or surgical interventions, or whether transesophageal echocardiography (TEE) is always required.
Aim: The aim of this study was to compare the accuracy of two–dimensional (2D) and three–dimensional (3D) echocardiographic parameters, including the GLIDE score, obtained by TTE versus TEE for screening patients with TR who are candidates for surgical or transcatheter intervention.
Methods: Consecutive patients with symptomatic and significant TR were prospectively enrolled. Each patient underwent both 2D/3D TTE and 2D/3D TEE on the same day. The GLIDE score was calculated using both imaging modalities. The score is based on five components: septo–lateral coaptation gap, chordal structure density, TR jet location, en–face TR jet morphology, and image quality. Each component was categorized as either straightforward (0 points) or complex (1 point), resulting in a total score ranging from 0 to 5.
Results: The study population included 42 patients (25 men and 17 women) with a median age of 79 years. Of these, 52.3% had severe TR, 42.8% massive TR, and 4.7% torrential TR. No statistically significant differences were observed between TTE and TEE in the assessment of TR severity, right ventricular size and function, annular dimensions, coaptation gap, or overall GLIDE score (all p › 0.05). In contrast, leaflet number was more accurately evaluated by TEE (p ‹ 0.001). Table 1 and 2.
Conclusions: Transthoracic echocardiography represents a reliable tool for the initial screening of patients with significant TR who are candidates for surgical or transcatheter intervention. In particular, the GLIDE score can be effectively applied using transthoracic imaging as a first–line screening method. These findings are especially relevant for elderly and frail patients, who may be spared a transesophageal examination when TTE findings already suggest unfavorable anatomy for intervention.

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Parameters	TTE	TEE	p
Gap, mm	6,93 ± 2,82	7,19± 3,1	0,689
Anulus perimeter, mm	129,69 ± 15,38	130,10 ± 15,71	0,905
Anulus area, cm^2	11,89 ± 2,96	11,94 ± 2,88	0,932
Valvular area, cm^2	7,49 ± 1,39	7,50 ± 1,30	0,968
AP annulus diameter, mm	44,00 ± 3,99	43,76 ± 4,40	0,796
SL annulus diameter, mm	44,90 ± 4,28	44,79 ± 4,10	0,897
Septal leaflet, mm	17,21 ± 1,85	16,98 ± 1,77	0,549
Posterior leaflet, mm	20,62 ± 2,44	20,57 ± 2,31	0,927
Anterior leaflet, mm	20,14 ± 2,24	20,10 ± 1,99	0,919
VC, mm	13,69 ± 3,73	13,62 ± 3,74	0,930
PISA r, mm	9,98 ± 1,58	9,83 ± 1,44	0,720
EROA, cm^2	0,59 ± 0,18	0,59 ± 1,78	1,000
Regurgitant volume, ml/bpm	58,90 ± 9,81	58,10± 9,63	0,704
Coaptation heigh, mm	6,65 ± 2,42	6,73 ± 2,35	0,877
Thenting area, cm^2	1,05 ± 0,68	1,06 ± 0,67	0,910
RV basal diameter, mm	46,29 ± 6,29	45,67 ± 6,27	0,653
RV medium diameter, mm	38,62 ± 6,99	38,57 ± 7,15	0,975
N. Leafleats			**< 0,001**
N 3 % (n)	100 (42)	73,8 (31)	
N 4 % (n)	0, (0)	26,2 (11)	
FAC, %	39,76 ± 4,05	40 ± 3,87	0,784
TAPSE, mm	18,95 ± 3,14	18,83 ± 2,93	0,858
S', cm/sec	10,88 ± 2,49	10,79 ± 2,37	0,858
PAPs, mmHg	48,79 ± 10,21	48,98 ± 9,54	0,930
LVEF, %	57,79 ± 7,81	57,38± 7,66	0,811

Table 1

Glide score parameters	TTE	TEE	p
Gap, mm			0,590
0-5 mm, % (n)	35,7 (15)	35,7 (15)	
≥ 6 mm, % (n)	64,3 (27)	64,3 (27)	
Chordal structure density			0,500
Minimal, % (n)	73,8 (31)	76,2 (32)	
Moderate/high, % (n)	26,2 (11)	23,8 (10)	
Predominante jet location			0,601
Anteroseptal/Central, % (n)	76,2 (32)	76,2 (32)	
Posteroseptal/anteroposterior/diffuse, % (n)	23,8 (10)	23,8 (10)	
En face TR jet morphology			0,598
Linear to oval, % (n)	73,8 (31)	73,8 (31)	
Star shaped, % (n)	26,2 (11)	26,2 (11)	
Image quality			0,644
Good, % (n)	90,5 (38)	90,5 (38)	
Limited, % (n)	9,5 (4)	9,5 (4)	
Total Glide score			0,967
0, % (n)	26,2 (11)	28,6 (12)	
1, % (n)	33,3 (14)	31,0 (13)	
2, % (n)	14,3 (6)	11,9 (5)	
3, % (n)	16,7 (7)	21,4 (9)	
4, % (n)	9,5 (4)	7,1 (3)	
5, % (n)	0	0	

Table 2

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A WOLF IN SHEEP'S CLOTHING: PAINLESS TYPE A AORTIC DISSECTION WITH INITIALLY NEGATIVE CT ANGIOGRAPHY AND THE PIVOTAL ROLE OF TRANSESOPHAGEAL ECHOCARDIOGRAPHY

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Background: Type A aortic dissection is a life–threatening emergency. Painless forms, especially when computed tomography angiography (CTA) is non–ECG–gated and performed for non–aortic indications, may escape diagnosis. Transesophageal echocardiography (TEE) can be crucial when acute severe aortic regurgitation and heart failure are present, particularly if the clinical picture is not typical.
Case presentation: A 52–year–old hypertensive, obese man with a history of intravenous and inhaled drug abuse presented to a peripheral emergency department with acute dyspnoea and pulmonary oedema, without chest pain. D–dimer levels were elevated and a thoracic CTA, performed to rule out pulmonary embolism, was negative for embolism and showed no clear aortic abnormalities. Transthoracic echocardiography (TTE) revealed severe eccentric aortic regurgitation with only mild dilatation of the ascending aorta and no signs of left ventricle chronic volume overload, leading to transfer to a tertiary cardiology center. TEE demonstrated an intimal flap at the aortic root extending towards the left coronary ostium, consistent with Stanford type A dissection. A second urgent aortic CTA again failed to show definite signs of dissection. Given the high clinical suspicion and the strongly suggestive TEE findings, the multidisciplinary heart team, including cardiologists, cardiac surgeons and imaging specialists, decided to proceed with emergency surgery. Intraoperative inspection confirmed an acute type A aortic dissection with a circumferential intimal tear along the sinotubular junction, extending to the aortic annulus, and a false lumen confined to the aortic root and proximal ascending aorta; both coronary ostia were anatomically intact. The patient underwent a Bentall procedure with replacement using a 28–mm Dacron valved conduit with a 25–mm pericardial bioprosthesis and coronary button reimplantation, together with left atrial appendage closure, with an uneventful postoperative course.
Conclusions: This case illustrates an atypical painless presentation of type A aortic dissection, dominated by acute heart failure due to severe aortic regurgitation in the absence of chest pain. It highlights the limitations of non–ECG–gated CTA performed for non–aortic indications and underscores the pivotal role of TEE in establishing the diagnosis and guiding life–saving management when clinical probability remains high despite a negative CTA.

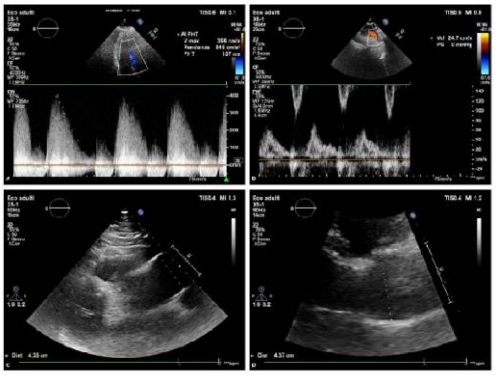

Figure 1. Transthoracic echocardiography. (A) Continuous-wave Doppler of the aortic regurgitation jet with measurement of pressure half-time (PHT), consistent with severe aortic regurgitation. (B) Pulsed-wave Doppler recorded at the aortic isthmus showing diastolic flow reversal, an additional indirect marker of severe aortic regurgitation. (C) Two-dimensional view of the proximal tubular ascending aorta as visualised by transthoracic echocardiography. (D) Two-dimensional transthoracic view in a different projection of the tubular ascending aorta, confirming mild dilatation of the proximal segment.

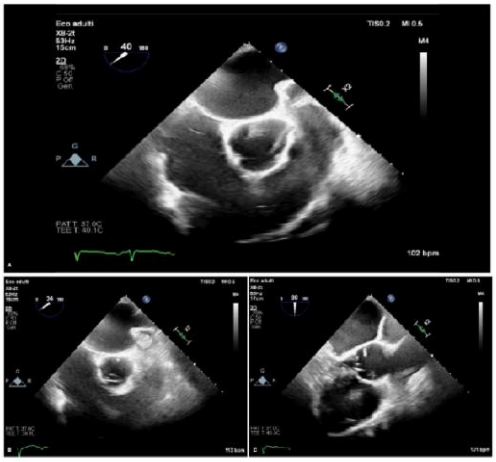

Figure 2. Transesophageal echocardiography. (A) Mid-esophageal short-axis view of the aortic root showing an intimal flap extending towards the left coronary ostium, consistent with type A aortic dissection. (B) Mid-esophageal short-axis view focused on the aortic valve, demonstrating a characteristic "double-barrel" appearance, with the outer contour corresponding to the free edge of the anterior cusp, suggestive of intimal separation. (C) Mid-esophageal long-axis left ventricular outflow tract view confirming the presence of the intimal flap at the aortic root and proximal ascending aorta.

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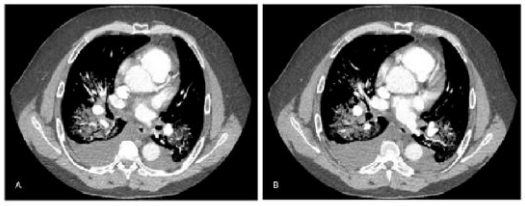

Figure 3: Chest CT angiography in the arterial phase. Scan was performed in cases where transesophageal echocardiography revealed aortic dissection, i.e., at the level of the left coronary ostium (A) and immediately above (B). However, CT angiography scans did not yield clear images suggestive of aortic root dissection.

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CORRELATION BETWEEN CARDIAC MRI AND SPECKLE TRACKING ECHOCARDIOGRAPHY IN PATIENTS WITH CARDIAC AMYLOIDOSIS

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Background: Cardiac amyloidosis (CA) causes myocardial involvement that can be characterized by cardiac magnetic resonance (CMR) late gadolinium enhancement (LGE). Whether left atrial strain is associated with LGE segment burden after accounting for left ventricular (LV) global longitudinal strain (GLS) remains unclear.
Methods: We retrospectively included 56 consecutive CA patients undergoing transthoracic echocardiography with speckle–tracking and contrast–enhanced CMR. Myocardial involvement was quantified as LGE segment burden (LGEseg; number of LGE–positive LV segments, range 0–17). Associations were assessed using Spearman correlation and negative binomial regression. Prespecified negative binomial models adjusted for age, sex, and amyloid type evaluated bi–plane left atrial reservoir strain (LASr) as the primary predictor with adjustment for GLS (primary model), LASr without GLS (secondary model, descriptive), and GLS as a standalone predictor (secondary analysis).
Results: LGEseg ranged from 0 to 17 (median 5.5; IQR 2–12.5). Global GLS was –14.66±4.03% and worsened across LGEseg categories (Welch ANOVA p=0.019; 0–5 vs 12–17 p=0.01). GLS correlated with LGEseg (ρ=0.43, p=0.001) and remained associated with higher LGEseg in the secondary analysis (IRR 1.11 per 1–unit GLS worsening; 95% CI 1.04–1.18; p=0.001). LASr correlated inversely with LGEseg (ρ=–0.49, p=3.38×10⁻⁴). In the primary model including both LASr and GLS, LASr remained significantly associated with lower LGEseg (IRR 0.955 per 1–unit increase; 95% CI 0.921–0.991; p=0.014; n=46), whereas GLS was attenuated (p=0.075).
Conclusions: In CA, LASr remains associated with CMR LGE segment burden after adjustment for GLS, supporting left atrial strain as a sensitive marker of disease burden complementing LV mechanics.

Imaging 3

Abstract citation ID: suag058.310

WHEN ATRIAL FIBRILLATION IS NOT JUST AN ARRHYTHMIA: CARDIAC ANGIOSARCOMA PRESENTING WITH PERICARDIAL EFFUSION

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Atrial fibrillation (AF) is rarely the initial manifestation of an underlying cardiac malignancy and persistent pericardial effusion (PE) after AF ablation should prompt further investigation.

A 67–year–old man underwent catheter ablation for symptomatic AF without complication or acute PE. 3 months later he developed fever and progressive dyspnea with elevated inflammatory markers. Echocardiography revealed a mild circumferential PE, confirmed by chest computed tomography (CT) which showed pulmonary micronodules too. Anti–inflammatory therapy with ibuprofen and colchicine was initiated. Fever persists and heart failure symptoms led to hospital admission. Repeat echocardiography revealed persistent PE and also a large echogenic mass arising from the roof of the right atrium and extending toward the superior vena cava, causing partial obstruction.

Coronary CT confirmed the right atrial mass (RAM), associated pericarditis and multiple mediastinal lymphadenopathies(Fig.1). Cardiac magnetic resonance imaging demonstrated a heterogeneous RAM with features suggestive of a malignant cardiac tumor, without evidence of myocardial involvement (Fig.2).

The patient was referred to a tertiary oncology center, where histological diagnosis confirmed primary cardiac angiosarcoma. Given the advanced stage of disease and extracardiac involvement, a multidisciplinary team opted for palliative oncological management.**Discussion:** Late PE following AF ablation is an uncommon complication, usually related to a delayed inflammatory response and typically responsive to anti–inflammatory therapy. In this case the lack of clinical improvement and the unexpected finding of a RAM prompted further investigation. PE is a rare but recognized manifestation of primary cardiac angiosarcoma. This malignancy predominantly affects males and typically arises in the right atrium, with invasion of adjacent structures.

Cardiac angiosarcoma is characterized by aggressive growth and early metastatic spread (commonly the lungs) resulting in a poor prognosis. Diagnosis relies on multimodality imaging while histological confirmation remains essential. Treatment strategies are not standardized and often involve palliative chemotherapy or surgical debulking.

This case underscores the importance of maintaining a high index of suspicion for alternative diagnoses when PE persists or progresses after AF ablation. Early use of multimodality imaging is crucial for timely diagnosis and appropriate management.

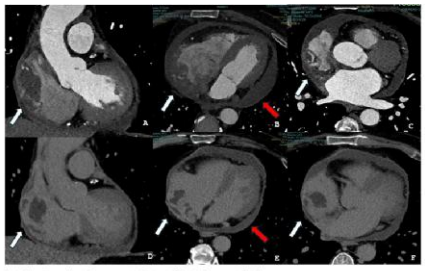

Figure 1: Cardiac CT study and assessment of Late Iodine Enhancement (LIE).
The upper panel (A–C) shows post-contrast acquisitions in the angiographic phase, compared with the corresponding delayed acquisitions (Late Iodine Enhancement, D–F) on coronal (A, D) and axial (B, C, E, F) slices. The white arrows indicate a hypodense mass in the right atrium characterized by heterogeneous post-contrast enhancement on the LIE scans. The red arrows indicate a circumferential pericardial effusion (maximum thickness 20 mm) and marked thickening and enhancement of the pericardial layers, consistent with probable secondary pericardial involvement.

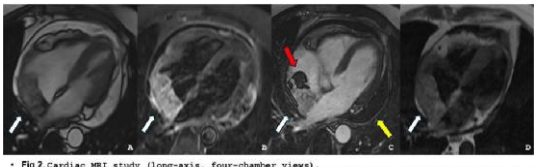

Fig 2. Cardiac MRI study (long-axis, four-chamber views).
The white arrows indicate the expansive right atrial mass adherent to the posterior wall. The mass shows a homogeneously hyperintense signal on T2 STIR sequences (B), indicative of edema/hyperemia. On pre-contrast T1 Black Blood sequences (D), the mass shows a heterogeneous signal, predominantly iso- to hyperintense relative to the myocardium, while on Late Gadolinium Enhancement images (C) there is marked and heterogeneous signal increase, consistent with post-contrast enhancement of heteroplastic tissue.
The red arrow highlights thrombotic material (characterized by absence of signal on delayed sequences) adherent to the mass, while the yellow arrow indicates an associated pericardial effusion with thickening and intense post-contrast enhancement of the pericardial layers.

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ISOLATED CHORDAL RUPTURE CAUSING FLAIL TRICUSPID LEAFLET AND TORRENTIAL TRICUSPID REGURGITATION: A RARE CAUSE OF ADVANCED RIGHT HEART FAILURE

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Background: Severe tricuspid regurgitation is increasingly recognised as an independent driver of right–sided heart failure. Primary (organic) mechanisms are uncommon, and isolated chordal rupture leading to a flail leaflet is exceptional.
Case: An 81–year–old patient was admitted for pacemaker generator replacement and presented with peripheral oedema, painful hepatomegaly and ascites. Transthoracic echocardiography showed marked right–sided chamber dilatation, right ventricular volume overload with diastolic D–shaped left ventricle, and torrential tricuspid regurgitation, without significant left–sided valve disease or ventricular dysfunction. Targeted assessment excluded an interatrial shunt. Dedicated valve views and three–dimensional imaging demonstrated a flail septal leaflet due to isolated chordal rupture, with no echocardiographic signs of active endocarditis.
Discussion: Defining the mechanism of tricuspid regurgitation is crucial to guide timing and selection of intervention. Although surgery is recommended for symptomatic severe primary tricuspid regurgitation when right ventricular function and end–organ status are still preserved, advanced age and comorbidity often confer prohibitive risk. Contemporary transcatheter options, including edge–to–edge repair and emerging tricuspid valve replacement systems, may represent a valuable alternative in selected patients.

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Conclusion: Isolated chordal rupture of the tricuspid valve, though rare, can cause massive regurgitation and advanced right heart failure. Comprehensive echocardiographic mechanistic assessment is essential to identify candidates for surgical or transcatheter treatment.

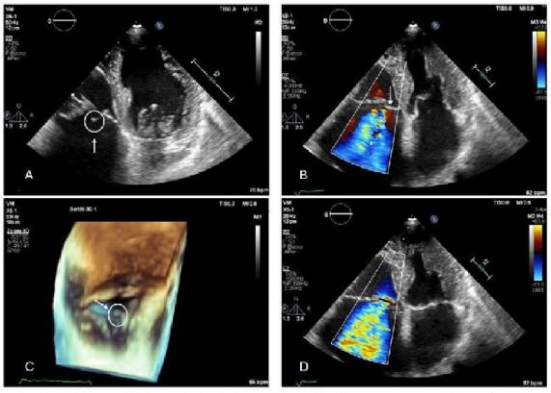

Figure 1. Transthoracic echocardiography. (A) Two-dimensional apical four-chamber view showing a finding consistent with chordal rupture (circle and arrow). (B) Systolic flail/eversion of the tricuspid septal leaflet. (C) Three-dimensional reconstruction confirming chordal rupture. (D) Colour Doppler demonstrating torrential tricuspid regurgitation.

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RIGHT VENTRICULAR TRAJECTORIES AFTER TAVR AND INTERACTION WITH LEFT–SIDED FILLING PRESSURES

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Background: Right ventricular (RV) structural and/or functional impairment is a recognized prognostic marker in severe aortic stenosis. Whether early post–TAVI RV trajectories are prognostically informative, and whether their association with outcomes varies according to left–sided filling pressures, remains unclear.
Methods: We conducted a single–center observational study including 107 consecutive patients undergoing transcatheter aortic valve implantation (TAVI) (January 2023–June 2024). Transthoracic echocardiography was performed pre–procedure and reassessed pre–discharge, within 1 week. RV systolic dysfunction was defined as TAPSE ‹17 mm and/or S' ‹9.5 cm/s and/or FAC ‹35%; RV dilation as RVD1 ›40 mm. RV abnormality (D) was defined as dysfunction and/or dilation, generating four trajectories: N to N (persistent normal), D to D (persistent abnormal), D to N (recovery), N to D (new abnormality). Pre–TAVI left–sided filling pressures were estimated by average E/e' and LAVi. The primary endpoint was late 1–year all–cause mortality (days 31–365) using a landmark approach. Associations were tested with Cox proportional hazards models (unadjusted, age–adjusted, and multivariable including pre–TAVI E/e' and LAVi), and stratified by E/e' (‹14 vs ≥14).
Results: RV trajectories were: N to N n=68, D to D n=18, D to N n=11, N to D n=10. Late (31–365 days) deaths were 27 (25.2%). Compared with N to N, D to D was associated with higher late mortality in the unadjusted model (HR 3.78, p=0.002) and remained significant after adjustment for age, pre–TAVI E/e', and LAVi (HR 3.91, p=0.015). D to N (HR 2.54, p=0.150) and N to D (HR 0.64, p=0.675) were not significant in the multivariable model. In stratified analyses, D to D predicted mortality in E/e' ‹14 (HR 5.28, p=0.016) but not in E/e' ≥14 (HR 3.06, p=0.236), where age was the only significant predictor (HR 1.27, p=0.021).
Conclusions: In a real–world TAVI cohort, persistent RV abnormality (D to D) identifies a high–risk phenotype for late mortality. The prognostic signal appears more evident when pre–TAVI filling pressure markers are not elevated, supporting an integrated left–right framework for post–TAVI risk stratification and warranting confirmation with formal interaction testing in larger cohorts.

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THE ROLE OF ADVANCED ECHOCARDIOGRAPHY IN PREDICTING ATRIOVENTRICULAR SYNCHRONY IN LEADLESS PACEMAKERS: A3, A STILL UNDERRECOGNIZED PARAMETER

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Introduction: Leadless cardiac pacemakers represent an alternative to conventional transvenous pacemakers and are capable of providing atrioventricular synchrony. The accelerometer of the Micra–AV leadless device detects mechanical atrial activity and uses this information to deliver ventricular pacing with AV synchrony. Considerable efforts have been made to identify predictors of adequate A4 signal amplitude, which determines the ability of the Micra–AV to maintain AV synchrony. The MARVEL 2 study demonstrated that A4 wave amplitude is crucial to ensure a high percentage of AVS. In recent years, in addition to traditional echocardiographic parameters, left atrial function has been investigated using a novel functional parameter, left atrial strain (LAs).
Objectives: This study aimed to evaluate the correlations between echocardiographic parameters and A3–A4 signal amplitudes in patients implanted with a Micra–AV pacemaker.
Methods: Eight patients (75 ± 13 years; 5 women) implanted with a Micra–AV device underwent comprehensive echocardiographic evaluation focused on left atrial assessment. Morphological and functional parameters were analyzed using both 2D and 4D techniques, with dedicated advanced echocardiography software (GE Vivid E95 – AFI LA, 4D Auto LAQ). After implantation, all patients underwent complete device interrogation to assess A3 and A4 wave amplitudes across all sensing vectors.
Results: Our data suggest that the A3 parameter, together with A4, may play a role in identifying patients with a high likelihood of achieving adequate AV synchrony following Micra–AV implantation. A3 amplitude showed an inverse correlation with mean E/e' ratio, indexed left atrial volume assessed by 2D echocardiography, and left atrial volume measured by 4D echocardiography ($p < 0.05$). A direct correlation was observed between A3 amplitude and left atrial reservoir strain, calculated using both 2D and 4D software, whereas an inverse correlation was found between A3 amplitude and left atrial contraction strain (in both 2D and 4D). Finally, the inverse correlation between A4 amplitude and left atrial contraction strain—previously reported by our group—was further confirmed.
Conclusions: Appropriate patient selection is crucial to achieve favorable clinical outcomes. In this context, echocardiographic parameters appear promising for identifying patients most likely to benefit from leadless pacemaker implantation with optimal atrioventricular synchrony.

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AN ANTERIOR RIGHT HEART MASS MIMICKING A CYST: DIAGNOSTIC CLUES FROM MULTIMODALITY IMAGING

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Case presentation: An 54–year–old woman with pacemaker implanted for sinus node dysfunction was asymptomatic at routine follow–up. Transthoracic echocardiography revealed a well–circumscribed, oval formation (35–38 mm) located anterior to the right ventricular (RV) inflow at the atrioventricular junction, causing mild extrinsic impression on RV without diastolic obstruction. Transesophageal echocardiography (TEE) was performed for better assessment. TEE showed a lesion with an internal echogenic rim consistent with stratified mural thrombosis and a central anechoic fluid component. Color Doppler identified a small intralesional vessel with low–velocity systo–diastolic flow (Figure 1). Agitated-saline contrast fully opacified right chambers without filling of the lesion, excluding communication with right cavities. Conversely, after SonoVue administration, the lesion demonstrated delayed filling occurring after opacification of right– and left–sided chambers, strongly suggesting an arterial blood supply. These echocardiographic findings suggested a coronary aneyrysm or pseudoaneurysm. Coronary CT angiography (CTA) confirmed a structure in the AV junction with partially thrombosed cavity, no communication with RV and a close relationship with the right coronary artery (RCA) (Figure 2). Invasive coronary angiography showed no significant coronary stenoses and opacification of the pseudoaneurysmal cavity through a small orifice arising from the mid RCA (Figure 3).
Discussion: Masses located anterior to the right–sided cardiac chambers represent a diagnostic challenge, as cystic lesions, extracardiac tumors, and vascular abnormalities may present with overlapping echocardiographic appearances. This case highlights how contrast echocardiography together with multimodality imaging is crucial for the diagnosis. Coronary pseudoaneurysms are uncommon, usually acquired (most often after percutaneous coronary intervention or cardiac surgery), and represent a contained rupture lacking normal arterial wall layers. They may be incidental or present with chest pain, ischemia, embolization, arrhythmias, or rarely rupture/tamponade. Diagnosis relies on multimodal imaging (CTA for anatomy/thrombus/relationships; angiography for the neck/feeder and possible endovascular therapy). Management is individualized and includes conservative surveillance for stable lesions, covered stents or coil/plug embolization, and surgery for large/expanding, symptomatic, infected, or high-risk anatomy.

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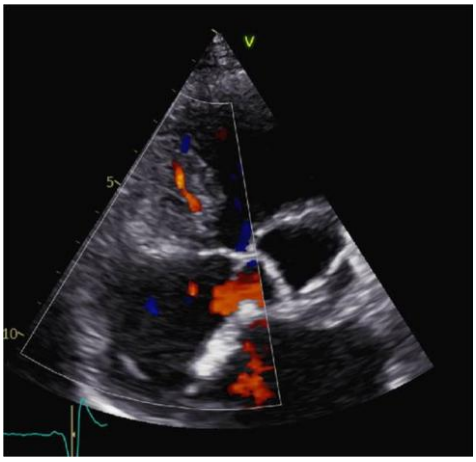

Figure 1

Figure 2

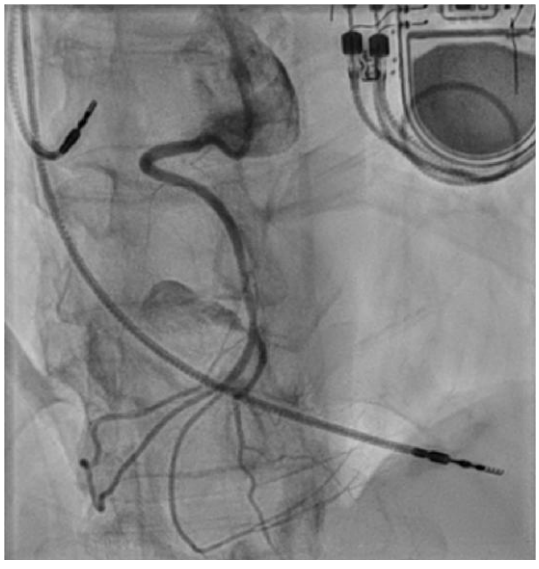

Figure 3

Abstract citation ID: suag058.315

THE IMPORTANCE OF MULTIMODAL IMAGING IN A COMPLEX CASE OF CIED–RELATED ENDOCARDITIS WITH NEGATIVE BLOOD CULTURES, COMPLICATED BY PULMONARY THROMBOSIS

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Asl Napoli 3 Sud – Po S. Leonardo; Aorn S. Anna E S. Sebastiano, Caserta; Casa Di Cura S. Michele, Caserta

Cardiac implantable electronic device (CIED)–related infective endocarditis represents a diagnostic and therapeutic challenge, particularly in the presence of negative blood cultures. We report the case of a 60–year–old woman with a history of resuscitated cardiac arrest, idiopathic myelofibrosis, hypothyroidism, and implantable cardioverter–defibrillator (ICD) implantation, who was admitted for persistent fever despite empirical antibiotic therapy. Physical examination revealed signs of device pocket infection, while laboratory tests showed marked systemic inflammation; repeated blood cultures were negative. Transthoracic and transesophageal echocardiography demonstrated a large (28×11 mm), highly mobile vegetation with high embolic potential attached to the ventricular lead of the ICD, without significant valvular involvement (Figure 1-2-3). Given the strong clinical suspicion, 18F–FDG PET–CT was performed and revealed pathological tracer uptake at the device pocket, allowing a definitive diagnosis of CIED–related endocarditis according to the 2023 ESC criteria, despite persistently negative blood cultures, likely influenced by prior antibiotic exposure. The patient was treated with empirical antibiotic therapy and underwent complete device extraction using a hybrid angio–VAC–assisted procedure, with a favorable outcome. After normalization of inflammatory markers and persistently negative blood cultures, a subcutaneous ICD was implanted. The in–hospital course was complicated by acute pulmonary embolism in the setting of SARS–CoV–2 infection, confirmed by CT pulmonary angiography and treated with oral anticoagulation and antiviral therapy. A repeat PET–CT scan excluded an infectious nature of the pulmonary thrombus. After a total of six weeks of antibiotic therapy, the patient was discharged in good clinical condition. This case highlights the pivotal role of multimodal imaging in the diagnostic workup of CIED–related endocarditis, the importance of early and complete device removal, and the need to consider SARS–CoV–2 infection as a prothrombotic risk factor.

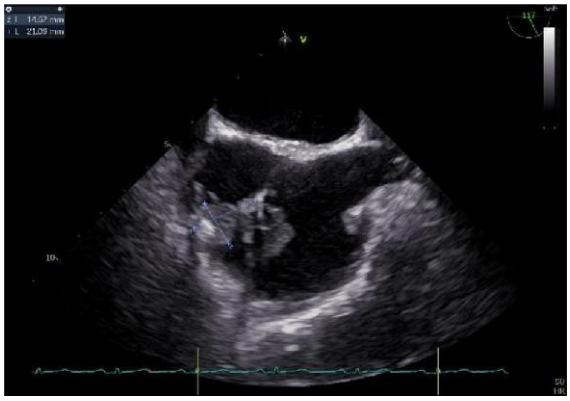

Figure 1

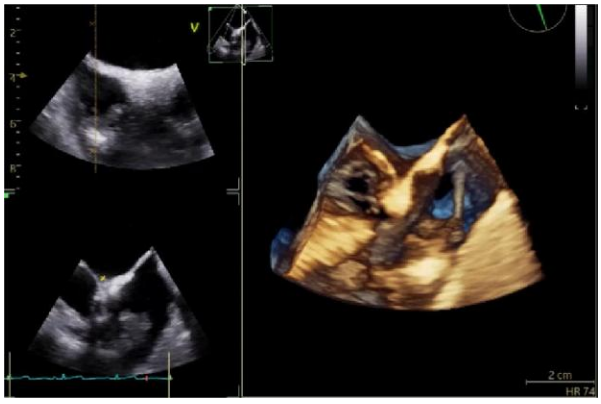

Figure 2

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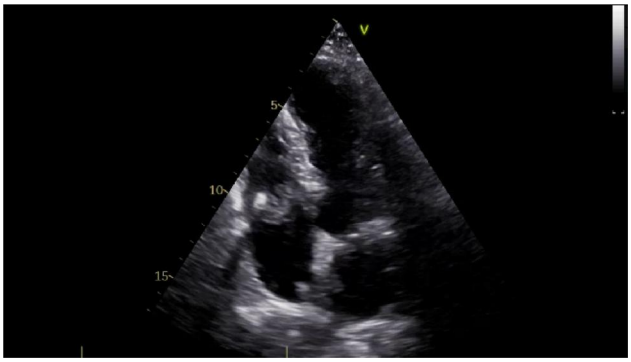

Figure 3

Abstract citation ID: suag058.316

LAUBRY–PEZZI SYNDROME IN AN 18–YEAR–OLD MALE: A CASE REPORT

A. Dattolo, M. Bolognesi, I. Borzillo, K. Fattouch, and M. Gabriele
U.O.C. Utic Con Cardiologia E Unita' Scompenso Cardiaco Ospedale Abele Ajello Mazara Del Vallo Asp Trapani; S.C. Cardiologia–Utic Ospedale San Martino Oristano; Centro Di Cardiologia Ed Emodinamica Pediatrica E Del Congenito Adulto Irccs Policlinico San Donato Milano; Università Degli Studi Di Enna "Kore" Gvm Care and Research, Meh, Palermo

Background: Laubry–Pezzi syndrome is a rare congenital heart disease characterized by the association of a ventricular septal defect (VSD) and aortic regurgitation. Clinical presentation is heterogeneous, and imaging is often crucial for diagnosis.
Case description: An 18–year–old Gambian male with no previous cardiac or family history presented to the emergency department with atypical chest pain. The electrocardiogram showed left ventricular hypertrophy, with normal troponin levels and blood pressure. Transthoracic echocardiography (TTE) demonstrated a markedly dilated left ventricle with preserved systolic function, dilation of the aortic root (42 mm), and a restrictive perimembranous VSD with left–to–right shunt (maximum velocity 5.5 m/s, peak gradient 123 mmHg) associated with aortic regurgitation. Transesophageal echocardiography (TEE) was performed for a detailed assessment of the valvular lesion, showing severe eccentric aortic regurgitation with right coronary cusp prolapse, due to the Venturi effect created by the turbulent flow through the VSD. The overall findings supported the diagnosis of Laubry–Pezzi syndrome. The patient underwent surgical repair with pericardial patch closure of the VSD and and mechanical aortic valve replacement.
Conclusions: Laubry–Pezzi syndrome, although rare, should be considered in young patients presenting with VSD and aortic regurgitation. Echocardiography remains the cornerstone for diagnosis and surgical planning.

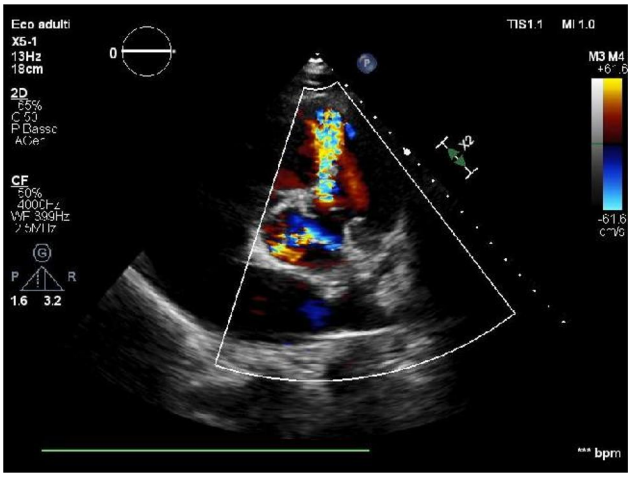

Figure 1. Transthoracic echocardiography, parasternal short-axis view, showing a restrictive perimembranous ventricular septal defect (VSD) with a left-to-right shunt on color Doppler

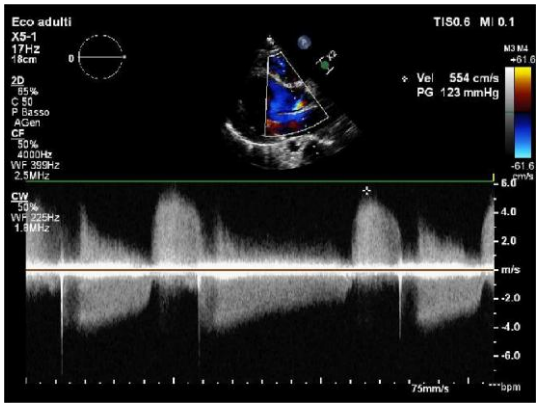

Figure 2. Transthoracic echocardiography with continuous-wave Doppler across the perimembranous VSD, demonstrating a maximum velocity of 5.5 m/s and a peak gradient of 123 mmHg, consistent with a restrictive defect.

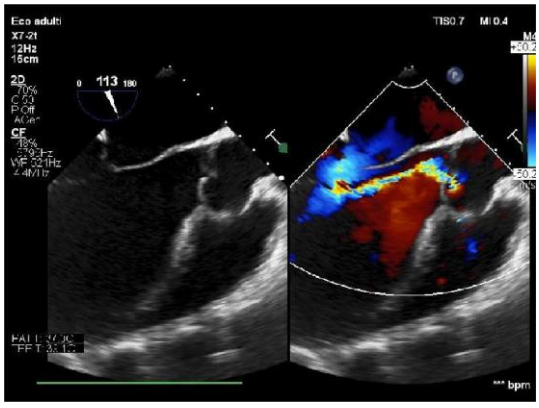

Figure 3. Transesophageal echocardiography, mid-esophageal long-axis view at 113°, revealing severe eccentric aortic regurgitation.

Cancer and Cardiovascular Imaging

Abstract citation ID: suag058.317

PREVALENCE AND PROGNOSTIC IMPACT OF CARDIAC RESONANCE ABNORMALITIES IN MYOTONIC DYSTROPHY PATIENTS

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Background: myotonic dystrophy (DM) is an autosomal dominant inherited neuromuscular disorder characterized by progressive muscular weakness and multisystem involvement. Cardiovascular magnetic resonance (CMR) provides useful information about the potential risk of myocardial involvement in the early stage of several cardiomyopathies. We performed a systematic review aiming to describe the prevalence of disease–related CMR abnormalities in patients with DM; moreover, we investigated the association between CMR abnormalities and arrhythmias to detect predisposing and/or influencing prognostic factors.
Matherials and methods: we performed a systematic review in accordance with 2009 guidelines from the PRISMA.
Results: a total of 16 reports were included in our systematic review. The main findings of our systematic review are the following: the prevalence of CMR–detected LV dysfunction, defined as LVEF≤ 50%, ranged from 2% to 29% in DM1 population, and was higher than in healthy controls; conversely, it has not been described among DM2 populations. The overall LGE positivity ranged

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from 13% to 42% among DM1 patients and did not correlate to the LVEF as detected by echocardiography. LGE positivity was an independent predictor of AF among DM1 patients. Focal myocardial fibrosis and fat infiltration have been reported respectively in 27% and 32% of DM2 patients and seem to be associated with a high prevalence of conduction system defects. DM patients showed a non–ischemic LGE pattern characterized by mid–myocardial and subepicardial enhancement, in the septum and within the basal inferolateral segments of the LV wall.
Conclusion: The prevalence of CMR–detected LV dysfunction ranges up to one–third of DM1 patients; in contrast, it was not described among DM2 patients. LGE myocardial areas can be detected up to 42% of DM1 patients and 32% of those with DM2. A non–ischemic LGE pattern, characterized by mid–myocardial and subepicardial wall distribution in the septum and within the basal inferolateral segments of the LV wall, is the most prevalent among overall DM population. Myocardial LGE is an independent predictor of AF in DM1 patients; and it was associated with an increased prevalence of cardiac disorders among DM2 patients. DM1 patients showed an increased global ECV compared with healthy subjects and DM2 patients.

Abstract citation ID: suag058.318

DIAGNOSIS OF CARCINOID SYNDROME WITH CARDIAC INVOLVEMENT AND SEVERE TRICUSPID VALVE DAMAGE

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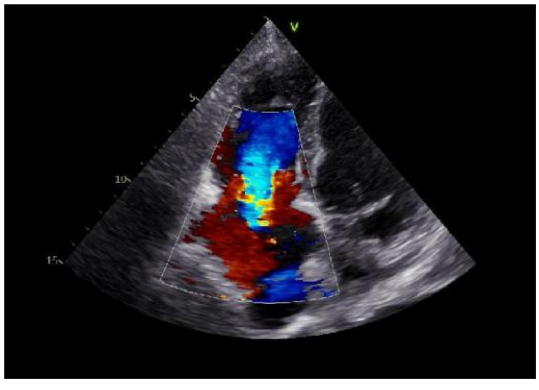
Policlinico Di Monza

Introduction: Carcinoid syndrome is a rare clinical condition caused by the systemic release of bioactive substances from a specific type of neuroendocrine tumors (NET) most commonly originating in the gastrointestinal tract. The syndrome typically develops during advanced or metastatic disease, particularly when hepatic involvement allows these vasoactive substances to bypass hepatic metabolism and enter the systemic circulation.
Clinical Case: A 78 years–old man with a story of previous inferior–lateral myocardial infarction and paroxysmal atrial fibrillation came to our attention after the echocardiographic finding of severe tricuspid regurgitation, not present 6 months before, and associated with signs of right heart failure. EKG revealed atrial fibrillation, HR 89, Q wave in inferior leads. Echocardiography confirmed a severe tricuspid regurgitation, showing retracted and fibrotic tricuspid flaps, with large coaptation deficit (figure 1 and 2); right ventricle was dilated with preserved contractile function, left ventricle presented normal function. An Angio–CT of the chest showed no pulmonary embolism but a massive hepatic replacement by repetitive hypervascular lesions, associated with Wirsung's duct dilatation, caused by the presence of a just partially visible cephalopancreatic mass. A MR–cholangiopancreatography confirmed these abdominal findings (figure 3), suggesting a neuroendrocrine nature. To differentiate pancreatic adenocarcinoma from a NET, an ultrasound–guided biopsy was performed which identified a well–differentiated NET (G1) with molecular positivity for chromogranin and synaptophysin. Staging CT did not reveal any secondary lesions other than the liver but, due to the advanced hepathic dysfunction, the patient was considered unsuitable for surgical treatment of the valve and, after high–dose diuretic therapy, treatment with somatostatin analogues was started.
Discussions: In carcinoid syndrome, cardiac involvement is caused by the deposition of carcinoid fibrotic plaques on the right heart chambers and valves, which are the first structures to receive hormonal input from the circulation. Although the primary treatment for tricuspid valve dysfunction is surgery, when liver metastases from NET are so extensive, primary treatment of the underlying tumor remains essential, along with symptomatic therapy, to improve quality of life and control peripheral congestion.



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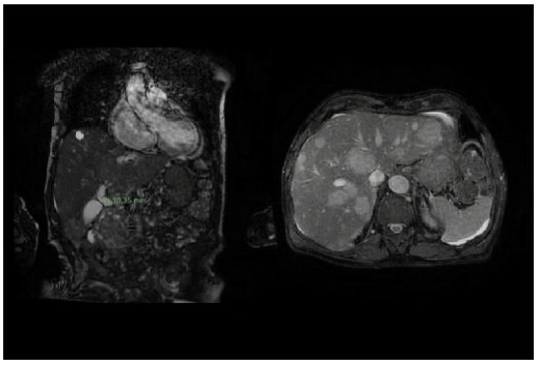

Figure 3

Abstract citation ID: suag058.319

WHEN A SUSPECTED THROMBUS IS NOT A THROMBUS: A CASE OF LEFT ATRIAL MYXOMA WITH HIGH EMBOLIC RISK

A. Nardone, L. Falcone, S. Testa, D. Mandunzio, A. Viele, G. Palmieri, B. Cuzzola, C. Romano, L. Guerrera, and A. Colavita
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Atrial myxomas are the most common benign primary cardiac tumors, with an incidence of approximately 3 in 1000 patients. Most arise in the left atrium and may cause complications such as obstruction or embolization. We report a case of an incidental left atrial myxoma detected in a patient presenting to the emergency department cause of palpitations.**Case Presentation:** A 51–year–old woman presented with palpitations and hypotension. Her history was notable for thrombocytosis of unclear etiology, under diagnostic evaluation. Electrocardiography revealed sinus tachycardia at 130 bpm, frequent premature ventricular beats. Transthoracic echocardiography showed an isoechoic left atrial mass measuring approximately 3 × 2 cm, initially suspected to be a thrombus. She was admitted to the cardiology unit and started on continuous intravenous heparin. Transesophageal echocardiography demonstrated a heterogeneous, multilobulated, mobile mass attached to the left side of the interatrial septum, measuring 3.8 × 1.9 cm, protruding into the left atrium and prolapsing into the left ventricle during diastole, with high embolic potential. (Figure 1-2) Due to hemodynamic instability and the risk of embolization, she was urgently transferred for cardiac surgery. Surgical excision led to hemodynamic stabilization, and histology confirmed an atrial myxoma. The postoperative course was uneventful, and she was discharged asymptomatic in good condition (Figure 3).
Discussion: Atrial myxomas most often arise in the left atrium and present variably, including arrhythmias, hemodynamic compromise, or embolic events. In this case, thrombocytosis initially suggested thrombus formation. Transesophageal echocardiography was critical in identifying the mass's attachment, mobility, and diastolic prolapse, indicating high embolic risk and supporting the diagnosis of myxoma. These findings prompted urgent surgical intervention.
Conclusions: This case emphasizes the need to consider atrial myxoma in the differential diagnosis of left atrial masses, even in patients with prothrombotic conditions. Transesophageal echocardiography is essential for accurate diagnosis and risk assessment. Prompt surgical excision prevents complications and ensures favorable outcomes.

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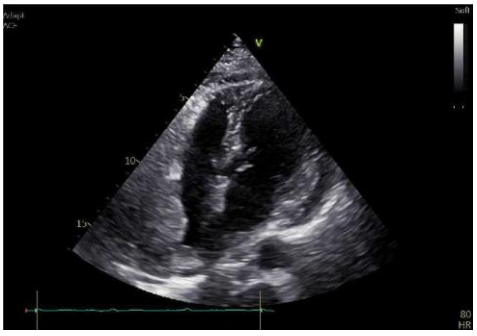
GIANT ATRIAL ANGIOSARCOMA: A CHALLENGING DIAGNOSIS

P. Milewski, A. Comunello, C. Ladurner, D. Ermacora, P. Engl, and R. Cemin
Ospedale Regionale San Maurizio, Cardiologia

Cardiac angiosarcoma is a malignant tumor of the heart, usually located in the right atrium, originating from the endothelial lining of the vessels and infiltrating the surrounding myocardium. A 70–year–old woman was admitted to our emergency department with dyspnea and palpitations. A 12–lead electrocardiogram revealed atrial flutter, successfully treated with electrical cardioversion, and oral anticoagulation was initiated.

Transthoracic echocardiography showed a trivial circumferential pericardial effusion and a marked thickening of the right atrial free wall, mimicking a large mass (Fig.1, fig. 2). CT confirmed a giant mass (57×46×65 mm) in the right atrial wall, hypodense with areas of intense vascularization becoming hyperdense after contrast injection. Abdominal CT revealed multiple small hypodense liver lesions and mesenteric involvement, while FDG–PET showed increased glucose uptake only in the atrial mass. Cardiac MRI demonstrated infiltration of the right atrial free wall, extension to the right atrioventricular sulcus with thight adherence to the right coronary artery and extension to the cranial portion of the right ventricle, with a hypovascularized core and patchy late gadolinium enhancement.

After a non–diagnostic liver biopsy, a direct right atrial biopsy was performed, leading to the definitive diagnosis of conventional angiosarcoma. Following this challenging diagnosis, the patient was referred to the Oncology Department and started appropriate chemotherapy.



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FULMINANT CONSTRICTIVE PERICARDITIS REVEALING AGGRESSIVE PLEURAL MESOTHELIOMA IN A LONG–TERM CANCER SURVIVOR

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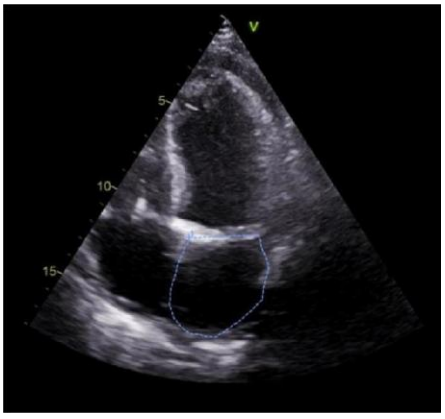
Patients exposed to mediastinal radiotherapy are at long–term risk for cardiovascular and non–cardiovascular complications. Constrictive pericarditis is a recognized late effect; however, malignant pericardial infiltration represents a rare and potentially misleading alternative diagnosis.

We report the case of a 52–year–old male with a history of childhood Hodgkin lymphoma treated with mediastinal radiotherapy, who over time developed thyroid disease requiring total thyroidectomy, post–actinic vasculopathy treated with carotid endarterectomy and an acute coronary syndrome in March 2023 with severe left ventricular dysfunction, successfully revascularized. At follow–up in September 2023, echocardiography showed improving left ventricular ejection fraction and a small, regressing, non–hemodynamically significant pericardial effusion (Figure 1). In December 2023, the patient was admitted for rapidly progressive dyspnea, peripheral edema and signs of right–sided heart failure. BNP was elevated (973 pg/mL). Chest CT revealed severe bilateral pleural effusions and circumferential pericardial fluid without mediastinal or pulmonary masses. The patient received anti–inflammatory and diuretic therapy, and underwent evacuative thoracentesis (pleural fluid cytology was non–diagnostic). He was then discharged home due to clinical improvement, with a planned short–term follow–up. He was soon re–admitted for atrial fibrillation with rapid ventricular response and further clinical deterioration. Serial echocardiograms documented rapid progression toward overt constrictive pericarditis with worsening biventricular dysfunction (LVEF 35–40%) (Figure 2). A second CT confirmed persistent pleuro–pericardial effusions. Radiation–induced constrictive pericarditis was considered the most likely diagnosis, and the patient was referred to a tertiary cardiac center where he underwent pericardiectomy. Intraoperatively, extensive infiltrative mediastinal and pericardial masses were unexpectedly identified, precluding effective pericardiectomy. Histopathology revealed aggressive pleural mesothelioma with pericardial invasion. The patient died of refractory cardiocirculatory failure on postoperative day 2.

In patients with a history of mediastinal radiotherapy, post–radiation constrictive pericarditis is the most likely diagnosis; however, the possibility of malignancy should not be excluded even if imaging and pleural fluid cytology are negative, particularly in cases of rapid clinical deterioration.



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Abstract citation ID: suag058.322

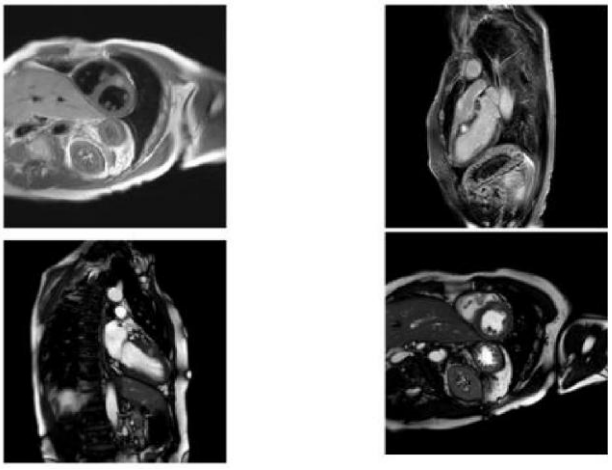
INTRAMYOCARDIAL MELANOMA METASTASIS DETECTING BY18–FDG–PET–CT: A RARE CASE REPORT

A. Mauriello, C. Fonderico, A. Maratea, V. Quagliariello, and N. Maurea
Istituto Nazionale Tumori – Irccs – Fondazione "G. Pascale"

Patient presentation: we present the case of a patient with a recent melanoma metastasis to the left ventricle (LV). The patient is a 57–year–old male who, in March 2013, underwent excision of a pigmented lesion of the right hip with histological diagnosis of superficial spreading melanoma. In July 2024, a follow up computerized tomography (CT) scan showed nodular lesion suspect for metastasis. Patient thus underwent splenectomy with pathological confirmation of melanoma metastasis, BRAF V600E mutation. Adjuvant Nivolumab was administered. In February, the patient routinely performed a CT scan that showed melanoma recurrence with lymph nodes and lung involvement. An urgent positron emission tomography (PET) with 18–fluorodeoxyglucose (FDG) scan was performed and revealed multifocal, intensely avid, metastatic deposits. In addition, focal uptake was seen in the LV myocardium (Figure 1).

Diagnosis and management: the patient was sent for cardiac magnetic resonance (CMR) that revealed well–defined iso–to–hypointense (melanin–containing) homogenous masses in LV (13 x 16 millimeters). It showed increased values on T1 and T2 mapping, as well as increased signal intensity on T2–weighted imaging and enhancement on late gadolinium enhancement images (Figure 2). The findings are highly suggestive of melanoma metastasis. Taking into consideration the primary resistance to anti–PD–1 moloclonal antibodies, patient was promptly commenced on targeted therapy with BRAF tyrosine kinase inhibitor, Encorafenib and MEK inhibitor, Binimetinib. After two months of treatment, the patient showed a reduction in 18–FDG uptake in the myocardium and at other sites of secondary lesions on the 18–FDG PET scan.

Conclusions: cardiac metastases from melanoma, before the advent of immunotherapy, were treated with palliative therapy. However, with the advent of immunotherapy, some cases are treated with immunotherapy with excellent results. Patients with BRAF–mutated melanoma tend to respond very quickly to treatment with RAF and MEK inhibitors. Given the primary resistance to anti–PD–1 monoclonal antibodies and the life–threatening nature of the LV metastasis, the patient was promptly started on targeted therapy with BRAF tyrosine kinase inhibitor, Encorafenib, and MEK inhibitor, Binimetinib. This case shows a great response to targeted treatment and proves how medical treatment without surgery can drastically reduce a malignant tumor's mass



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A SURPRISING INTRACARDIAC MASS, WHAT SHOULD WE EXPECT?

A. Capoferri, G. Dognini, R. Sanvito, G. Faggiano, D. Belloli, F. Cinelli, A. Pavone, and M. Rondi
Asst–Bergamo Ovest–Treviglio– Bergamo

Introduction: The detection of an intracardiac mass, particularly a ventricular one, is always a destabilizing and questioning event. In a non–necrotic left ventricle with normal contractility and function, it is likely a tumor; primary cardiac tumors are rare (0.1–0.2% of all tumors), while metastatic tumors are more likely, with total cardiac involvement occurring in up to 14.2% of patients with metastatic tumors, with a minority reaching the myocardium or endocardium and majority the pericardium. The most common metastatic tumors that can involve the heart are melanoma, lung cancer, renal cancer, and lymphoproliferative tumors.
Discussion: The case involves a 60–year–old woman who presented to the emergency department due to difficulty walking for groin pain radiating to the lumbar region. Initially, an autoimmune inflammatory disease was suspected, but chest CT revealed an excavated lesion in the left lower lung lobe and multiple pulmonary nodules, leading to a suspected diagnosis of lung cancer. An echocardiogram was initiated for suspected left ventricular thrombosis from chest CT scan revealed a large, oval–shaped, non–protruding, adherent intracardiac mass (5 x 3 cm) originating from the interventricular septum and part of the lateral wall. It was non–pedunculated and had homogeneous echogenicity with a jagged margin for only a short section. Cardiac MRI followed, which in turn confirmed the cardiac mass, suggesting a metastatic nature with the presence of additional secondary atrial tumors. Further investigations documented the presence of brain metastases, for which radiotherapy was undertaken. The diagnosis of lung cancer was confirmed days later by the results of biopsies of lymph nodes in the neck and subcutaneous lesions on the back.
Conclusions: This case demonstrates how the onset of cancer can be sneaky, presenting with diverse symptoms and unexpected and surprising involvement of multiple organs. It demonstrates how cardiac involvement is not limited to the most common cardiac tamponade.

Heart Failure - Arrhythmias and Electronic Devices

Abstract citation ID: suag058.324

WHEN RATE CONTROL BECOMES HARMFUL: CARDIOGENIC SHOCK AFTER TREATMENT OF ATRIAL FIBRILLATION–RELATED TACHYCARDIOMYOPATHY

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A 75–year–old woman with no known cardiovascular disease was admitted for acute decompensated heart failure. She reported months of progressive exertional dyspnea. Electrocardiography revealed atrial fibrillation with rapid ventricular response (~140 bpm). Transthoracic echocardiography showed reduced left ventricular ejection fraction (LVEF 40%) with diffuse hypokinesia, severe atrial dilation with atrial functional moderate–to–severe mitral and tricuspid regurgitation, pulmonary hypertension and left pleural effusion. Laboratory tests showed reduced TSH (0.26 μIU/mL) with normal free thyroid hormones, and no liver or kidney damage.

During hospitalization, multiple attempts at rate control were performed using high–dose beta–blockers (metoprolol up to 200 mg/day, followed by propranolol up to 160 mg/day) and digoxin, with poor ventricular rate control. After exclusion of left atrial appendage thrombosis, electrical cardioversion successfully restored sinus rhythm, with rapid improvement of LVEF to 52%, consistent with tachycardiomyopathy. The patient was discharged in sinus rhythm (60 bpm) on metoprolol 100 mg/die, flecainide 100 mg/die, anticoagulation, diuretics, canreonate and antithyroid therapy (metimazole 5 mg/die); catheter ablation of AF was scheduled. Within 24 hours, she was readmitted with syncope. On admission, she was hypotensive (70/50 mmHg) with sinus bradycardia (45 bpm), severe metabolic derangement (lactate 7.4 mmol/L), and acute kidney injury (creatinine 3.4 mg/dL). Echocardiography showed severe functional mitral and tricuspid regurgitation with global hypokinesia and LVEF 40%. Iatrogenic beta–blocker–induced hemodynamic collapse was suspected. She required inotropes and withdrawal of negative chronotropic drugs. Hemodynamics progressively improved, and serial echocardiography demonstrated complete recovery of LVEF (60%) and marked reduction of valvular regurgitation. Coronary angiography was normal.

At 3–month follow–up, her echocardiogram showed persistence of normal LVEF together with mild mitral and tricuspid regurgitation. She underwent successful AF ablation.**Conclusion:** This case illustrates the vulnerability of patients with AF–related tachycardiomyopathy and thyroid dysfunction. Even after apparent recovery and restoration of sinus rhythm, beta–blockers may precipitate cardiogenic shock. Early rhythm–control strategies, cautious pharmacological therapy and prolonged in–hospital observation are crucial in this population.

Abstract citation ID: suag058.325

QUALITY OF LIFE IMPROVEMENT AND REDUCTION IN HOSPITALIZATIONS IN PATIENTS WITH HEART FAILURE UNDERGOING CARDIAC CONTRACTILITY MODULATION (CCM) THERAPY: A SINGLE–CENTER EXPERIENCE

R. Valecce, M. Dadamo, G. Incampo, C. Volpe, M. Moramarco, D. Dinunzio, V. Minnielli, V. Giannoccaro, M. Cuonzo, G. Genchi, and M. Bonfantino
Ospedale Di Venere, Bari

Cardiac contractility modulation (CCM) is an innovative therapeutic strategy for chronic heart failure, particularly in patients with reduced or moderately impaired left ventricular ejection fraction. Unlike conventional therapies that primarily reduce hemodynamic load or modulate neurohormonal pathways, CCM directly enhances myocardial contractile function. The delivery of high–voltage biphasic electrical impulses during the absolute refractory period aims to improve contractile efficiency without significantly affecting heart rate or rhythm. Preclinical and clinical studies have shown favorable effects on cellular and molecular mechanisms, including calcium handling, gene expression, and oxidative stress reduction. We report data from 16 patients (11 males; mean age 71 ± 10.9 years) who underwent CCM implantation at our center since February 2023. All patients were carriers of an implantable cardioverter–defibrillator. Heart failure etiology was ischemic cardiomyopathy in ten patients, valvular heart disease in two, and dilated cardiomyopathy in four. All patients had a history of heart failure–related hospitalizations, and two experienced ICD shocks within the previous six months. Patients were classified as high risk (NYHA class III, n=10; class IV, n=6), with a mean left ventricular ejection fraction (LVEF) of 28 ± 6.8% and mean pulmonary artery systolic pressure (PASP) of 43.1 ± 13.9 mmHg. CCM implantation was successfully performed in all cases. Patients were followed on an outpatient basis and reassessed at 3, 6, and 12 months. At follow–up, mean LVEF increased to 30.1 ± 8.2%, while mean PASP decreased to 37.2 ± 12.8 mmHg. Improvement of at least one NYHA class was observed in four patients (data unavailable for three). Notably, 62.5% of patients experienced no heart failure–related hospitalizations during the 12 months following implantation. Despite the limitations of a small sample size, our single–center experience aligns with existing literature and demonstrates clinically meaningful improvements in functional status, cardiac performance, and hospitalization burden in patients with moderate–to–severe left ventricular systolic dysfunction treated with CCM.

Abstract citation ID: suag058.326

NON–INVASIVE ASSESSMENT OF FUNCTIONAL PARAMETERS AFTER THE IMPLANTATION OF A CCM

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A 72–year–old female patient with non–ischemic dilated cardiomyopathy (FE 30%) presented to our attention due to persistent dyspnea, despite optimized medical therapy for heart failure. In particular, her medication regimen included: sacubitril/valsartan 49/51 x2/die, dapagliflozin 10 mg/die, bisoprolol 7.5 mg/die, furosemide 25 mg/die, and vericiguat 10 mg/die (the latter for 6 months). Her medical history included: a dual–chamber defibrillator (Medtronic) implantation in 2023 and permanent atrial fibrillation with a narrow QRS complex (90 ms). Given her symptoms and clinical hystory, cardiac contractility modulation (CCM) therapy was proposed and implanted contralaterally to the defibrillator, thus on the right side (Figure 1). Both the procedure and hospital stay were uneventful, and the patient was discharged. Subsequent follow–ups were conducted at 1 month and 6 months with clinical cardiological evaluation, device checks of the defibrillator and CCM, echocardiogram, and the Minnesota Living with Heart Failure Questionnaire (MLHFQ). The echocardiogram showed no significant signs of improvement at 6 months. The initial MLHFQ score was 60. It remained unchanged at 1 month, but at 6 months a significant improvement was registered with a score of 40. The patient reported a subjective improvement in quality of life, with reduced dyspnea during certain daily activities and no longer required diuretic/furosemide therapy. AICD monitoring, however, revealed an interesting trend in the diagnostic parameters collected daily by the device and grouped in trends (Compass Medtronic). In particular, there was not a significant improvement in daily hourly activity (Figure 2), but a marked improvement in the amount of intracorporeal fluid (OptiVol) and a reduction in the percentage of daily ventricular pacing (Figue 3).**Discussion:** CCM therapy is a valid alternative in patients with symptomatic heart failure to reduce hospitalizations when optimized therapy is not sufficient. In the discussed

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case, the device ensured an improvement in symptoms, probably in daily activities with lower energy expenditure, and significantly reduced congestion (demonstrated not only by improved OptiVol values, but also by enabling discontinuation of the diuretic). Evaluating the diagnostic tools available from continuous device monitoring could be an even more objective parameter to validate the effectiveness of CCM, in contrast to the NYHA and MLHFQ, which instead represent more subjective evaluation systems.

Figure 1. X rays- CCM device on right side and AICD on left side

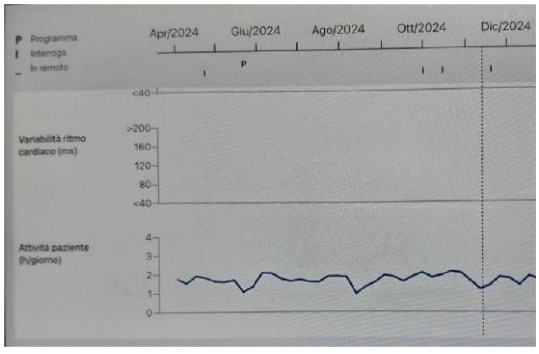

Figure 2. Daily activities (hours of phisical activity/ 24 h) trend

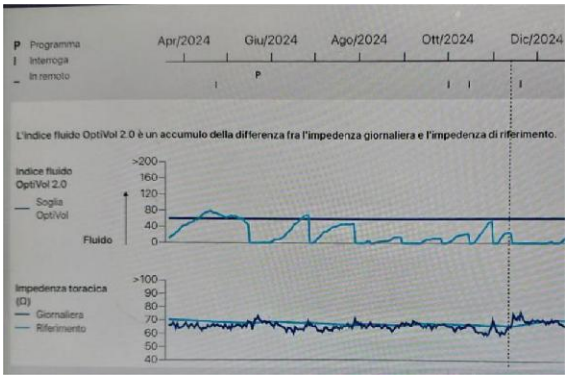

Figure 3. OptiVolume trend

Abstract citation ID: suag058.327

ATRIAL FIBRILLATION AND HEART FAILURE: IS CATHETER ABLATION A GAME CHANGER FOR PROGNOSIS?

M. Orlandi, B. Frassoni, A. Guidorossi, F. Russo, F. Barocelli, F. Grassi, F. Notarangelo, A. Crocamo, L. Vignali, and G. Niccoli
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We present the clinical case of a 70–year–old male patient with multiple cardiovascular risk factors and no previous cardiac history. The first admission to our institution was in December 2023 for heart failure with reduced ejection fraction (LVEF 20–25%) with coronary arteries without critical stenoses and atrial fibrillation (AF) with moderate–to–high ventricular response (Figure 1). Electrical cardioversion was performed, with early recurrence of atrial fibrillation. The patient was subsequently followed at our cardiology day hospital, where he underwent multiple visits for therapeutic optimization, with poor hemodynamic stability requiring high doses of oral and intravenous diuretics. In April 2024, a further electrical cardioversion (ECV) was scheduled but not performed due to a suspected finding on transesophageal echocardiography (TEE) suggestive of intracavitary thrombosis. In October 2024, the patient was readmitted for congestive heart failure and treated with high–dose diuretics and levosimendan. In this setting, cardiac MRI revealed subendocardial late gadolinium enhancement (LGE) of the basal anteroseptal wall of the left ventricle and mid–wall LGE of the basal interventricular septum (Figure 3). Intracavitary thrombosis was excluded on follow–up TEE, CRT–D was implanted for primary prevention, and subsequent ECV was acutely effective in restoring sinus rhythm. After hemodynamic optimization, the patient was rehospitalized in January 2025 and he underwent ablation of the cavotricuspid isthmus and circumferential pulmonary vein isolation, followed by recurrence of AF at discharge. Hemodynamic compensation did not improve due to persistence of atrial fibrillation until February 2025, when sinus rhythm was documented; therefore, the CRT–D was reprogrammed to DDD mode, 40–110 bpm. At subsequent follow–ups, the patient consistently remained in sinus rhythm, with progressive improvement in dyspnea (NYHA class I–IIa), circulatory compensation, and left ventricular function. At the most recent transthoracic echocardiogram (July 2025), LVEF was 47%, with diffuse hypokinesia, severely dilatated left ventricle, dilated atria and mild mitral regurgitation (Figure 2). This clinical case highlights how the ablation of cavotricuspid isthmus and circumferential pulmonary vein isolation in patients with hypokinetic–dilated cardiomyopathy and biventricular dysfunction can result in a marked and sustained improvement in ventricular function, clinical symptoms and overall prognosis.

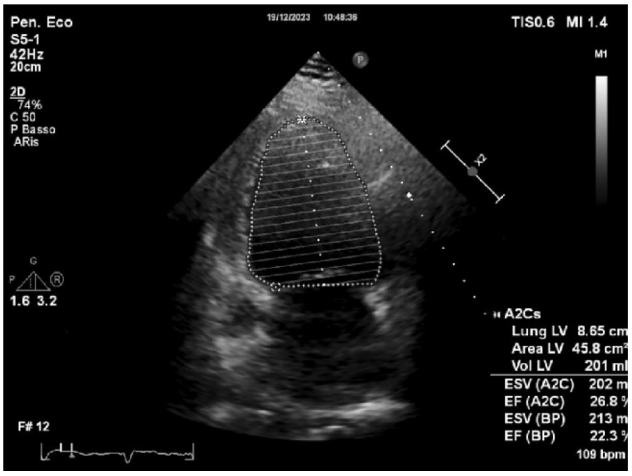

FIGURA 1: LVEF before catheter ablation

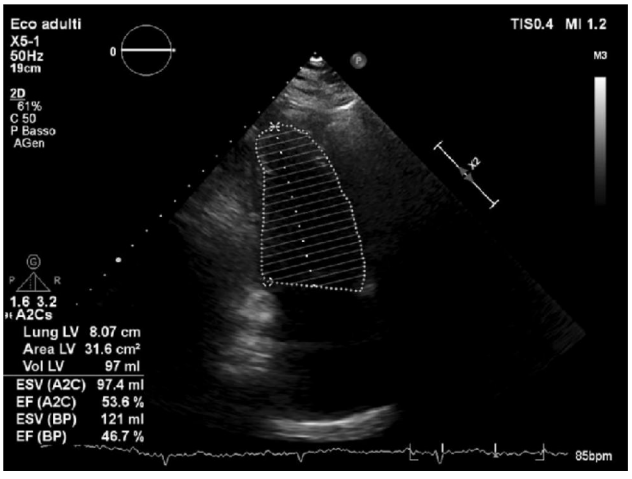

FIGURA 2: LVEF after catheter ablation

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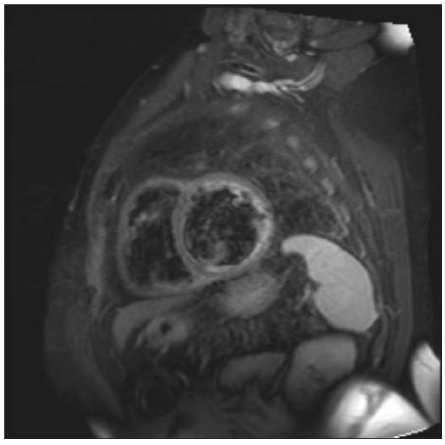

FIGURA 3: Subendocardial LGE at cardiac MRI

Abstract citation ID: suag058.328

CARDIAC CONTRACTILITY MODULATION (CCM) THERAPY: AN EMBLEMATIC CASE OF REDUCED HOSPITALIZATIONS FOR HEART FAILURE

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Introduction: In heart failure, profound cellular and molecular changes have recently been documented. Cardiac contractility modulation therapy appears to act precisely at these levels.
Case report: We present the case of a 73–year–old man. In August 2016, the patient experienced an acute coronary syndrome and underwent percutaneous coronary revascularization. In October 2016, a dual–chamber ICD was implanted due to persistent severe left ventricular dysfunction (LVEF 35%) despite optimized medical therapy. After several hospitalizations at other centers for acute decompensated heart failure, he was admitted again in September 2023 for cardiogenic shock, followed by percutaneous transluminal coronary angioplasty of the left main–left anterior descending–right coronary–circumflex arteries with repeat intervention. He was subsequently admitted to our Unit in December 2023 for worsening dyspnea. Transthoracic echocardiography showed a LVEF of 25% and a sPAP of 65 mmHg. NT–proBNP levels 5,439 pg/mL. During hospitalization, after continuous intravenous diuretic therapy, implantation of a CCM device was proposed, with placement of two ventricular leads on the right interventricular septum.

Following discharge, the patient reported a significant improvement in clinical status, with no further hospitalizations for heart failure exacerbation, and he underwent regular follow–up at our Heart Failure Clinic. ICD interrogations demonstrated a reduction in ventricular arrhythmic burden. Semiannual echocardiographic evaluations showed persistent severe left ventricular dysfunction with a reduction in sPAP (45 mmHg). In February 2025, the patient was readmitted for acute decompensated heart failure. Echocardiographic findings were substantially unchanged compared with the previous admission, while NT–proBNP levels had increased to 25,062 pg/mL. Interrogation of the CCM device revealed generator battery depletion, which had not been recharged for approximately one month. During hospitalization, intravenous diuretic therapy was administered and the CCM device was reactivated, after which the patient showed clinical improvement and was discharged with recovery from heart failure.
Conclusion: This case demonstrates that the patient experienced a sustained clinical and quality–of–life improvement while CCM therapy was active, with an improvement of at least one NYHA functional class and a marked reduction in NT–proBNP levels.

Acute Heart Failure 1

Abstract citation ID: suag058.329

GUIDELINE–DEFINED DIASTOLIC HEART FAILURE PREVALENCE IN ACUTE HEART FAILURE: A COHORT STUDY OF PATIENTS WITH LVEF › 40%

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Background: Heart failure with preserved or mildly reduced ejection fraction (HFpEF/HFmrEF) accounts for a large share of acute heart failure (AHF) admissions. However, it remains uncertain how often decompensation is attributable to isolated diastolic dysfunction, without relevant structural or arrhythmic disease, as required by guideline–based definitions. Although HFmrEF is classified separately in guidelines, we included patients with LVEF ›40%, consistent with major HFpEF trials and registries.
Objective: To assess the prevalence ofAHF driven solely by diastolic dysfunction in patients with LVEF ›40% and congestion.
Methods: We retrospectively analyzed 773 consecutive AHF admissions (January 2022–November 2023) with complete echocardiography at entry. Of these, 323 had LVEF ›40%. Systemic congestion was defined as inferior vena cava (IVC) diameter ›21 mm with reduced inspiratory collapse. A structured algorithm identified significant cardiac pathology (severe valvular disease, precapillary pulmonary hypertension, cardiomyopathy, arrhythmias with hemodynamic impact) and stage V kidney disease. Patients without these conditions were classified as guideline–defined HFpEF/HFmrEF. This variable was tested in multivariable logistic regression against systemic congestion.
Results: Among 323 patients with LVEF ›40%, 252 (78%) had systemic congestion. Of these, 206 (81.7%) had severe valvular disease, 26 (10.3%) had other significant cardiac disease or stage V renal failure, and only 20 (8%) had no identifiable cause and thus fulfilled guideline–defined HFpEF/HFmrEF. Guideline–defined HFpEF/HFmrEF was inversely associated with congestion (OR 0.037, 95% CI 0.017–0.078, p‹0.001).
Conclusions: In LVEF ›40%, systemic congestion is rarely due to isolated diastolic dysfunction. Guideline–defined HFpEF appears uncommon as a cause of acute decompensation, underscoring the need for comprehensive diagnostic evaluation

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TIMELY ESCALATION OF MECHANICAL CIRCULATORY SUPPORT AND INTER–CENTER COLLABORATION: THE KEY TO A SUCCESSFUL OUTCOME IN ADVANCED CARDIOGENIC SHOCK

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Cardiogenic shock remains a major clinical challenge, requiring timely recognition and intervention. Optimal management involves escalation of mechanical circulatory support (MCS), ideally within an organized hub–and–spoke network. We report the case of a 68–year–old man with ischemic heart disease due to complex coronary artery disease, with multiple percutaneous coronary interventions (PCI) of the left anterior descending artery (LAD), complicated by recurrent in–stent restenosis. In August 2025, recurrent angina led to the diagnosis of severe left main in–stent restenosis, for which surgical revascularization was attempted. Only a left internal mammary artery graft to the LAD could be performed because circumflex revascularization was not feasible. The postoperative course was complicated by cardiogenic shock, requiring urgent PCI of the left main and circumflex arteries. After initial recovery, the patient was readmitted in October 2025 from the cardiac rehabilitation ward with SCAI D cardiogenic shock, presenting with moderate left ventricular dysfunction, severe mitral regurgitation, profound hypotension and hypoperfusion resulting in hepatorenal dysfunction, secondary to acute occlusion of the LAD bypass graft. Early initiation of inotropic and vasopressor therapy combined with intra–aortic balloon pump implantation achieved partial hemodynamic stabilization. Owing to persistent instability the patient was promptly transferred to a tertiary hub center with a heart transplant program, where escalation to left ventricular unloading with Impella 5.5 resulted in marked hemodynamic improvement and recovery of end–organ function. This stabilization allowed comprehensive reassessment and planning of definitive therapy. The patient was subsequently transferred back to the referring center after 19 days of MCS and underwent successful bypass grafting to the LAD and mitral valve replacement. This case highlights the critical role of structured collaboration between centers in managing advanced cardiogenic shock. Timely escalation of mechanical circulatory support, including Impella 5.5, enables hemodynamic stabilization and effective left ventricular unloading, creating a window for comprehensive reassessment and planning of definitive therapies. Hub–and–spoke networks are therefore essential to optimize outcomes in patients with SCAI D cardiogenic shock, ensuring access to advanced therapies, including heart transplantation, when recovery is not achievable.

Abstract citation ID: suag058.331

APICAL–AXILLARY CONFIGURATION IN BRIDGE–TO–BRIDGE PARACORPOREAL LEFT VENTRICULAR ASSIST DEVICE TO ENHANCE PATIENT'S RECOVERY AND IMPROVE CLINICAL OUTCOMES

G. Pisani, A. Cannata, D. Ronco, M. Velasco, B. De Chiara, and C. Russo

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S.C. Cardiochirurgia E Del Trapianto Di Cuore – Dipartimento Cardiotoracovascolare – Asst Grande Ospedale Metropolitano Milano Niguarda

Short term mechanical circulatory support (ST–MCS) could be a bridge–to–bridge strategy in INTERMACS–1 patients candidate to intracorporeal left ventricular assist device (LVAD). In this setting cannulation is usually performed through femoro–femoral percutaneous access. Nevertheless, it hinders nursing and patient's early mobilization. Here we describe our strategy for the reconfiguration of the ST–MCS to ease patient's recovery before intracorporeal LVAD implantation. A 45 years old man was transferred to our Center in refractory cardiogenic shock, supported by means of femoro–femoral V–A ECMO and intra–aortic balloon pump. Four days earlier an acute myocardial infarction occurred on the left venticle anterior wall, complicated by an impending myocardial rupture. On ECMO primary PCI was performed on the culprit lesion and then a pericardial patch was applied over the infarcted area through a median sternotomy.

After a week, severe mechanical hemolysis occurred, secondary to thrombosis of the venous femoral cannula and the left atrial vent. Therefore, we reconfigured ST–MCS to paracorporeal LVAD: inflow cannula was inserted into the left ventricular apex and connected to a CentriMag System™ and the ECMO cannula in the femoral artery was used as outflow. On full LVAD support, right ventricular failure occurred. A paracorporeal Right–Oxygenator–VAD (Oxy–RVAD) was implanted. ECMO cannula in the femoral vein was replaced and adopted as inflow, whereas the outflow cannula was anastomosed to the main pulmonary artery. Oxy–RVAD was removed successfully after 9 days. To ease patient's mobilization, on day 24 LVAD outflow line was connected to the left axillary artery achieving an apical–axillary LVAD. The day after, we started weaning from sedation and mechanical ventilation. On post–operative day 2 mobilization of upper and lower limbs were started with MOTOmed® training without complications. After 41 days on paracorporeal LVAD support, a HeartMate 3TM (HM 3TM) was finally implanted through left thoracotomy as a bridge to candidacy. Preexisting apical access was used to HM 3TM inflow cannula implant. Again, RV failure imposed a 10–days period of paracorporeal RVAD support. Overall, in our experience apical–axillary cannulation strategy facilitated patient's mobilization, enhancing clinical recovery and improving psychological status before intracorporeal LVAD implantation.

Abstract citation ID: suag058.332

THE PROGNOSTIC VALUE OF NON–INVASIVE VENTILATION IN PATIENTS WITH ACUTE HEART FAILURE

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Cardiologia, Università Degli Studi Di Bari "Aldo Moro"; Pronto Soccorso, Ospedale "F. Perinei"; Cardiologia, Università Degli Studi Di Foggia; Cardiologia, Ospeldale "San Paolo"; Cardiologia, Ospedale "San Paolo"; Cardiologia, Ospedale "Di Venere"; Cardiologia, Ospedale "F. Perinei"

Objectives: Patients with acute heart failure (AHF) often receive initial non–invasive ventilation (NIV). This study aimed to evaluate the prognostic role of NIV in patients hospitalized for AHF.
Methods: This was a retrospective cohort study. We enrolled patients admitted to our cardiac intensive care unit with a diagnosis of AHF. Anthropometric, clinical, pharmacological, and instrumental assessments were collected. Both in–hospital and 180–day post–discharge mortality were evaluated.
Results: Among 200 patients (mean age 81 ± 9 years; 52% male), NIV was applied in 80 cases (40%). These patients had more severe NYHA functional class, a higher prevalence of de novo AHF, required higher diuretic doses, and had longer hospital stays. In multivariate analysis, NIV remained significantly associated with length of stay (LOS) (r = 0.26; p = 0.0004). In–hospital mortality was 5% overall and significantly higher in the NIV group compared to non–NIV patients (10% vs. 1.6%, p < 0.001). At 180 days, mortality was also significantly higher in the NIV group [hazard ratio (HR) 1.84; 95% confidence interval (CI): 1.18–2.85; p = 0.006]. After adjusting for age, BNP, CRP, arterial blood gas parameters, renal function, and LVEF, NIV remained an independent predictor of 180–day mortality (HR 1.61; 95% CI: 1.01–2.54; p = 0.04).
Conclusions: Patients with AHF who required NIV exhibited more severe disease and longer hospital stays. NIV use was independently associated with both in–hospital and post–discharge mortality, suggesting its potential role as a prognostic marker in AHF.

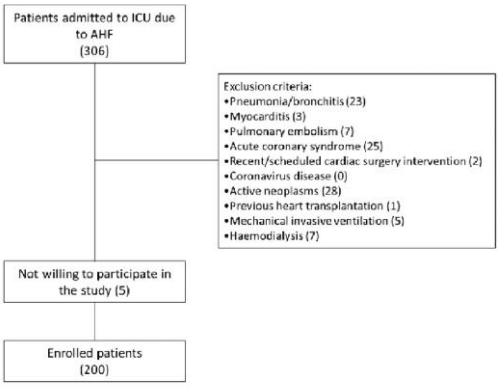

Figure 1. Flow chart of the study.

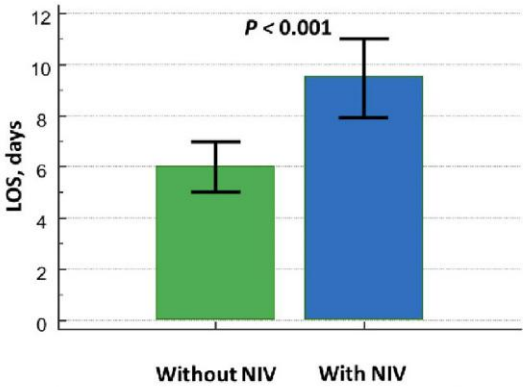

Figure 2. Differences in length of hospital stay between patients on and without NIV treatment.

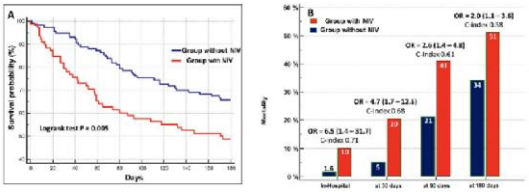

Figure 3. (A) Kaplan–Meier survival curves stratified in relation to the administration of NIV. **(B)** Mortality rate in patients treated with NIV as compared to those who did not receive NIV at different times of follow-up. OR = odds ratio [95% confidences interval].

Abstract citation ID: suag058.333

SPAP THRESHOLD TO DEFINE PULMONARY CONGESTION IN ACUTE HEART FAILURE IN ABSENCE OF SEVERE TRICUSPID REGURGITATION

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Spedali Civili Di Brescia

Background and aims: Pulmonary and/or peripheral venous congestion defines the clinical diagnosis of acute heart failure (AHF). However, the systolic pulmonary arterial pressure (sPAP) thresholds at which pulmonary (chest x–ray) and inferior vena cava (IVC) congestion occur are not well established. This study aimed to identify a cut–off value of sPAP that reliably indicates AHF.
Methods and results: We retrospectively included 380 consecutive patients hospitalized for AHF at an Italian referral centre, after excluding those with severe tricuspid regurgitation. Receiver operating characteristic (ROC) curve analysis and Youden's J statistic identified a threshold of sPAP ≥ 48.75 mmHg

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as the most accurate in predicting both pulmonary (sensitivity = 89.9%, specificity = 73%) and peripheral (sensitivity = 88.3%, specificity = 82.5%) fluid overload. The association between this sPAP threshold and both pulmonary and peripheral congestion was confirmed by chi–square testing (p ‹ 0.001) and multivariate logistic regression (p ‹ 0.001). After adjustment for confounders, sPAP ≥ 49 mmHg was independently associated with all–cause death or heart failure (HF) hospitalization (HR = 1.713; 95% CI 1.127–2.602; p = 0.012).
Conclusions: sPAP threshold of 49 mmHg identifies AHF with clinically useful accuracy—pulmonary (chest X–ray) congestion

Abstract citation ID: suag058.334

IRON–OVERLOAD CARDIOMYOPATHY DIAGNOSED BY CMR IN A POLYTRANSFUSED PATIENT

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Background: In hematologic patients undergoing repeated transfusions, iron overload may cause dilated cardiomyopathy and arrhythmias. After excluding coronary artery disease, tissue characterization by cardiac magnetic resonance (CMR) enables the diagnosis of cardiac siderosis.
Case presentation: A 56–year–old man with a myeloproliferative neoplasm on ruxolitinib, candidate for allogeneic transplantation, had a history of multiple transfusions. Personal and family cardiac history was unremarkable. Cardiovascular risk factors included arterial hypertension. He presented with dyspnea and a 10–kg weight gain over 20 days, with new peripheral edema. A 24–h Holter for palpitations showed infrequent premature ventricular complexes, often in couplets/triplets, and brief non–sustained ventricular tachycardia (maximum 4 beats). ECG showed sinus rhythm, left bundle branch block, mild ST–segment depression and inferolateral T–wave inversion. Laboratory tests showed mild leukopenia and anemia, with BNP 1,646 pg/mL. Transthoracic echocardiography revealed a dilated left ventricle with LVEF 45% due to diffuse hypokinesia; right–sided chambers were normal; moderate tricuspid regurgitation was present; the inferior vena cava was dilated with reduced collapsibility. He was admitted for acute decompensated heart failure with newly detected left ventricular dysfunction. Coronary angiography showed no angiographically significant stenoses. CMR demonstrated a severely dilated left ventricle (Figure 1) with LVEF 37% and diffuse hypokinesia, globally reduced native T1 with increased extracellular volume (Figure 2-3), and a markedly hypointense liver, overall consistent with myocardial and hepatic iron deposition. The patient continued hematologic therapy with cardiology follow–up, but died a few months later due to pneumonia complicated by septic shock.
Discussion/Conclusions: In heavily transfused patients presenting with heart failure and/or ventricular arrhythmias, iron–overload cardiomyopathy should be considered. CMR provides a non–invasive diagnosis and may guide management.

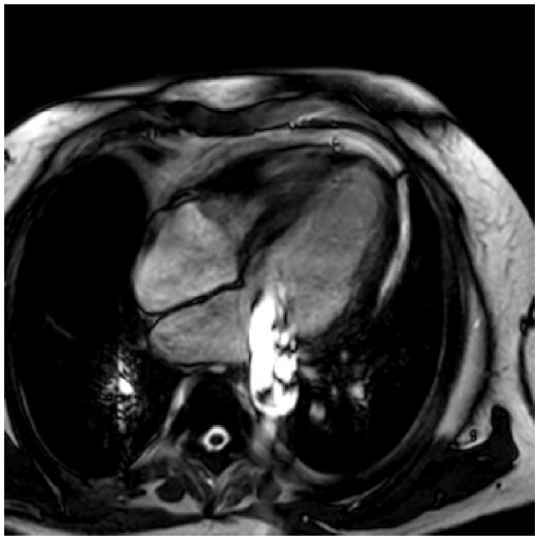

Figure 1

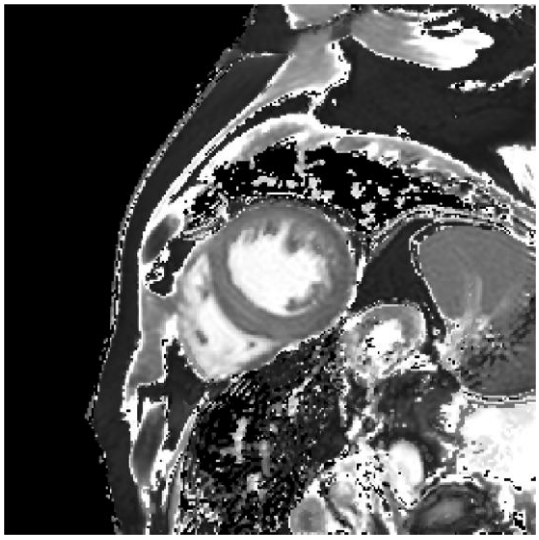

Figure 2

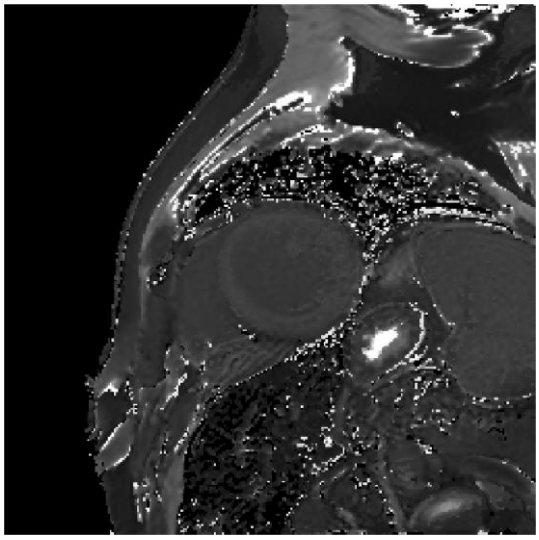

Figure 3

Abstract citation ID: suag058.335

HYPOALBUMINEMIA AND MORTALITY IN ACUTE HEART FAILURE: MEDIATING ROLE OF SYSTEMIC INFLAMMATION AND CONGESTION

I. Barnaba, D. De Feo, M. Iacoviello, G. Citarelli, G. Ricci, C. Campanella, V. Bonfantino, P. Caldarola, M. Ciccone, F. Massari, and P. Scicchitano
Cardiologia, Università Degli Studi Di Bari "Aldo Moro"; Cardiologia, Ospedale "San Paolo"; Cardiologia, Università Degli Studi Di Foggia; Cardiologia, Ospedale "Di Venere"; Cardiologia, Ospedale "F. Perinei"

AIMS: Hypoalbuminemia (HA) is increasingly recognized as a strong predictor of all–cause mortality in patients with acute heart failure (AHF). Because serum albumin correlates with other prognostic factors (e.g., congestion and inflammation), we investigated whether these pathways mediate the association between HA and outcomes.
Methods: In this retrospective cohort study of patients admitted for AHF, HA was defined as serum albumin ≤3.5 g/dL. We assessed length of hospital stay and 180–day post–discharge mortality. An inflammation score (0–2) was computed from high–sensitivity C–reactive protein and neutrophil–to–lymphocyte ratio (1 point for each biomarker above the median value). A congestion score (0–2) was computed from B–type natriuretic peptide and peripheral hydration assessed by bioimpedance (1 point for each biomarker above the median value).
Results: Among 400 patients (79±10 years; 51% male), HA was present in 210 (52%) and was associated with more severe presentation and longer hospital stay. In 32% of patients, HA co–occurred with an elevated inflammation score.

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In–hospital mortality and 180–day mortality was higher in patients with HA than in those without HA (12% vs 3.6% and 47% vs 27%, respectively). At 180 days, HA was associated with mortality (hazard ratio [HR] 2.2, 95% CI 1.5–3.1; P<0.0001). In multivariable Cox models, HA remained an independent predictor of mortality (HR 1.6, 95% CI 1.1–2.3; P=0.01) along with inflammation and congestion. Mediation analysis showed that inflammation mediated 15% and congestion 16% of the HA–mortality association (31% combined).
Conclusions: Hypoalbuminemia is common in AHF and is associated with longer hospitalization and higher in–hospital and 180–day mortality. Its prognostic impact is independent of, but partly explained by, systemic inflammation and congestion. These findings may help define a hypoalbuminemic phenotype that could benefit from nutritional support and/or albumin supplementation.

Abstract citation ID: suag058.336

CONGESTION, INFLAMMATION AND RENAL IMPAIRMENT MEDIATE THE ASSOCIATION BETWEEN CARDIAC TROPONIN AND MORTALITY IN ACUTE HEART FAILURE

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Cardiologia, Università Degli Studi Di Bari "Aldo Moro"; Cardiologia, Università Degli Studi Di Foggia; Cardiologia, Ospedale "San Paolo"; Cardiologia, Ospedale "F. Perinei"; Cardiologia, Ospedale "Di Venere"

AIMS: Elevation of cardiac troponin (cTn) is a strong predictor of mortality in acute heart failure (AHF), but the mechanisms underlying cTn release are not fully understood. Beyond acute myocardial ischaemia, ventricular stretch, systemic inflammation and renal dysfunction may contribute. We evaluated the prognostic association between high–sensitivity cardiac troponin I (hs–cTnI) and 180–day mortality in AHF, considering congestion, inflammation and renal function as potential mediators.
Methods: We enrolled patients hospitalized for AHF without acute coronary syndrome. At admission, congestion, inflammation and renal function were assessed using brain natriuretic peptide (BNP, pg/mL), high–sensitivity C–reactive protein (hs–CRP, mg/L) and estimated glomerular filtration rate (GFR, mL/min), respectively. After confirming associations of these variables with hs–cTnI and mortality, we performed parallel mediation analysis to quantify mediation effects.
Results: Among 431 patients (79±10 years; 51% men), 180–day mortality was 36%. Admission hs–cTnI levels did not differ between patients with and without chronic coronary artery disease and correlated with BNP (r=0.38), hs–CRP (r=0.21) and GFR (r=−0.23). In multiple regression, hs–CRP, BNP and GFR explained 18% of hs–cTnI variability. In univariable Cox models, hs–cTnI, hs–CRP, BNP and GFR predicted all–cause death. The hs–cTnI–mortality association was partially mediated by inflammation, congestion and renal function, accounting for 23%, 16% and 23% of the total effect, respectively; together these mediators explained 62% of the association. In multivariable Cox models, ln(hs–CRP) (HR 1.21, 95% CI 1.08–1.37), ln(BNP) (HR 1.37, 95% CI 1.09–1.74) and GFR (HR 0.99, 95% CI 0.98–1.00) remained independently associated with mortality, whereas ln(hs–cTnI) did not (HR 1.07, 95% CI 0.97–1.17).
Conclusions: In AHF, circulating troponin is associated with mortality, but this relationship is largely explained by systemic inflammation, congestion and renal impairment. Troponin appears to reflect disease severity rather than provide independent prognostic information.

Acute Heart Failure - Short Term Mechanical Circulatory Support

Abstract citation ID: suag058.337

PROGNOSTIC VALUE OF VENOUS–TO–ARTERIAL CARBON DIOXIDE DIFFERENCE IN ISCHEMIC CARDIOGENIC SHOCK: A SINGLE–CENTER RETROSPECTIVE STUDY

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Background: Cardiogenic shock (CS) is a complex clinical condition associated with high mortality, characterized by severe impairment of cardiac output and systemic hypoperfusion. The venous–to–arterial carbon dioxide partial pressure difference (ΔPCO_2) has been proposed as an alternative marker of tissue hypoperfusion and microcirculatory dysfunction; however, its prognostic value in ischemic cardiogenic shock remains unclear.
Aims: To evaluate the prognostic role of ΔPCO_2 during the first 24 hours of hospitalization in patients with ischemic cardiogenic shock.
Methods: This single–center, retrospective, observational study included 76 patients admitted to the cardiac intensive care unit for ischemic cardiogenic shock. ΔPCO_2 was recorded at admission and at 3, 6, 12, and 24 hours when available. Patients were retrospectively classified into survivors (n=46) and non–survivors (n=30) according to in–hospital mortality. Clinical, hemodynamic, laboratory, and blood gas data were collected. ΔPCO_2 values were compared between the two groups.
Results: In–hospital mortality was significantly associated with older age, diabetes mellitus, impaired renal function, higher central venous pressure, reduced left ventricular ejection fraction, and more advanced SCAI shock stage. Lactate levels at 12 and 24 hours were significantly higher in non–survivors. Conversely, although ΔPCO_2 values were pathologically elevated at admission in most patients, no significant differences were observed between survivors and non–survivors at any time point, nor was ΔPCO_2 independently associated with in–hospital mortality.
Conclusions: In patients with ischemic cardiogenic shock, ΔPCO_2 did not demonstrate an independent prognostic value for in–hospital mortality, despite confirming its role as a marker of hypoperfusion. Lactate kinetics, SCAI classification, and organ function parameters remain the most reliable prognostic indicators. Further prospective studies on larger cohorts are warranted to better define the clinical role of ΔPCO_2 in this setting. Keywords: cardiogenic shock; myocardial infarction; mortality; prognosis; venous–to–arterial pCO_2 difference.

Abstract citation ID: suag058.338

HEPARIN VERSUS BIVALIRUDIN ANTICOAGULATION IN ADULT PATIENTS WITH CARDIOGENIC SHOCK SUPPORTED BY VA–ECMO: A RETROSPECTIVE CLINICAL STUDY

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Background and aims: Cardiogenic shock is a severe, life–threatening condition often requiring VA–ECMO support. This study aimed to compare the safety and effectiveness of bivalirudin versus heparin anticoagulation in adults with cardiogenic shock on VA–ECMO.
Methods: 29 consecutive patients were enrolled in this retrospective monocentre study between April 2021 and July 2025. All patients were treated with veno–arterial extracorporeal membrane oxygenation (VA–ECMO) for cardiogenic shock and were admitted to our institution in Siena. Clinical features, short–term outcomes and laboratory data were collected.
Results: Three sub–groups regarding anticoagulation strategies were identified: conventional heparin (H group, n=14), bivalirudin (B group, n=6), and an initial heparin regimen followed by a switch to bivalirudin (HB group, n=9). Baseline characteristics—including age (mean 57±10 years), aetiology (predominantly acute myocardial infarction, 55%), left ventricular ejection fraction (mean 14%), and SCAI stage (mostly D or E)—were comparable across groups. The HB group demonstrated the longest mean duration of ECLS support (13±8 days, p = 0.04). Use of central venting, adjunct mechanical unloading (IABP/Impella), and renal replacement therapy did not differ significantly between groups. Overall bleeding complications occurred in 31% of patients, thrombotic events were uncommon, and stroke occurred in 17% of the cohort, with similar distribution among groups. Transfusion requirements for blood products also showed no significant differences. Overall mortality was 48.2% and did not significantly differ across groups. However, mortality during ECMO support was significantly higher in the heparin group (57.1%, p = 0.01), whereas both bivalirudin–containing groups exhibited better early survival with no deaths recorded in the first 10 days. Survival analysis confirmed a significantly worse early trajectory for the heparin group (p = 0.02, Figure 1). Heparin treatment was significantly associated with higher in–hospital mortality on ECMO in univariable analysis (OR 8.66, p=0,02) and in multivariable analysis (OR 21.01, p=0,01), together with AMI aetiology (OR 13.32, p=0,05) (Table 1).
Conclusions: patients with cardiogenic shock on VA–ECMO treated with heparin experienced higher early mortality compared with those treated with bivalirudin or hybrid regimens. Heparin use and AMI aetiology were identified as independent predictors of death during ECMO support.

Variable	Univariate		Multivariate	
	OR (95% CI)	p value	OR (95% CI)	p value
Age	NS	NS	NS	NS
Male	NS	NS	NS	NS
AMI aetiology	5.50 (0.91-33.18)	0.06	13.32 (0.99-177.85)	0,05
Heparin treatment	8.66 (1.39-53.85)	0.02	21.01 (1.64-268.56)	0.01
CVVHDF	5.33 (0.92-30.64)	0.06	NS	NS

Table 1

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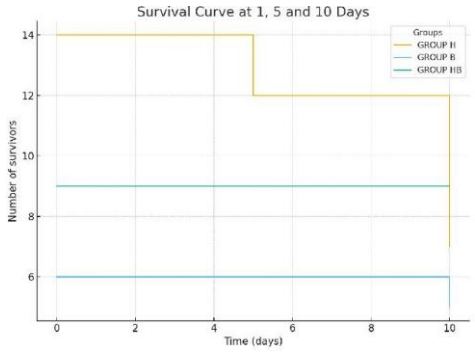

Figure 1

Abstract citation ID: suag058.339

E–CPR IN REFRACTORY CARDIAC ARREST POST CARDIAC TAMPONADE AND SEVERE BIVENTRICULAR DISFUNCTION IN A YOUNG WOMAN

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A 19–year–old woman was admitted to the Emergency Department for generalized tonic–clonic seizures after one week of fever. On admission she was comatose (GCS 3), hemodynamically stable, nonspecific abnormalities on ECG (Figure 1), and severe hypoglycaemia (5 mg/dL) (Figure 2). Neurological status improved after intravenous glucose. Brain CT was unremarkable. Laboratory tests showed lymphocytic leukocytosis, elevated C–reactive protein, thrombocytopenia, mild troponin elevation, acute kidney injury, prolonged INR, mildly increased transaminases, and elevated LDH, CK and myoglobin. Two hours later, the patient developed sudden cardiac arrest due to pulseless electrical activity. Advanced life support and endotracheal intubation were initiated. Transthoracic echocardiography revealed a massive pericardial effusion causing cardiac tamponade. Emergency pericardiocentesis drained exudative fluid; however, refractory cardiac arrest persisted, with only a brief return of spontaneous circulation followed by prolonged electromechanical dissociation. After prolonged resuscitation, veno–arterial extracorporeal membrane oxygenation (VA–ECMO) was initiated. Early echocardiography showed severe biventricular dysfunction with minimal aortic valve opening, prompting IABP implantation for left ventricular venting. Given the suspicion of acute myopericarditis, high–dose corticosteroids were administered; endomyocardial biopsy was not feasible. Cardiac function rapidly improved, with normalization of biventricular systolic function within 48–72 hours, allowing ECMO weaning. Weaning was complicated by Harlequin syndrome, requiring urgent ECMO removal while maintaining IABP support, later discontinued. Extensive microbiological testing was negative. The ICU course was complicated by left lower limb compartment syndrome requiring fasciotomy, mild intracranial hemorrhagic suffusion during unfractionated heparin therapy, and pneumonia with pleural effusion. The patient recovered and was extubated without neurological sequelae. Cardiac magnetic resonance imaging performed after 15 days showed pericardial edema, circumferential effusion and diffuse late gadolinium enhancement of the pericardial layers, without myocardial involvement, consistent with acute pericarditis. The final diagnosis was acute myopericarditis complicated by cardiac tamponade, multiorgan dysfunction and severe transient post–arrest biventricular stunning, with a possible contribution of systemic inflammatory response syndrome.

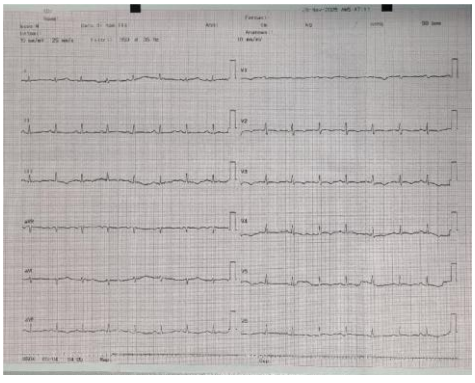

Figure 1

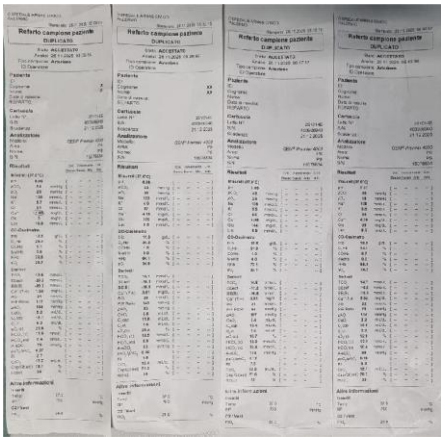

Figure 2

Abstract citation ID: suag058.340

IMPELLA–PROTECTED, IVUS–GUIDED ORBITAL ATHERECTOMY IN HIGH–RISK PCI FOR HEAVILY CALCIFIED UNPROTECTED LEFT MAIN–LAD BIFURCATION DISEASE

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Background: Calcified coronary lesions (CCL) represent a major challenge during percutaneous coronary intervention (PCI), particularly when involving the left main coronary artery (LMCA). Severe coronary calcification is associated with suboptimal stent expansion, malapposition, increased rates of restenosis, and a higher incidence of procedural complications. In this setting, the use of intravascular imaging and dedicated plaque–modifying strategies is often required to adequately prepare the lesion and optimize stent deployment. In patients with depressed left ventricular ejection fraction (LVEF) and complex coronary anatomy, high–risk PCI (HR–PCI), supported by percutaneous mechanical circulatory support (pMCS), may represent a viable alternative to coronary artery bypass grafting (CABG), particularly when surgical risk is deemed prohibitive.
Case Summary: We report the case of a 69–year–old man with multiple cardiovascular risk factors and chronic coronary syndrome, who was also an implantable cardioverter–defibrillator (ICD) carrier due to a prior history of ventricular arrhythmias. The patient presented with severe, heavily calcified, unprotected left main coronary artery (LMCA)–left anterior descending artery (LAD) bifurcation disease (Medina 1.1.0), in the setting of multivessel coronary artery disease and moderately reduced left ventricular ejection fraction (LVEF 40%). After Heart Team evaluation, CABG was ruled out because of excessively high surgical risk, and the patient was therefore referred for PCI. He underwent Impella–protected, intravascular ultrasound (IVUS)–guided PCI with orbital atherectomy and drug–eluting stent (DES) implantation from the LMCA into the LAD, followed by DES implantation in the mid–LAD. Post–procedural IVUS confirmed optimal stent expansion and apposition. No major periprocedural complications occurred. A planned angiographic follow–up performed two months later confirmed sustained patency of the LMCA–LAD and mid–LAD stents.
Conclusions: Orbital atherectomy allowed effective calcium modification, while IVUS guidance ensured adequate lesion assessment and stent optimization. Prophylactic Impella support mitigated hemodynamic risk in a patient with impaired ventricular function undergoing PCI of heavily calcified unprotected LMCA bifurcation disease. This case highlights the importance of careful patient selection, meticulous procedural planning and multimodality approach when considering high–risk PCI.

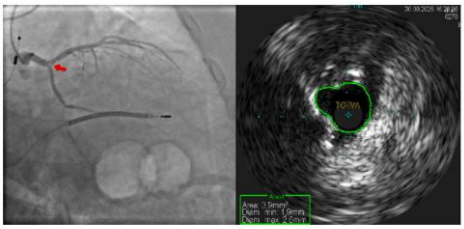

Figure 1. Severely calcified left main coronary artery lesion. Left: angiographic view showing a calcified nodule in LMCA. Right: IVUS image showing a minimal lumen area of 3.9 mm^2, suggestive of a hemodynamically significant stenosis.

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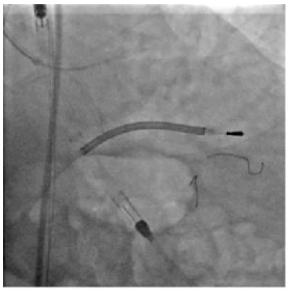

Figure 2. Fluoroscopic image showing the orbital atherectomy diamond-coated crown and the Impella device, with the pigtail tip and left ventricular inlet area positioned within the left ventricle.

Figure 3. Final angiographic result after PCI, showing optimal stent expansion with no residual stenosis and TIMI 3 flow.

Abstract citation ID: suag058.341

AN EXTRACORPOREAL HELP: ROLE OF VA–ECMO IN STUNNED HEART AFTER ACUTE CORONARY SYNDROME

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Arnas Civico, Palermo; Asst Brianza

A 39–year–old man was admitted to emergency room for chest pain that had been ongoing for ten days. Blood pressure was 125/70 mmHg. Physical examination showed no signs of congestion or peripheral hypoperfusion Blood lactates level was 6,1 mmol/l.

Electrocardiogram (image 1) revealed an inferior STEMI, right bundle block and ventricular premature beats. On echocardiography diffuse left ventricular hypokinesia with inferomedial basal akinesia and a left ventricular ejection fraction of 35%. The right ventricle showed preserved systolic function.

On coronary angiography proximal occlusion of the left anterior descending artery (LAD) with angiographic features suggestive of recent thrombosis, critical proximal stenosis of the circumflex artery (CX), and occlusion of a dominant right coronary artery (RCA), also consistent with recent occlusion. A drug eluted stent was implanted on RCA. Due to the persistence of chest pain, angioplasty of the LAD was subsequently performed.

During the LAD angioplasty, acute thrombosis of the circumflex artery was occoured, followed by cardiac arrest. Cardiopulmonary resuscitation maneuvers were initiated and once circulation was restored, hemodynamic support was provided with an intra–aortic balloon pump (IABP) and adrenaline infusion. Angioplasty both the LAD and LCx was completed, achieving good final TIMI flow. A new cardiac arrest due to a shockable rhythm occurred. There was no no–flow time, while total low–flow time was 50 minutes. Blood lactate levels was › 17 mmol/L. Veno–arterial extracorporeal membrane oxygenation (VA–ECMO) was initiated, and the patient was transferred to the intensive care unit (ICU) with hemodynamic support provided by adrenaline, VA–ECMO and IABP.

After two weeks in ICU the patient was weaned from mechanical and pharmacological supports. The patient was subsequently transferred to a cardiovascular rehabilitation unit without neurological sequelae. Left ventricular ejection fraction at discharge was 50%, with only residual inferomedial basal akinesia. There is a growing interest and use of circulatory support systems in the intensive care community. European Resuscitation Council Guidelines suggest that VA–ECMO may be considered as a rescue therapy for selected adults with IHCA and OHCA when conventional CPR is failing to restore spontaneous circulation in settings where this can be implemented.

Image 1. Electrocardiogram: Inferior STEMI with right bundle block

Imagine 1

Abstract citation ID: suag058.342

ALTERNATIVE STRATEGIES FOR LEFT VENTRICULAR UNLOADING WITH A TRANSSEPTAL APPROACH

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Cardiogenic shock (CS) is a life–threatening syndrome characterized by inadequate cardiac output, hypoperfusion and progressive organ dysfunction, with persistently high mortality despite advances in revascularization and critical care. In selected cases, mechanical circulatory support (MCS), including veno–arterial extracorporeal membrane oxygenation (VA–ECMO), is required. However, retrograde aortic flow during VA–ECMO increases left ventricular (LV) afterload, potentially worsening LV distension, pulmonary congestion, and myocardial oxygen demand. Although unloading strategies such as intra–aortic balloon pump (IABP) support or transaortic devices may mitigate these effects, they are often contraindicated in patients with complex anatomy or mechanical complications. Left atrial veno–arterial extracorporeal membrane oxygenation (LAVA–ECMO) enables targeted left atrial decompression via transseptal access, reducing pulmonary venous and LV filling pressures. Biatrial drainage is feasible but less commonly utilized. A 32–year–old man previously treated for a late–presenting ST–segment elevation myocardial infarction, complicated by persistent severe LV dysfunction (ejection fraction 25%), was rehospitalized for worsening heart failure despite optimized medical therapy and IABP support. Multimodality imaging revealed a mid–apical LV aneurysm, an intramural hematoma, and an organized pericardial effusion consistent with suspected focal LV rupture. Surgical repair was contraindicated, and implantation of an Impella device or durable LV assist device was deemed unacceptably high risk. In the setting of progressive clinical deterioration, LAVA–ECMO was initiated as a bridge to heart transplantation. Following echocardiography–guided transseptal puncture and balloon septostomy, a biatrial drainage cannula was positioned (Figure 1-2), and ECMO flow was increased to 4 L/min. This unloading strategy resulted in stabilization of hemodynamic and respiratory parameters (Figure 3) and a marked reduction in intracavitary spontaneous echo contrast ("smoke"). Although moderate LV distension persisted, the greatest hemodynamic benefit was observed during the first 36 hours of support. Despite evidence of rapid hemodynamic improvement and the ability to provide effective biventricular support through single–access biatrial drainage, patient selection for LAVA–ECMO remains challenging. Heterogeneity in indications, timing, ventricular geometry, and pathology limits standardized selection criteria.

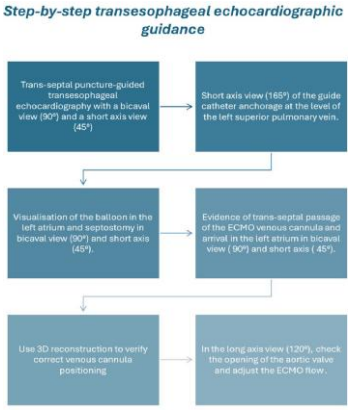

Figure 1

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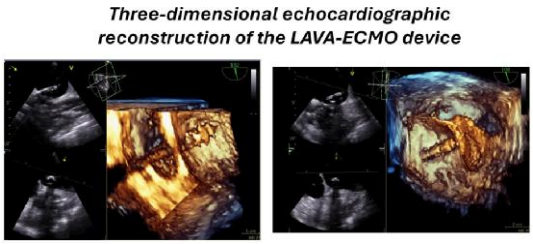

Figure 2

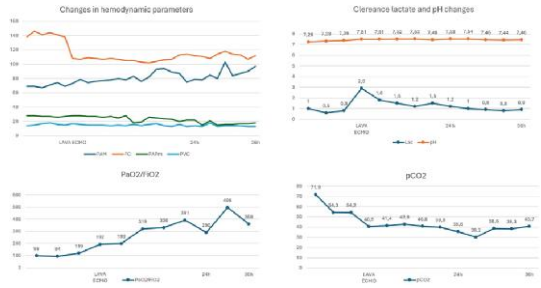

Figure 3

Heart Failure With Reduced Ejection Fraction

Abstract citation ID: suag058.343

SHORT–TERM VARIABILITY OF THE MECKI SCORE IN PATIENTS WITH HEART FAILURE

M. Mapelli, E. Salvioni, A. Piotti, A. Galotta, I. Mattavelli, M. Emdin, V. Castiglione, M. Cipriani, F. Tortomasi, V. Agnese, C. Vignati, J. Campodonico, B. Pezzuto, M. Contini, S. Paolillo, P. Perrone Filardi, and P. Agostoni
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Background: Cardiopulmonary exercise testing (CPET) provides several prognostic parameters in patients with heart failure (HF), including peak VO_2, VE/VCO_2 slope, and anaerobic threshold (AT). However, the reproducibility of these variables may be affected by effort–dependence, operator variability, and methodological issues. Since the MECKI score integrates CPET with laboratory and echocardiographic parameters, understanding its short–term variability is crucial to distinguish random fluctuations from clinically meaningful changes.
Aim: This study aimed to assess the short–term variability of the MECKI score and its individual components in patients with heart failure with reduced ejection fraction (HFrEF), to define thresholds that separate biological variability from true clinical change.
Methods: We prospectively enrolled 404 HFrEF patients (LVEF ‹40%) across four Italian HF centers. All patients underwent two CPETs approximately one week apart, with laboratory and echocardiographic data collected at both time points. The MECKI score and its components (peak VO_2, VE/VCO_2 slope, hemoglobin, serum sodium, LVEF, and eGFR) were calculated for each test. Patients with conditions introducing excessive variability (e.g., dialysis) were excluded. Variability was assessed by comparing repeated measures and calculating intra–patient differences.
Results: The study population had a mean age of 65±12 years, 83.4% were male, and HF etiology was ischemic in 46% and non–ischemic in 47%. Medical therapy was in line with contemporary guidelines (ACEi/ARB/ARNI 96%, beta–blockers 95%, SGLT2i 83%, MRA 82%). At baseline, AT was not identifiable in 45 patients, and in 53 patients at the second test; 331 patients had AT consistently identified in both tests and were included in the main analysis. Periodic breathing was observed in 48 cases at the first and 45 at the second test. Across the study population, short–term variability of MECKI score values was low (Figure 1): mean difference (bias) was –0.004, with limits of agreement ranging from –0.042 to 0.034, indicating good agreement within the expected variability of the variable
Conclusion: The MECKI score shows high short–term reproducibility in ambulatory HFrEF patients. These findings reinforce the reliability of the MECKI score in clinical practice and research, supporting its use as a stable prognostic tool for heart failure patients.

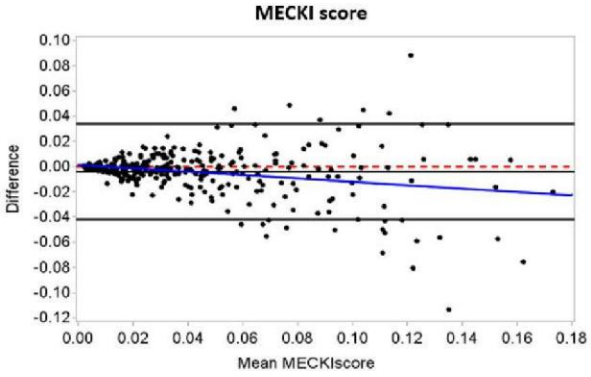

Figure 1

Abstract citation ID: suag058.344

STRUCTURAL REVERSE REMODELING WITH VERICIGUAT IN HFREF: IS THE BENEFIT DEPENDENT ON THE DEGREE OF BASELINE GUIDELINE–DIRECTED MEDICAL THERAPY OPTIMIZATION?

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"Card. G. Panico" Hospital; Villa Verde Hospital; Cardiomed Medical Center; Universita' Dell'aquila

Background: Vericiguat, a soluble guanylate cyclase (sGC) stimulator, has demonstrated a significant reduction in cardiovascular events in heart failure with reduced ejection fraction (HFrEF). While recent real–world evidence suggests its potential to promote structural reverse remodeling, it remains debated whether its impact on structural remodeling is a synergistic effect with optimized medical therapy (based on the "four pillars" or GDMT), or if the drug promotes myocardial recovery through an independent pathway. We investigated whether the improvement in Left Ventricular Ejection Fraction (LVEF) after vericiguat initiation is influenced by the degree of baseline GDMT optimization.
Methods: We performed a longitudinal analysis of 72 HFrEF patients (LVEF ‹ 40%) treated with vericiguat. At baseline, patients were stratified into two groups according to their therapeutic status: Full–GDMT (presence of all four pillars: ARNI/ACEi, Beta–blockers, MRA, and SGLT2i) and Sub–optimal GDMT (absence of at least one of the four pillars). The primary objective was to compare the 6–month change in LVEF (ΔLVEF) between these two groups to determine if the effect of vericiguat was linked to the pre–existing therapeutic regimen.
Results: At 6 months, mean LVEF significantly increased across the entire cohort (from 31.9 ± 2.1% to 34.2 ± 3.1%; p ‹ 0.01). Crucially, no significant difference was found in the magnitude of LVEF recovery between the two groups: the mean increase in LVEF was 3.1 ± 0.8% in the Full–GDMT group and 2.9 ± 0.8% in the Sub–optimal GDMT group. A two–way ANOVA confirmed that the structural benefit of vericiguat was consistent across both groups, showing no significant interaction between treatment effect and baseline therapy status (P for interaction = 0.20, η2 = 0.02).
Conclusions: Our findings demonstrate that vericiguat–induced reverse remodeling does not depend on the degree of optimization of the "four pillars" at the time of treatment initiation. This suggests that sGC stimulation triggers a distinct and autonomous pathway for myocardial recovery, providing consistent structural benefits even in patients who have not yet achieved full target GDMT.

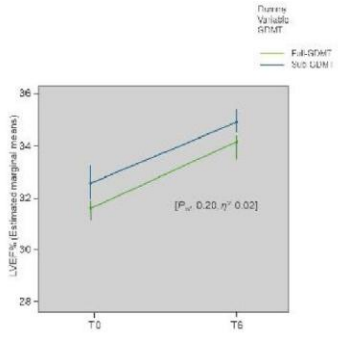

Fig 1. Change in Left Ventricular Ejection Fraction (LVEF) according to baseline GDMT status. (T0: baseline T6: 6-months Follow-up)

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Abstract citation ID: suag058.345

TRENDS IN MEDICAL THERAPY OPTIMIZATION IN HFREF: DATA FROM THE PONTE SC–SCA REGISTRY

G. Palmieri, G. Citarelli, M. Iacoviello, G. Biancofiore, P. Scicchitano, L. De Gennaro, F. Massari, M. Bonfantino, N. Brunetti, C. Campanella, P. Colonna, G. Dalena, A. Passantino, E. Pisanò, F. Nardi, F. Colivicchi, F. Oliva, D. Gabrielli, M. Grimaldi, and P. Caldarola
Policlinico Riuniti; Ospedale San Paolo; Ospedale Perinei; Ospedale Di Venere; Policlinico Di Bari; Ospedale Santa Maria Degli Angeli; Istituti Clinici Scientifici Maugeri Irccs, Cardiac Rehabilitation Unit of Bari Institute; Ospedale Perrino; Ospedale Santo Spirito; Presidio Ospedaliero San Filippo Neri – Asl Roma 1; Asst Grande Ospedale Metropolitano Niguarda; Azienda Ospedaliera San Camillo Forlanini; Ospedale Miulli

Background & Study Aim: In recent years, substantial progress has been achieved in the treatment of heart failure (HF), particularly in patients with reduced ejection fraction (HFrEF). Among the objectives of the PONTE SC/SCA registry is the evaluation of adherence to guideline–recommended therapies through both prospective and retrospective analyses. The aim of this study was to assess trends in therapy optimization over recent years, with particular focus on the use of angiotensin–converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), angiotensin receptor–neprilysin inhibitors (ARNI), beta–blockers, mineralocorticoid receptor antagonists (MRA), and sodium–glucose co–transporter 2 inhibitors (SGLT2i).
Methods and Results: Between January 2024 and September 2025, 1,203 patients were enrolled, including 496 with heart failure with reduced ejection fraction (HFrEF). In this population, a retrospective analysis of clinical assessments was conducted for 83 patients in 2021, 244 in 2022, and 297 in 2023, alongside a prospective analysis including 972 patients in 2024 and 643 in 2025 (Figure 1). As shown in the figure, a significant increase in the prescription rates of SGLT2i and quadruple therapy was observed, while prescription rates of the other pharmacological classes remained largely stable.
Conclusions: The PONTE SC/SCA registry demonstrates a favorable trend toward optimization of medical therapy in patients with HFrEF. These findings highlight the quality of care provided by participating centers and confirm the value of the registry as a tool for analyzing and improving diagnostic and therapeutic pathways in heart failure.

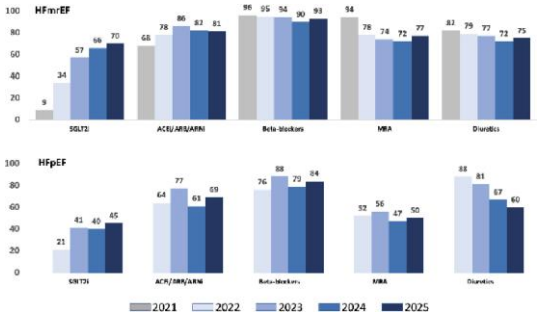

Figure 1

Abstract citation ID: suag058.346

NT–PROBNP AS A MIRROR OF HEMODYNAMIC RESERVE: INSIGHTS FROM CPET WITH NON–INVASIVE CARDIAC OUTPUT MONITORING IN PATIENTS WITH HF AND REDUCED LVEF

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Centro Cardiologico Monzino, Irccs, Milano

Background: N–terminal pro–B–type natriuretic peptide (NT–proBNP) is a well–established biomarker in heart failure (HF), reflecting ventricular filling pressures and neurohormonal activation. Although it is widely used for risk stratification, its relationship with dynamic parameters derived from cardiopulmonary exercise testing (CPET) and with contractile reserve has not been fully clarified.
Methods: 174 patients (66.4±11.3 y/o; LVEF 40.5±9.3%) with HFrEF and HFimpEF undergoing CPET with non–invasive cardiac output monitoring (Physioflow), baseline echocardiography, and laboratory testing. In addition to standard ventilatory parameters, left ventricular ejection fraction (LVEF), heart rate response (ΔHR), and stroke volume increment (ΔSV) were assessed. Correlations between NT–proBNP and functional variables were assessed using Pearson's coefficient.
Results: Higher NT–proBNP levels were significantly associated with impaired hemodynamic reserve. NT–proBNP correlated inversely with ΔSV (r = –0.21; p = 0.01) and with ΔHR (r = –0.40; p ‹ 0.001), indicating reduced contractile and chronotropic reserve. Impaired hemodynamic reserve translated into a significantly reduced overall performance: peak oxygen uptake (pVO_2) was inversely related to NT–proBNP (r = –0.37, p ‹ 0.001) (Figure 1). In addition, higher NT–proBNP levels were associated with greater ventilatory inefficiency, expressed by VE/VCO_2 slope (r = +0.39; p ‹ 0.001). By contrast, LVEF at rest showed only a weak and non–significant correlation with NT–proBNP (r ≈ –0.15). Figure 2 shows correlation beetween NT-proBNP and SV.
Conclusion: NT–proBNP is strongly associated with impaired chronotropic and contractile reserve, reduced aerobic capacity, and ventilatory inefficiency. Interestingly, our data suggest the rest LVEF is not related to NTproBNP suggesting a reduced prognostic power compared to functional variables. These findings suggest that the combined use of CPET and NT–proBNP enables more accurate risk stratification in patients with HF, providing a comprehensive approach that unites biochemical and physiological data.

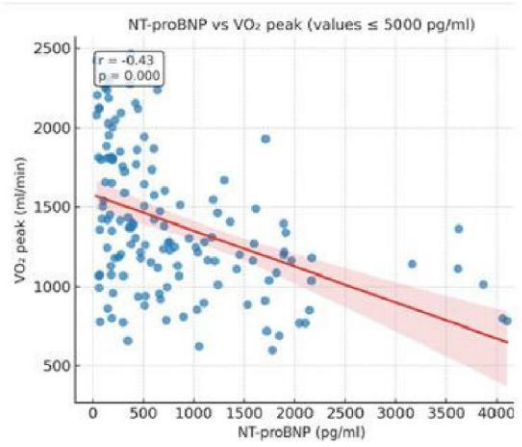

Figure 1

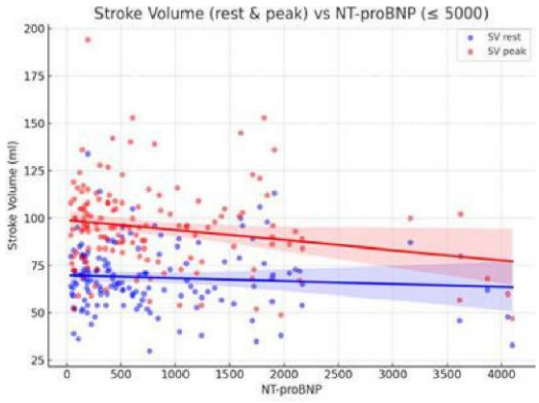

Figure 2

Abstract citation ID: suag058.347

IMPACT OF SGLT2 INHIBITORS ON LEFT VENTRICULAR FILLING PRESSURES ASSESSED BY THE COMBINATION OF LEFT ATRIAL STRAIN AND DOPPLER MEASURES IN PATIENTS WITH HEART FAILURE REDUCED EJECTION FRACTION

M. Di Peppo, G. Biancofiore, M. Romano, R. Pugliese, G. Alcidi, S. Ioannoni, M. Correale, N. Brunetti, and M. Iacoviello
Aou Policlinico Riuniti Di Foggia

Background: The type 2 sodium–glucose cotransporter inhibitors (SGLT2i) are milestone drugs in the treatment of heart failure with reduced ejection fraction (HFrEF). However, the mechanisms responsible for their beneficial effects are still to be clarified.
Aim of the study: To evaluate the effect of SGLT2i therapy on left ventricular filling pressure in a group of HFrEF outpatients by analysing changes in traditional and new echocardiographic parameters.
Methods: Before and 3, 6, 12, and 24 months after the introduction of SGLT2i, the following traditional and new echocardiographic indices reflecting left ventricular filling pressures were evaluated: – the ratio between early diastolic peak at pulsed Doppler (E) and the mean septal–lateral mitral early diastolic peak at TDI (E/e'); – the maximal deformation of the left atrium (left atrial reservoir, LAr) by two–dimensional speckle tracking analysis; – the ratio

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between E and LAr (E/LAr); – the ratio between LAr and E/e' (LAr/Ee'). In a subgroup of patients, an echocardiographic evaluation was performed 6–12 months before SGLT2i introduction. Changes in the repeated measures were evaluated by linear mixed models. A p<0.05 was considered significant.
Results: We enrolled 60 HFrEF outpatients (83% males, age 61 ± 13, mean LVEF 31 ± 7%, NYHA class II in 75% and III in 25%), all in conventional medical therapy (sacubitril/valsartan or ACE– inhibitors or angiotensin II receptor blockers in 100%, beta–blockers in 100%, mineralcorticoid receptor antagonists in 87%, loop diuretics in 62%). As shown in the Figure 1, E/e' did not significantly change during follow–up. In contrast, the E/LAr ratio significantly decreased from 3 months onward, while LAr/e' increased significantly over the same time period.
Conclusions: These findings indicate that SGLT2 inhibitors can reduce left ventricular filling pressure evaluated by new derived echocardiographic indices in HFrEF patients already receiving optimised medical therapy. These findings highlight the potential role of SGLT2i in improving diastolic function and atrial–ventricular coupling in HFrEF.

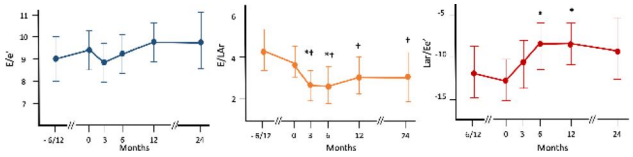

Figure 1

Abstract citation ID: suag058.348

OPTIMIZATION OF MEDICAL THERAPY IN PATIENTS WITH HFREF: DATA FROM THE PONTE SC–SCA REGISTRY

G. Citarelli, M. Iacoviello, G. Palmieri, M. Di Peppo, P. Scicchitano, L. De Gennaro, F. Massari, M. Bonfantino, N. Brunetti, C. Campanella, P. Colonna, G. Dalena, A. Passantino, E. Pisanò, F. Nardi, F. Colivicchi, F. Oliva, D. Gabrielli, M. Grimaldi, and P. Caldarola
Ospedale San Paolo; Policlinico Riuniti; Ospedale Perinei; Ospedale Di Venere; Policlinico Di Bari; Ospedale Santa Maria Degli Angeli; Istituti Clinici Scientifici Maugeri Irccs, Cardiac Rehabilitation Unit of Bari Institute; Ospedale Perrino; Ospedale Santo Spirito; Presidio Ospedaliero San Filippo Neri – Asl Roma 1; Asst Grande Ospedale Metropolitano Niguarda; Azienda Ospedaliera San Camillo Forlanini; Ospedale Miulli

Background & Study Aim: The PONTE SC/SCA registry was designed to evaluate the outcomes of a structured outpatient follow–up program integrating hospital and community care for patients with heart failure (HF) or those recently hospitalized for acute coronary syndrome (ACS). The aim of the present study was to analyze one of the main process indicators of the registry in HF patients, namely prescribed pharmacological therapy, with particular focus on the use of angiotensin–converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), angiotensin receptor–neprilysin inhibitors (ARNI), beta–blockers, mineralocorticoid receptor antagonists (MRA), and sodium–glucose co–transporter 2 inhibitors (SGLT2i) in patients with heart failure with reduced ejection fraction (HFrEF).
Methods and Results: Between January 2024 and September 2025, 1,203 patients were enrolled, including 496 with HFrEF. As shown in the figure, following enrollment, ACEi/ARB/ARNI were prescribed in 89% of cases (ARNI in 64%), beta–blockers in 97%, MRA in 85%, and SGLT2i in 85% of patients. Quadruple therapy with and without ARNI was prescribed in 69% and 51% of cases, respectively (Figure 1).
Conclusions: The PONTE SC/SCA registry demonstrates effective optimization of medical therapy in patients with HFrEF. Achievement of this key process indicator reflects the high quality of care provided by the regional network of heart failure outpatient clinics in the Apulia region and confirms the value of the registry as a tool for analyzing and optimizing diagnostic and therapeutic pathways in heart failure patients.

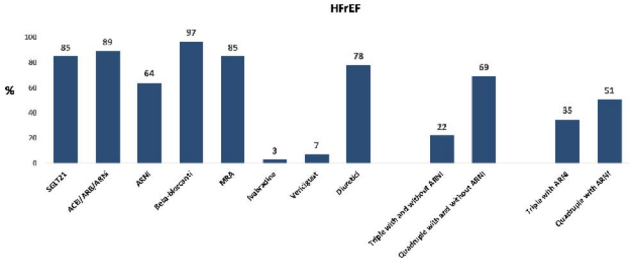

Figure 1

Chronic Heart Failure

Abstract citation ID: suag058.349

WHEN TELEMETRY MISLEADS: THE VALUE OF CLINICAL EVALUATION IN DEVICE DECISION–MAKING AND HEART FAILURE MANAGEMENT

M. Mazza, M. Palazzini, R. Mené, and G. Seresini
Grande Ospedale Metropolitano Niguarda; Ospedale Di Sondrio

A 72–year–old woman was admitted for evaluation of hypokinetic dilated cardiomyopathy, along with heart failure with reduced ejection fraction (HFrEF). It was incidentally discovered during pre–operative cardiology assessment for carotid endarterectomy, due to critical left internal carotid stenosis. Her history included recurrent presyncopal episodes with prodromal symptoms and absence of palpitations, dyspnea or angina, typically triggered by vagal stimuli such as orthostatism or exertion. Additional comorbidities included anorexia (BMI 16 kg/m²), major depressive disorder, and rheumatoid arthritis. Chronic therapy consisted of acetylsalicylic acid, statins, antidepressants, and immunosuppressive agents. On admission, transthoracic echocardiography (TTE) showed a dilated left ventricle (LV) with an EF of 25% and grade II diastolic dysfunction, without valvulopathy. Other TTE signs were consistent with increased pulmonary resistance. ECG revealed sinus rhythm with newly diagnosed left bundle branch block (LBBB) and T–wave inversion in lateral and inferior leads. Coronary angiography excluded obstructive coronary artery disease. A diagnosis of HFrEF was established, and medical therapy (MT) was initiated and optimized. At discharge, LVEF remained unchanged, while pulmonary resistance normalized. During continuous ECG monitoring, asymptomatic episode interpreted as second–degree atrioventricular block (AVB) Mobitz type II were reported, with pause followed by wide QRS complexes (fig.1). According to 2021 ESC Guidelines, pacing was initially considered. Furthermore, given EF ‹35%, unclear syncopal history, and LBBB with QRS duration ›135 ms, cardiac resynchronization therapy with defibrillator (CRT–D) for primary prevention of sudden cardiac death (SCD) was discussed. However, severe underweight raised concerns regarding increased procedural risk, including device erosion, pocket infection, pneumothorax, and cardiac perforation. Detailed review of telemetry tracings demonstrated an abnormally flat pause baseline and QRS complex identical in polarity and morphology to descending T waves (fig.2), consistent with another ECG artifact displaying isolated T waves without true ventricular depolarization (fig.3). Thus, telemetry malfunction was identified, and the diagnosis of AVB was excluded. Consequently, the indication for pacing was withdrawn. MT will be continued for two months, after which reassessment for CRT–D wireless implantation will be performed

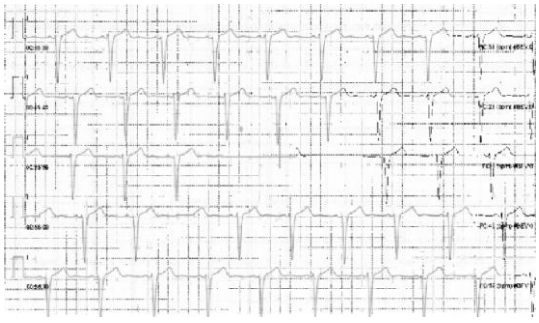

Figure 1

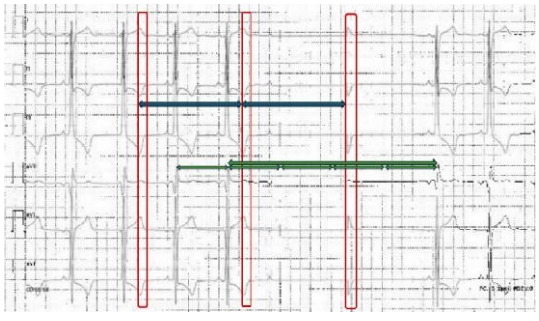

Figure 2

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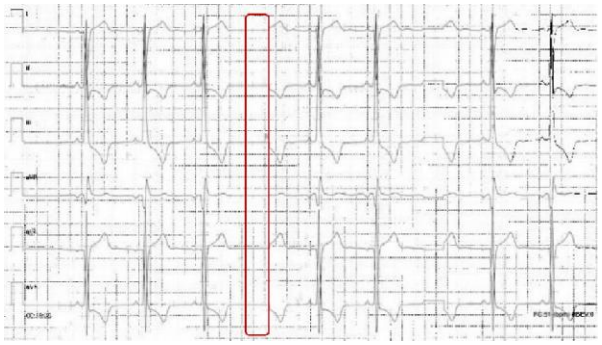

Figure 3

Abstract citation ID: suag058.350

ORGANIZATIONAL MODEL OF THE HEART FAILURE OUTPATIENT CLINIC AT AORN CARDARELLI: FROM ACUTE MANAGEMENT TO THERAPEUTIC OPTIMIZATION

V. Capone, F. Marsico, S. Rumolo, M. Abbate, V. Cannavale, R. Gottilla, F. Cacciapuoti, A. Madrid, S. Crispo, M. Tesorio, and C. Mauro
Aorn A. Cardarelli, Napoli

Background: Heart failure (HF) represents a significant clinical and economic burden, characterized by high rates of rehospitalization and mortality. Effective management requires a structured transition from acute care to specialized longitudinal follow–up. This abstract describes the organizational model of the Heart Failure Outpatient Clinic within the Cardiology and Intensive Coronary Care Unit (UTIC) at AORN Cardarelli (Naples, Italy).
Materials and Methods: Patients are enrolled directly following an Emergency Department (ED) visit with a specialist cardiological consultation, or post–discharge from the Cardiology/UTIC ward. A mandatory clinical protocol is required for the first visit: patients must present a recent Transthoracic Echocardiogram (TTE) and a comprehensive panel of blood tests, including NT–proBNP levels. The clinical workflow is designed to provide intensive monitoring, with follow–up appointments scheduled at 1–month, 3–month, and 6–month intervals, tailored to the clinical severity and hemodynamic stability of the individual patient.
Results: The implementation of this structured model allows for the systematic titration of Guideline–Directed Medical Therapy (GDMT). By utilizing standardized entry criteria (TTE and NT–proBNP), the clinic facilitates immediate risk stratification. A key outcome of this organizational structure is the identification of candidates for non–pharmacological interventions. Patients with persistent low ejection fraction (EF ‹ 35%) are channeled into dedicated pathways for the implantation of Implantable Cardioverter Defibrillators (ICD) or Cardiac Resynchronization Therapy (CRT–D/P). This proactive approach ensures that patients receive advanced device therapy at the optimal physiological window, potentially reducing the incidence of sudden cardiac death and worsening heart failure.
Conclusions: The organizational model of the Heart Failure Outpatient Clinic at AORN Cardarelli demonstrates that a streamlined transition from acute to outpatient care is essential for high–quality HF management. By integrating rigorous clinical monitoring with standardized diagnostic requirements, the clinic effectively bridges the gap between hospital discharge and long–term stability. This model not only optimizes pharmacological treatment but also serves as a critical screening hub for life–saving device implantation, ultimately aiming to improve patient survival and quality of life in a high–volume tertiary care setting.

Abstract citation ID: suag058.351

OPTIMIZING OUTPATIENT MANAGEMENT OF HEART FAILURE: REAL–WOLRD IMPLEMENTATION OG GUIDELINE–DIRECTED MEDICAL THERAPY, ANALYSIS FROM CARDARELLI HOSPITAL OF NAPLES

F. Marsico, S. Rumolo, V. Capone, A. Bellis, V. Cannavale, F. De Fazio, M. Esposito, A. Madrid, C. Materazzi, M. Tesorio, and C. Mauro
Aorn Cardarelli, Napoli

Background: Heart failure (HF) is a significant global health burden, characterized by high rates of hospitalization and mortality. Recent clinical guidelines emphasize the implementation of “The Four Pillars“ of Guideline–Directed Medical Therapy (GDMT) to improve clinical outcomes and quality of life. The primary objective of this study is to evaluate the clinical management and therapeutic adherence within a specialized outpatient Heart Failure Clinic, focusing on the integration of foundational therapies and novel pharmacological agents like Vericiguat (Verquvo).
Materials and Methods: This retrospective observational study analyzed a cohort of 400 patients diagnosed with heart failure and followed systematically by a dedicated outpatient HF service. Data collection focused on the prescription rates of the four foundational pillars: Sodium–Glucose Cotransporter–2 inhibitors (SGLT2i), Angiotensin Receptor–Neprilysin Inhibitors (ARNI), Beta–blockers (BB), and Mineralocorticoid Receptor Antagonists (MRA). Furthermore, the usage of the soluble guanylate cyclase (sGC) stimulator, Vericiguat, was assessed. The study also documented specific clinical contraindications that prevented the optimization of these therapies.
Results: The analysis revealed a high level of adherence to international guidelines. Approximately 70% of the total cohort received the complete “four pillars“ regimen. Specifically, SGLT2 inhibitors (Dapagliflozin or Empagliflozin) were prescribed to 90% of patients, while Beta–blockers and MRAs showed an even higher penetration, exceeding 90% of the population. ARNI therapy was successfully implemented in 60% of cases. Notably, approximately 65% of patients were also treated with Vericiguat, indicating a proactive approach toward high–risk patients.
Conclusions: The findings demonstrate that a structured outpatient approach enables high adherence to GDMT, with 70% of patients receiving comprehensive four–pillar therapy. The high utilization of SGLT2i and the integration of Vericiguat suggest an evolving treatment landscape aimed at reducing residual risk. However, clinical challenges such as hypotension and renal dysfunction remain significant hurdles. Dedicated HF clinics are essential for monitoring these parameters, allowing for the maximum possible optimization of life–saving therapies while managing side effects effectively.

Abstract citation ID: suag058.352

REMOTE MOTIVATIONAL INTERVIEWING IN HEART FAILURE: A QUALITATIVE STUDY OF PATIENTS’ EXPERIENCES

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Asst Di Lodi; Università Di Pavia; Ss Antonio E Biagio E Cesare Arrigo University Hospital– Research and Innovation Department.; Ausl Di Reggio Emilia; Università Di Roma Tor Vergata

Background: Heart failure (HF) is a complex chronic condition requiring effective self–care behaviours to prevent adverse outcomes. Remote motivational interviewing (MI) may represent a sustainable and acceptable intervention to support self–care in individuals with HF, but the literature does not report how this type of intervention is experienced and perceived by patients.
Aim: To explore the experiences and perceptions of patients with HF who received remote MI within the multicentre ReMOTIVATE–HF randomised controlled trial (RCT).
Methods: ReMOTIVATE–HF is an ongoing dyadic multicentric RCT comparing remote MI with standard care in enhancing self–care in individuals affected by HF. At the end of participation, patients from three Centres were involved in semi–structured interviews. Data were analysed through an inductive phenomenological approach and thematic analysis. Nineteen codes were organised into nine subthemes and four overarching themes.
Results: Twenty patients participated in the interview. Four themes emerged from the thematic analysis (Figure 1):

(1) Preferences and acceptability of remote MI, including attitudes toward caregiver participation, preferred delivery modality (videoconferencing vs in–person), and session format (group vs individual). Patients expressed varied but clear preferences, with overall acceptance of the remote approach.
(2) Motivations for enrolment and engagement, such as the need for reassurance, updated health information, contact with healthcare professionals, and the desire to contribute to research.
(3) Perceived impact of the intervention, including improved HF self–management, enhanced emotional coping, acquisition of new skills, and a strengthened sense of support and wellbeing.
(4) Relationship with healthcare providers, highlighting reassurance from nurses, feelings of being cared for, and generally positive evaluations of the intervention’s value.

Conclusions: Patients perceived MI as helpful, accessible, and supportive of self–care behaviours; they experienced caregiver involvement as meaningful, and nurses emerged as key figures in providing reassurance and continuity of care. Findings support the acceptability and potential clinical applicability of remote MI to enhance HF self–care.

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Figure 1. Summary of the themes, subthemes, and codes describing patients' experiences with remote motivational interviewing.

Abstract citation ID: suag058.353

ADHERENCE TO PHARMACOLOGICAL THERAPIES AND LIFESTYLE RECOMMENDATIONS AFTER HOSPITALIZATION FOR ACUTE HEART FAILURE: RESULTS OF THE DIMACC PROJECT

G. Russo, A. Corticelli, F. Avanzini, L. Acone, E. Arienti, C. Bova, M. Brambillasca, S. Colognesi, A. Conti, P. Di Giulio, B. Lucia, M. Paone, S. Pastore, G. Perico, N. Tagliabue, N. Trivero, and F. Achilli
Ospedale Carate Brianza; Ospedale Pio Xi; Casa Di Comunita'; Università Degli Studi Di Torino; Polo Territoriale Asst Brianza; Universita' Degli Studi Milano; Business Integration Partners Spa

Background: The first year after admission for Acute Heart Failure (AHF) is the most critical period, with high mortality and readmission rates, often favoured by discontinuation of prescribed therapies or poor adherence to lifestyle recommendations. The DIMACC Project ("Dimissioni Accompagnate", i.e. Accompanied Discharge) was launched on May 1st, 2023 to provide a structured follow–up for patients admitted with AHF to the Intensive Cardiac Care Unit (ICCU) and Cardiology ward of Pio XI Hospital in Desio.
Aim: To assess adherence to pharmacological therapies and lifestyle recommendations during the first year after discharge. Methods DIMACC is a prospective quality improvement study conducted in real–world clinical practice. Follow–up includes a structured pathway of physician–nurse visits and diagnostic tests over 12 months. Adherence to pharmacological and non–pharmacological therapies was collected by nurses during follow–up visits. Comparisons between initial and final visits were performed using the chi–square test, considering a p–value ‹ 0.05 as statistically significant.
Results: From May 1, 2023, to April 30, 2024, 158 patients were admitted for AHF to our ICCU and Cardiology ward. Of these, 136 were discharged home or to a cardiovascular rehabilitation centre, and 68 were included in the project. Among these patients, 7 did not attend the first follow–up visit, 2 died before the final visit, 8 were lost to follow–up, and 53 completed the 12–month follow–up. The percentage of the latter patients reporting good adherence to pharmacological therapies and recommended lifestyle measures at the initial and final visits is shown in Table 1. At the beginning of follow–up, adherence to pharmacological therapies prescribed at discharge was very high, in contrast to adherence to recommended lifestyle measures. No statistically significant changes were observed during follow–up for any of the variables considered.
Conclusion: A structured follow–up after AHF hospitalization supports long–term adherence to pharmacological therapies, but has limited impact on lifestyle modification. New strategies are needed to improve patients' diet, physical activity, smoking cessation, and psychological well–being.

ADHERENCE TO PRESCRIBED DRUG THERAPY AND RECOMMENDED LIFESTYLE MEASURES IN THE YEAR AFTER HOSPITALIZATION FOR ACUTE HEART FAILURE

OBJECTIVES	INITIAL VISIT (n = 53)	FINAL VISIT (n = 53)
Adherence to prescribed drug therapy		
Taking all prescribed medications (n, %)	51 (96.2)	48 (90.6)
Daily medication intake (n, %)	46 (86.8)	43 (81.1)
Taking medications at the correct time (n, %)	45 (84.9)	48 (90.6)
No discontinuation when feeling well (n, %)	51 (96.2)	50 (94.3)
No discontinuation when feeling unwell (n, %)	51 (98.2)	51 (98.2)
Adherence to recommended lifestyles		
Fluid intake < 1 l/day (n, %)	12 (22.6)	18 (34.0)
Limited alcohol intake (n, %)	40 (75.5)	32 (60.4)
Limited salt intake (n, %)	19 (35.8)	16 (30.2)
Physical activity for ≥30 minutes on ≥3 days/week (n, %)	19 (35.8)	21 (30.6)
Smoking cessation among 14 smokers (n, %)	9 (64.3)	6 (42.9)
Absence of anxiety/depression (n, %)	29 (54.7)	33 (62.3)

Table 1

Abstract citation ID: suag058.354

NON–INVASIVE CARDIAC HAEMODYNAMIC AND FLUID CONTENT SYSTEM (NICAS) AS A NEW METHOD FOR THE MANAGEMENT OF PATIENTS WITH HEART FAILURE

E. Salerno, I. Fumarulo, B. Garramone, M. Vaccarella, F. Burzotta, and N. Aspromonte
Irccs Policlinico Universitario Agostino Gemelli

Background: Systemic congestion can be identified as a cause and result of worsening cardiovascular function. Being able to correctly identify the hemodynamic status of the patient can surely address the therapeutic process with early treatment adjustments. However, nowadays the gold standard includes invasive measurements. As an alternative, NiCas represents a valid new non–invasive technology based on regional bioimpedance.
Purpose: We aim to assess the usefulness of Nicas in the therapeutic management of patients with Heart Failure.
Methods: We conducted our analysis on 60 patients with Chronic Heart Failure (CHF) who came to our Day Hospital. The average dosis of "home" diuretics was 195 mg of Furosemide p.o. daily. All patients underwent several measurements of cardiac parameters using Nicas, upon admission, after i.v. diuretics and shortly before discharge. Measurements recorded by NiCas were stroke volume, stroke index, cardiac output, cardiac index, total body water, total peripheral resistance, cardiac power index and granov–goor index. Based on the data obtained, integrating it with blood chemistry tests, we adjusted the diuretic therapy, personalizing it for each patient.
Results: The analysis of data obtained from non–invasive measurements allowed therapeutic decisions to be modified with significant adjustments that could not have been made based on clinical evaluation alone. More in detail, an 83–year–old obese male patient with ischemic HFpEF, diabetes, chronic kidney disease and permanent atrial fibrillation was admitted to our day hospital for mild dyspnoea and lower limb edema. While clinical assessment suggested that diuretics should be administered, Nicas showed low levels of total body water compared to a high body mass index. Therefore, focusing exclusively on clinical assessment, diuretics would have had a negative effect on patient and symptoms could be explained by obesity and possible lymphatic insufficiency (Figure 1). Morover, NiCas proved to be useful in detecting significant amounts of fluids in a 75–year–old patient with HFrEF and no apparent need of diuretics, allowing for proper therapeutic adjustment (Figure 2-3).
Conclusions: The NiCas is a new non–invasive system, which has been demonstrated to be useful in the therapeutic management of patients with CHF. By using this technology, it is possible not only to customise patient's treatment but also to detect subclinical conditions, preventing all worsening and hospitalisations, the latter associated with a worse prognosis.

Figure 1: Hemodynamics status report of a 83 years-old patient with dyspnoea and lower limb edema.

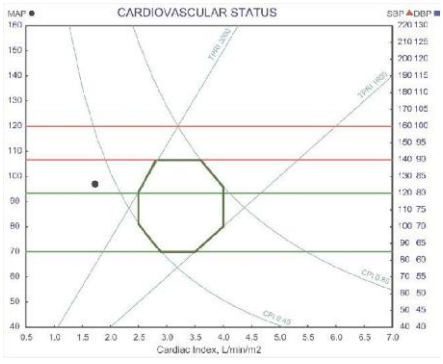

Figure 2: Hemodynamics status report of a 75 years-old patient with HFrEF for specific adjustments to diuretic therapy

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Figure 3: Hemodynamics status report of a 75 years-old patient with HFrEF for specific adjustments to diuretic therapy

Heart Failure Pharmacological Therapy

Abstract citation ID: suag058.355

PREDICTORS OF MORTALITY IN PATIENTS WITH ACUTE DECOMPENSATED HEART FAILURE TREATED WITH AN EARLY AND ACCELERATED MANAGEMENT STRATEGY (INSIGHTS FROM FIL–AHF STUDY)

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Introduction: Acute decompensated heart failure (ADHF) remains a leading cause of hospitalization and mortality worldwide despite therapeutic advances. Early identification of patients at increased risk of adverse outcomes is crucial to improve clinical decision–making and optimize management strategies. Although early and accelerated treatment approaches may enhance hemodynamic stabilization, their impact on mortality and prognostic determinants in ADHF remains incompletely defined.
Purpose: This study aimed to identify predictors of mortality in patients hospitalized for ADHF and treated with an early and accelerated therapeutic strategy, with particular focus on the four foundational pillars of heart failure therapy.
Methods: We retrospectively analyzed 373 consecutive patients admitted with ADHF from the Emergency Department to our Cardiology Unit between August 2023 and December 2024. All–cause mortality at 1 year was assessed using ongoing registries and clinical studies conducted in our centre. Univariate and multivariate analyses were performed to identify independent predictors of mortality.
Results: The mean age was 76.5 ± 10.8 years, and 59.5% of patients were male. Mean body mass index was 26.8 ± 4.7, and 23.6% had diabetes mellitus. Heart failure phenotypes included HFrEF in 27.6%, HFmrEF in 26.8%, and HFpEF in 45.6%. Atrial fibrillation was present in 69% of patients. At discharge, 18.2% had an implantable cardioverter–defibrillator and 2.7% a wearable cardioverter–defibrillator. The 1–year all–cause mortality rate was 17.6%. On univariate analysis, mortality was significantly associated with age, diabetes, eGFR ‹30 mL/min, anemia, NT–proBNP levels, and length of hospital stay. Multivariate analysis identified age (OR 1.10; 95% CI 1.04–1.18; p=0.002) and length of hospital stay (OR 1.06; 95% CI 1.01–1.12; p=0.02) as independent predictors of mortality (Fig. 1).
Discussion: In this real–world cohort, 1–year mortality remained substantial despite early and accelerated management strategies. Advanced age emerged as the strongest independent predictor, reflecting the impact of frailty and comorbidities. Prolonged hospitalization also independently predicted mortality, serving as a marker of disease severity and clinical complexity. These findings highlight the persistent vulnerability of ADHF patients and underscore the importance of early risk stratification, managing comorbidities and optimized in–hospital treatment, even within accelerated pathways.

Variable	Univariate Predictors			Multivariate Predictors	
	Deaths (N=64) Median (Q1-Q3); Mean±SD or N	Survivors (N=307) Median (Q1-Q3); Mean±SD or N	P value	Odds Ratio (95% CI)	P value
Age (yr)	83 (77–85)	75 (70-84)	<0.0001	1.10 (1.04-1.18)	0.002
<40	0	3	-	-	-
41-50	1	8	-	-	-
51-60	9	34			
61-70	4	64			
71-80	33	107			
81-90	64	101			
>90	3	4			
BMI (Kg/m²)	25.9 (22.4-29.2)	26 (23.7-29.4)	0.49	-	-
<18.5	2	5	-	-	-
18.5-24.9	24	112	-	-	-
25-29.9	26	118	-	-	-
30-34.9	9	53	-	-	-
35-39.9	4	15	-	-	-
>40	1	4	-	-	-
HF – EF (%)	45 (35-60)	48 (37-52)	0.17	-	-
HFpEF (>50)	26	143	-	-	-
HFmrEF (41-49)	15	81			
HFrEF (<40)	27	107	-	-	-
Atrial fibrillation	52	219	0.83		
Diabetes	22	69	0.30	-	-
Systolic Blood Pressure (mmHg)	118 (102-135)	120 (110-135)	0.99		
eGFR Cockroft-Gault (ml/min)	49 (31-61)	51 (39-70)	0.01	-	-
<15	1				
15-30	25	33	-	-	-
>30	38	265	-	-	-
Potassium level (mEq/l)	3.96±0.54	3.5 (3.7-4.3)	0.41	-	-
NT pro BNP (pg/ml)	5052.3 (1640-11487.5)	1963.3 (832.5-4067.5)	<0.0001	1.0001 (1.00002-1.0002)	0.01
Hemoglobin (g/dl)	11.8±1.85	12.8±1.62	<0.0001		
Hospital stay (days)	5 (3-9)	3 (2-5)	0.02	1.06 (1.01-1.12)	0.01

Figure 1

Abstract citation ID: suag058.356

EFFECTS OF TYPE 2 SODIUM GLUCOSE COTRANSPORTER INHIBITORS ON RENAL FUNCTION AND RENAL RESISTANCE INDEX

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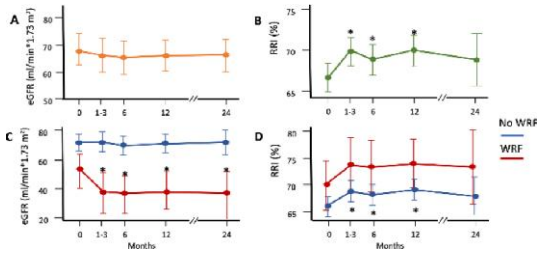
Background: Type 2 sodium glucose cotransporter inhibitors (SGLT2i) have demonstrated cardiorenal protection in patients affected by type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD) and chronic heart failure (CHF). Among the mechanisms underlying this benefit, there is the possible restoration of tubuloglomerular, which contrasts glomerular hyperfiltration and the progression of CKD. Aim of the study. To evaluate the relationship between the introduction of SGLT2i, the estimated glomerular filtration rate (eGFR) and the arterial renal resistance index (RRI) in CHF outpatients with reduced ejection fraction (HFrEF).
Methods: Fifty–two patients (mean age 60±13, 81% males, NYHA class 2.2 ±0.39, 21% with T2DM and 31% with CKD) affected by HFrEF (mean left ventricular ejection fraction, LVEF, 31±7%) and in conventional therapy (100% ACE–inhibitors or ATII receptor antagonists or sacubitril/valsartan, 100% beta–blockers, 86% mineralcorticoid receptor antagonists) were enrolled. Before and 1 or 3, 6, 12, and 24 months after SGLT2i prescription, eGFR by serum creatinine levels and the renal resistance index (RRI) by echo Doppler were evaluated. Changes in the repeated measures were evaluated by linear mixed models. A p<0.05 was considered significant.
Results: In comparison with baseline values, a non–significant reduction in eGFR but a significant increase in RRI values was observed at 1–3, 6 and 12 months (see Figure panels A and B). During early follow–up, 13% of patients showed early worsening of renal function (WRF, defined as an increase of serum creatinine > 0.3 mg/dl with an eGFR reduction >25%). Among patients with and without WRF, eGFR diverged, whereas a similar trend in change of RRI was observed.
Conclusions: In HFrEF patients, after SGLT2i introduction a significant increase in RRI observed in patients with and without early WRF. These data strengthen the possible effects of SGLT2i on afferent arterioles and hyperfiltration, considering that afferent and efferent arterioles are mainly responsible for renal resistance variations.



Abstract citation ID: suag058.357

PONTE SC–SCA REGISTRY: BASELINE CHARACTERISTICS OF PATIENTS WITH HEART FAILURE

G. Palmieri, E. Costabile, G. Citarelli, M. Iacoviello, P. Scicchitano, L. De Gennaro, F. Massari, M. Bonfantino, N. Brunetti, C. Campanella, P. Colonna, G. Dalena, A. Passantino, E. Pisanò, F. Nardi, F. Colivicchi, F. Oliva, D. Gabrielli, M. Grimaldi, and P. Caldarola
Policlinico Riuniti; Ospedale San Paolo; Ospedale Perinei; Ospedale Di Venere; Policlinico Di Bari; Ospedale Santa Maria Degli Angeli; Istituti Clinici Scientifici Maugeri Irccs, Cardiac Rehabilitation Unit of Bari Institute; Ospedale Perrino; Ospedale Santo Spirito; Presidio Ospedaliero San Filippo Neri – Asl Roma 1; Asst Grande Ospedale Metropolitano Niguarda; Azienda Ospedaliera San Camillo Forlanini; Ospedale Miulli

Background & Study Aim: The observational PONTE SC/SCA registry was designed to evaluate the effectiveness of integrated hospital–to–community care pathways for patients with heart failure (HF) or those recently hospitalized for acute coronary syndrome (ACS). This study aimed to describe the baseline characteristics of patients with HF enrolled in the registry.
Methods and Results: Between January 2024 and September 2025, 1,203 patients were enrolled, including 496 (41%) with heart failure with reduced ejection fraction (HFrEF), 189 (16%) with mildly reduced ejection fraction (HFmrEF), 302 (25%) with preserved ejection fraction (HFpEF), and 216 (18%) with improved ejection fraction (HFimpEF) (Fig. A). From 2024 to 2025, an increasing trend in HFpEF diagnoses was observed, rising from 23% to 35%,

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likely reflecting improved diagnostic accuracy (Fig. B). As shown in the table, HFrEF patients were more frequently diabetic, had greater functional limitation, and lower systolic blood pressure. HFpEF patients were more often female, reduced estimated glomerular filtration rate (e–GFR), and a lower prevalence of ischemic heart disease. HFimpEF patients were younger, with less functional limitation, lower heart rate, better renal function, and lower NT–proBNP levels.

Conclusions: The PONTE SC/SCA registry demonstrates a predominance of care for patients with HFrEF and HFimpEF among the participating outpatient clinics. Analysis of these data and the clinical characteristics of enrolled patients provides valuable insights for further optimization of patient management and diagnostic–therapeutic pathways in heart failure.

	HFrEF	HFmrEF	HFpEF	HFimpEF	P
Number	496	189	302	216	
Age (years)	69±12	70±12	69±14	66±13	0.003
Male sex, %	79	77	60	70	<0.001
BMI (kg/m²)	28±5	28±5	28±5	28±5	0.894
Ischemic etiology, %	51	44	10	27	<0.001
Diabetes mellitus, %	33	29	25	36	0.021
Hypertension, %	72	75	79	70	0.086
Atrial fibrillation, %	22	22	23	16	0.255
NYHA (%) I/II	76	85	85	92	<0.001
III	24	15	15	8	
Systolic blood pressure (mmHg)	117±17	125±15	127±17	122±17	<0.001
Heart rate (b/m)	72±15	71±18	73±16	69±15	0.042
LVEF (%)	34±5	45±2	56±5	49±5	<0.001
e-GFR <60, %	45	45	44	33	0.032
NT-proBNP (pg/ml) ‡	2198±3445	1707±3249	1436±1975	666±1168	0.004

Notes: P values refer to ANOVA for continuous variables and Pearson's chi-square test for categorical variables. *Available in 999 patients; †Available in 944 patients; ‡Available in 360 patients.

Fig. A

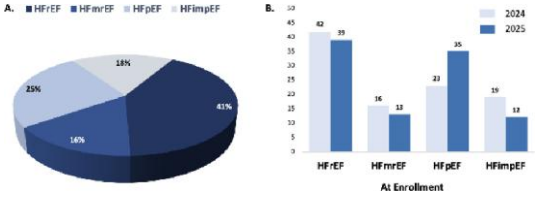


Fig. B

Abstract citation ID: suag058.358

DOSE OPTIMIZATION TRENDS OF THE FOUR PILLARS OF THERAPY IN HFREF: DATA FROM THE PONTE SC–SCA REGISTRY

G. Citarelli, G. Gulino, G. Palmieri, M. Iacoviello, P. Scicchitano, L. De Gennaro, F. Massari, M. Bonfantino, N. Brunetti, C. Campanella, P. Colonna, G. Dalena, A. Passantino, E. Pisanò, F. Nardi, F. Colivicchi, F. Oliva, D. Gabrielli, M. Grimaldi, and P. Caldarola
Ospedale San Paolo; Policlinico Riuniti; Ospedale Perinei; Ospedale Di Venere; Policlinico Di Bari; Ospedale Santa Maria Degli Angeli; Istituti Clinici Scientifici Maugeri Irccs, Cardiac Rehabilitation Unit of Bari Institute; Ospedale Perrino; Ospedale Santo Spirito; Presidio Ospedaliero San Filippo Neri – Asl Roma 1; Asst Grande Ospedale Metropolitano Niguarda; Azienda Ospedaliera San Camillo Forlanini; Ospedale Miulli

Background & Study Aim: In patients with heart failure with reduced ejection fraction (HFrEF), the use of four main pharmacological classes is currently recommended: angiotensin receptor–neprilysin inhibitors (ARNI), preferred over angiotensin–converting enzyme inhibitors (ACEi) or angiotensin receptor blockers (ARB), beta–blockers, mineralocorticoid receptor antagonists (MRA), and sodium–glucose co–transporter 2 inhibitors (SGLT2i). The aim of this study was to evaluate trends in prescribed dose adjustments of ACEi/ARB/ARNI, beta–blockers, and MRA over recent years, following the introduction of SGLT2i, in patients enrolled in the PONTE SC/SCA registry.
Methods and Results: Among the 496 patients with HFrEF enrolled in the registry, both retrospective (2021–2023) and prospective (2024–2025) analyses were performed. Over this period, prescription rates of ACEi/ARB/ARNI (82–89%), ARNI (58–64%), MRA (84–86%), and beta–blockers (93–96%) remained stable, whereas a significant increase in SGLT2i prescription was observed, from 10% to 85%. The increased use of SGLT2i did not affect the dosing of the other pharmacological classes; however, the proportion of patients receiving the maximum recommended dose remained low, particularly for ARNI and ACEi/ARB (Figure 1).
Conclusions: In the PONTE SC/SCA registry, the increased use of SGLT2i did not influence either prescription rates or dosing of the other recommended drug classes. Nevertheless, these findings highlight the need to increase the proportion of patients treated with ARNI at the maximum recommended dose.

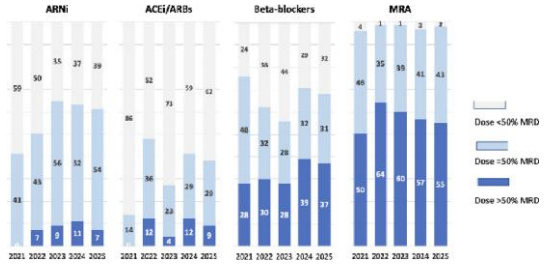


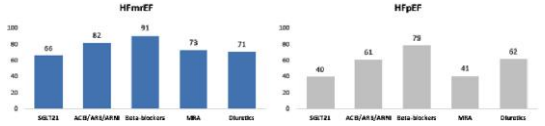
Figure 1

Abstract citation ID: suag058.359

OPTIMIZATION OF MEDICAL THERAPY IN PATIENTS WITH HFMREF AND HFPEF: DATA FROM THE PONTE SC–SCA REGISTRY

G. Palmieri, A. Crudo, G. Citarelli, M. Iacoviello, P. Scicchitano, L. De Gennaro, F. Massari, M. Bonfantino, N. Brunetti, C. Campanella, P. Colonna, G. Dalena, A. Passantino, E. Pisanò, F. Nardi, F. Colivicchi, F. Oliva, D. Gabrielli, M. Grimaldi, and P. Caldarola
Policlinico Riuniti; Ospedale San Paolo; Ospedale Perinei; Ospedale Di Venere; Policlinico Di Bari; Ospedale Santa Maria Degli Angeli; Istituti Clinici Scientifici Maugeri Irccs, Cardiac Rehabilitation Unit of Bari Institute; Ospedale Perrino; Ospedale Santo Spirito; Presidio Ospedaliero San Filippo Neri – Asl Roma 1; Asst Grande Ospedale Metropolitano Niguarda; Azienda Ospedaliera San Camillo Forlanini; Ospedale Miulli

Background & Study Aim: In recent years, significant progress has been made not only in the treatment of heart failure with reduced ejection fraction (HFrEF) but also in patients with mildly reduced (HFmrEF) and preserved ejection fraction (HFpEF). This study aimed to evaluate the management of HFmrEF and HFpEF patients within the PONTE SC/SCA registry.
Methods and Results: Between January 2024 and September 2025, 1,203 patients were enrolled, including 189 with HFmrEF and 302 with HFpEF. Prescribed pharmacological therapy was analyzed, focusing on angiotensin–converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), angiotensin receptor–neprilysin inhibitors (ARNI), beta–blockers, mineralocorticoid receptor antagonists (MRA), and sodium–glucose co–transporter 2 inhibitors (SGLT2i). As shown in the figure, ACEi/ARB/ARNI, beta–blockers, and MRA were prescribed in a high proportion of cases, whereas SGLT2i use was more limited, particularly among HFpEF patients.
Conclusions: The PONTE SC/SCA registry demonstrates partial optimization of therapy in HFmrEF and HFpEF patients, especially regarding SGLT2i use. These findings provide valuable insights for further improving diagnostic and therapeutic pathways in heart failure and highlight the importance of a regional registry as a tool for monitoring and optimizing patient care.



Abstract citation ID: suag058.360

SAFETY OF EARLY AND ACCELERATED EVIDENCE BASED PHARMACOLOGICAL THERAPY FOLLOWING ACUTE DECOMPENSATED HEART FAILURE (THE FIL–AHF STUDY)

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UOC Cardiologia Clinica E Riabilitativa P.O. San Filippo Neri – Asl Roma 1; UOC Cardiologia – Azienda Ospedaliera Universitaria S. Andrea; UOC Cardiologia Clinica E Riabilitativa P.O. San Filippo Neri – Asl Roma 1

Introduction: Growing evidence supports early and intensified therapy during hospitalization for acute decompensated heart failure (ADHF) to reduce cardiovascular morbidity and mortality across the entire spectrum of ejection

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fraction (EF). Trials such as EMPULSE and TRANSITION have demonstrated that early initiation of empagliflozin and sacubitril/valsartan in hospitalized patients with ADHF is feasible and safe.
Purpose: This study aimed to evaluate the safety and tolerability of an early and accelerated implementation of guideline–directed medical therapy, with particular focus on the four therapeutic pillars, during hospitalization for ADHF.
Methods: We retrospectively analyzed 373 consecutive patients admitted from the Emergency Department to our Cardiology Unit between August 2023 and December 2024. Utilization of the four pillars at admission and discharge was compared, along with changes in systolic blood pressure (SBP), creatinine, estimated glomerular filtration rate (eGFR), NT–proBNP, serum potassium, and hemoglobin levels.
Results: Median age was 79 years, 59.5% were male, median BMI was 25.9, and 23.6% had diabetes. Heart failure phenotypes included HFrEF (27.6%), HFmrEF (26.8%), and HFpEF (45.6%). Use of ACEi/ARBs/ARNi increased from 58.1% at admission to 81.5% at discharge. SGLT2 inhibitor prescription rose from 22.2% to 68.1%. Beta–blocker use increased from 65.9% to 86.9%, and MRA use from 27.6% to 78.2% (Figure 1). During hospitalization, hemoglobin decreased slightly (12.9 ± 1.9 to 12.8 ± 2.0 g/dL; p=0.03) and SBP declined from 130 (115–145) to 120 (110–130) mmHg (p<0.0001). Renal function showed a modest but significant worsening, with creatinine increasing from 1.19 to 1.24 mg/dL (p=0.0045) and eGFR decreasing from 54 to 53.4 mL/min (p=0.0021). Serum potassium levels slightly decreased from 4 (3.7–4.3) to 3.9 (3.7–4.2) mEq/l (p=0.009) (Figure 2). Among patients not receiving SGLT2 inhibitors, only 5.6% had an absolute contraindication (eGFR <25 mL/min). NT–proBNP levels significantly decreased from 3068 (1396–7004) to 2276 (941–5126) (p<0.0001).
Discussion: Hospitalization represents a crucial opportunity for therapeutic optimization in ADHF. Early initiation of intensified therapy was feasible, safe, and well tolerated, with only modest and expected changes in clinical and laboratory parameters. The low rate of absolute contraindications to SGLT2 inhibitors suggests that therapeutic inertia may significantly contribute to their underutilization.

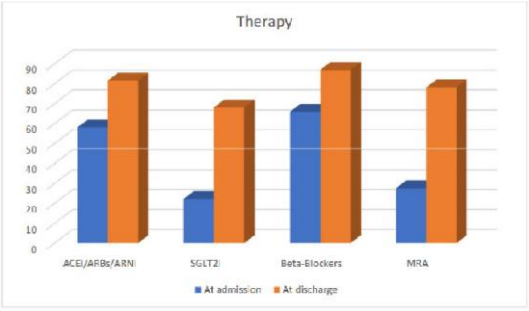

Figure 1. Variation of medical treatment at admission and at discharge

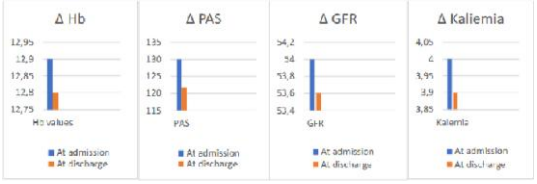

Figure 2. Changes in systolic blood pressure, estimated glomerular filtration rate, serum potassium, and hemoglobin levels at admission and at discharge

Coronary Interventional Procedures in Acute Coronary Syndrome

Abstract citation ID: suag058.361

ACUTE STEMI IN A 26–YEAR–OLD MALE

D. Maffeo, C. Mastellone, L. De Luca, and B. Liccardo
Ospedale Monaldi

ST–elevation myocardial infarction (STEMI) in patients younger than 40 years represents a distinct clinical entity compared with ACS in older populations. In this age group, traditional atherosclerotic mechanisms driven by long–standing exposure to classical cardiovascular risk factors are less prevalent, while alternative or overlapping pathophysiological processes play a more prominent role. These include plaque erosion, isolated coronary thrombosis, spontaneous coronary artery dissection, vasospasm, and inherited or acquired pro–thrombotic conditions.

In the present case (Figure 1), intravascular ultrasound (IVUS) demonstrated a non–calcified atherosclerotic plaque with endothelial erosion and superimposed thrombus (Figure 2), without evidence of plaque rupture or dissection. Plaque erosion is increasingly recognized as a frequent substrate of ACS in young patients, particularly smokers, and is characterized by endothelial denudation, preserved fibrous cap integrity, and high thrombogenic potential. Smoking and acute physical exertion likely acted as triggers by promoting endothelial dysfunction, increased shear stress, and platelet activation.

However, these factors alone may not fully explain the occurrence of myocardial infarction at such a young age. The identification of multiple pro–thrombotic genetic polymorphisms affecting fibrinolysis and the renin–angiotensin system suggests a permissive biological background favoring thrombus formation and persistence. Although each variant confers only a modest increase in cardiovascular risk, their coexistence may create a cumulative pro–inflammatory and pro–coagulant vascular milieu, facilitating early atherothrombosis even in the absence of dyslipidemia, metabolic syndrome, or autoimmune disease.

This case underscores the importance of a comprehensive etiologic evaluation in young patients with STEMI. While current guidelines do not recommend routine thrombophilia screening in all ACS patients, such recommendations are largely derived from older populations. In patients under 40 years of age—especially those with few conventional risk factors or atypical angiographic findings—a more extensive diagnostic approach appears justified.

Systematic use of intravascular imaging and selective genetic and thrombophilia testing in this population may improve understanding of disease mechanisms, refine risk stratification, and support more personalized long–term prevention strategies.

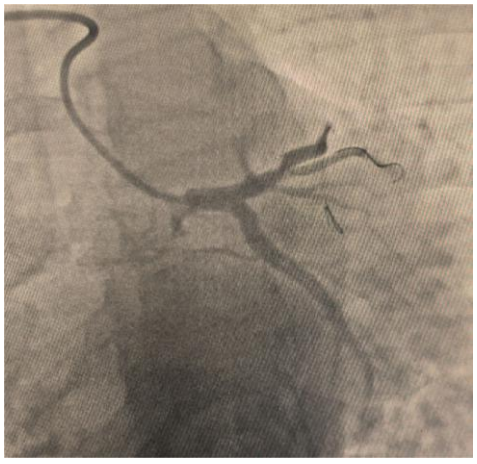

Figure 1

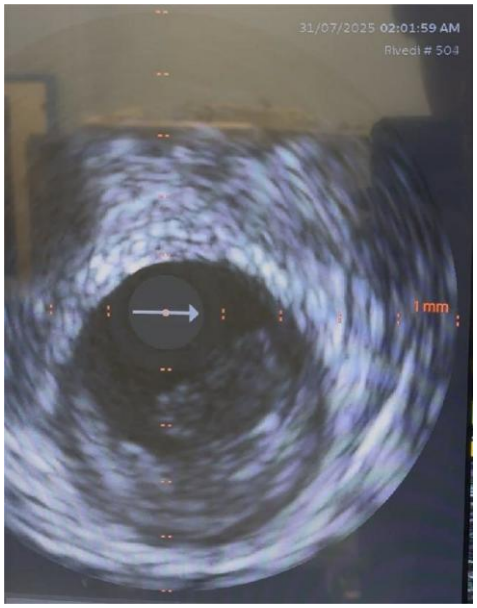

Figure 2

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Abstract citation ID: suag058.362

SUCCESSFUL PERCUTANEOUS TREATMENT OF CALCIFIED LEFT MAIN DISEASE

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Azienda Ospedaliera Universitaria Integrata Di Verona; Ospedale Mater Salutis

Clinical Case: A 77–year–old man was admitted to the Emergency Department with a two–hour history of chest pain and recurrent angina over the previous month. Physical examination and vital signs were unremarkable. EKG showed diffuse ventricular repolarization abnormalities and TnT was 1,200ng/L. Transthoracic echocardiography revealed preserved biventricular systolic function. Medical history included anterior STEMI treated with PCI on the left anterior descending artery (LAD) in 2012, chronic total occlusion of the right coronary artery (RCA), peripheral artery disease. Cardiovascular risk factors were arterial hypertension, diabetes mellitus II, dyslipidaemia. A diagnosis of NSTEMI was made.
Management: Coronary angiography demonstrated a good angiographic result of the previous PCI and a severe sub–occlusive stenosis of the distal LM (fig.1). PCI of the LM was performed under mechanical circulatory support with an intra–aortic balloon pump (IABP). The left coronary system was engaged with a 7F XB 3 guiding catheter, with guidewires positioned in the LAD and protective wires in the circumflex artery and intermediate branch. After lesion preparation on LM with a semi–compliant balloon, plaque modification was achieved using intravascular lithotripsy (IVL, Shockwave system) due to severe calcification. A 3.5×34mm drug–eluting stent was implanted from LM to proximal LAD in overlap with the previous stent. Repeated kissing balloon inflations and final proximal optimization technique (POT) were performed. The circumflex artery was treated with a 3×15mm drug–coated balloon, followed by final kissing balloon inflation. Final angiography showed an optimal result (TIMI 3 flow) and no complications (fig.2). The IABP was removed at the end of the procedure.
Outcome and Follow–Up: The in–hospital course was uneventful, with no arrhythmic events. At one–month follow–up, the patient was asymptomatic with no anginal recurrence.
Future Perspectives: Timely revascularization of critical LM disease is crucial, particularly in high–risk patients. Mechanical circulatory support with IABP may provide additional safety during complex LM PCI. IVL represents a valuable calcium debulking device, allowing effective lesion preparation with a safety profile (low risk of dissection, perforation, distal embolization. Finally, meticulous bifurcation technique, including final POT, plays a crucial role in optimizing stent expansion and long–term outcomes.

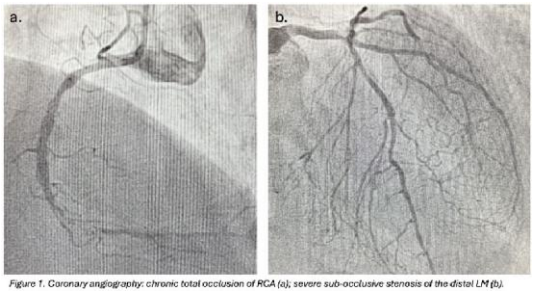

Figure 1. Coronary angiography: chronic total occlusion of RCA (a); severe sub-occlusive stenosis of the distal LM (b).

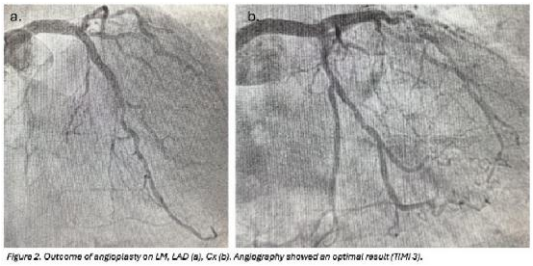

Figure 2. Outcome of angioplasty on LM, LAD (a), Cx (b). Angiography showed an optimal result (TIMI 3).

Abstract citation ID: suag058.363

SUDDEN CARDIAC ARREST IN A PATIENT WITH A RARE SINGLE CORONARY ARTERY ANOMALY

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Background: Out–of–hospital cardiac arrest is a major cause of mortality, most commonly related to ischemic heart disease. Rare congenital coronary anomalies may represent an uncommon but potentially lethal substrate for malignant ventricular arrhythmias.
Case Presentation: A 42–year–old woman with no known cardiovascular history was found unconscious in an out–of–hospital setting. On arrival of Emergency Medical Services, she was in cardiac arrest due to ventricular fibrillation. Electrical defibrillation restored spontaneous circulation (ROSC). Post–ROSC EKG showed a new–onset left bundle branch block. Urgent coronary angiography revealed a complex congenital coronary anomaly characterized by absence of the left main coronary artery and a single coronary artery arising from the right coronary sinus. The vessel appeared markedly ectatic and tortuous, giving rise to both the left anterior descending (LAD) and circumflex(LCx) arteries, without angiographically significant stenoses. Multiple coronary arteriovenous fistulas draining into the pulmonary artery and involving septal branches were also observed (Image 1A). Coronary CT confirmed the absence of the left main coronary artery and demonstrated a single ectatic coronary artery (up to 7 mm) originating from the right coronary sinus, with a highly tortuous course and formation of a vascular network at the cardiac apex. Retrograde filling of a dilated LAD and origin of a dilated LCx (7–8 mm) were observed (Image 1B–C). Multiple fistulous connections with hypertrophic bronchial arteries were present. A right–sided pneumothorax and pneumomediastinum were also detected and successfully treated with chest drainage. After a few days in the intensive care unit, the patient was weaned from mechanical ventilation with complete neurological recovery. Initial transthoracic echocardiography showed severe left ventricular systolic dysfunction (LVEF 30–35%), which improved to 60% during hospitalization. Given the occurrence of ventricular fibrillation in the absence of a reversible ischemic cause, a dual–chamber implantable cardioverter–defibrillator was implanted for secondary prevention. At discharge, the patient was prescribed only a beta–blocker.
Conclusion: This case highlights a rare presentation of complex congenital coronary artery anomaly with extensive coronary fistulization leading to sudden cardiac arrest. Advanced imaging and multidisciplinary management were essential for diagnosis and favorable outcome.

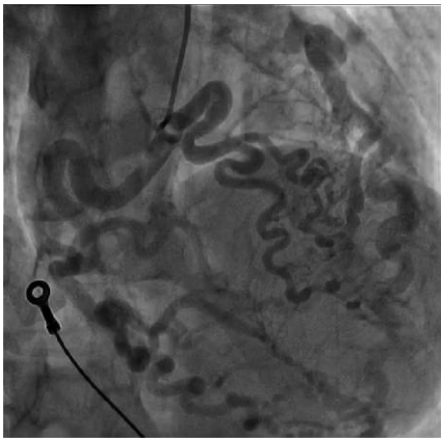

Image A

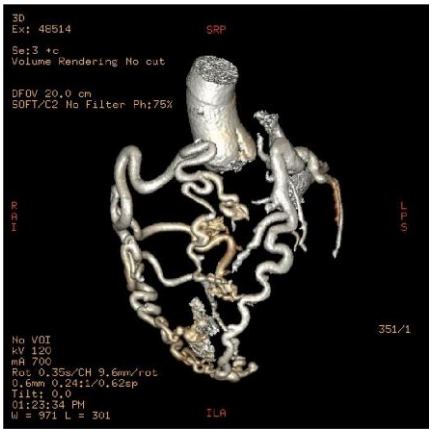

Image B

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Image C

Abstract citation ID: suag058.364

IABP–PROTECTED LEFT MAIN ANGIOPLASTY FOLLOWING TRANSCATHETER AORTIC VALVE REPLACEMENT

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An 84–year–old woman with arterial hypertension, dyslipidemia, carotid atherosclerosis, and multifactorial anemia with a positive fecal occult blood test presented with worsening dyspnea, chest pain, and acute hypertensive pulmonary edema (BP 150/100 mmHg). Her medical history included PCI with DES implantation in the mid LAD and TAVI for severe aortic stenosis in 2022. Chronic therapy included bisoprolol, ASA, atorvastatin/ezetimibe, valsartan, and amlodipine.

At admission, hemoglobin was 9.4 g/dL and hs–TnI increased from 99 to 16,000 pg/dL. ABG analysis showed severe respiratory and metabolic acidosis (pH 7.1, pCO_2 54 mmHg, pO_2 54 mmHg, lactate 5 mmol/L, sO_2 73%, HCO_3 16.8 mmol/L). NIV and intravenous diuretics led to clinical improvement. ECG showed ST–segment depression in the lateral leads with ST elevation in aVR. Transthoracic echocardiogram demonstrated preserved LVEF with inferior wall hypokinesia, mild–to–moderate paravalvular aortic regurgitation, and right ventricular dysfunction.

Urgent coronary angiography revealed critical left main disease with severe three–vessel involvement. Recurrent acute pulmonary edema required IABP placement and transfer to the intensive cardiac care unit.

The case was discussed by the Heart Team, which recommended PCI due to prohibitive surgical risk. A protected high–risk PCI was performed using a crossover approach to the LAD, with implantation of a DES covering the Left Main ostium. Post–dilatation and kissing balloon inflation of the LAD–LCx bifurcation achieved an optimal angiographic result (TIMI 3). Residual lesions were managed conservatively. The IABP was removed at the end of the procedure, and cangrelor infusion was initiated, followed by clopidogrel oral loading dose.

After the procedure, hypotension and anemia occurred due to femoral bleeding related to the vascular access site, where arterial closure had been performed using a FemoSeal device. CT angiography revealed a femoral pseudoaneurysm, which was successfully treated by endovascular exclusion. Hemoglobin levels stabilized after blood transfusions, and the remaining hospital course was uneventful.

Post–TAVI patients with ACS and complex coronary anatomy represent a high–risk population. In this setting, protected high–risk PCI after Heart Team discussion is crucial when surgical revascularization is contraindicated, and mechanical circulatory support should be carefully selected.

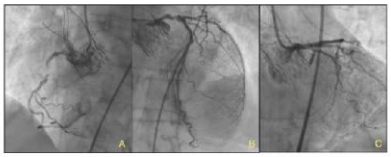

Figure. Coronary angiography demonstrating severe multivessel coronary artery disease with aortic valve prosthesis in situ.
(A) Right coronary artery (non-selective cannulation) showed near-occlusion of the ostial and mid segments.
(B) Left main coronary artery demonstrating 50% stenosis in the mid segment and critical stenosis in the distal segment; the left anterior descending artery was diffusely atherosclerotic and calcified, with a patent stent in the mid segment.
(C) Circumflex artery showed critical stenosis in the ostio-proximal segment.

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INTEGRATED REPERFUSION FOR SIMULTANEOUS STEMI AND LARGE–VESSEL OCCLUSION: A CASE REPORT

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Introduction: Simultaneous ST–elevation myocardial infarction (STEMI) and acute ischemic stroke (simultaneous cardio–cerebral infarction) is rare and challenging. Both are time–dependent and require rapid reperfusion, yet STEMI antithrombotic therapy may increase intracranial bleeding risk. Treatment sequencing should be individualized according to hemodynamic status, neurological severity, and local logistics.
Case report: A 75–year–old woman with hypertension and dyslipidemia, without known heart disease, presented with constrictive chest pain (~55 min onset) followed 10–15 min later by aphasia and right upper–limb weakness. She was unstable: BP 88/58 mmHg, HR 125 bpm, SpO_2 86% on room air, diffuse crackles (acute pulmonary edema), cold extremities; NIHSS 12. ECG showed anterior ST elevation (V1–V4 up to 4 mm) extending to I/aVL with reciprocal ST depression in II, III, aVF. hs–troponin I was 410 ng/L (URL ‹34) with peak ›30,000 ng/L at 12–18 h; NT–proBNP 5,600 pg/mL (URL ‹300). Non–contrast brain CT excluded hemorrhage; CT angiography revealed left MCA M1 occlusion with fronto–temporo–insular hypoperfusion.
Decision making: A multidisciplinary cardiology–stroke pathway was activated. Given hypotension, pulmonary edema, and extensive anterior STEMI with high risk of deterioration/cardiac arrest, a "heart–first" strategy was selected: immediate coronary angiography and primary PCI, followed by mechanical thrombectomy after stabilization. IV thrombolysis was deemed unfavorable due to bleeding risk and the anticipated need for dual antiplatelet therapy, with immediate endovascular stroke treatment available.
Treatment and course: Coronary angiography (radial access) showed proximal thrombotic LAD occlusion (TIMI 0) and no significant disease elsewhere. Primary PCI with DES achieved TIMI 3 flow and improved BP (110/70 mmHg) with relief of dyspnea. The patient then underwent thrombectomy with TICI 3 reperfusion. CT at 24 h showed no hemorrhagic transformation; NIHSS improved to 5. Echocardiography showed anteroseptal/apical akinesia, LVEF 35–40%, elevated filling pressures, and mild functional MR; no initial LV thrombus (serial reassessment planned). Antithrombotic therapy was initiated and reviewed daily, balancing coronary ischemic risk against cerebral bleeding risk.

Abstract citation ID: suag058.366

USE OF DRUG COATING BALLOONS FOR THE MANAGEMENT OF CORONARY BIFURCATION

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Introduction: Management of multivessel coronary artery disease (MVD) in patients with recurrent acute coronary syndromes (ACS) remains challenging, particularly in the presence of several cardiovascular (CV) risk factors and previous percutaneous coronary interventions (PCI). Coronary bifurcation lesions further increase procedural complexity and are associated with higher risk of adverse events related to multiple stent implantation.
Case Presentation: A 50–year–old man with several CV risk factors was admitted to our catheterization laboratory for chest pain with a diagnosis of inferior ST–elevation myocardial infarction (STEMI). In 2019, the patient had a non–STEMI treated with PCI and drug–eluting stent (DES) implantation of the diagonal branch; in 2024, he underwent to a PCI with DES implantation of the proximal left anterior descending artery (LAD) for an anterior STEMI. Coronary angiography revealed an acute thrombotic occlusion of the posterior interventricular branch (PDA), significant stenosis of the ostial left circumflex artery (LCx), and in–stent restenosis of the LAD and of the diagonal branch (D1). Primary PCI with DES implantation of the PDA was successfully performed; after the procedure, the patient was transferred in the Coronary Care Unit. After five days the patient underwent to PCI staged procedure to achieve complete revascularization. Intravascular ultrasound (IVUS) assessment of the LAD and LCx revealed significant in–stent atherosclerosis of the LAD and a concentric fibro–lipidic plaque with small amount of calcium at the ostium of LCx, with a Minimal Lumen Area (MLA) of 3.3 mm2. Pre–dilatation with a kissing balloon (KB) technique using two non–compliant (NC) balloons 3.0×15 mm inflated at high atmospheres was performed on the LAD and LCx, followed by NC balloon dilatation 2.5×20 mm of the D1. In order to avoid additional stent implantation, we decided to perform a final KB on the LAD and LCx with two Sirolimus drug–eluting balloons (DEB), obtaining an optimal angiographical result.

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Follow–Up: At 6–months follow–up, the IVUS demonstrated absence of neo–atherosclerosis of the LAD and an optimal MLA of the ostial LCx, with no evidence of adverse vessel remodelling.
Conclusions: This case supports the feasibility and safety of an IVUS–guided DEB strategy in complex bifurcation lesions, enabling effective revascularization while minimizing further stent implantation in a high–risk patient with MVD and recurrent ACS.

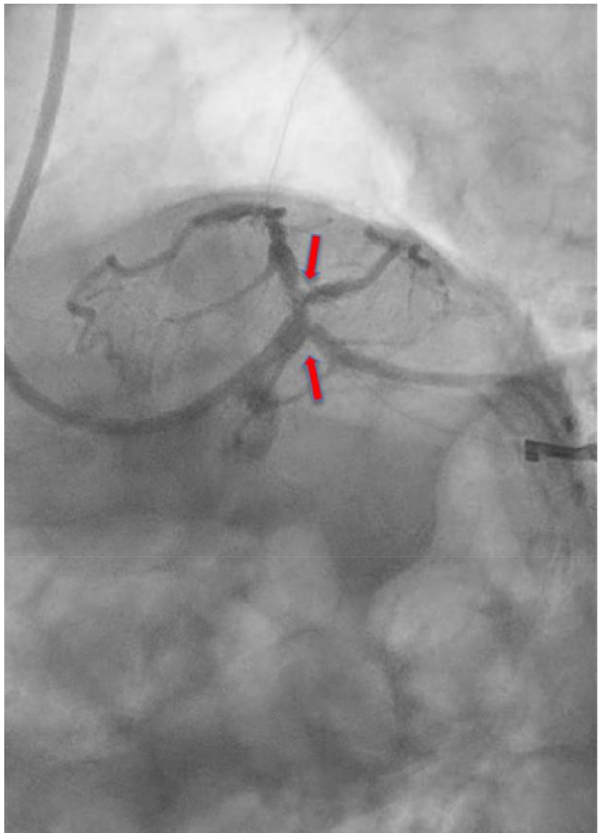

Figure 1. Angiography of the left coronary artery. The red arrows indicate critical in-stent restenosis of the LAD and critical stenosis at the ostium of the LCx.

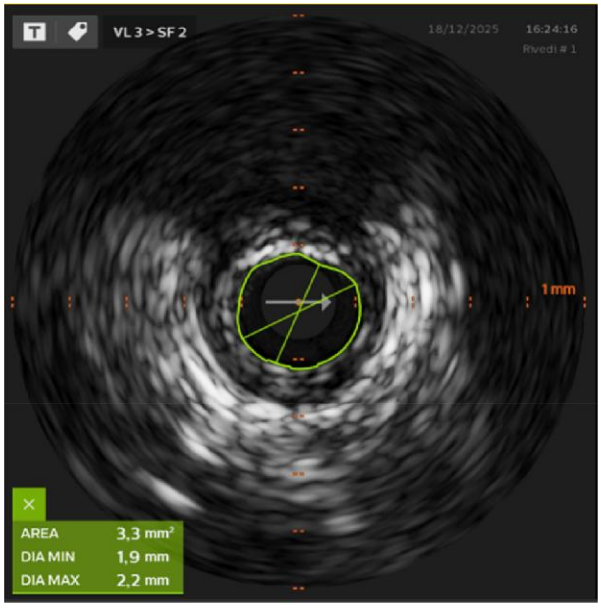

Figure 2. IVUS image of the LCx ostium.

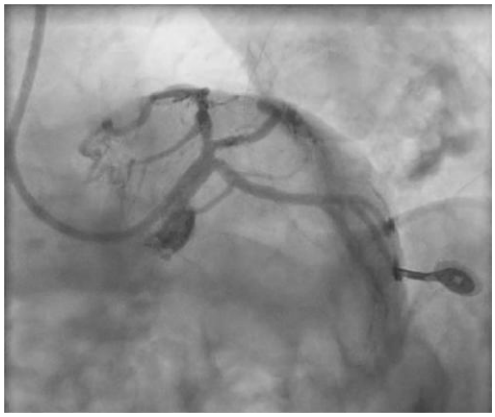

Figure 3. Final angiographic result.

Pulmonary Circulation Disease - Pulmonary Artery Hypertension 1

Abstract citation ID: suag058.367

IMPACT OF COMORBIDITIES ON THERAPY RESPONSE IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

B. Pozzato, S. Wort, K. Dimopoulos, H. Nashat, L. Claire Price, C. Mccabe, B. Mukherjee, and M. Vicenzi
Ospedale San Luca Irccs – Istituto Auxologico; Royal Brompton Hospital; Cardiology Unit Asst Rhodense Garbagnate Milanese Hospital

Background: An increasing number of older patients are currently being diagnosed with idiopathic pulmonary arterial hypertension (iPAH) and heritable PAH (HPAH). In this population, cardiovascular (CVc) or respiratory (Rc) comorbidities are common and can affect response to PAH therapies, hence clinical guidelines advise a cautious approach to treatment. The prognostic impact of CVc and Rc in this population remains uncertain.
Method and Aims: We retrospectively analysed iPAH and HPAH patients with and without comorbidities and assessed the influence of CVc and Rc on the likelihood of clinical improvement after initiation of PAH therapies by at least one ERS/ESC risk class (four–strata model), as defined by BNP levels, WHO functional class (WHO–FC), and 6MWD. We collected data on 13 comorbidities. ERS/ESC risk scores were assessed at baseline (T0) and T1 (within 3–12 months).
Results: A total of 135 patients with iPAH or HPAH were included, 91 with and 44 without comorbidities. Mean age was 60 years old and was higher in patients with comorbidities (p=0.0009). The probability of clinical improvement by at least one risk class was 70.5% (p = 0.02). An increasing number of CVc and Rc progressively reduced the probability of improvement: each additional CVc significantly reduced the odds of improvement by 27% (p = 0.018), while each additional Rc was associated with lower odds of improvement (OR = 0.62, p = 0.168). Therefore, though statistical significance was not reached, there appeared to be a greater negative effect in patients with Rc. If only 1 CVc is present, the probability of improvement is equal to patients without comorbidities ($\chi 2$=1.94, p = 0.16), supporting optimized treatment in this group.
Conclusions: Compared to CVc, Rc appear to have a stronger negative impact on treatment response in patients with iPAH and HPAH. Although CVc also negatively affect the probability of improvement, patients with a single CVc show a response similar to the control group, supporting the benefit of optimized therapy in this subgroup.

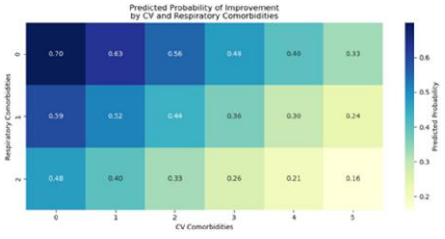

Figure 1: heatmap from a binary multivariable logistic regression illustrating the predicted probability of clinical improvement according to the number of cardiovascular and respiratory comorbidities.

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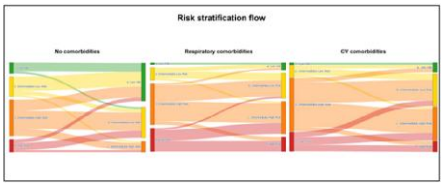

Figure 2: changes in risk classification from T0 to T1 according to the ESC/ERS four–strata model in patients without comorbidities (left), with respiratory comorbidities (middle), and with cardiovascular comorbidities (right).

Figure 2
Figure 1

Abstract citation ID: suag058.368

UNMASKING EXERCISE–INDUCED PULMONARY HYPERTENSION DURING CARDIAC REHABILITATION

D. Triggiani, E. Fertani, E. De Tommasi, N. Camassa, L. De Michele, A. Mannarini, P. Colonna, and A. Passantino
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Background: Pulmonary hypertension (PH) is a progressive and often underdiagnosed condition that may present with nonspecific symptoms such as exertional dyspnea and fatigue. Its detection is particularly challenging when resting parameters are normal and comorbidities mask early signs. Cardiac rehabilitation offers a unique opportunity to uncover latent forms of PH through structured physical activity and close monitoring.
Case Report: A 69–year–old man with class III obesity, type 2 diabetes, hypertension, and obstructive sleep apnea syndrome (OSAS) was admitted for chest pain and diagnosed with inferior STEMI. Coronary angiography showed non–obstructive coronary artery disease, consistent with MINOCA. Echocardiography revealed segmental akinesia with preserved LVEF and a dilated but functional right ventricle, with non–measurable pulmonary artery pressures (figure 1).

During cardiac rehabilitation, the patient developed exertional dyspnea and significant desaturation during the six minutes walking test, despite normal resting oxygen saturation. Bubble contrast echocardiography suggested a right–to–left shunt on Valsalva, not confirmed on resting TEE. Spirometry revealed mild obstruction; polysomnography confirmed OSAS. Stress echocardiography showed a marked rise in pulmonary artery pressures (PAP 80 mmHg) without inducible ischemia (figure 2).

Right heart catheterization demonstrated precapillary pulmonary hypertension with elevated pulmonary vascular resistance (mPAP 30 mmHg, PCWP 11 mmHg, PVR 3.5 WU). Lung perfusion scintigraphy and CT angiography revealed segmental perfusion defects and chronic thromboembolic disease (figure 3), consistent with chronic thromboembolic pulmonary hypertension (CTEPH). Parenchymal findings included emphysematous bullae and ground–glass opacities. The patient was diagnosed with CTEPH and OSAS, representing a rare Group 3–4 pulmonary hypertension overlap. CPAP therapy, Riociguat, and anticoagulation were initiated.
Conclusions: This case highlights the diagnostic value of cardiac rehabilitation as a clinical observatory for uncovering hidden cardiopulmonary diseases. The structured environment—combining supervised exercise, continuous monitoring, and multidisciplinary assessment—enabled the identification of exertional hypoxemia and led to a targeted diagnostic workup. In patients with unexplained dyspnea, especially those with OSAS, clinicians should maintain a high index of suspicion for pulmonary hypertension.

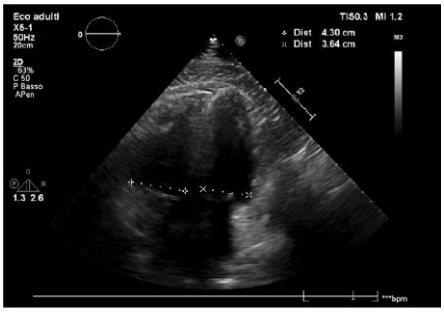

Figure 1. Rest echocardiogram with enlarged right-heart view; pulmonary artery pressure was not measurable.

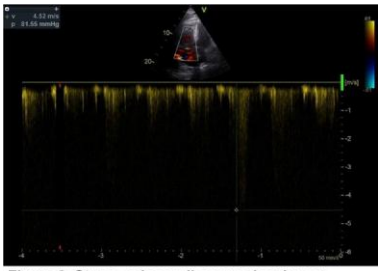

Figure 2. Stress echocardiogram showing an increase in pulmonary artery pressure.

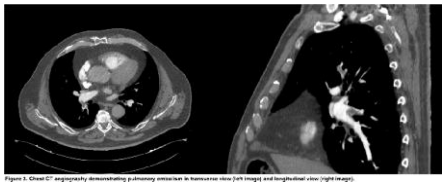

Figure 3. Chest CT angiography demonstrating pulmonary embolism in transverse view (left image) and longitudinal view (right image).

Abstract citation ID: suag058.369

ACQUIRED AORTO–PULMONARY FISTULA: A CASE REPORT HIGHLIGHTING DIAGNOSTIC CHALLENGES

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Background: Aorto–pulmonary fistula (APF) is a rare but potentially life–threatening condition, most commonly occurring as a complication of aortic surgery or aortic dissection. This case report describes a non–iatrogenic APF caused by a chronic aortic arch aneurysm, an uncommon etiology that is scarcely reported in the literature.
Case Summary: 68–year–old woman was admitted for severe right heart failure (RHF) secondary to pulmonary hypertension (PH), refractory to high–dose diuretic therapy. Three months earlier, a chronic aneurysm of the aortic arch had been documented (Figure 1), but the underlying cause of PH remained undetermined. Targeted transthoracic echocardiography (TTE), using off–axis views guided by a high index of clinical suspicion, revealed abnormal aorto–pulmonary flow, subsequently confirmed by dedicated CT angiography (Figure 2). The patient underwent staged open surgical repair (Figure 3: intraoperative TEE), resulting in complete closure of the fistula and full hemodynamic recovery. Postoperative course was uneventful, with marked improvement in pulmonary pressure and in right ventricular function.
Conclusion: Prompt diagnosis, guided by high clinical suspicion and targeted, multimodal imaging, is essential for identifying rare and potentially life–threatening causes of pulmonary hypertension. Early diagnosis facilitates timely intervention of potentially reversible causes of pulmonary hypertension, like aorto–pulmonary fistula, leading to substantial symptom relief and improving patient outcomes.

Figure 1. Saccular aneurysm of the aortic arch along its concavity, arising distal to the origin of the left common carotid artery, measuring 5 × 6 cm

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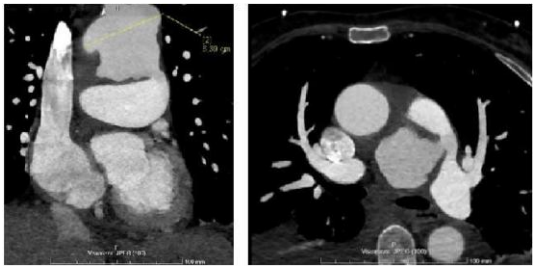

Figure 2. Two-dimensional CT angiography of the aorta demonstrating a small fistulous tract between the aortic arch aneurysm and the pulmonary trunk. (A) Coronal Plane (B) Axial Plane

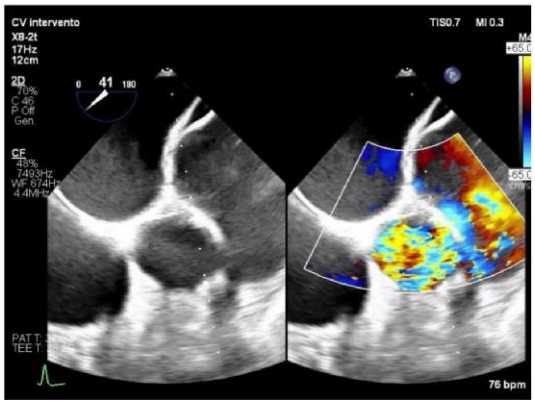

Figure 3. Intraoperative transesophageal echocardiography, mid-esophageal short-axis view above the aortic valve plane, showing abnormal flow between the aorta and the pulmonary trunk.

Abstract citation ID: suag058.370

UNMASKING PULMONARY HYPERTENSION IN SYSTEMIC SCLEROSIS SINE SCLERODERMA

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Ospedale Generale Regionale Miulli; Ospedale Villa Verde

Pulmonary arterial hypertension (PAH) is a severe and life–threatening complication of systemic sclerosis (SSc), particularly challenging to diagnose in scleroderma sine scleroderma (ssSSc), a rare subset lacking the typical skin involvement. In ssSSc, early symptoms may be limited to Raynaud's phenomenon, often overlooked, leading to delayed recognition of PAH and poor prognosis. SSc is an autoimmune disease characterized by vascular injury and fibrosis of the skin and internal organs, including lungs, heart, and kidneys. It is classified into diffuse cutaneous (dcSSc), limited cutaneous (lcSSc), and ssSSc, with ssSSc resembling lcSSc in autoantibody profile and visceral manifestations. We report a 60–year–old woman presenting with dyspnea and bilateral leg edema. Imaging revealed NSIP–type interstitial lung disease and dilated pulmonary arteries and heart chambers. NT–pro–BNP was elevated (8160 ng/ml), and ECG showed sinus rhythm with right axis deviation and right ventricular strain. Echocardiography demonstrated severe right heart failure with right ventricular dilation (Figure 1 - 40 mm), interventricular septum flattening (EI 1.5), severe tricuspid regurgitation (Figure 2), and markedly impaired RV function (FAC 21%, TAPSE 13 mm, TAPSE/PAPs 0.14 mm/mmHg). Her history included diabetes, repeated COPD–like exacerbations, Raynaud's phenomenon, and mild dysphagia. Reevaluation of CT imaging revealed subtle esophageal dilatation (Figure 3), prompting autoimmune testing, which showed high–titer ANA (1:2560) with nucleolar pattern. Based on clinical, imaging, and serological findings, ssSSc was diagnosed. Right heart catheterization confirmed significant precapillary pulmonary hypertension. Despite aggressive therapy, including non–invasive ventilation, parenteral prostanoids, and inhaled nitric oxide, the patient progressed to respiratory failure and died. This case underscores the importance of considering ssSSc in patients with SSc–like visceral involvement even in the absence of cutaneous manifestations. Lack of skin changes contributes to delayed diagnosis, allowing irreversible vascular and organ damage. Early recognition and timely initiation of therapy are critical to enhance survival. Awareness among clinicians—including cardiologists, pulmonologists, and rheumatologists—is essential to ensure prompt multidisciplinary management and optimize prognosis and quality of life in patients with this rare and severe form of systemic sclerosis.

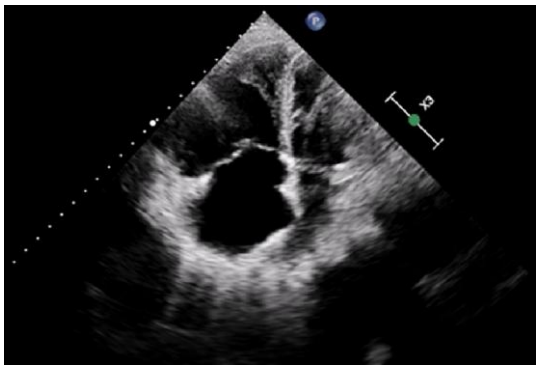

Figure 1

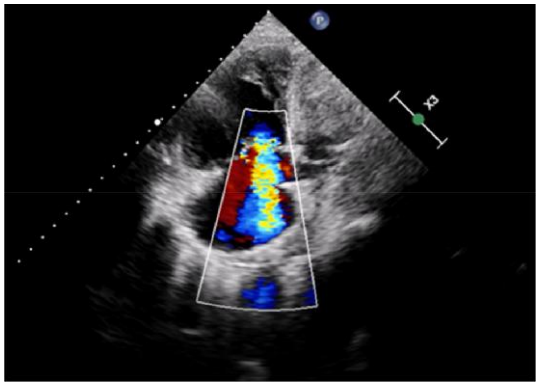

Figure 2

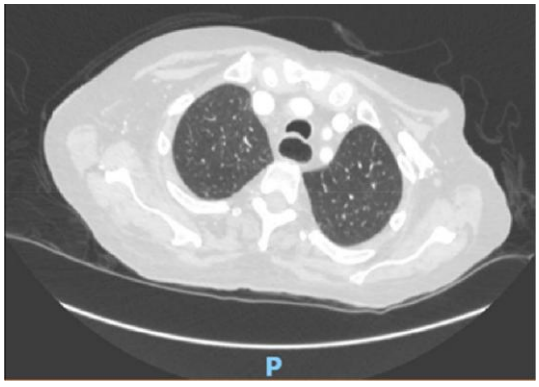

Figure 3

Abstract citation ID: suag058.371

REASSESSING RISK STRATIFICATION IN PULMONARY HYPERTENSION. THE EMERGING ROLE OF ECHOCARDIOGRAPHY AND THERAPEUTIC OPTIMIZATION WITH SOTATERCEPT

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Risk stratification in pulmonary arterial hypertension (PAH) is critical for prognosis and treatment decisions, yet current models—including ESC/ERS tables, REVEAL, and COMPERA—have significant limitations. They inadequately account for dynamic right–ventricular (RV) function, genetic factors, and individual comorbidities. Approximately 40% of patients classified as low risk deteriorate despite guideline–based therapy, indicating that risk assessment may be incomplete and may lead to suboptimal treatment choices. Traditional noninvasive markers, such as WHO functional class, 6–minute walk

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distance, and BNP/NT–proBNP, are subjective and non-specific. Echocardiography is increasingly recognized as a key tool for early detection of RV dysfunction and monitoring therapy. TAPSE ‹18 mm, RV/RA dilation, and RV end–systolic remodeling correlate with worse outcomes, but individual measures may not capture load–dependent RV–pulmonary arterial interactions. The TAPSE/PASP ratio, reflecting RV–PA coupling, appears superior, providing a more comprehensive assessment of RV function under pulmonary load. Sotatercept, a TGF–β/activin pathway modulator, has shown significant reductions in pulmonary vascular resistance, improved functional capacity, and decreased composite cardiovascular risk in high–risk patients on maximal therapy, highlighting the need for updated risk thresholds and personalized treatment strategies. A clinical case illustrates these principles: a 40–year–old man presented with dyspnea, leg edema, elevated NT–proBNP, right ventricular strain on ECG, and CT evidence of pulmonary artery and right heart dilation. Echocardiography revealed severe RV dilation, hypokinesia, tricuspid regurgitation, high PASP, and impaired RV–PA coupling (Figure 1). Despite improvement to intermediate–low risk on standard criteria after triple therapy, advanded echocardiogrphy revealed persistent subtle RV dysfunction (reduced TAPSE/SPAP and impaired RVFWS) (Figure 2-3) despite normalized conventional parameters, prompting the addition of sotatercept. After one year, the patient achieved NYHA class I, normalized pulmonary resistance, and complete echocardiographic remodeling. This case emphasizes the limitations of static risk tables and the importance of integrating advanced echocardiographic markers into risk assessment. Sotatercept demonstrates the potential for a new era of therapy, where non-invasive dynamic monitoring of RV function can guide treatment optimization and improve outcomes in PAH.

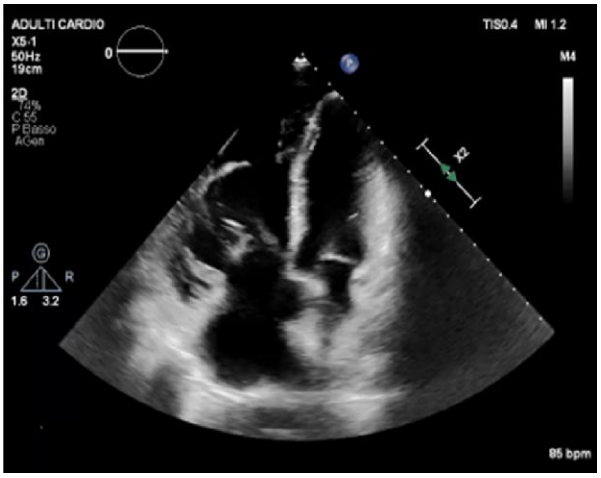

Figure 1

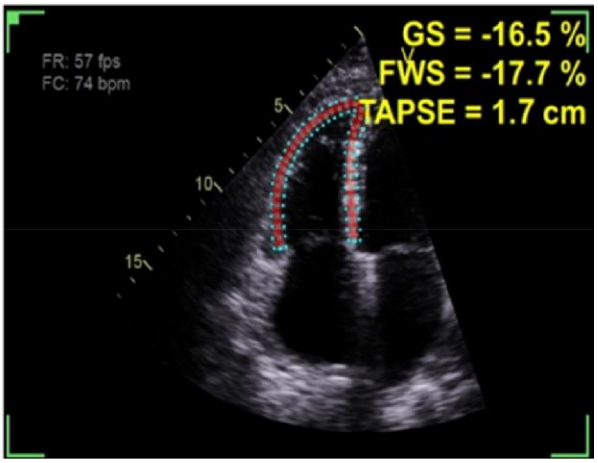

Figure 2

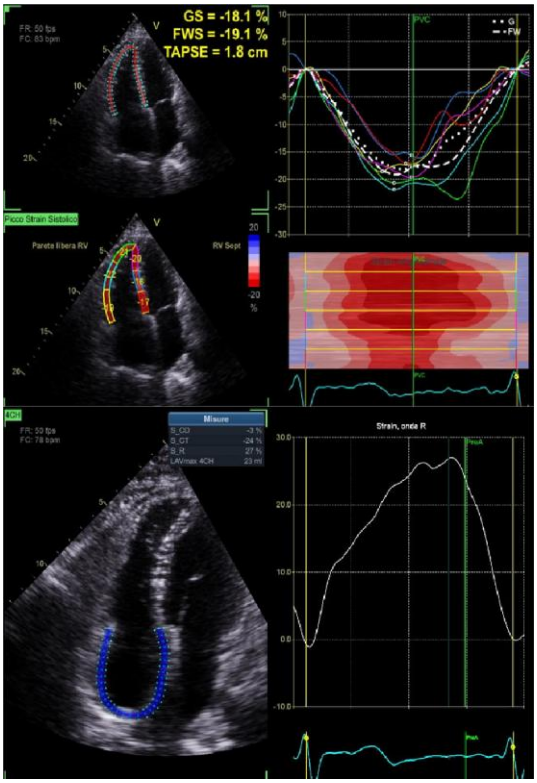

Figure 3

Abstract citation ID: suag058.372

INFLUENCE OF AGE IN THE ASSESSMENT OF THERAPEUTIC RESPONSE IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

F. Dardi, D. Guarino, A. Ballerini, R. Bertozzi, F. Donato, F. Cennerazzo, M. Salvi, E. Nardi, I. Magnani, A. Manes, M. Palazzini, and N. Galiè
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Background: In patients with pulmonary arterial hypertension (PAH) current European guidelines recommend achieving a low–risk profile, primarily based on World Health Organization functional class (WHO–FC), 6–minute walk distance (6MWD), and natriuretic peptides (BNP/NT–proBNP). However, these non–invasive parameters are influenced by age. We investigated the impact of age on treatment response and evaluated the prognostic role of haemodynamic–based risk assessments.
Methods: Treatment–naïve PAH patients from a single–centre registry were included, stratified by age. Clinical, functional, and haemodynamics were assessed at baseline and after initial PAH– targeted therapy. Prognostic discrimination was performed using non–invasive (ESC/ERS 4– strata, REVEAL Lite 2) and haemodynamic–based risk models (including a purely haemodynamic –RHC– risk tool) with Cox regression and c–statistics.
Results: 794 PAH patients were enrolled. Elderly individuals exhibited worse WHO–FC, higher BNP/NT– proBNP levels, and shorter 6MWD, despite lower right ventricular (RV) afterload, likely due to comorbidities and worse RV function. Improvement of WHO–FC, BNP/NT–proBNP, and 6MWD is lower in the elderly, despite comparable haemodynamic changes across the age groups. In older patients, non–invasive risk tools overestimated RHC risk tool severity and demonstrated a reduced prognostic accuracy. In patients ›65 years reaching a low–risk haemodynamic profile, non–invasive risk tools were of no added prognostic value. Conversely, haemodynamics provided independent prognostic information in younger patients (Figure 1).
Conclusions: Haemodynamics is less influenced by age than non–invasive risk assessment and is of added prognostic value to non–invasive assessment in younger patients. Achieving a low–risk haemodynamic profile can be a valid therapeutic target when non–invasive criteria are not met in patients ›65 years.

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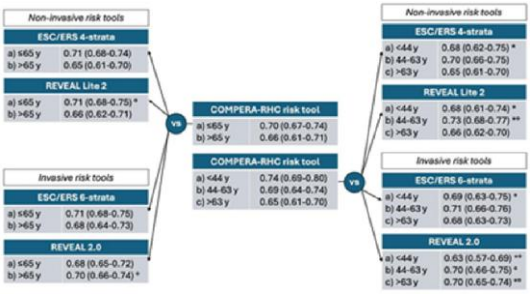

Figure 1

Abstract citation ID: suag058.373

ASSESSMENT OF THORACIC WALL MUSCLES WITH HRCT IN PATIENTS WITH PULMONARY HYPERTENSION UNDERGOING RIGHT HEART CATHETERIZATION

E. Maggio, G. Serino, F. Adamo, A. Mihai, T. Recchioni, C. Vizza, R. Badagliacca, and S. Papa
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Introduction: several studies indicate a relationship between chronic cardiovascular disease and sarcopenia, but its expression in different pulmonary hypertension (PH) subgroups is still unknown. Our study aims to identify loss of muscle mass in different subgroups of PH, exploring the correlation with different hemodynamic parameters, using the skeletal muscle index (SMI) and the intramuscular fibroadipose tissue (IMAT) derived by the chest high resolution computed tomography (HRCT) scan to evaluate muscles such as pectoral muscles (PM) and erector spinae muscle (ESM).
Methods: we included in this retrospective monocentric cohort study 914 patients, corresponding to a total of 1188 right heart catheterization (RHC) performed between 2009 and 2021. We excluded patients with missing data (11 patients, 1,2%) or those (168 patients, 14%) who did not respect the criteria for the diagnosis of PH. Furthermore, we have excluded repeated RHC (274, 27,15%) from the study by focusing exclusively on the first RHC performed for each patient, resulting in a total of 735 RHCs included in the study. Of these, 235 (32%) were identified as belonging to Group 1 PH, 192 (26%) belonged to Group 2 PH, and the remaining 308 (42%) belonged to Group 3 PH. Moreover, only 294 patients underwent HRCT, distributed as 123 in Group 1, 55 in Group 2, and 116 in Group 3.
Results: Our results showed that IMAT was higher in Group 2 (4.85±2.94 cm^2) compared to Group 1 (4.28±3.50), and both were higher than in Group 3 (3.29 ±2.19 cm^2) ($p<0.01$). A subanalysis in Group 1 patients shows a positive correlation between PAPm and IMAT PM (r=0.133, p=0.012), IMAT ESM (r=0.168, p=0.002), IMAT PM/BSA (r=0.121, p=0.020), IMAT ESM/BSA (r=0.159, p=0.003) and IMAT (PM+ESM)/BSA (r=0.164, p=0.002). Regarding cardiac index (CI), we found a negative correlation with IMAT ESM (r=–0.176, p=0.001), IMAT ESM/BSA (r=–0.156, p=0.004) and IMAT (PM+ESM)/BSA (r=–0.132, p=0.012). Finally, TPVR shows a positive correlation with IMAT ESM (r=0.103, p=0.040) and IMAT ESM/BSA (r=0.117, p=0.023).
Conclusion: These findings highlighted that PH is associated with myosteatosis, with a correlation with the increased afterload and reduced CI. This is particularly important because patients with PH tend to move less (mainly due to dyspnea), thereby promoting sarcopenia, which in turn worsens motor skills. This relationship constitutes a positive feedback loop that could worsen quality of life and prognosis.

Pulmonary Circulation Disease - Pulmonary Artery Hypertension 2

Abstract citation ID: suag058.374

WHEN MORE IS LESS: PULMONARY HYPERTENSION AND HEART FAILURE IN A PATIENT WITH SYSTEMIC SCLEROSIS

D. Triggiani, E. De Tommasi, N. Camassa, L. De Michele, A. Mannarini, R. De Michele, I. Fraccalvieri, S. Montaruli, A. Perrone, and P. Colonna
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Background: Pulmonary hypertension (PH) in systemic sclerosis (SSc) is a complex and heterogeneous condition, often classified as Group 1 pulmonary arterial hypertension (PAH). However, overlapping mechanisms—including left heart dysfunction (Group 2), interstitial lung disease (Group 3), and chronic thromboembolic disease (Group 4)—are frequent in patients with longstanding, multisystemic SSc. This overlap complicates therapeutic decisions, as pulmonary vasodilators, while beneficial in precapillary PH, may exacerbate heart failure in the presence of postcapillary involvement. This case highlights how dual vasodilator therapy can unmask a latent postcapillary component, leading to clinical decompensation, and supports the rationale for a more conservative, physiology–guided approach.
Case Report: A 75–year–old woman with longstanding SSc and multiorgan involvement was admitted for congestive heart failure. Her history included permanent atrial fibrillation, chronic respiratory failure, moderate chronic kidney disease, and diastolic dysfunction. She had been diagnosed with precapillary PH in 2021 (mPAP 26 mmHg, PVR 2.4 WU, PCWP 11 mmHg) and treated with bosentan, later switched to macitentan and tadalafil. At admission in November 2025, she presented with systemic congestion and worsening renal function. Echocardiography showed preserved systolic function, grade III diastolic dysfunction, and a chronic pericardial effusion. Right heart catheterization, performed while on dual therapy, revealed normalized PVR (1.05 WU) but a significant rise in PCWP (29 mmHg), indicating a shift toward postcapillary PH (table 1). Intravenous hydration improved renal function and reduced pericardial effusion. Given the hemodynamic profile and clinical response, tadalafil was discontinued, while macitentan and diuretics were maintained. The patient was discharged in stable condition with close follow–up.
Conclusions: This case underscores the potential harm of overtreatment in SSc–associated PH. While dual vasodilator therapy is standard in PAH, it may unmask or worsen a postcapillary component in patients with mixed or evolving hemodynamics. In such cases, monotherapy with an ERA may offer a safer and more effective strategy. Careful hemodynamic monitoring and individualized treatment are essential to avoid iatrogenic decompensation. In SSc–PH, treating less may sometimes mean treating smarter.

Parameter	Year 2021	Year 2025
Aortic Pressure S/D/M (mmHg)	160/75/100	130/70/90
Pulmonary Pressure S/D/M (mmHg)	33/19/26	51/23/34
Pulmonary Vascular Resistance (Wood)	2.4	1.05
Right Ventricle Pressure S/EDP	30/3/7	47/7/12
PCW Pressure (mmHg)	11	29 "a" wave 21
Mean Right Atrial Pressure (mmHg)	5	11
Cardiac Output (L/min)	6.2	4.33
Cardiac Index	—	2.73
Stroke Volume (ml/beat)	61.39	59.3
Stroke Volume Index	—	37.4
Ao O_2 Saturation	96%	99.4%
PCW O_2 Saturation	90%	97.1%
Inferior Vena Cava O_2 Saturation	86%	82%
Superior Vena Cava O_2 Saturation	64%	74%
Pulmonary Artery O_2 Saturation	87%	74%
Hemoglobin	12.1 g/dL	12.6 g/dL

Table 1. Hemodynamic parameters obtained by right-heart catheterization, compared with previous measurements from 2021.

Abstract citation ID: suag058.375

A CHALLENGING CASE REPORT IN A CATH LAB

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A 78 yo male presented to our Cardiology Department complaining of an increasing and severe dyspnoea. His anamnesis was relevant for a previous right myocardial infarction treated with percutaneous coronary angioplasty (PTCA) and a deep vein thrombosis treated with apixaban for 6 months with a

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recurrence after 4 years treated with rivaroxaban, still on board during our evaluation.

The transthoracic echocardiogram showed a normal left ventricular systolic function, a D–shape appearance, with elevated filling pressures and a severe mitral regurgitation due to valve prolapse. On the right side a dilation of the right ventricle was accompanied by a severe tricuspid regurgitation with normal contractility parameters and high ventriculo–atrial gradient (sPAP 95 mmHg). The initial suspicion was a severe mitral regurgitation conditioning a secondary pulmonary hypertension (PH); the patient was then initiated with oral diuretic therapy and a trans–esophageal echocardiogram was then performed.

After one month, diuretic therapy was effective in reducing mitral regurgitation alongside with left ventricular filling pressures, but, surprinsingly, estimated pulmonary pressures were still high (sPAP 95 mmHg). The patient underwent a high resolution CT scan and a contrast–CT chest scan which revealed no evidence of parenchymal disease, but multiple arterial filling defects. We then performed a right heart catheterization (RHC) via the internal giugular vein which revealed the following parameters: a medium pulmonary arterial pressure of 54 mmHg, a pulmonary artery wedge pressure (PAWP) of 17 mmHg, pulmonary vascular resistances of 6 wood units (WU), a central vein saturation of 56% and a reduced cardiac index (1.8 L/m2). No significant changes in saturation were found.

Our parameters pointed towards the presence of a combined post capillary pulmonary hypertension with a severe reduction of cardiac index, which was coherent with the clinical and echocardiographic findings, but the PAWP waveform was not reflective of a correct catheter positioning (Fig.1) even after targeting the right lung zone 3 and arterial oxygen saturation was 96%.

We then placed the Swan–Ganz catheter on the contralateral pulmonary branch thereby revealing a completely different curve with a PAWP of 7 mmHg (Fig.2) and a different diagnosis: a chronic thrombo–embolic pulmonary hypertension (CTEPH).

The patient was then treated with a pulmonary thromboendoarterectomy surgery (Fig.3)

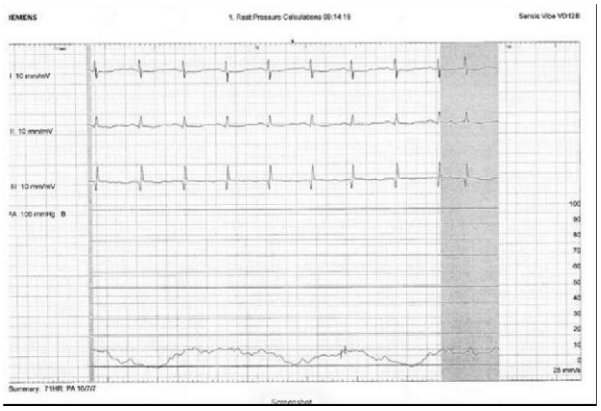

Figure 1

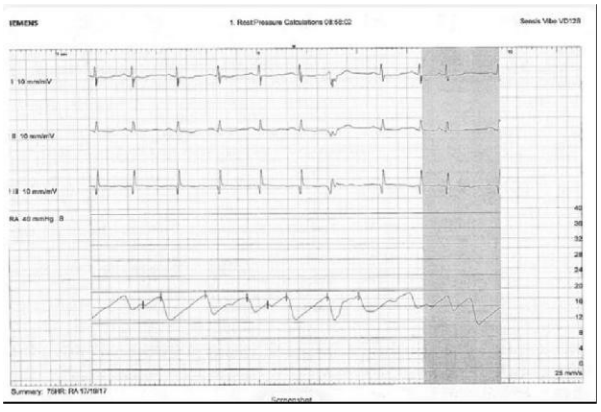

Figure 2

Figure 3

Abstract citation ID: suag058.376

EX NOCENTIBUS: THE CHALLENGING MANAGEMENT OF PULMONARY VENO–OCCLUSIVE DISEASE

A. Mastrangelo, S. Rastelli, F. Barocelli, A. Guidorossi, F. Russo, G. Benatti, L. Vignali, and G. Niccoli
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PVOD is a rare form of pulmonary arterial hypertension (PAH) characterized by remodeling of pulmonary venules with intimal fibrosis leading to lumen obliteration, progressive increase in vascular resistance, right heart failure and death (Figure 1). It is essential to distinguish PVOD from other causes of PAH due to its more aggressive progression, poorer prognosis and poor response to specific PAH therapies, which may cause fatal iatrogenic pulmonary edema. The development of edema following pulmonary vasodilator therapy strongly supports the diagnosis of PVOD. In PVOD obstruction of small pulmonary veins impairs capillary drainage increasing pulmonary capillary pressure. Vasodilators raise precapillary blood flow without improving venous outflow (dam effect) rapidly boosting capillary hydrostatic pressure leading to edema. This paradoxical response is distinctive of PVOD and has major diagnostic and therapeutic implications. Histology is the diagnostic gold standard, but lung biopsy is contraindicated in significant PAH and a non–invasive diagnostic approach is often necessary. We report a 79–year–old woman with systemic sclerosis–associated PAH and suspected PVOD. From January 2025, the patient developed progressive exertional dyspnea and fatigue. HRCT showed centrilobular ground–glass opacities, mediastinal lymphadenopathy, smooth interlobular septal thickening and pulmonary artery dilation–features suggestive of PVOD (Figure 2). Pulmonary function tests revealed significantly reduced DLCO (26%). In October 2025 RHC revealed precapillary PAH (PAPm 37 mmHg; PAWP 10 mmHg; PVR 9,3 WU). Given the HRCT findings, PVOD could not be excluded, and PAH–specific therapy with macitentan was started cautiously. One week later, no heart failure signs were evident, but after 21 days the patient developed resting dyspnea with severe acute partial respiratory failure on chronic (pH 7.45; pCO2 32 mmHg; pO2 39 mmHg; sO2 72%) and was hospitalized. Imaging and clinical evaluation showed congestive heart failure likely linked to macitentan–induced pulmonary edema, which resolved rapidly after discontinuation of macitentan and a few days of oxygen therapy and iv diuretics, confirming the suspicion of PVOD. This case highlights the diagnostic and therapeutic difficulties of PVOD, emphasising the need for high clinical suspicion and extreme caution when initiating treatments targeted at PAH with very close follow–up due to the risk of rapid deterioration even several days after the start of therapy.

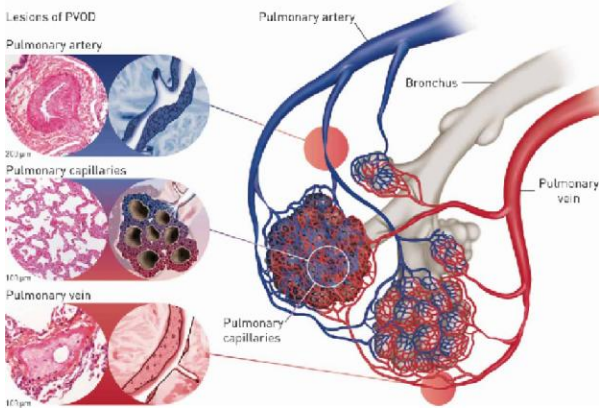

Figure 1

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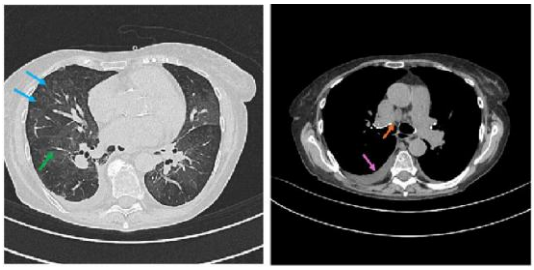

Figure 2

Abstract citation ID: suag058.377

INDIVIDUALIZED PSYCHOTHERAPEUTIC PATHWAY FOR PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

G. Spinelli, G. Galgano, F. Fortunato, S. Di Marino, R. Musci, F. Cacciapaglia, P. Pierucci, and M. Grimaldi
Ospedale Generale Regionale Miulli; Ospedale Villa Verde

Introduction: Pulmonary arterial hypertension (PAH) is a rare, chronic, and progressive condition associated with high morbidity and poor prognosis despite advances in pharmacological therapies. Patiens are often required to manage complex multidrug regimens, including not only oral medications but also continuous intravenous or subcutaneous infusion and inhaled therapies, which substantially affect quality of life and illness perception. Comorbidities and the burden of complicated treatment plans frequently lead to psychological distress and decreased therapeutic adherence. In this context, psychotherapeutic support represents a crucial component of comprehensive patient care.
Objectives: This study aimed to assess the prevalence of psychopathological symptoms, specifically stress, anxiety, and depression, in patients with PAH, and to evaluate the effectiveness of psychological intervention in improving adherence to complex pharmacological treatments.
Materials and Methods: Patients underwent a structured psychological assessment using validated instruments. Levels of stress, anxiety, and depression were evaluated through the Hospital Anxiety and Depression Scale (HADS). Depressive symptomatology was further assessed using the Beck Depression Inventory–II (BDI–II), allowing discrimination between clinically depressed and non–depressed patients. Personality traits were examined using the Minnesota Multiphasic Personality Inventory–2 (MMPI–2), while cognitive functioning was evaluated through a comprehensive neuropsychological battery to identify potential cognitive deficits.
Results and Conclusions: Qualitative and quantitative analyses identified anxiety as the predominant psychological profile among patients with PAH. Psychotherapeutic intervention was associated with a reduction in anxiety levels of approximately 50%. Moreover, an individualized and continuous psychotherapeutic approach was shown to significantly improve adherence to pharmacological therapies, with potential positive implications for patient survival. Psychotherapy thus emerges as an essential adjunct to medical treatment in PAH, enhancing overall therapeutic effectiveness, alleviating psychological distress, and improving patients' emotional well–being and quality of life (Figure 1).

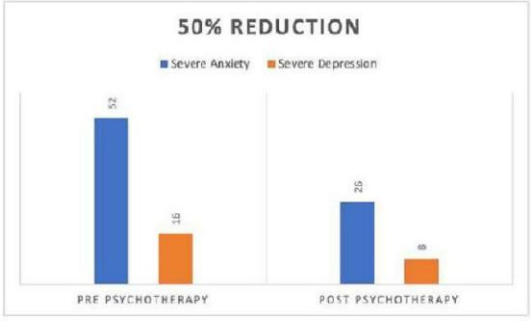

Figure 1

Abstract citation ID: suag058.378

MORTALITY RISK IN SYSTEMIC SCLEROSIS–ASSOCIATED PULMONARY ARTERIAL HYPERTENSION: CONCORDANCE BETWEEN THERAPEUTIC RESPONSE, HEMODYNAMIC IMPROVEMENT AND VALIDATED CLINICAL SCORES

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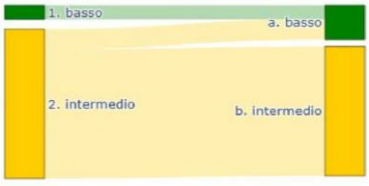
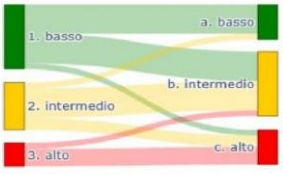
Background: Systemic sclerosis–associated pulmonary arterial hypertension (SSc–PAH) is a severe complication affecting 15–18% of SSc patients, with a three–year survival rate below 50%. Early diagnosis is crucial to initiate targeted therapy. Although risk stratification tools such as the ESC/ERS 3–strata model and REVEAL 2.0 score are widely used, they were not specifically developed for SSc–PAH, potentially limiting their accuracy in this setting.
Aim: This study aimed to evaluate survival, therapeutic response, and prognostic accuracy of the ESC/ERS 3 strata model and REVEAL 2.0 score in patients with SSc–PAH, and to identify early predictors of clinical improvement.
Methods: A retrospective, observational study was conducted on 23 female patients with confirmed SSc–PAH, diagnosed by right heart catheterization and followed at a single center. Clinical, functional, and hemodynamic data were collected at baseline (T0) and after 3–12 months after treatment initiation (T1). Risk scores were applied at both time points to assess longitudinal changes and prognostic value.
Results: The Nine–year survival rate was 87%. Both scores showed a trend toward risk improvement after therapy although changes did not reach statistical significance (p=0.727) [Figures 1,2]. Hemodynamic parameters improved significantly, with reductions in mean pulmonary artery pressure (mPAP T0 28 mmHg* [24,5–31,0] – mPAP T1 24 mmHg [21,0–30,0]; p=0.043) and pulmonary vascular resistance (PVR T0 4,3 WU [3,4–5,9] – PVR T1 2,7 WU [1,9–2,9]; p<0.001), and an increased cardiac output (CO T0 4,6 L/min [4,1–5,2] – CO T1 5,4 L/min [4,8–6,2]; p=0.014). Functional capacity showed no substantial improvement. Baseline right atrial area (RAA) was inversely associated with clinical improvement (improved patients' RAA T0 12,5 cm2 [10,5–13,0] – not improved patients' RAA T0 16,0 cm2 [14,0–19,5]; OR 0.502; p<0.05), indicating early prognostic relevance [Figure 3].
Conclusions: Early diagnosis and treatment are associated with improved long–term survival in SSc–PAH. However, current risk stratification models may underestimate treatment benefit in this population. Baseline right atrial area may represent a valuable prognostic marker. Development of tailored tool specifically designed for SSc–PAH is warranted to optimize therapeutic strategies. *
Results are reported as median values.

FIGURE 1
RISK CLASS TRANSITION ACCORDING TO THE THREE STRATA ESC/ERS MODEL



The Sankey diagram illustrates the distribution and transitions in risk classification of patients between baseline (T0) and after 3–12 months after treatment initiation (T1), according to the three strata ESC/ERS model. On the left, the bars represent patients initially classified as low risk (T0) and intermediate risk (T0). All the patients initially at low risk (green bar, 2 patients), remained at low risk at T1. Among patients initially at intermediate risk (yellow bar), 3 shifted to low risk and 18 remained at intermediate risk at T1.

FIGURE 2
RISK CLASS TRANSITION ACCORDING TO THE REVEAL MODEL



The Sankey diagram illustrates the distribution and transitions of 23 patients across three risk categories at baseline (T0, on the left) and first reassessment (T1, on the right) according to the REVEAL model: low risk (green), intermediate risk (yellow), and high risk (red). At baseline, 7 patients were classified as low risk. At T1, 5 remained in the low-risk category, while 2 shifted to intermediate risk. At T0, 11 patients were classified as intermediate risk. Among them, 2 improved to low risk, 6 remained at intermediate risk, and 3 worsened to high risk at T1. Finally, 5 patients were classified as high risk at baseline. At first reassessment, 3 remained high risk, while 2 improved to intermediate risk.
In summary, 7 patients improved or remained stable in the low-risk category, 8 patients experienced worsening (transitioning to a higher risk class), and 8 patients remained stable in intermediate or high-risk categories.

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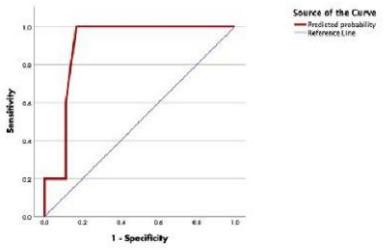
FIGURE 3
ROC CURVE FOR BASELINE ATRIAL AREA AS PREDICTOR OF IMPROVED CLINICAL OUTCOME



Right atrial area was a discriminative variable between patients who improved (median value 12.5 cm²) and those who did not (median value 16.0 cm²). A binary logistic regression analysis showed a borderline statistically significant inverse association between atrial area and improvement ($p = 0.050$), with an odds ratio (OR) of 0.502 (95% CI: 0.253–0.999), indicating that for each 1 cm² increase in atrial area, the probability of clinical improvement decreased by approximately 50%. The data from logistic regression were used to generate a ROC. The area under the curve (AUC) was 0.900, indicating excellent prognostic accuracy. The optimal cut-off value, determined by maximizing the Youden index was 13.5 cm², below which the test showed maximal discriminative ability. At this threshold, sensitivity was 100% and specificity was 83.3%.

Abstract citation ID: suag058.379

POLLUTION AND PULMONARY HYPERTENSION: A DOUBLE LINK. RATIONALE AND DESIGN OF A RETROSPECTIVE STUDY

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Valparma Hospital; Clinica Pneumologica Parma

Introduction: Air pollution is a complex mixture of gases and other molecules that permeate the atmosphere, making exposure largely unavoidable in most indoor and outdoor environments. External, or environmental, pollution can be produced by dumping from numerous sources, including motor vehicles, industrial processes, agricultural dust, fires, etc. All sources of PM have the potential to impact human health, but while domestic pollution impacts people on a personal level, environmental pollution has the potential to affect global health. Pulmonary arterial hypertension is a condition characterized by an increase in mean pulmonary pressure (mPAP) › 20 mm/Hg with pulmonary vascular resistance › 2 MW. Interestingly, there is growing interest in understanding the impact of air pollution on cardiovascular and pulmonary health, including its potential association with pulmonary hypertension.
Method: This study aimed to investigate whether exposures to air pollutant emissions caused harmful health effects in the Parma metropolitan area and in the nearby cohorts of Langhirano and Sorbolo, south and north of the city respectively. In particular, we wanted to evaluate whether the exposure rate to particulate matter had a greater effect on the development of pulmonary hypertension; environmental pollution data were provided by ARPAE Emilia Romagna and refer to the average values of the same period in the years 2015, 2017, 2020, 2023. The Local Ethics Committee approved this study on 07/21/2025 n° protocol 0000481 and participants provided written informed consent. This study will be a non–interventional, retrospective and monocenter. After excluding patients with postcapillary pulmonary hypertension, we selected 36 patients [13M;23F] with at least moderate or severe precapillary pulmonary hypertension, because they lived in Parma and the neighboring municipalities under study. 28 had idiopathic pulmonary hypertension (PAH); 8 had pulmonary hypertension associated with scleroderma.
Conclusions: This study has been designed to improve our understanding of pathophysiological link from air pollution and pulmonary hypertension.The findings could potentially allow for a more appropriate approach to the pathology

Abstract citation ID: suag058.380

INFLAMMATORY MYOPATHIES AND PULMONARY HYPERTENSION: RARE BUT SEVERE ASSOCIATION

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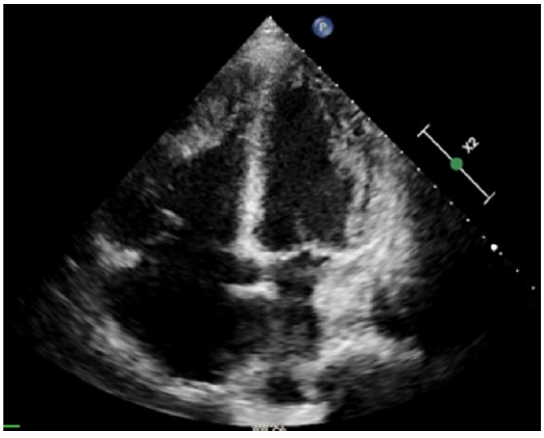
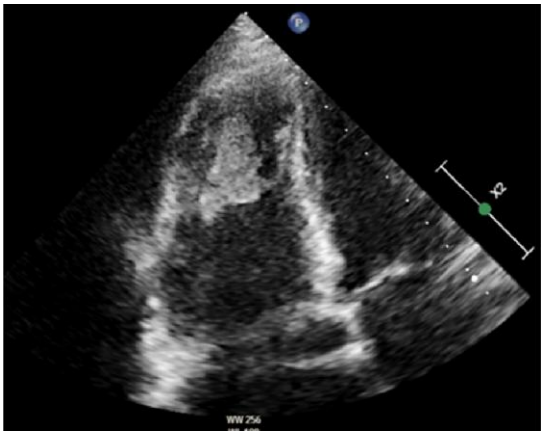
Ospedale Generale Regionale Miulli

Autoimmunity plays a central role in the pathogenesis of idiopathic inflammatory myopathy (IIM), with autoantibodies identified in over 50% of patients. These target both nuclear and cytoplasmic cellular components and are classified as myositis–specific (MSAs) or myositis–associated autoantibodies (MAAs), often present in other connective tissue diseases (CTDs). While pulmonary hypertension (PH) is a recognized complication of CTDs, it is rare in IIM, and when present, it is frequently associated with interstitial lung disease. The prevalence of MSAs/MAAs in PH patients remains unclear. We report a 70–year–old woman admitted for dyspnea, ascites, jugular vein distension, and leg edema. She had a two–year history of dysphagia, weight loss, and mild myalgia. Laboratory evaluation showed markedly elevated NT–pro–BNP and ECG revealed atrial fibrillation with right ventricular strain. Chest CT demonstrated nonspecific ground–glass opacities and bilateral distal pulmonary emboli. Echocardiography showed severe right heart dilation and dysfunction, consistent with right heart failure due to precapillary PH, with evidence of right intraventricular thombosis. Extensive laboratory testing revealed positivity for lupus anticoagulant (LAC), prompting anticoagulation with warfarin. Notably, antinuclear antibodies (ANA) were negative, whereas anticytoplasmic autoantibodies (AC–15, AC–16, AC–18) were detected. The interplay between myopathy and PH is multifactorial. Skeletal, particularly respiratory, muscle impairment can induce hypoventilation and hypoxemia, promoting PH onset or progression. Inflammatory and autoimmune mechanisms may directly affect pulmonary vasculature, causing endothelial injury and remodeling. Esophageal involvement can produce dysphagia. Diagnosis remains challenging due to clinical heterogeneity and overlap with other neuromuscular or systemic diseases. Cytoplasmic autoantibodies, though less commonly reported than nuclear patterns, may provide critical diagnostic information. This case illustrates the complexity of PH in CTDs, where overlapping pathophysiological mechanisms may place patients along a spectrum between Group 1 and Group 4 chronic thromboembolic PH. It underscores the importance of extending immunological workup beyond conventional autoantibodies, as less frequently investigated anticytoplasmic antibodies can reveal rare forms of PH associated with mixed connective tissue disease or inflammatory myopathies.





Pulmonary Circulation Disease - Tev

Abstract citation ID: suag058.381

POST–TRAUMATIC UPPER LIMB VENOUS THROMBOSIS DIAGNOSED WITH VEIN FINDER AND CONFIRMED BY DOPPLER ULTRASOUND: A CASE REPORT

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Polimedic, Palermo

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Upper limb deep vein thrombosis (UEDVT) is an uncommon condition compared to lower limb thrombosis, often associated with iatrogenic or mechanical causes. We report the case of a 65–year–old woman, with no systemic risk factors, who developed an occlusive venous thrombosis of the left upper limb following blunt trauma (Figure 1). The use of an infrared vein finder allowed the identification of an abnormal venous image with a dark, “full” and non–variable appearance, immediately raising the suspicion of thrombosis, which was later confirmed by Doppler ultrasound (Figure 2). This case highlights the potential role of the vein finder not only as a tool for venous access, but also as a rapid, simple, and safe method for early diagnostic suspicion in traumatic settings. A 65–year–old woman, with no history of malignancy, thrombophilia, or other systemic risk factors, presented after a blunt trauma to the left upper limb. On examination, mild edema and localized tenderness were observed, without signs of compartment syndrome. The vein finder showed a venous tract with an unusually dark and “full” image, lacking the physiological dynamic variations of filling seen in other districts. Subsequent Doppler ultrasound confirmed an occlusive venous thrombosis, with intraluminal hypoechoic material, absence of compressibility, and absence of color Doppler flow signal. This case suggests that the vein finder, beyond its primary role in venipuncture guidance, may serve as a useful adjunct for raising clinical suspicion of upper limb venous thrombosis. In post–traumatic situations, its simplicity and speed may direct the clinician towards early diagnosis, subsequently confirmed with Doppler ultrasound. Further observational studies are needed to define the actual diagnostic value of the vein finder in venous thrombosis.

Figure 1

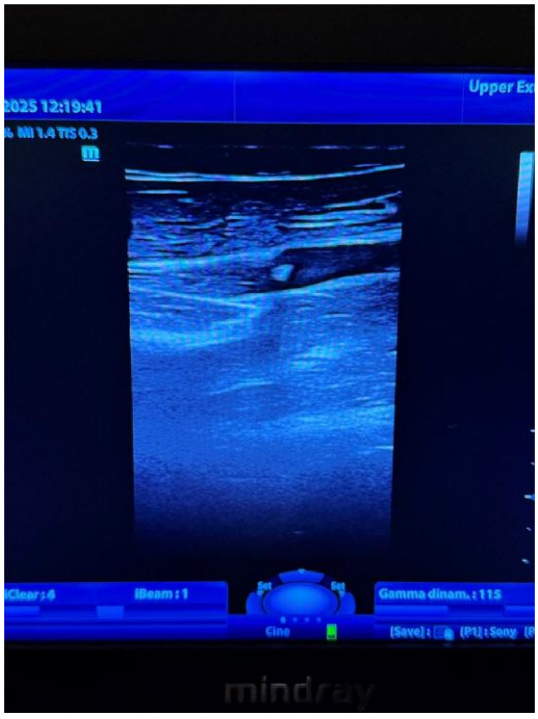

Figure 2

Abstract citation ID: suag058.382

MECHANICAL THROMBECTOMY AFTER FAILED THROMBOLYSIS IN MASSIVE PULMONARY EMBOLISM: A CASE REPORT

G. Miletti, G. Starita, D. D'Anna, J. Capparelli, F. Perconti, R. Giordano, V. Michienzi, E. Massaro, S. Meghnagi, M. Belmonte, A. Romaniello, A. Zolovkins, and E. Barbato
Azienda Ospedaliero Universitaria "Sant'Andrea"

Background: A 63 yo woman with a history of arterial hypertension, atrial fibrillation and breast cancer, recently bedridden due to a depressive condition, presented to the emergency department with acute dyspnea. At admission, she was tachypneic and hypoxemic, non–invasive PA was 90/50 mmHg. ECG showed atrial fibrillation at 80 bpm with right BBB, TTE showed RV dilation and dysfunction (TAPSE 12 mm, RV S' 9 cm/s), D–shape of interventricular septum, moderate tricuspid regurgitation (sPAP 40 mmHg) and multiple masses floating in the right sections (Figure 1); LV function was preserved. First suspicion was acute pulmonary embolism with initial hemodynamic compromise (pre–test probability was intermediate–high, Wells score 5.5). The patient was admitted to the ICCU.
Methods: CT pulmonary angiography showed massive saddle PE with bilateral involvement and RV enlargement (Figure 2). Laboratory tests showed elevated D–dimer and BNP, hs–TnI 26 pg/mL. Systemic thrombolysis with alteplase was administrated, followed by iv. heparin. The patient remained dyspneic and TTE showed persistent RV dilatation and dysfunction, even though intracardiac thrombi were no longer visible. Control CT showed new triangular parenchymal consolidations, consistent with pulmonary infarction, along with worsening respiratory distress. Doppler ultrasound revealed right popliteal vein thrombosis. Diagnostic pulmonary arteriography confirmed extensive bilateral thrombi, so rescue catheter–directed mechanical thrombectomy was performed. Multiple aspiration passes with a 20 Fr Inari FlowTriever system, with blood reinfusion via the FlowSaver system (Figure 3), achieved significant thrombus removal and an improvement in pulmonary pressures.
Results: There was a rapid improvement in clinical conditions and cardiac imaging data. The patient was discharged with oral anticoagulant therapy (edoxaban).
Conclusions: Massive PE often requires systemic thrombolysis, though this may fail. Persistent clot burden increases the risk of CTEPH, associated with poor prognosis. Catheter–directed mechanical thrombectomy represents an effective and safe rescue option. Multimodality imaging and a multidisciplinary approach were key to achieve best clinical management.

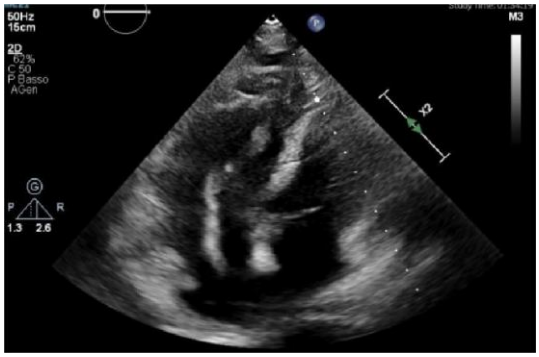

Figure 1

Figure 2

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Figure 3

Figure 1

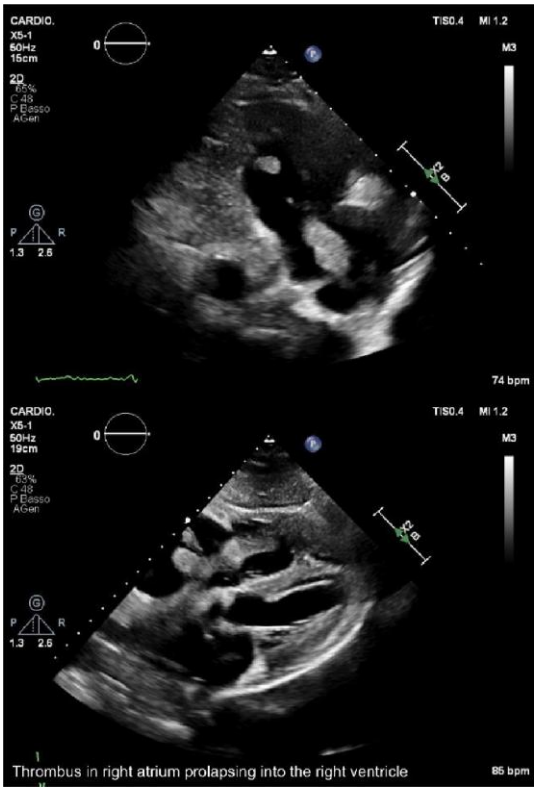

Figure 2

Abstract citation ID: suag058.383

PERCUTANEOUS TREATMENT OF MASSIVE PULMONARY EMBOLISM WITH MOBILE THROMBUS IN RIGHT HEART CHAMBERS: A CASE REPORT

S. Matera, A. Terranova, B. Polletta, S. Tolone, E. Pezzola, F. Simonelli, C. Pandolfi, V. Chianta, V. Cesario, and D. Gabrielli
Ospedale San Camillo Forlanini; Policlinico Umberto I

Introduction: Massive pulmonary embolism is associated with high mortality and requires immediate treatment. Mechanical thrombectomy is an effective therapeutic option for patients at high hemodynamic risk who have contraindications to systemic thrombolysis.
Case report: An 82–year–old woman with a history of hypertension, dyslipidemia, permanent atrial fibrillation, and breast cancer presented to the emergency department with acute dyspnea, chest pain and hypotension. Arterial blood gas showed severe hypoxemia, hypocapnia and hyperlactatemia. The patient had recently undergone total left knee replacement, with temporary discontinuation of NOAC therapy and initiation of LMWH 4,000 IU once daily. The ECG showed a new–onset right bundle branch block. Blood tests revealed a markedly elevated D–dimer (10,672 ng/mL) and elevated high–sensitivity troponin. A lung CT scan performed for suspected pulmonary embolism demonstrated extensive bilateral pulmonary thromboembolism involving lobar and segmental branches and a large right atrial thrombus (Figure 1). The echocardiogram confirmed the presence of a mobile thrombus (10 cm × 16 mm) in right atrium prolapsing into the right ventricle, acute right ventricular overload signs, dilated inferior vena cava and severe pulmonary hypertension (sPAP 50 mmHg) (Figure 2). Due to the high PESI/sPESI risk scores and deterioration of hemodynamic status, intravenous heparin and inotropic support were initiated. Considering the recent major orthopedic surgery and the associated high bleeding risk, mechanical thrombectomy was selected as the treatment strategy. The procedure was performed under echocardiographic and angiographic guidance, achieving complete thrombus removal and pulmonary reperfusion (Figure 3). Post–procedural echocardiography demonstrated normalization of right ventricular function, absence of residual thrombi, and hemodynamic stabilization. Lower extremity venous Doppler revealed bilateral deep vein thrombosis showing signs of recanalization. Elastic stocking therapy was initiated, with concomitant initiation of NOAC therapy and close clinical follow–up.
Conclusions: This case highlights the importance of early recognition of thromboembolic complications in unstable postoperative patients and the role of mechanical thrombectomy as an effective alternative to systemic thrombolysis.

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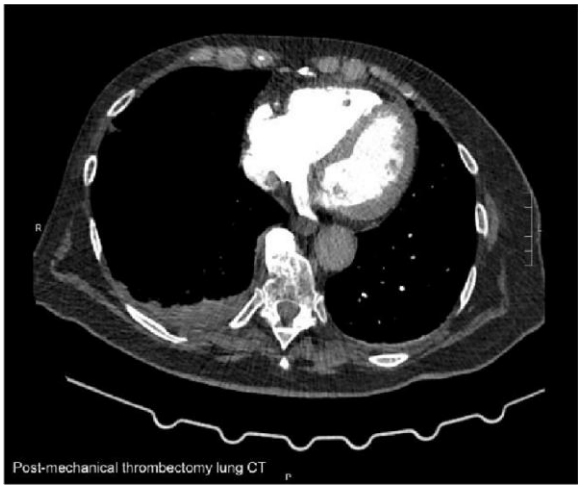

Figure 3

Abstract citation ID: suag058.384

THROMBOASPIRATION IN HIGH–RISK PULMONARY EMBOLISM WITH HIGH BLEEDING RISK

L. Di Caccamo, F. Dispensa, G. Cerruto, M. Stancampiano, G. Zambelli, R. Nola, M. Benedetto, G. Cirrincione, and I. Smecca
Arnas P.O. Civico E Benfratelli; Aou Policlinico P. Giaccone

A 68 year old woman was admitted to emergency room for mental confusion. Brain computed tomography (CT) angiography revealed a giant saccular aneurysm (24 mm diameter) of the posterolateral side of the communicating segment of the right internal carotid artery and another small aneurysm of the left middle cerebral artery (image 1). The giant aneurysm was treated with percutaneous embolization, while treatment of the smaller aneurysm was deferred to a subsequent hospitalization. After a few months, the smaller aneurysm was treated with the placement of 2 metal clips. On pre–discharge brain CT, subcraniotomy epidural hematoma (17 mm). After one month, the patient presented hypotension and syncope. A high–risk pulmonary embolism with right ventricular dysfunction was diagnosed. Dobutamine and continuous infusion of unfractionated heparin were initiated. Due to lack of improvement, pulmonary thrombectomy was performed using FLOW TRIEVER Inari 24 F catheter (image 2). At the end of the procedure, Pulmonary Artery Pressure was 25/8 mmHg. After multiple follow–up brain CT scans and neurological assessments, anticoagulant therapy was initiated with stability on brain CT for the following 5 days. On the sixth day, the patient developed headache, confusion, and vomiting. An intra–axial hemorrhage was observed in the area adjacent to the sac of the giant saccular aneurysm, previously treated endovascularly. The aneurysm ruptured into the right lateral ventricle, resulting in tetraventricular hemorrhage. Subarachnoid hemorrhage and leftward shift of the septum pellucidum were also observed. (image 3) A new embolization procedure was then performed on the cerebral aneurysm using nine microcoils. Final angiographic control demonstrated that the cerebral aneurysm had been successfully embolized. Unfortunately, the patient did not regain consciousness. The patient was subsequently considered for organ donation with donation of the heart as well, which at pre–explant evaluation showed non–dilated right chambers and preserved systolic function. The management of pulmonary embolism in patients at high risk of bleeding remains challenging, and standardized treatment pathways are lacking. The advent of novel percutaneous devices for pulmonary embolism treatment represents an important therapeutic option.

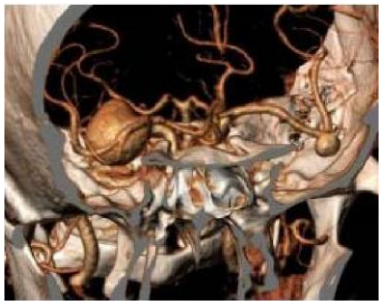

Image 1: 3D reconstruction of the cerebral aneurysm

Image 2: Clots aspirated from the pulmonary circulation

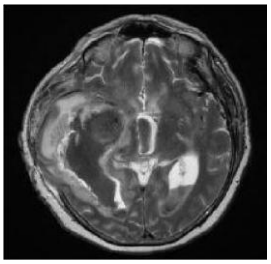

Image 3: Ruptured aneurysm with cerebral hemorrhage

Abstract citation ID: suag058.385

MASSIVE PULMONARY EMBOLISM WITH THROMBUS–IN–TRANSIT STRADDLING A PATENT FORAMEN OVALE: A CONSERVATIVE MANAGEMENT STRATEGY

M. Malasisi, T. Sciarretta, M. Possamai, Y. Caldarella, D. Barbisan, E. Lucci, F. Cocuzza, C. Pio Loco Detto Gava, S. Giacomelli, C. Cernetti, and N. Gasparetto
Unit of Cardiology, Neuro–Cardio–Vascular Department, Aulss 2 Marca Trevigiana, Hospital of Treviso; Unit of Cardiology, Neuro–Cardio–Vascular Department, Aulss 2 Marca Trevigiana, Hospital of Montebelluna

Background: Massive pulmonary embolism complicated by an intracardiac thrombus straddling a patent foramen ovale (PFO) is a rare but life–threatening condition, associated with high risk of systemic embolization and mortality.
Case presentation: We report the case of a 68–year–old woman with a history of idiopathic left lower limb deep vein thrombosis, who presented with progressive exertional dyspnea, left leg pain and edema, followed by a witnessed syncope preceded by chest discomfort. Computed tomography pulmonary angiography revealed bilateral massive pulmonary embolism with extensive thrombotic involvement of lobar, segmental and subsegmental branches. Transthoracic echocardiography (Figure 2) showed right ventricular dilatation and dysfunction with signs of pulmonary hypertension consistent with an intermediate–high risk pulmonary embolism. Transesophageal echocardiography (Figure 1 - 3) identified a large, mobile, polylobulated thrombus straddling the interatrial septum through a patent foramen ovale, protruding into both atria. The patient remained hemodynamically stable and was managed conservatively with anticoagulation with unfractionated heparin, followed by low–molecular–weight heparin, and subsequently transitioned to vitamin K antagonist therapy. Serial echocardiographic follow–up demonstrated complete resolution of the intracardiac thrombus and normalization of right ventricular function. A diagnostic workup revealed positivity for Factor V Leiden with no evidence of underlying malignancy.
Conclusions: This case highlights the importance of early echocardiographic assessment in acute pulmonary embolism to detect rare but high–risk complications such as thrombus–in–transit through a PFO. In selected hemodynamically stable patients, intensive anticoagulation with close imaging follow–up may represent an effective and safe therapeutic strategy.

Figure 1

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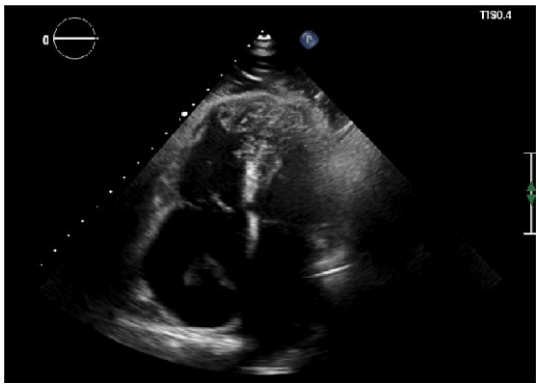


Figure 2

Figure 3

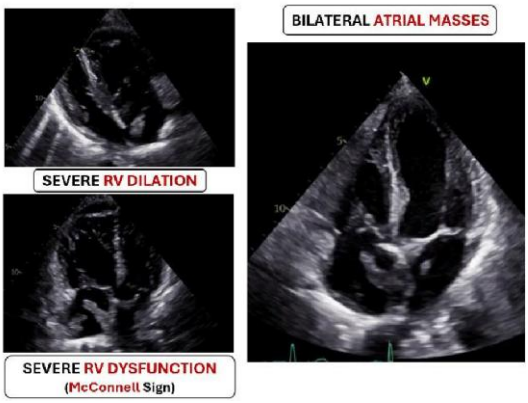
Abstract citation ID: suag058.386

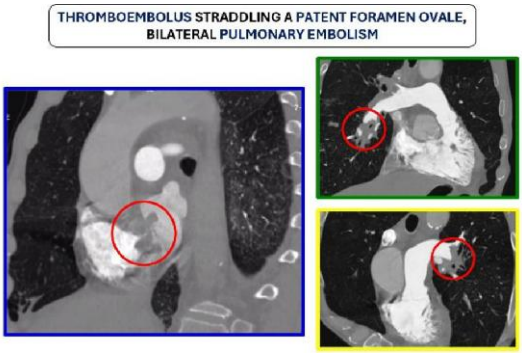
PULMONARY EMBOLISM WITH BIATRIAL THROMBI MIMICKING CARDIAC INVOLVEMENT IN AN ONCOLOGICAL PATIENT

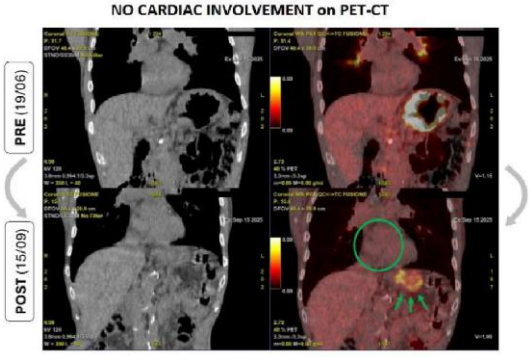
D. Fabbri, M. Martinelli, R. Sartor, S. Livan Truong, C. Ammendolea, and A. De Leo
Ospedale S. Martino, Belluno

A 76–year–old man with no previous cardiovascular disease was diagnosed with stage IV–B diffuse large B–cell gastric lymphoma and started on chemotherapy. Baseline echocardiography showed preserved left ventricular systolic function, moderate aortic stenosis and intermediate probability of pulmonary hypertension. During treatment, the patient developed progressive clinical deterioration with persistent hypotension, cough, bilateral ankle edema, anorexia and weight loss. Initial laboratory tests revealed neutrophilic leukocytosis with normal cardiac biomarkers, and symptoms were initially attributed to infection and malnutrition. Due to persistent hypotension, a cardiology evaluation was performed and revealed a previously undocumented atrial mass on transthoracic echocardiography. Shortly thereafter, the patient experienced acute worsening with near–syncope and hypoxemic respiratory alkalosis. Electrocardiogram showed T–wave inversion in right precordial leads, while cardiac biomarkers were markedly elevated. Urgent echocardiography demonstrated severe right ventricular dilation and dysfunction with McConnell's sign, elevated pulmonary artery systolic pressure, and large bilateral atrial masses in contact with the interatrial septum. Computed tomography angiography confirmed bilateral pulmonary embolism and identified a large intracardiac mass extending into both atria, consistent with a thrombus straddling a patent foramen ovale. After multidisciplinary discussion, unfractionated heparin infusion was initiated despite the high bleeding risk related to gastric lymphoma. The patient showed rapid hemodynamic stabilization, progressive recovery of right ventricular function, reduction of pulmonary pressures, and regression of atrial masses. Positron emission tomography excluded cardiac lymphoma involvement. The patient was discharged on oral anticoagulation in stable clinical conditions.

In conclusion, pulmonary embolism should be promptly considered in oncological patients with unexplained clinical deterioration; intracardiac masses may mimic malignancy but can be thrombotic; multimodality imaging and individualized multidisciplinary decision–making are crucial in complex cardio–oncology cases.







Abstract citation ID: suag058.387

ACUTE PULMONARY EMBOLISM IN A PATIENT WITH HEPARIN–INDUCED THROMBOCYTOPENIA AFTER ORTHOPAEDIC SURGERY

E. Jannello, A. Roccabruna, S. Giatti, F. Deluca, S. Valenza, M. Milan, F. Zanon, and C. Picariello
Ospedale Santa Maria Della Misericordia, Rovigo

A 75–year–old obese woman with hypertension, type II diabetes, stage IIIa chronic kidney disease and anaemia was admitted after an accidental fall. Hip X–ray showed a right femur fracture, and she underwent uncomplicated hip arthroplasty on day 2. On admission platelet, count was 264 x10.9/L and haemoglobin 11.7 g/dL. Thrombotic prophylaxis with low molecular weight heparin (LMWH) 4000 IU/die was started on day 1. On day 10, she developed severe thrombocytopenia (platelets 19 x10.9/L; 12 x10.9/L in citrate) and

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LMWH was replaced with Fondaparinux; one platelet pool was administered. The following day, she developed acute dyspnoea with hypoxia and hypocapnia. EKG showed right bundle branch block, S1Q3T3 pattern and signs of right ventricular (RV) overload. A contrast–enhanced computed tomography revealed extensive bilateral pulmonary embolism and small subpleural infarcts (Figure 1). She was transferred to the Cardiac Intensive Care Unit. Blood pressure was 115/65 mmHg; heart rate 100 bpm; SpO2 94% on facial mask 10 L/min; respiratory rate 25–30/min; haemoglobin 9.3 g/dL; D–dimer ›20 mg/L; troponin T 160 ng/L; NTproBNP 2098 pg/mL. Echocardiography showed RV dilatation and dysfunction, with a TAPSE/sPAP ratio of 0.2. She was classified as intermediate–high risk pulmonary embolism, but thrombolysis was contraindicated due to recent surgery. Suspected heparin–induced thrombocytopenia (HIT) also controindicated unfractionated heparin. The 4Ts score was 5–6 and antibodies against multimolecular complexes of platelet factor 4 (PF4) and heparin complexes were requested. Danaparoid was started after angiologic consultation. Doppler ultrasound revealed bilateral proximal deep vein thrombosis and superficial thrombosis of the right saphenous vein. PF4–heparin antibodies later confirmed HIT. Despite therapy, respiratory and echocardiographic improvement was limited, with persistent oxygen requirement and thrombocytopenia. We consulted the hub centre for catheter–based thrombectomy. After transfusion of two units of red blood cells, the patient underwent successful percutaneous thrombectomy on day 21 with improvement in pulmonary flow. Platelet count gradually improved, allowing the introduction of oral anticoagulant on day 25. At discharge on day 30, echocardiography showed normal dimensions and function of the right ventricle (TAPSE/sPAP was 0.7), EKG abnormalities had resolved, platelet count was 307 x10.9/L, and haemoglobin 11.6 g/dL. Biomarkers markedly improved.

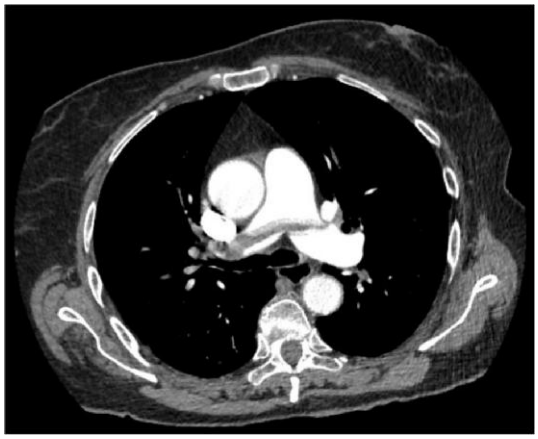

Figure 1

Myocarditis 1

Abstract citation ID: suag058.388

PREVALENCE AND ROLE OF PATHOGENIC CARDIOMYOPATHY GENE VARIANTS IN PEDIATRIC BIOPSY–PROVEN ACUTE MYOCARDITIS

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Background and aim: Acute myocarditis (AM) is an important cause of heart failure in children and adults. The pathogenesis is not completely understood and pathogenetic (P) variants in cardiomyopathy genes may play a role in determining the clinical course and outcomes of patients with AM. We aim to determinate the prevalence of pathogenic/likely pathogenic (P/LP) cardiomyopathy gene variants in a cohort of pediatric patients with biopsy–proven (BP) AM and the correlation with outcome.
Methods: We collected data from a cohort of 124 paediatric patients with BP–AM; we selected only patients that performed genetic tests. We compared gene positive and gene negative groups. T–student test and Kaplan Meier analysis were used. Outcome included death and heart transplantation.
Results: 30 contemporary consecutive patients performed genetic test and were included in the study. Prevalence of P/LP gene variants was 27%, with a prevalence in sarcomeric genes (figure 1). No pathological mutations in desmosomial genes were found. No statistically significant differences were detected between gene positive and gene negative groups. In particular, analysis showed no difference in terms of fibrosis, viral infection or coinfenction, ejection fractions and outcome (figure 2 and 3). Moreover, no differences were found in recovery or in requiring mechanical circulatory support (MCS) (table 1).
Conclusions: The link between genetics and myocarditisremained. Probably myocarditis has a multifactorial pathogenesis in which a genetic predisposition interacts with environmental or other triggers. Our pediatric experience didn't show any difference in outcomes between gene positive and gene negative patients. However, this result required a validation in a larger population.

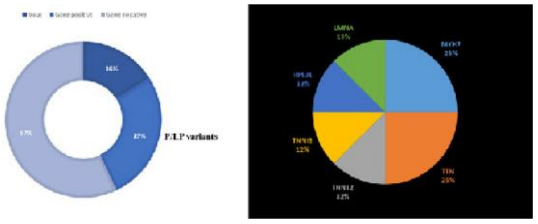

Figure 1

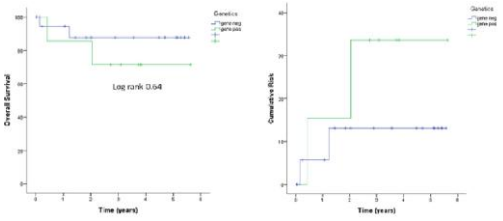

Figure 2

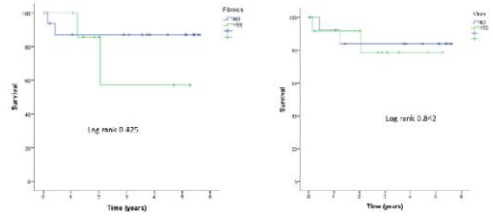

Figure 3

Abstract citation ID: suag058.389

A STRANGE CASE OF HFPEF: EGPA WITH SISTEMIC INVOLVEMENT

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A 61–year–old woman presented to the emergency department with dyspnea and chest pain radiating to the back at rest. Laboratory tests showed creatinine 1.76 mg/dL, stable hsTnT elevation (264→256 pg/mL), NT–proBNP 19,090 pg/mL, and D–dimer 1,969 ng/mL. ECG revealed sinus rhythm with diffuse inferolateral ST–segment depression. Echocardiography demonstrated preserved LV systolic function (LVEF 65%), increased wall thickness with apical kissing, borderline RV function, pulmonary hypertension, and diastolic dysfunction with elevated filling pressures.

Medical history included chronic kidney disease, asthma with nasal polyposis, eosinophilia, and prior mastectomy for in situ ductal carcinoma. Immunological evaluation had suggested interstitial nephropathy with possible IgG4 involvement. Given the combination of asthma, eosinophilia, and nasal polyposis, she fulfilled criteria for eosinophilic granulomatosis with polyangiitis (EGPA).

CT angiography excluded pulmonary embolism but showed mosaic attenuation. Laboratory tests confirmed marked eosinophilia (2,170 ×10⁹/L, 30%) and elevated eosinophil cationic protein (216 µg/L), with further NT–proBNP increase (22,535 pg/mL). Urinalysis revealed microscopic hematuria without proteinuria. Right heart catheterization demonstrated post–capillary pulmonary hypertension (PCWP 27 mmHg). Brain MRI showed multiple T2 hyperintense lesions, consistent with multifocal vasculitis (Figure 1).

Cardiac magnetic resonance revealed diffuse endocardial late gadolinium enhancement with extensive thrombotic layering along the LV endocardium and mitral valve, consistent with Loeffler endocarditis (Figure 2). The hospital course was complicated by acute pulmonary edema, restrictive diastolic filling (Figure 3), acute–on–chronic kidney injury (peak creatinine 4.37 mg/dL), and urinary sepsis.

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After multidisciplinary discussion, immunosuppressive therapy with high–dose methylprednisolone, oral prednisone, and cyclophosphamide pulses was initiated, together with warfarin. Given the highly suggestive clinical, biochemical, and imaging findings and the high bleeding risk, endomyocardial biopsy was deferred. The patient improved clinically, with stable renal function (creatinine 3.5 mg/dL) and reduced NT–proBNP at discharge. At follow–up, she remained hemodynamically stable, with reduced LV wall thickness, preserved systolic function, persistent restrictive filling, and progressive GLS improvement (from −10% to −20% at six months).

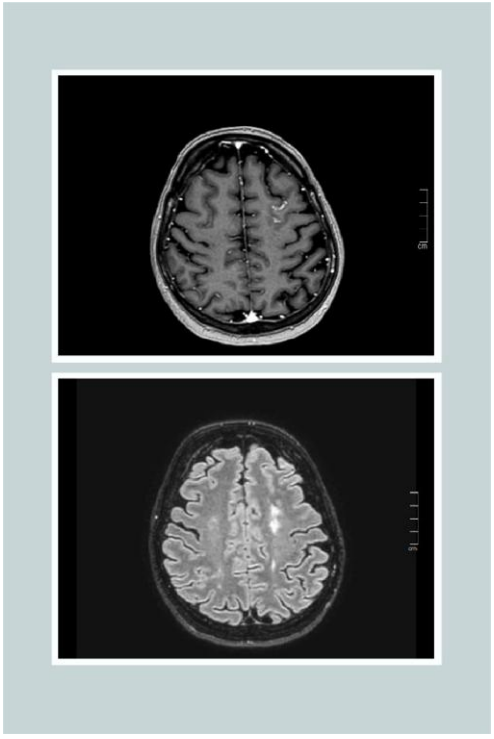
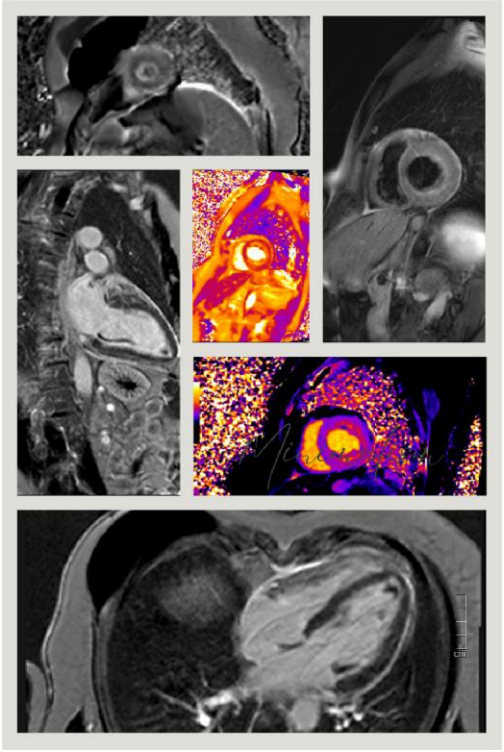


Figure 1



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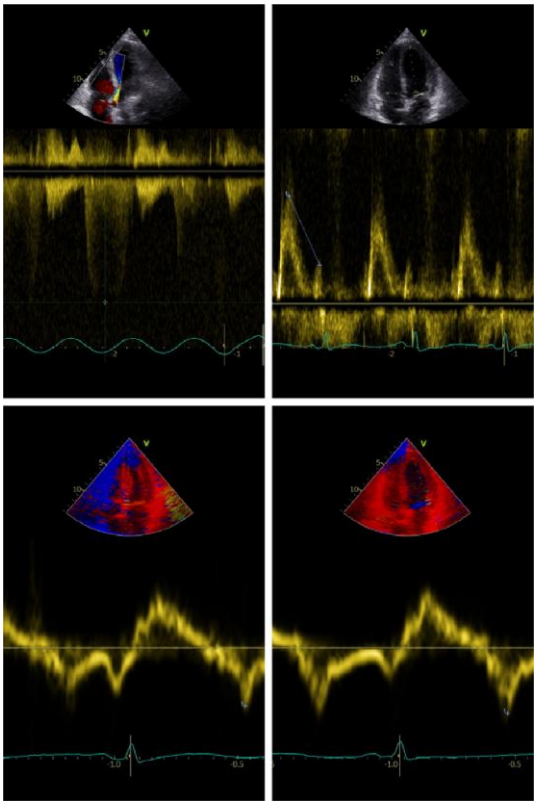

Figure 3

Abstract citation ID: suag058.390

THE "SILENT" HEART BEHIND FEVER AND CONJUNCTIVITIS: SUBACUTE MYOPERICARDITIS IN AN IMMUNOCOMPETENT ADULT WITH SUGGESTIVE CMV SEROLOGY

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Background: Myopericarditis can be clinically "silent" and present as fever of unknown origin. In immunocompetent adults, CMV–associated cardiac involvement is uncommon and virological attribution may be uncertain.
Case presentation: A 33–year–old immunocompetent, physically active man presented with 10 days of high–grade fever (up to 39.5°C), malaise, gastrointestinal symptoms and severe conjunctivitis, without chest pain, dyspnoea, syncope or palpitations. Blood tests showed intense inflammation (CRP 237 mg/L) and marked myocardial injury (hs–cTnI 3025 pg/mL) with elevated NT–proBNP (4939 pg/mL). Serial ECGs were unremarkable. Transthoracic echocardiography showed preserved left ventricular ejection fraction (~55%) and a mild pericardial effusion (max 5 mm) without haemodynamic compromise. The clinical course was stable (no major arrhythmias; downtrending troponin). Microbiological testing was negative, except for CMV IgM positivity with IgG negativity; blood CMV–DNA was undetectable, therefore no antiviral therapy was started. Treatment with ibuprofen plus colchicine and activity restriction was prescribed. Cardiac magnetic resonance was performed and confirmed subacute myopericarditis (non–ischaemic subepicardial inferolateral LGE, pericardial enhancement and effusion up to ~18 mm) with preserved biventricular function. At 4–week follow–up, symptoms and biomarkers normalised and pericardial effusion resolved.
Conclusions: Persistent fever with conjunctivitis and troponin rise may conceal myopericarditis even without chest pain. According to latest ESC guidelines, early echocardiography and CMR are pivotal for diagnosis and phenotyping. Acute serous conjunctivitis is an uncommon accompanying sign that warrants accurate evaluation. Isolated CMV IgM positivity should be interpreted as suggestive rather than definitive causation when viral DNA is negative, supporting proportionate conservative management in stable immunocompetent patients. To the best of our knowledge, this is the first reported case of acute myopericarditis and conjunctivitis in a healthy subject with serology suggestive of acute CMV infection and negative serology for other common causative agents.

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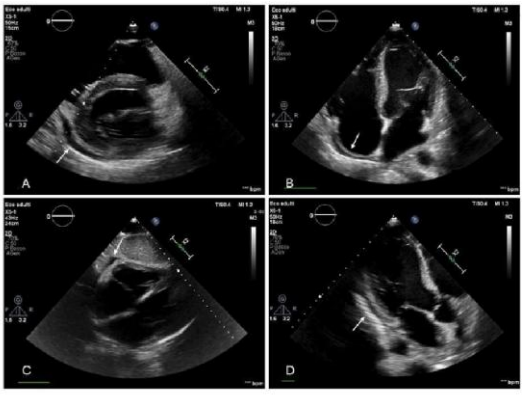

Figure 1. Transthoracic echocardiogram showing a mild, haemodynamically non-significant pericardial effusion (white arrows), located posteriorly at the mid basal segments of the left ventricular posterior wall (A, D) and anteriorly both in the right retro-atrial region (B) and at the basal segment of the right ventricular free wall (C).

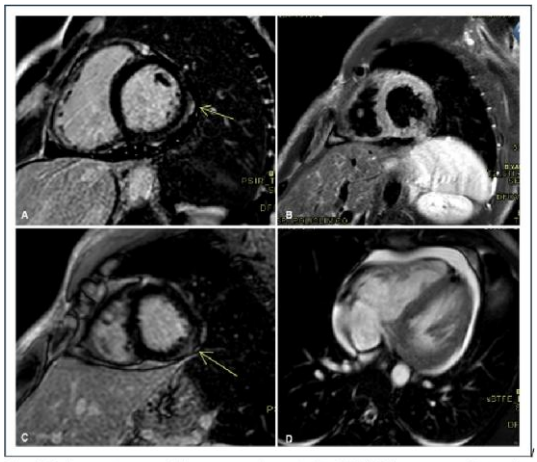

Figure 3. Cardiac magnetic resonance: findings consistent with myopericarditis. (A) PSIR/LGE sequence: non-ischaemic mid-to-apical lateral enhancement (subepicardial pattern) suggestive of myocarditis. (B) T2-STIR sequence: mild myocardial hyperintensity consistent with mild oedema and inflammatory infiltrate. (C) PSIR sequence (apex): apical subpericardial enhancement, consistent with inflammatory involvement. (D) Axial view: visible pericardial effusion (morphological assessment).

Figure 2. Clinical photograph of the eye showing viral conjunctivitis, characterised by conjunctival hyperaemia. The image has been appropriately anonymised by selective blurring of the iris to prevent biometric identification while preserving the clinically relevant findings.

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MULTI–DRUGS RESISTANT AUTOIMMUNE MYOCARDITIS IN INFANT: A CASE REPORT

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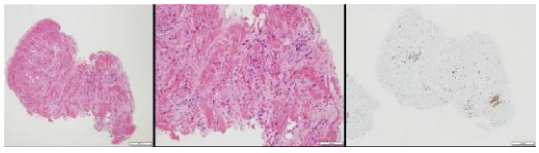
Background and aim: Acute myocarditis (AM) is an important cause of heart failure and mortality in children and adults. We describe a case of a 1–year old girl with relapsing autoimmune myocarditis multi–resistant to conventional immunosuppressive therapy.

Case report: A 1–year old girl was referred to our hospital for an incidental finding of heart enlargement at chest X–Ray performed for respiratory infection. Echocardiogram showed dilated cardiomyopathy (DCM) with biventricular involvement, severe systolic dysfunction and severe mitral regurgitation (MR). hsTNT and NTproBNP were high, genetic test and metabolic screening resulted normal. Endomyocardial biopsy (EMB) was performed and showed the presence of lymphocytic myocarditis, virus negative (figure 1). Anti–heart antibodies (AHA) were negative. Patients started corticosteroids and azathioprine with clinical and instrumental improvement. After few months, she showed a complete recovery, but after cortisone, tapering DCM reappeared. She performed a second EMB that was no diagnostic and a cardiac magnetic resonance (CMR) confirmed the presence of AM with oedema and fibrosis. She was treated with corticosteroids, Mycophenolate Mofetil (MMF) and Cyclosporine, with cardiac recovery. When the cortisone was tapered, the patient presented again ventricular dysfunction. She was hospitalized, EMB was repeated and confirmed the presence of lymphomonocytic infiltration with necrosis and fibrosis. CMR showed extensive fibrosis (figure 2). She was treated with cortisone, MMF and Tacrolimus. Ventricular function recovered and the child remained stable for a long time with low cortisone dose. After 2 years, EBM was repeated and resulted negative; while AHA were positive. MMF was continued, while Tacrolimus and cortisone were discontinued. After 1 month, she presented again biventricular dysfunction with severe MR, and she experienced ventricular fibrillation with cardiac arrest. She was resuscitated and treated with ECMO. After few days, she presented cerebral bleeding and brain death. Autopsy showed the presence of lymphomonocytes myocardial infiltration with necrosis and fibrosis.
Conclusions: This is the younger case reported in literature with autoimmune myocarditis multi–resistant to combined immunosuppressive therapy. These patients are very rare and the management remain challenging. A multidisciplinary approached for targeted advanced therapy is demanded.



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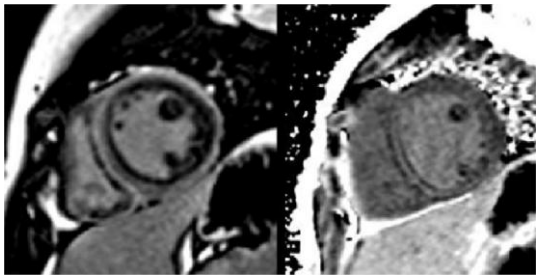

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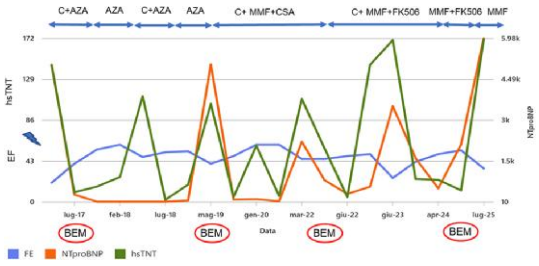

Figure 3

Abstract citation ID: suag058.392

CAMPYLOBACTER JEJUNI MYOCARDITIS

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Cardiologia Merate

Introduction: Campylobacter Jejuni (C.J.) (Figure 1) is a non–spore–forming, Gram–negative, microaerophilic, helical rod–shaped bacterial species

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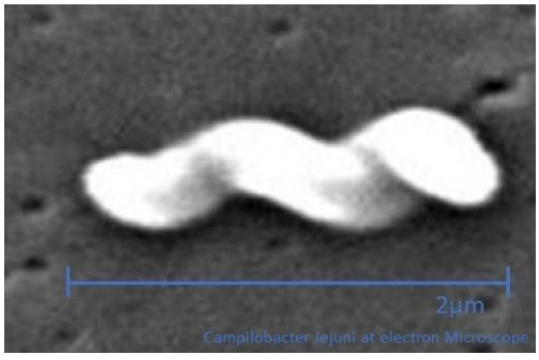
commonly found in animal feces. It is commonly associated with poultry diseases and is one of the most common causes of gastroenteritis in humans worldwide. Improperly prepared beef and poultry are the most common ways of transmission. Very rarely, gastroenteritis is followed by chest pain indicative of myocarditis.
Case report: A 33–year–old female patient with a latex allergy and seasonal allergens developed gastroenteritis with diarrhea and fever. Seven days after the onset of gastrointestinal symptoms, she also developed pain in her left arm, which worsened the following day with the onset of oppressive retrosternal chest pain. The pain was continuous and only minimally affected by breathing. In Emergency room: normal EKG, WBC 10100 109/L (4–9); Hb 122 g/L (135–170); PLT 344000 109/L (150–400), creatinine 0.59 mg/dl (0.59–1.04), K 3.3 mmol/L (3.6–5.2), Na 138 mmol/L (135–145), TnI 2445 ng/L (‹ 50) CRP 30 mg/L (‹ 3.3). EchocardioCD: normal. Cardiac MRI: Active non–ischemic inflammatory damage at the lower basal site, with partial involvement of the lower septum and posterior and lateral wall (Figure 2-3). Positive stool culture for C.J. Anti–inflammatory therapy with aspirin 500 mg three times a day with improvement of chest pain and azithromycin for 3 days was started. No arrhythmias were observed on telemetry throughout the entire hospital stay. EKG on discharge: "Flat" T wave in V5–V6.
Conclusions: C.J. myocarditis is a very rare complication of the more common C.J. gastroenteritis. The evolution, as in this case, is usually benign. In rare cases, however, it can progress to more complex forms, and one related death has been reported in literature. The onset of cardiac symptoms during gastroenteritis should always lead to a diagnosis of IMPS (inflammatory myopericardial syndrome). EKG, echocardiogram, and troponin measurement are first–level tests. If troponin is abnormal, even in the absence of EKG or echocardiogram changes, the investigations should be complemented with cardiac MRI, which often reveals an inflammatory pattern not visible with other methods. A stool culture is also useful as it can reveal the causative agent, allowing for the setting of targeted antibiotic therapy



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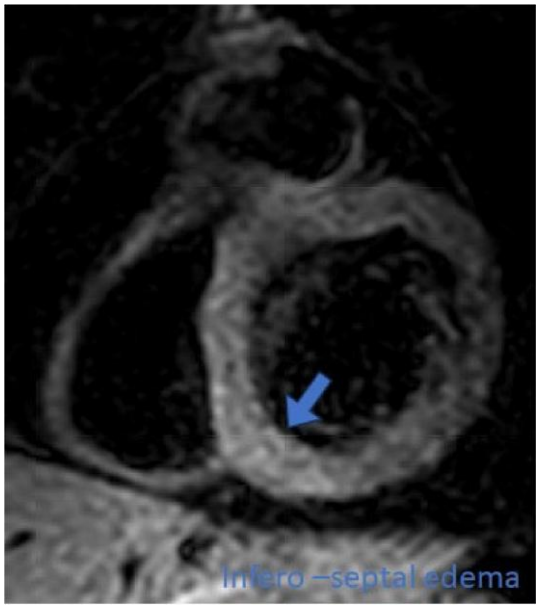

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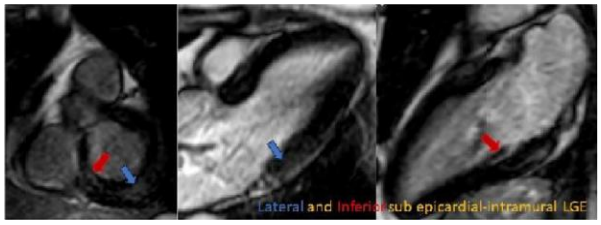

Figure 3

Abstract citation ID: suag058.393

FULMINANT MYOCARDITIS DURING COVID–19 OUTBREAKS: MYTHS OR REALITY?

C. Menghi, A. Giordani, A. Baritussio, M. De Gaspari, S. Federico, C. Vicenzetto, E. Bison, M. Cattini Peloso, E. Pontara, R. Marcolongo, S. Rizzo, C. Basso, and A. Caforio
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Background: Although infections are established triggers, the etiopathogenetic role of SARS–CoV–2 in fulminant myocarditis (FM) remains unproven. Moreover, the concordance between SARS–CoV–2 detection on nasopharyngeal swabs and its identification by molecular analysis of endomyocardial biopsy (EMB) has not been systematically investigated.
Aims: To compare clinical characteristics, diagnostic findings, and outcomes of FM cases before and after the COVID–19 pandemic in a tertiary referral center. To assess concordance between SARS–CoV–2 detection by serological or molecular testing on nasopharyngeal swabs and viral polymerase chain reaction (PCR) on EMB specimens.
Methods: We retrospectively analyzed FM cases diagnosed between 2001 and 2025, comparing patients diagnosed before and after March 2020. The primary composite outcome included cardiac death, heart transplantation, or myocarditis relapse.
Results: Forty–six FM patients (61% male; median age 36 years) were included; 17 (37%) were diagnosed after March 2020. Clinical presentation and diagnostic features were comparable between cohorts. Ventricular fibrillation and ventricular tachycardia occurred in 53% and 33% of patients, respectively. Median left ventricular ejection fraction (LVEF) was 40.0% [27.5–47.0]. Troponin and C–reactive protein were elevated in 89% and 79% of patients, respectively. EMB was performed in 78% of patients, showing predominantly lymphocytic myocarditis (83%), followed by giant–cell (14%) and eosinophilic (3%) forms, without differences between periods. Viral genomes were detected in 26% of EMBs, most commonly parvovirus B19 and enterovirus; SARS–CoV–2 was not identified in any myocardial specimen, including two patients with concurrent SARS–CoV–2 infection. Thirteen patients had received COVID–19 vaccination, with no post–vaccination myocarditis. Immunosuppressive therapy was administered in 28% of patients. Over a median follow–up of 34 months, the composite outcome occurred in 35% of patients, with no differences between pre– and post–pandemic cohorts. On multivariable analysis, baseline LVEF was the only independent predictor of adverse outcome (HR 0.94; 95% CI 0.90–0.98; p = 0.010).
Conclusions: FM patients showed similar clinical presentation, histopathology, and outcomes before and after the COVID–19 pandemic. The absence of myocardial SARS–CoV–2 detection despite positive nasopharyngeal testing argues against a direct causal role of SARS–CoV–2 in FM within this cohort.

Myocarditis 2

Abstract citation ID: suag058.394

SUBACUTE PARVOVIRUS B19 MYOCARDITIS WITH A DILATED PHENOTYPE: ROLE OF LEVOSIMENDAN AND CARDIOPROTECTIVE THERAPY IN VENTRICULAR FUNCTION RECOVERY

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Introduction: Parvovirus B19 is one of the main etiological agents implicated in myocarditis and post–infectious dilated cardiomyopathy. Clinical presentation may be insidious, with progressive evolution toward chronic heart failure. In the absence of specific antiviral therapy, management relies on early cardioprotective treatment and targeted hemodynamic support.

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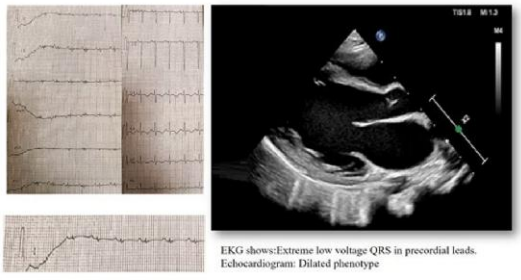
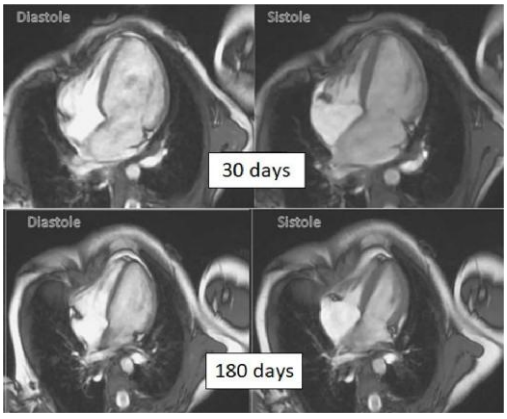
Case: We report the case of a previously healthy 5–year–old girl referred to our center for progressively worsening heart failure occurring approximately one month after a nonspecific febrile illness. At presentation, she showed clinical signs of congestion (NYHA II–III). Transthoracic echocardiography revealed dilated phenotype with severe LV systolic dysfunction (LVEF 20–25%) and moderate mitral regurgitation. Cardiac biomarkers were markedly elevated (NT–proBNP ›20,000 pg/mL, troponin ~100 ng/L). The etiological diagnosis of subacute Parvovirus B19 myocarditis was confirmed by the concomitant presence of serology (IgM antibodies) and a high viral DNA load.
Treatment: Guideline–oriented heart failure therapy was promptly initiated, including intravenous diuretics, ACE inhibitors, beta–blockers, mineralocorticoid receptor antagonists, and ivabradine, resulting in rapid clinical improvement and partial recovery of ventricular function. Given the persistence of significant systolic dysfunction, levosimendan infusion was performed under continuous monitoring. In the hours following administration, a further and marked improvement in left ventricular ejection fraction was observed (EF 50%), accompanied by a reduction in biomarkers. Cardiac magnetic resonance imaging excluded active myocardial edema and showed no significant fibrosis in the acute phase. At mid–term follow–up (6 months), complete normalization of left ventricular dimensions and function was documented, with minimal residual fibrotic changes.
Conclusions: This case demonstrates that even severe dilated phenotypes secondary to Parvovirus B19 myocarditis may be potentially reversible when managed with an early and structured therapeutic approach. Myocarditis management in the pediatric setting presents specific features and levosimendan has a wider clinical application, supported by observational evidence and more robust pathophysiological rationale. Levosimendan, due to its pharmacologic characteristics, represents a valuable option for hemodynamic support and functional recovery although available data remain limited and not definitive.



EKG shows:Extreme low voltage QRS in precordial leads.
Echocardiogram: Dilated phenotype



Abstract citation ID: suag058.395

MYOPERICARDITIS: THE IMPORTANCE OF TIMELY IDENTIFICATION FOR OPTIMAL CLINICAL AND THERAPEUTIC MANAGEMENT

P. De Luca, V. Sollazzo, and A. De Luca
S.C. Medicina Interna – Dipartimento Di Area Medica – Ospedale "T. Masselli–Mascia" San Severo; S.C. Cardiologia Clinica E Interventistica – Dipartimento Di Area Medica – Ospedale "T. Masselli–Mascia"; S.C. Cardiologia Clinica E Interventistica – Dipartimento Di Area Medica – Ospedale "T. Masselli–Mascia" San Severo

Background: Myopericarditis is an often insidious clinical entity characterized by difficult diagnosis. We describe the unique clinical case of a man with a minor stroke of cardioembolic etiology. Tests revealed the presence of an intraventricular thrombosis caused by eosinophilic infiltrative myopericarditis.
Clinical Case: A sixty–year–old man was admitted to the emergency room with transient right–sided weakness and dysarthria. His medical history included hypertensive heart disease and smoking. Blood tests revealed lymphocytosis and eosinophilic granulocytosis. Noncontrast brain CT revealed diffuse subcentimeter–sized hypodensities in the white matter, suspicious for cardioembolic etiology. The patient was admitted to the Internal Medicine Department for further diagnostic testing. ECG: sinus tachycardia with negative T waves in the precordial and inferior leads (no abnormalities present on the Emergency Department ECG). Echocardiogram: diffuse hypokinesia in all segments of the left ventricle, with akinesia of the apical segments and a suspicious thrombus formation at the apex of the left ventricle; preserved ejection fraction; mild non–tamponadacting pericardial effusion. Laboratory findings: elevated troponin and cardiac enzymes. The patient was transferred to the Cardiology Department, where a coronary CT scan ruled out significant coronary stenosis. Heart failure therapy and high–dose corticosteroids were administered with benefit. At follow–up two and six months after discharge, the patient was found to be in good hemodynamic control.
Conclusions: Myopericarditis is an inflammatory disorder of the myopericardium that presents with chest pain, dyspnea, and palpitations. The peculiarity of our case was its asymptomatic nature, suggesting a subacute neurological onset. The diagnosis was suspected based on ECG abnormalities and elevated troponin levels. Imaging techniques are essential in the diagnostic workup, as is coronary CT in the differential diagnosis of acute coronary syndrome. Endomyocardial biopsy is recommended in cases characterized by hemodynamic instability, so this procedure was not considered appropriate. Sharing this case aims to demonstrate that myopericarditis is a disease that can present insidiously, requiring an integrated approach using cardiovascular imaging techniques and a multidisciplinary approach.

Abstract citation ID: suag058.396

ACUTE MYOCARDITIS ASSOCIATED WITH CAMPYLOBACTER JEJUNI INFECTION IN THE PEDIATRIC AGE: FIRST ITALIAN REPORT

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Introduction: In the pediatric population, viral infections represent the most common cause of myocarditis. Bacterial forms are not only rare but also likely underdiagnosed. The association between acute or active Campylobacter jejuni infection and myocarditis is exceptionally uncommon, despite the steadily increasing global incidence of Campylobacter–related gastroenteritis.
Case report: We report the case of a 15 yo boy who presented to the ED with fever, diarrhea, and abdominal pain of approximately 3 days' duration. During initial evaluation, a significant elevation of cardiac troponin was detected (692 pg/mL), prompting transfer to our Pediatric Cardiology Unit. At admission, the patient was in good general condition and asymptomatic from a cardiac standpoint. EKG showed sinus rhythm with concave ST–segment elevation in the inferior leads. Echocardiography revealed hypokinesia of the inferior wall with normal EF. Stool testing for gastrointestinal pathogens was positive for Campylobacter. Although a watch–and–wait approach may be considered in uncomplicated cases, given the presence of cardiac involvement and persistent gastrointestinal symptoms, antibiotic therapy with azithromycin was initiated, resulting in rapid clinical improvement. During hospitalization, progressive normalization of troponin levels, resolution of electrocardiographic abnormalities, and complete recovery of echocardiographic findings were observed. The patient was discharged after one week in good clinical condition (Figure 1).

Discussion: Campylobacter–associated myocarditis is a rare condition, predominantly reported in adolescent males and often preceded by febrile gastroenteritis. Clinical presentation is heterogeneous and may include chest pain, EKG abnormalities, and elevated markers of myocardial injury, with generally mild and reversible echocardiographic findings, although fatal outcomes have been reported. The underlying pathophysiological mechanisms remain unclear and may involve direct bacterial invasion, toxin–mediated injury, or immune–mediated processes. Available evidence, largely based on case reports and small case series, suggests a generally favorable prognosis with targeted antibiotic therapy and appropriate cardiac monitoring. Early recognition allows appropriate monitoring and timely treatment of a potentially severe yet often reversible condition.

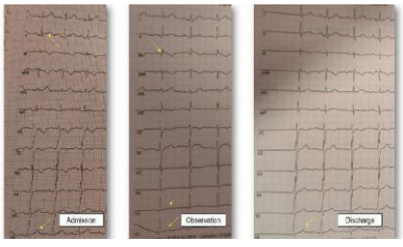

Figure 1

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Abstract citation ID: suag058.397

WEST NILE VIRUS AS A TRIGGER FOR CARDIOVASCULAR DISEASES: A META–SUMMARY OF CASE REPORTS

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Background: The West Nile virus (WNV) is a widespread, mosquito–borne flavivirus that poses a significant public health issue in endemic regions. In a small fraction of cases (less than 1%), the virus invades the central nervous system, leading to a serious condition known as West Nile neuroinvasive disease (WNND). This can manifest as encephalitis (50–71%), meningitis (15–35%), or acute flaccid paralysis (3–19%). WNV has been recently described as a possible trigger of cardiovascular diseases (CVDs).
Methods: We searched for case reports published in Pubmed, Google Scholar and EMBASE from 2009 to 2023. In the present meta–summary, 8 case reports describing patients who experienced CVDs following an WNV infection were included.
Results: A total of 8 patients with diagnosed CVDs triggered by WNV were examined. The median age was 67.29 (interquartile range, IQR: 53–70) years and 87.5% were male. 6 of 8 (75%) patients had altered mental status due to neurological involvement of the infection. Comorbidities were present in 5 patients (62.5%). Left ventricular ejection fraction was impaired in 5 patients (62.5%). 4 of 8 patients (50%) had arrhythmias, with 3 of them having a normal ejection fraction. Only the female patient failed to recover her ejection fraction and was implanted with a cardiac resynchronization therapy device. Data on the length of hospital stay and the day of onset of cardiac complications are not available for all patients. Sudden cardiac death was reported in one patient (12.5%).

Discussion: Currently, very few cases of WNV–associated CVDs have been reported. Cardiac arrhythmias are a frequent complication in critically ill patients. However, specific arrhythmias in WNV have not been reported. It's still unclear whether the heart damage in WNV–associated myocarditis is caused by an indirect immune reaction to the virus or by the virus directly invading heart cells and causing inflammation. Direct viral involvement of the myocardium could be explained by a greater viral aggressiveness in penetrating cells, which might also explain why patients with frequent cardiovascular involvement also more frequently have neurological involvement. Furthermore, being male and having an advanced age are other common factors in patients with CVDs.
Conclusions: CVDs due to WNV have been associated with myocarditis and arrhythmias in particular, among elderly patients, males, and those with neurological impairment.

Abstract citation ID: suag058.398

E–CPR IN PROLONGED REFRACTORY CARDIAC ARREST POST CARDIAC TAMPONADE AND SEVERE BIVENTRICULAR DISFUNCTION IN A YOUNG WOMAN

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Aou Policlinico P. Giaccone; Arnas P.O. Civico E Benfratelli

A 19y woman admitted to ED for generalized seizures, preceded by 1week of fever and a recent trip to Lapland: she was comatose GCS 3, stable haemodynamic, EKG SR and non–specific abnormalities, severe hypoglycaemia 5 mg/dL. Neurological status improved after i.v. glucose.Brain CT unremarkable.Lab tests: leukocytosis (lymphocytic), high CRP 6, thrombocytopenia, mild troponin elevation, creatinine 2.8, INR 2.7,mildly increased AST/ ALT, high LDH, CK and myoglobin.Roughly 2 h after admission, sudden cardiac arrest (CA) occurred due to PEA.ACLS and endotracheal intubation started.Echo:massive pericardial effusion causing cardiac tamponade. Emergency pericardiocentesis drained exudative fluid; however, refractory CA persisted, with only a brief return of ROSC after 60 min, followed by prolonged PEA.After 107 min of manual chest compression, VA–ECMO was initiated.Early echo showed severe biventricular dysfunction with minimal aortic valve opening, so IABP was implanted for left ventricular venting.Suspecting acute myopericarditis, high–dose corticosteroids and i.v. immunoglobulins were given, EMB was not feasible due to severe instability.Cardiac function progressively improved in normalization of biventricular systolic function within 48–72 hours, allowing ECMO weaning, which was complicated by Harlequin syndr, requiring urgent ECMO removal while maintaining IABP support, which was subsequently removed together with the pericardial drain.ICU course was complicated by left lower limb compartment syndr.requiring fasciotomy, acute limb ischemia due to embolization from femoral pseudoaneurysm, mild intracranial hemorrhagic suffusion during UF heparin, and pneumonia with pleural effusion requiring drainage. Extensive microbiological test on blood, BAL, cerebrospinal fluid and nasal swab was negative.Patient slowly recovered and was extubated without neurological sequelae.Seen persistent mild pericardial effusion and pericardial thickening, colchicine and low–dose corticosteroids were continued.Cardiac MR 15 days later:pericardial edema, circumferential effusion max 9 mm, diffuse LGE of pericardial layers, no myocardial edema or enhancement, consistent with acute pericarditis.Ibuprofen was therefore added.Overall, the most likely diagnosis was acute viral myopericarditis complicated by cardiac tamponade, multiorgan dysfunction and severe transient biventricular stunning after prolonged CA, with a possible overlapping contribution of systemic inflammatory response syndr.

Eosinophilic Myocarditis

Abstract citation ID: suag058.399

EOSINOPHILIC MYOCARDITIS: A DIAGNOSIS THAT CANNOT WAIT

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A 31–year–old man presented to the emergency department at night with chest pain at rest radiating to the left shoulder, associated with fever and abdominal pain. Symptoms had begun earlier the same day, were oppressive and constant, and partially relieved by analgesics. One month earlier, he had been diagnosed with chronic eosinophilic leukemia with PDGFRα mutation, not yet on treatment. No cardiovascular risk factors or relevant comorbidities were reported. Physical examination showed regular heart rhythm with normal heart sounds, clear lung fields, no peripheral edema, and no palpable lymphadenopathy. Splenomegaly was palpable below the left costal margin and non–tender. A maculopapular rash was present on the trunk. Vital signs revealed blood pressure 144/95 mmHg, heart rate 115 bpm, and oxygen saturation 97% on room air; the patient was afebrile. EKG (Fig. 2) demonstrated sinus tachycardia (120 bpm), short PR interval, normal intraventricular conduction, ST–segment depression up to 2 mm in anterolateral leads, and T–wave inversion in inferior leads. Laboratory tests showed leukocytosis with marked hypereosinophilia, hemoglobin 12.7 g/dL, platelet count 77,000/μL, creatinine 1.16 mg/dL, and elevated high–sensitivity troponin I (2,557 pg/mL, rising to 2,608 pg/mL). NT–proBNP was 2,009 pg/mL. Transthoracic echocardiography revealed preserved global systolic function, increased wall thickness and echogenicity in the para–apical segments with systolic obliteration of the true apex, consistent with Loeffler endocarditis (Fig.1), along with a minimal pericardial effusion and no significant valvular disease. Suspecting myocarditis, the patient was admitted to the cardiac intensive care unit. Hematology consultation led to early initiation of imatinib due to rapid clinical progression and suspected hematologic cardiac involvement. After exclusion of infectious causes, intravenous corticosteroids were administered for three days with clinical improvement. Coronary computed tomography angiography showed no epicardial coronary artery disease. Cardiac magnetic resonance demonstrated multiple non–ischemic late gadolinium enhancement areas in the mid–to–apical lateral wall and left ventricular apex, with myocardial edema, fulfilling the updated Lake Louise criteria for myocarditis (Fig.3). After complete resolution of cardiac manifestations, the patient was referred for allogeneic bone marrow transplantation and chemotherapy due to cerebral secondary involvement.

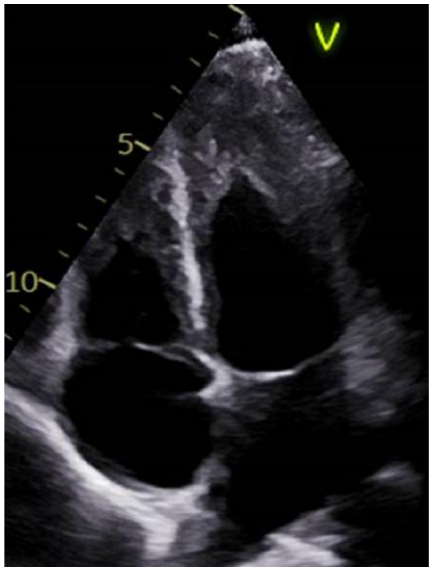

Figure 1

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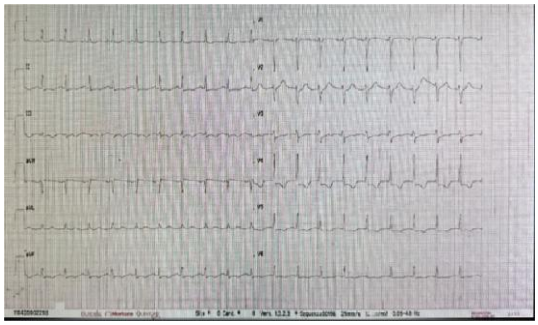

Figure 2

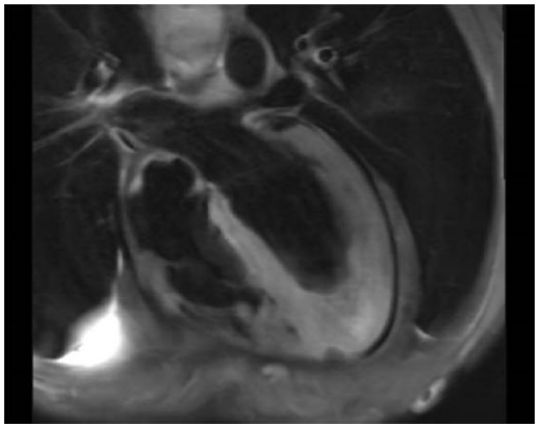

Figure 3

Abstract citation ID: suag058.400

EOSINOPHILIC MYOCARDITIS: DIAGNOSTIC PITFALLS AND THERAPEUTIC CHALLENGES. A CASE SERIES

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Background: Eosinophilic myocarditis (EM) is a rare, potentially life–threatening condition. Diagnosis is challenging due to heterogeneous clinical presentation, imaging phenotype overlapping with other cardiomyopathies, suboptimal timing and use of endomyocardial biopsy (EMB), and misconceptions, notably that EM can be excluded in the absence of peripheral eosinophilia. Delayed recognition may lead to irreversible myocardial injury and adverse outcomes.
Case summary: We describe four EM cases highlighting distinct diagnostic and therapeutic challenges. Case 1 presented with chest pain and was initially misclassified as apical hypertrophic cardiomyopathy on cardiovascular magnetic resonance (CMR) due to apical psuedohypertrophy, delaying EM diagnosis and resulting in endomyocardial fibrosis with severe mitral regurgitation requiring annuloplasty. Case 2 presented while on chronic corticosteroid therapy for eosinophilic asthma, with severe biventricular dysfunction and mild eosinophilia; EMB revealed a polymorphous inflammatory infiltrate. In Case 3, EMB performed for severe LV dysfunction during steroid therapy for a prior diagnosis of eosinophilic granulomatosis with polyangiitis revealed lymphocytic myocarditis; eosinophilic infiltration became evident on repeat EMB only after steroid tapering. Case 4 presented with chest pain, peripheral eosinophilia and ST–elevation myocardial infarction due to coronary embolism, with biventricular apical thrombosis; idiopathic hypereosinophilic syndrome was later diagnosed and EMB during high–dose IV steroids showed a lymphocytic infiltrate. In our case series, treatment included corticosteroids with azathioprine (Case 1) and long–term anti–IL–5 monoclonal antibodies (mepolizumab) in systemic eosinophilic disorders (Cases 2–4); in all cases treatment was well tolerated without EM relapses, and enabled corticosteroid withdrawal, sustained control of peripheral eosinophilia, improved NYHA class and normalization of left ventricular ejection fraction and cardiac biomarkers.
Conclusions: EM can manifest as isolated cardiac disease without extracardiac involvement or eosinophilia. Prognosis depends on timely diagnosis. Diagnostic pitfalls arise from overreliance on non–invasive imaging and smoldering disease course, particularly when chronic corticosteroids mask clinical and histological features. Targeted IL–5 pathway biologics are a promising, well–tolerated treatment option even in advanced EM.

Abstract citation ID: suag058.401

EOSINOPHILIC MYOCARDITIS INTERNATIONAL REGISTRY

M. Palazzini, J. Lehtonen, L. Potena, M. Mäyränpää, J. Rågback, A. Foà, A. Uribarri, H. Thiele, M. Vidal–burdeus, A. Freund, F. Gustafsson, C. Tschöpe, A. Elsanhoury, J. Ihle, W. Rudi, U. Grabmaier, M. Merlo, V. Melenovský, I. Weislova, S. Jellinghaus, A. Linke, C. Baldovini, R. Adorisio, P. Kuchynka, T. Paleček, J. Krejčí, H. Poloczková, A. Caterino, N. Gilotra, J. Lovell, E. Macomb, J. Shih, K. Hong, V. Rossi, F. Ruschitzka, C. Cavallini, C. Riccini, M. Kamal, F. Huang, M. Groh, P. Gentile, G. Andrea, A. Lala, H. Shimokawa, C. Vandenbriele, A. Sionis, M. Schmidt, A. Grosu, E. Bollano, and A. Turco
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Background: Acute eosinophilic myocarditis (EM) is considered a highly lethal clinical condition, yet current knowledge relies largely on small case series. Robust data on its clinical presentation, associated conditions, management, and outcomes are lacking.
Methods: We conducted an international, multicenter, retrospective cohort study across 53 centers on five continents. Among 193 patients with histologically confirmed acute EM identified between 1992 and 2023, 156 met inclusion criteria after excluding cases with insufficient data, symptom duration ›30 days, or unconfirmed pathology.
Results: Median age was 48 years (IQR 34–59), with a predominance of males (67%). Only two patients were ≤16 years. Dyspnea (76%), fever (61%), and chest pain (53%) were the most frequent presenting symptoms. Peripheral eosinophilia was only reported in 57%. Median left ventricular ejection fraction (LVEF) at presentation was 32% (IQR 25–48%). EM was associated with eosinophilic granulomatosis with polyangiitis (22%), hypersensitivity reactions (14%), idiopathic/undefined etiologies (45%), and miscellaneous causes (19%). In–hospital death or heart transplantation (HTx) occurred in 23 patients (15%), while 44% being treated with temporary mechanical circulatory support and 92% with immunosuppressive agents. One– and three–year cumulative rates of death or HTx were 19% and 24%, respectively. A higher—but not statistically significant—3-year event rate was observed in hypersensitivity–related EM compared with EGPA–associated EM (46% vs. 13%; p=0.15). Increased age, decreased LVEF on admission and no immunosuppressive therapy during hospitalization were independent predictors of death or HTx.

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Conclusions: Acute EM frequently presents without peripheral eosinophilia, underscoring the essential role of endomyocardial biopsy for diagnosis. Despite contemporary management, in–hospital and mid–term mortality remain high. Effective patient–specific strategies to improve outcomes in this rare but life–threatening condition are needed.

Abstract citation ID: suag058.402

CLINICAL PRESENTATION AND PROGNOSTIC IMPACT OF EOSINOPHILIC MYOCARDITIS ASSOCIATED TO EOSINOPHILIC GRANULOMATOSIS WITH POLYANGIITIS

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Background: Eosinophilic granulomatosis with polyangiitis (EGPA) is a rare systemic vasculitis marked by asthma, eosinophilia, and multi–organ involvement. Cardiac involvement (CI)—from pericardial effusion to eosinophilic myocarditis—is among the most severe manifestations and strongly affects prognosis. Despite advances in diagnosis and therapy, CI features and outcomes remain incompletely defined.
Purpose: To characterize CI in EGPA, compare patients with CI versus non–cardiac involvement (nCI), and assess prognostic implications in a contemporary multicenter cohort.
Methods: Retrospective bicenter study of 53 EGPA patients (CI n=26; nCI n=27). Baseline demographics, biomarkers, echocardiography, cardiac magnetic resonance (CMR), and endomyocardial biopsy (EMB, when available) were analysed. Groups were compared using standard statistical tests.
Results: At diagnosis, mean age was 50.5±15.7 years; 45.3% were male, with balanced traditional cardiovascular risk factors. Figure 1 displays main results of the study. CI patients had higher hospitalization rates at diagnosis (p‹0.01), mainly due to cardiac symptoms. CI showed greater severity, with lower LVEF (42.8±15.9% vs 59.7±4.5%; p=0.002) and more frequent pericardial effusion (61.5% vs 0%; p=0.011). Severe presentations were common: complicated course (91.7%), cardiogenic shock (24%), fulminant myocarditis (28%), and temporary mechanical circulatory support (15.4%). Troponin and NT–proBNP were markedly elevated. At discharge, only 45.8% recovered LVEF ≥50%. Eosinophil counts and CRP did not differ between groups. ANCA–positive patients were less often male and less likely to present with CI. EMB (performed in 52.2% of CI) showed eosinophilic myocarditis in 76%. CMR confirmed myocarditis in 83%, with frequent late gadolinium enhancement (90.9%), mainly subendocardial (Figure 2), and intracavitary thrombi in 27.3%. Follow–up was longer in nCI (Figure 1). At last follow–up, LVEF remained lower in CI, while mortality was low and not significantly different between groups.
Conclusions: CI in EGPA represents a severe clinical phenotype with distinctive CMR and supportive EMB findings. Cardiac symptoms often drive initial hospitalization and diagnosis. Despite low mortality with contemporary management, residual systolic dysfunction is common, supporting routine cardiac screening and long–term follow–up, especially in symptomatic patients.

	General population	Cardiac involvement		
		No	Yes	
	N=53	N=27	N=26	p-value
Cardiovascular symptoms at presentation (32)	26 (52.5%)	1 (14.3%)	19 (26.0%)	0.006
TTE at admission LVEF (%) (26)	50.00 (30.50–57.25)	59.67 (4.51)	42.83 (15.92)	0.002
TTE at admission Pericardial effusion (26)	16 (58.2%)	0 (0.0%)	16 (61.5%)	0.011
Need for Hospitalization at time of EGPA diagnosis (42)	34 (81.0%)	8 (50.0%)	26 (100.0%)	<0.001
Death during hospitalization (32)	1 (3.1%)	0 (0.0%)	1 (4.0%)	1
Length Follow Up (years) (53)	8.00 (3.00–14.00)	13.00 (7.50–18.00)	3.50 (2.00–8.50)	<0.001
Death during follow-up (53)	4 (7.5%)	1 (3.7%)	3 (11.5%)	0.351
TTE Last Follow Up LVEF (%) (44)	57.00 (49.75–61.25)	60.50 (57.25–64.25)	55.00 (46.50–57.50)	0.005

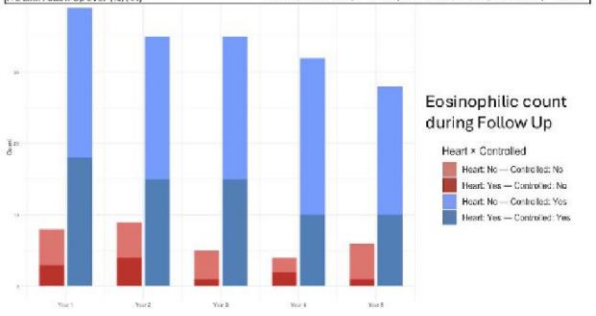

Figure 1

Cardiac involvement - diagnosis	N=23
Eosinophilic Myocarditis histologically proven, (23)	12 (52.2%)
›Myocarditis proven on EMB, (12)	9 (75%)
Myocarditis proven by cardiac CMR, (23)	19 (83.0%)
LGE in Myocardium, (22)	20 (90.9%)
LGE Pattern, (20)	
Sub-epicardial	2 (10.0%)
Mid-myocardial	4 (20.0%)
Sub-endocardial	13 (65.0%)
Trans-mural	1 (5.0%)

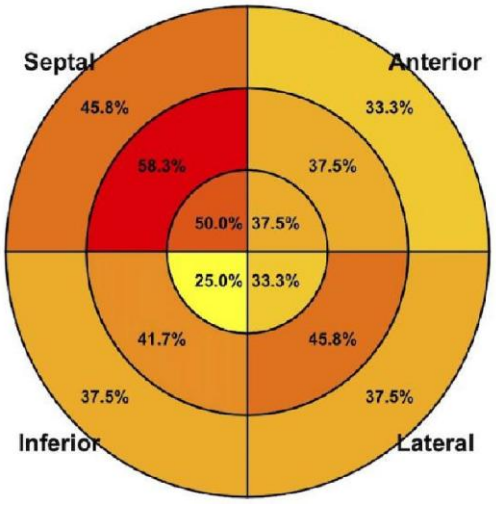

Figure 2

Abstract citation ID: suag058.403

THE IMPORTANCE OF ECHODYNAMICS: A CASE OF EOSINOPHILIC MYOCARDITIS

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Fondazione Irccs Policlinico San Matteo

Introduction: Daily bed–side evaluation of echographic advanced parameters allows therapeutic tailoring in multiple scenarios.
Case Presentation: A 63–year–old woman with no cardiac–related symptoms was admitted to the emergency department because of lower limbs paresthesias. The presence of significant peripheral hypereosinophilia and the results of the chest CT–scan were coherent with the suspect of eosinophilic pneumonia. The ECG showed diffuse ST–segment depression and hsTnI and NT–proBNP were elevated. The echocardiography revealed a diffusely–hypokinetic small–sized left ventricle (LVOT VTI 10 cm, EF 35%), no signs of suboptimal ventriculo–arterial coupling (VAC 1.2), severe functional mitral regurgitation, elevation of left ventricular filling pressures (E/A 1, E wave 56 cm/s, IVRT 60 ms, Vp 40 cm/s), normal indexes of right ventricular systolic function with signs of impaired relaxation (tricuspid E/A 1.2, E/e' 5.5, presence of pre–systolic RVOT A–wave), moderate tricuspid regurgitation with elevated pulmonary pressures (ePASP 40 mmHg), no splanchnic congestion (normal suvrahepatic vein flow, portal vein pulsatility index ‹ 30%, renal vein stasis index 0) and no splanchnic hypoperfusion (renal resistive index 0.4). Endovenous diuretic therapy was started, without any vasodilator nor inotrope. A coronary CT–angiography ruled out obstructive CAD. The clinical suspect of eosinophilic myocarditis was raised and steroid therapy was started, without performing an invasive endomyocardial biopsy (EMB). The patient had an improvement in terms of anterograde cardiac output and filling pressures, with reduction of MR, TR and estimated pulmonary pressures; weight–adjusted low molecular weight heparin was also started because of left ventricular thrombus. A cardiac magnetic resonance was finally performed, with findings coherent with the hypothesis of eosinophilic myocarditis.

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Conclusion: in this case, two main aspects can be elucidated. The first insight is related to not performing an EMB, according to the 2024 ACC Expert Consensus on Myocarditis: the patient was classified as a stage B (asymptomatic) myocarditis, with an unfavourable estimated risk–benefit ratio. The second insight is related to the role of echodynamics in assessing the need for vasodilator, inotropic and diuretic therapy, especially in a scenario in which diastolic dysfunction plays a major role: daily evaluation allowed an accurate therapeutic optimization.

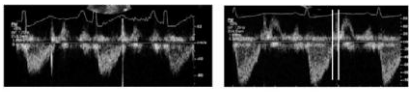

Figure 1. ICU admission. Left: LVOT VTI showing reduction in anterograde SV. Right: IsoVolumic Relaxation Time, coherent with elevated LV filling pressures

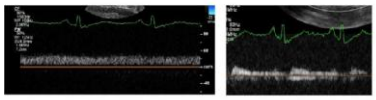

Figure 2. Left: Portal Vein Flow (pulsatility < 30%). Right: Renal Resistive Index (< 0.7)

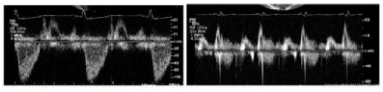

Figure 3. ICU discharge. Left: LVOT VTI showing significant improvement of SV. Right: PW Doppler with anterograde transmitral flow showing signs of normal LV filling pressures

Drug-Related Myocarditis

Abstract citation ID: suag058.404

FULMINANT MYOCARDITIS ASSOCIATED WITH IMMUNE CHECKPOINT INHIBITORS: A CASE REPORT

D. Mandunzio, B. Cuzzola, F. D'Amico, S. Testa, N. Porchetta, A. Viele, A. Trivisonno, and A. Colavita
Ospedale Cardarelli

Myocarditis associated with immune checkpoint inhibitors (ICIs) is a rare complication but carries a high mortality rate. The clinical presentation can mimic acute coronary syndrome, making diagnosis complex and often delayed. An 81–year–old man was admitted to the emergency department with worsening dyspnea. The ECG showed lateral ST–segment elevation associated with a wide QRS complex, absent in previous tracings (Figure 1). The echocardiogram showed a severe reduction in global systolic function with akinesia of the lateral wall and apex, associated with bilateral pleural effusion. Blood tests showed a marked increase in myocardiokinecrosis enzymes. He had a history of squamous cell carcinoma of the scalp undergoing treatment with nivolumab. The patient was transferred to the intensive care unit and underwent urgent coronary angiography, which did not reveal any hemodynamically significant coronary stenosis. During his hospital stay; he experienced rapid clinical deterioration, culminating in cardiogenic shock. The patient was subjected to infusion therapy with norepinephrine and dobutamine at maximal doses with little benefit. Echocardiography showed a further reduction in ejection fraction with severe reduction in stroke volume (SVi 20 ml/min). In the absence of an ischemic cause and in light of ICI exposure, a diagnosis of checkpoint inhibitor–mediated immune myocarditis was made, and treatment with methylprednisolone was immediately initiated. Magnetic resonance imaging was not performed due to the patient's marked hemodynamic instability. The patient underwent BEM with evidence of a CD4– and CD8–positive lymphocyte infiltrate associated with myocardial necrosis, thus confirming the diagnosis of ICI–mediated myocarditis. Despite intensive care, the patient died of refractory cardiogenic shock. Myocarditis is characterized by a mortality rate exceeding 50%, representing a significant challenge in the Intensive Care Unit.

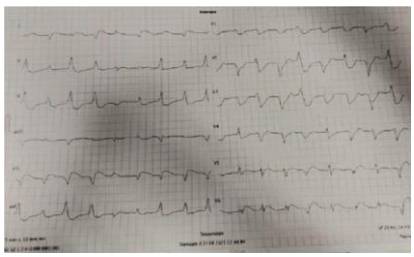

Figure 1: Markedly hypertrophic and dysfunctional left ventricular stenosis. Infiltration of the ventricle is evident.

Abstract citation ID: suag058.405

CATASTROPHIC PEMBROLIZUMAB–INDUCED TRIPLE–M SYNDROME: A RARE CASE OF RAPIDLY PROGRESSIVE IMMUNE–MEDIATED CARDIOTOXICITY

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The Triple–M Syndrome is a rare and severe immune–mediated adverse event associated with Immune Checkpoint Inhibitors, characterized by the concomitant occurrence of myocarditis, myositis, and myasthenia gravis. To date, approximately 50 cases have been reported, mainly following pembrolizumab or nivolumab administration in patients with melanoma, lung, or renal cancer, with an estimated mortality of 38%. Clinical management is challenging and not standardized. High–dose corticosteroids are considered first–line therapy, while intravenous immunoglobulins, plasma exchange, pyridostigmine, and other immunosuppressive agents have been used in steroid–refractory cases. We report a rare case of Triple–M Syndrome following a single dose of pembrolizumab. A 69–year–old hypertensive male with no previous cardiovascular history was diagnosed with stage IIB superficial spreading melanoma (Clark level IV). Fifteen days after the first administration of pembrolizumab (200 mg), he developed rapidly progressive dyspnea, myalgias, neck pain, palpitations, and oppressive chest pain, associated with mild hypoxemia (SpO_2 91% on room air). Laboratory tests showed AST/ALT 121/342 U/L, LDH 830 U/L, CPK 1230 U/L, potassium 5.5 mmol/L, NT–proBNP 7664 ng/L, and hs–cTnT 1147 ng/L. Arterial blood gas revealed respiratory alkalosis with mild hypoxemia. Suspecting ICI–related cardiotoxicity, the patient was admitted to the Cardiac Intensive Care Unit. Transthoracic echocardiography showed a left ventricular ejection fraction of 40% with septal and infero–basal hypokinesia, without pericardial effusion. During hospitalization, left eyelid ptosis and dysphagia developed. ECG showed sinus tachycardia, right bundle branch block, diffuse repolarization abnormalities, ventricular bigeminy, and intermittent alternation with left bundle branch block. Coronary angiography excluded obstructive coronary artery disease. A diagnosis of Triple–M Syndrome was established, and high–dose intravenous methylprednisolone (1 g/day) was initiated. On day two, rapid neurological deterioration occurred with bilateral ptosis, dysphonia, hypoventilation, and hypercapnic respiratory failure requiring intubation. Intravenous immunoglobulins and plasma exchange were added, but the patient died approximately 65 hours after admission. ICI–related Triple–M Syndrome remains a rare, fulminant, and often fatal condition. Early recognition and prompt multidisciplinary management are crucial, yet prognosis remains poor.

Abstract citation ID: suag058.406

MESALAZINE–ASSOCIATED MYOPERICARDITIS IN A YOUNG PATIENT WITH ULCERATIVE COLITIS: A CASE REPORT

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Ulcerative colitis (UC) is primarily a gastrointestinal disorder, but 25–40% of patients may develop extraintestinal manifestations. Cardiac involvement is rare (‹1%), with pericarditis and, more infrequently, myocarditis. Mesalazine is a common first–line therapy for mild–to–moderate UC and is generally well tolerated, though rare cases of drug–induced myopericarditis have been described. Distinguishing UC–related cardiac inflammation from mesalazine–induced toxicity can be challenging. Awareness of this uncommon adverse reaction is essential, as prompt withdrawal of mesalazine and initiation of anti–inflammatory treatment can facilitate recovery of cardiac function and help prevent further complications. We report the case of a 20–year–old male with a recent diagnosis of UC treated with oral mesalazine, who presented to the emergency department with pharyngeal pain, intermittent low–grade fever, and recurrent chest pain. Laboratory tests showed mild anemia and hypokalemia, neutrophilic leukocytosis, elevated transaminases, troponin I (994 pg/mL), NT–proBNP (5404 pg/mL) and CRP. Electrocardiography revealed tachycardia with ST–segment elevation and T–wave inversion in the inferior leads (Figure 3). Echocardiography showed hypokinesia of the mid–distal inferior septum and mid anterolateral and posterior walls, mild left ventricular systolic dysfunction (LVEF 44%), moderate mitral regurgitation, and a non–tamponade pericardial effusion. The patient was admitted to the Cardiology Unit. Cardiac CT excluded coronary artery disease. Infectious etiologies were ruled out. Suspecting mesalazine–induced myopericarditis, the drug was promptly discontinued. The patient was started on ibuprofen, colchicine, low–dose bisoprolol and potassium canrenoate. Cardiac MRI revealed myocardial edema with subepicardial late gadolinium enhancement in the inferolateral walls (Figure 1 and 2), supporting the diagnosis of myopericarditis. Endomyocardial biopsy was not performed given the low–risk status of the patient. Upon clinical stabilization, 30 days later the patient was discharged

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asymptomatic and with normalization of inflammatory and myocardial injury markers. LVEF improved to 60% This case highlights a rare association between mesalazine therapy and acute myopericarditis in young patients with ulcerative colitis. Discontinuation of mesalazine and early administration of anti–inflammatory therapy is associated with clinical recovery and normalization of cardiac function.

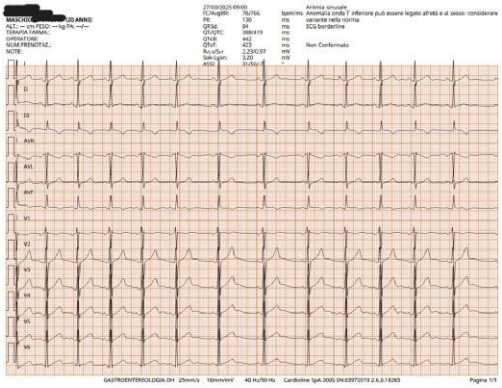

Figure 1

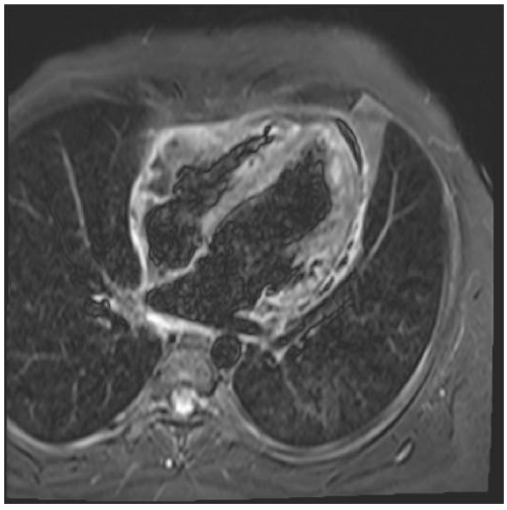

Figure 2

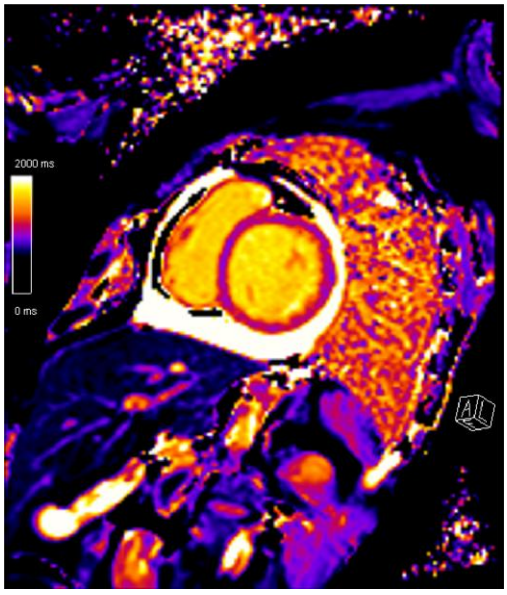

Figure 3

Abstract citation ID: suag058.407

IMMUNE CHECKPOINT INHIBITOR–RELATED FULMINANT MYOCARDITIS WITH PREDOMINANT RIGHT VENTRICULAR FAILURE AND MYASTHENIA GRAVIS OVERLAP: A CASE REPORT

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Immune checkpoint inhibitors (ICIs) are increasingly used in oncology but may cause severe immune–related adverse events, including myocarditis, a rare condition associated with high mortality. Predominant right ventricular (RV) involvement and overlap with neuromuscular toxicity represent an exceptionally uncommon and aggressive presentation. We report the case of a 68–year–old overweight male smoker with bladder cancer treated with pembrolizumab, admitted for acute dyspnea and neck pain, preceded by several days of diplopia. He had no prior cardiovascular history, and baseline echocardiography before ICI therapy showed normal biventricular size and systolic function. On admission, the patient was tachycardic and normotensive, with metabolic acidosis and hyperlactatemia. Electrocardiography revealed an idioventricular rhythm with ST–segment elevation in leads V1–V3. Transthoracic echocardiography demonstrated preserved left ventricular systolic function but severe RV dilation and systolic dysfunction with moderate tricuspid regurgitation. Pulmonary embolism was excluded, while laboratory tests showed markedly elevated high–sensitivity troponin levels. Urgent coronary angiography revealed normal coronary arteries. The patient was admitted to the coronary intensive care unit and treated with inotropic support and intravenous diuretics. Given the severe isolated RV dysfunction and ventricular arrhythmias, ICI–related myocarditis was strongly suspected and high–dose intravenous corticosteroids were promptly initiated. Despite immunosuppressive therapy, the clinical course rapidly deteriorated with progressive biventricular failure and systemic hypoperfusion. Neurological evaluation confirmed myasthenia gravis. Plasma exchange was initiated, followed by escalation to veno–arterial extracorporeal membrane oxygenation and additional immunosuppression with abatacept and ruxolitinib. The disease remained refractory, complicated by multiorgan failure, leading to death 10 days after hospital admission. This case highlights the fulminant nature of ICI–related myocarditis with predominant RV involvement, particularly when associated with neuromuscular immune toxicity. Early recognition of disproportionate RV dysfunction in the presence of elevated cardiac biomarkers and normal coronary arteries is crucial, although prognosis remains poor despite aggressive multidisciplinary management.

Abstract citation ID: suag058.408

MESALAZINE–RELATED MYOPERICARDITIS: A RARE CARDIOTOXICITY IN ULCERATIVE COLITIS

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Introduction: Mesalazine (5–ASA) is a cornerstone therapy for ulcerative colitis (UC), but rarely can cause immune–mediated cardiotoxicity (myocarditis/pericarditis/myopericarditis), usually within weeks of starting induction. CMR is pivotal to confirm myocardial/pericardial involvement and guide follow–up.
Case: A 28–year–old man with UC presented with acute pericarditic chest pain (worse supine/deep inspiration, better upright), without syncope, palpitations, or relevant dyspnea. One week earlier, he had been discharged after an intestinal flare and started mesalazine 3 g/day plus systemic steroids (tapering). He also reported a recent febrile rhinitis episode.
Initial work–up: Hemodynamically stable, afebrile, no heart failure signs. ECG was normal (no ST elevation or PR depression). Labs showed isolated troponin elevation (200 pg/mL) with normal CRP/ESR. Differential included viral myocarditis, extra–intestinal IBD involvement, and 5–ASA adverse reaction. Echo/CMR: Transthoracic echo showed a small pericardial effusion, no tamponade, preserved systolic function. Acute CMR confirmed preserved biventricular function, small effusion, myocardial edema (T2/T2–mapping) and a non–ischemic LGE pattern (subepicardial, inferolateral, non–coronary distribution) with associated pericardial enhancement—consistent with acute myopericarditis.
Management and outcome: Given the compatible timing, lack of systemic inflammation, negative virology, and imaging findings, mesalazine–related cardiotoxicity was considered highly likely. Mesalazine was permanently discontinued and class avoidance recommended; steroids were continued with a revised taper and an alternative non–5–ASA maintenance strategy planned (immunomodulator/biologic according to phenotype). Symptoms resolved and troponin normalized.
Follow–up: At 1 month, off mesalazine, the patient was asymptomatic with normal labs; repeat CMR showed regression of myocardial edema and complete resolution of pericarditis signs.
Conclusion: 5–ASA myopericarditis may present with normal ECG and negative inflammatory markers; troponin and CMR are key for diagnosis and follow–up. In

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recently treated IBD patients, pericarditic chest pain with troponin rise should promptly raise suspicion of drug–induced cardiotoxicity and trigger early multidisciplinary management.

Abstract citation ID: suag058.409

MESALAZINE–INDUCED MYOPERICARDITIS IN A PATIENT WITH ULCERATIVE COLITIS: A CASE REPORT

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Università Campus Bio Medico Di Roma; Azienda Ospedaliera San Camillo Forlanini

Background: Mesalazine (5–aminosalicylic acid) is a first–line therapy for ulcerative colitis. Cardiac inflammation, including myocarditis and pericarditis, represents a rare but potentially serious adverse effect and may be difficult to distinguish from extraintestinal manifestations of inflammatory bowel disease.
Case presentation: A 20–year–old man with a recent diagnosis of ulcerative colitis presented with acute chest pain and fever after 20 days of oral mesalazine therapy. Electrocardiography showed ST–segment elevation in the inferior leads. Laboratory tests revealed elevated inflammatory markers, high–sensitivity troponin I (500 ng/L), and increased NT–proBNP levels (5,400 pg/mL). Transthoracic echocardiography showed left ventricular systolic function at the lower limits of normal (LVEF 50%) and a small pericardial effusion. Coronary CT angiography excluded significant coronary artery disease. Cardiac magnetic resonance revealed myocardial oedema and non–ischaemic meso–subepicardial late gadolinium enhancement, consistent with acute myopericarditis. Blood cultures and stool testing for common bacterial pathogens were negative. Based on the clinical presentation, the temporal relationship with mesalazine initiation, and the exclusion of alternative causes, mesalazine–induced acute myopericarditis was suspected. Mesalazine was discontinued, and treatment with colchicine and ibuprofen was initiated, while prednisone and metronidazole were continued for ulcerative colitis. Rapid clinical improvement was observed, with resolution of fever and chest pain and normalization of left ventricular systolic function (LVEF 60%, GLS –19.4%). Further evaluation revealed proteinuria and imaging findings suggestive of an inflammatory renal process, raising suspicion of mesalazine–associated interstitial nephritis.
Discussion: This case highlights mesalazine–induced myopericarditis as a rare early hypersensitivity reaction. Prompt recognition and drug discontinuation are essential, as they are usually associated with rapid and complete recovery.

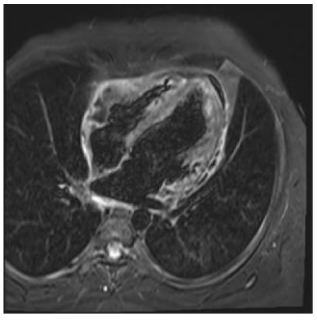

Figure 1: Axial T2-weighted STIR cardiac magnetic resonance shows circumferential pericardial hyperintensity and pericardial effusion, consistent with active pericardial inflammation. Associated myocardial hyperintensity suggests edema, supporting acute myopericarditis in the appropriate clinical context

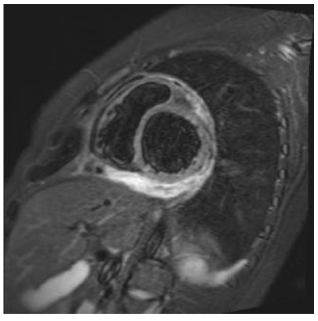

Figure 2: Short-axis T2-weighted STIR cardiac magnetic resonance shows circumferential pericardial hyperintensity with associated effusion and myocardial hyperintensity suggestive of edema. Findings are consistent with active inflammation in acute myopericarditis

Abstract citation ID: suag058.410

TREATMENT OF PEMBROLIZUMAB–INDUCED FULMINANT MYOCARDITIS: A CASE REPORT

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Ospedale Civile Di Montebelluna; Ospedale Ca' Foncello

Background: immune–checkpoint inhibitors (ICIs), such as Pembrolizumab (a PD–1 monoclonal antibody), have revolutionized cancer therapy. These drugs stimulate T–cell response against the tumor, but due to activation of the immune system, their use can cause immune–related adverse events that may involve the myocardium, leading to the development of fulminant myocarditis. This condition can occur in up to 1% of patients treated with ICIs within the first weeks of therapy, with an associated mortality rate of 33%.
Case report: we present the case of a 76–year–old patient who underwent Pembrolizumab administration for malignant melanoma of the left shoulder. Two days after the second dose of Pembrolizumab, the patient developed acute myositis, characterized by very high levels of creatine phosphokinase, myoglobin, and transaminases, accompanied by intense myalgia of the lower limbs. The condition was initially treated by suspending the PD–1 inhibitor and administering methylprednisolone. Nine days later, the patient developed dyspnea, associated with a rise in troponin T levels and a significant arrhythmic burden, characterized by frequent polymorphic ectopic ventricular beats and sustained and nonsustained ventricular tachycardia. Echocardiography showed acute severe left ventricular dysfunction; cardiac magnetic resonance imaging (MRI) findings were suggestive of myocarditis, which rapidly deteriorated into cardiogenic shock, poorly responsive to inotropic and antiarrhythmic therapy, treated with noninvasive ventilation and intravenous immunoglobulins. For this reason, we initiated a second–line therapy with abatacept and ruxolitinib, resulting in progressive improvement and resolution of left ventricular dysfunction. The patient was therefore transferred to a rehabilitation center. However, 20 days later, the patient was again transferred to our ICU for a relapse of biochemical and arrhythmic myocarditis, with no worsening of cardiac function. Therefore, we administered four additional doses of abatacept, continued ruxolitinib therapy, and progressively reduced corticosteroid dosage, with a consistent improvement in arrhythmic burden and troponin T levels until discharge.
Conclusion: this case underscores the importance of prompt diagnosis of myocarditis and the initiation of specific treatment in patients receiving ICIs. Furthermore, the effects of ICIs can persist for a long time after discontinuation, thus requiring prolonged specialist observation.

Pacing Modalities

Abstract citation ID: suag058.411

FLUOROLESS LEFT BUNDLE BRANCH AREA PACING USING CARTO 3 SYSTEM IN A PATIENT WITH RADIODERMATITIS

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Asst Crema

Introduction: Left bundle branch area pacing (LBBAP) can involve significant radiological exposure. Electroanatomic mapping with CARTO 3 system (Biosense Webster©) has proven useful for pacemaker implantation without fluoroscopy.
Clinical Case: A 65–year–old patient with chronic ischemic heart disease, following percutaneous myocardial revascularization. Admitted for syncope without prodromes. He previously underwent radiotherapy for lung adenocarcinoma with subsequent radiodermatitis of the axillary cavity and left hemithorax.
Findings included: ECG showing sinus rhythm with left bundle branch block (QRS 150 ms); echocardiogram revealing moderate left ventricular dysfunction (EF 42%) due to diffuse hypokinesia; no significant coronary stenoses at coronary angiography; electrophysiological study negative for induction of sustained ventricular arrhythmias, but showing pathological supra– and infra–Hisian conduction (AH interval 155 ms, HV 80 ms). Considering the indication for pacemaker (PM) implantation, the left ventricular dysfunction, and the need to avoid X–ray exposure, left bundle branch area pacing (LBBAP) was performed guided by a non–fluoroscopic mapping system (CARTO 3). A three–dimensional anatomical reconstruction of the right atrium/His bundle/right ventricle was created using a decapolar catheter (DECANAV Biosense Webster©) introduced via left axillary vein. Then, a lead (Medtronic Capsure–Sense 4574–53) was positioned in the right atrial appendage and another one lead (Medtronic Select Secure 3830–69 cm), advanced through a fixed–curve sheath (C315His), was screwed in 1.5 cm anteriorly and inferiorly to the His bundle. The final ECG showed stimulated QRS morphology with positive terminal deflection (rSR pattern) in V1, QRS duration 110 ms, and V6 R–Wave Peak Time (V6RWPT) 70 ms.

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Regarding the electrical parameters: ventricular capture threshold was 1.5 V @ 0.4 ms, R–wave ›10 mV, impedance 550 Ω. No complications. Three months after pacemaker implantation, complete recovery of left ventricular systolic function (EF 55%) and stability of the pacemaker's electrical parameters were documented. No further progression of radiodermatitis.
Conclusions: Pacemaker implantation with LBBAP using non–fluoroscopic electroanatomic reconstruction is safe and effective, and, beyond selected cases, could be used to reduce radiological exposure for patients and operators.

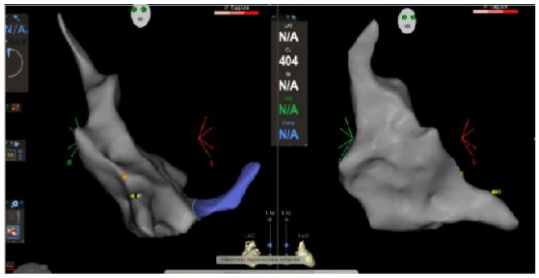

Figure 1: Positioning of the electro-catheter for left bundle branch area stimulation using a non-fluoroscopic mapping system (CARTO 3) with three-dimensional anatomical reconstruction of the right sections; the yellow sphere indicates the His bundle.

Figure 2 (Left): Pre-procedure ECG. (Right): Post-procedure ECG. The change confirms successful physiological pacing, with narrowed QRS duration and improved ventricular synchrony, contributing to left ventricular function recovery (EF from 42% to 55%) at 3-month follow-up.

Abstract citation ID: suag058.412

EVIDENCE OF DIFFERENT CONDUCTION VELOCITY ACCORDING TO HIS BUNDLE PACING INTENSITY OUTPUT

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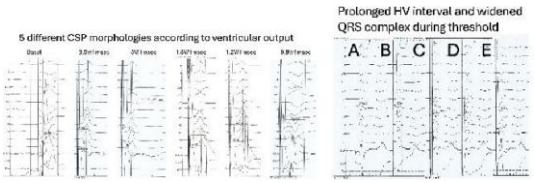
Ente Eccesiastico Osp Gen Reg F. Miulli; Ente Ecclesiastico Osp. Gen. Reg. F. Miulli; Ente Ecclesiastico Osp Gen Reg Miulli; Ente Ecclesiastico F. Miulli; Cardiologia Universitaria Policlinico Bari; Ente Ecclesiastico F Miulli

Background: His bundle pacing (HBP) is considered the most physiological method for cardiac pacing. In heart failure patients with narrow QRS, we noted varying clinical effects depending on HBP output (HIPPOS study ongoing). Here, we report two cases demonstrating how different conduction velocities correspond to different intensities of HBP output.
Methods/Results: An 82–year–old woman presented with high–grade AV block and narrow QRS. During lead fixation showed initial RBBB morphology, which transitioned to LBBB with stable AV conduction. High output HBP (3.5V/1ms) corrected LBBB. At 3V/1ms an r' in V1 was observed with a small increase in HV from 44 to 46ms, while at 1.8V/1msec there was a "jump" from 74 to 92ms in RWPT in V6, loosing however the r'in V1. QRS was larger from 74 to 88msec. As output decreased, QRS widened and HV interval varied, with selective HBP at low outputs failing to correct LBBB. In a 76–year–old man with AF and spontaneous RBBB, HBP reduced QRS duration and HV interval as output increased. Lower voltages led to longer QRS and HV intervals, again resulting in selective HBP without RBBB correction before threshold.
Results: In both cases, the variations in pacing intensity revealed distinct changes in ECG morphology and conduction intervals, highlighting the dynamic relationship between HBP output and myocardial conduction. These observations suggest that incremental adjustments in pacing voltage can modulate the degree of bundle branch block correction, as reflected by alterations in QRS duration, HV interval, and waveform characteristics.
Conclusions: In both cases there is evidence of conduction system capture from the highest to the lowest voltage. Pacing from high to low voltage in both cases produced multiple ECG morphologies, with evidence that higher HBP outputs result in greater conduction velocity and more complete bundle branch block correction.



Abstract citation ID: suag058.413

CHALLENGING ANATOMY IN CARDIAC CONTRACTILITY MODULATION IMPLANT: THE ADDED VALUE OF THE EXPECTED INTEGRATED CCM/HV TECHNOLOGY

G. Frigo, D. Pacetta, F. Saladini, P. Buja, G. Povolo, S. Pontarollo, and G. Pasquetto
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Background: Subclavian vein stenosis or occlusion represents a significant challenge during transvenous cardiac device implantation, potentially compromising lead placement and increasing procedural risk. In cardiac contractility modulation (CCM) therapy, it is common to implant the device with a concomitant contralateral pacemaker or defibrillator, thus involving both the right and left venous accesses.
Case summary: We report the case of a 74–year–old gentleman, previously implanted for primary prevention with a single chamber ICD capable of atrial sensing (Biotronik, Acticor 7 VR–T DX). The patient with numerous cardiovascular risk factors, COPD and chronic renal failure, had ischemic heart disease with severely depressed ejection fraction and had previously undergone revascularization with coronary artery bypass grafting. The ICD was implanted on the left side. The patient was selected for a CCM device implant (Impulse Dynamics, Optimizer Smart Mini) due to worsening heart failure symptoms requiring recurrent hospitalizations. The right venography, performed before the procedure, revealed a stenotic/nearly occluded right subclavian vein (Fig. 1a–b). Using a fluoro–guided right axillary approach and gentle maneuvers, a guidewire was advanced into the partially patent vein and progressive venous dilation allowed safe advancement of the introducer sheath. Through the same access, the two active fixation leads were advanced toward the interventricular septum according to standard practice. Post–procedural imaging confirmed stable leads positioning and the absence of venous injury or thrombosis (Fig. 2)
Discussion: This case highlights that, even in the presence of significant stenosis, with careful pre–procedural venous assessment and the use of gradual dilation techniques, transvenous pacing lead implantation may be feasible. The availability of guidewires of different softness and dilators of various calibers can be useful in a step–by–step approach to resolving the difficulty. In the case of CCM implantation concomitantly with another device, both venous accesses must be engaged, until an integrated technology is available.
Conclusion: Partial stenosis/occlusion of the subclavian vein does not necessarily preclude successful pacemaker implantation, but the procedure may be challenging. The upcoming integrated CCM/HV technology will make it easier to manage cases with difficult anatomical variants such as the case described.

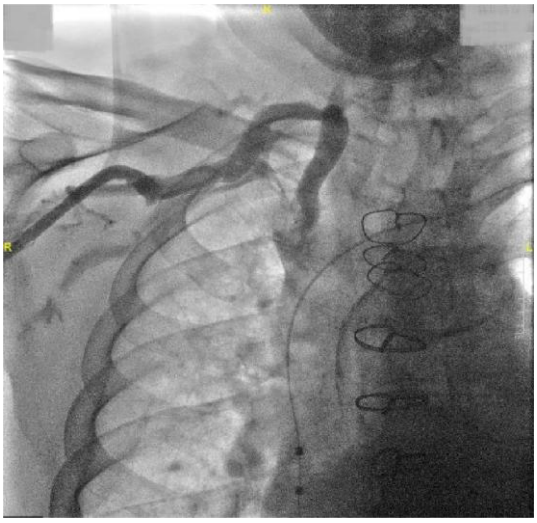

Fig. 1A

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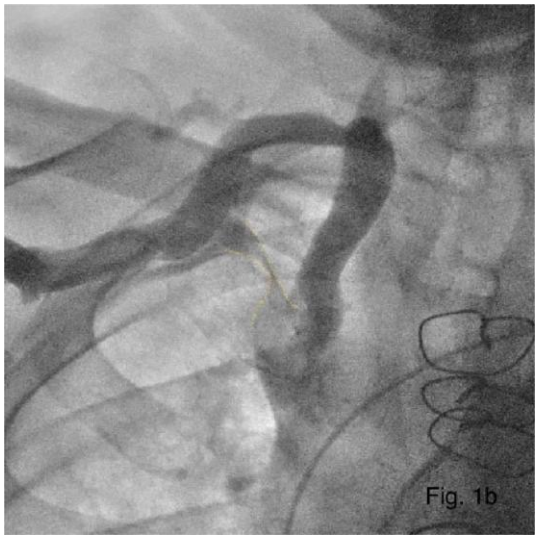

Fig. 1B

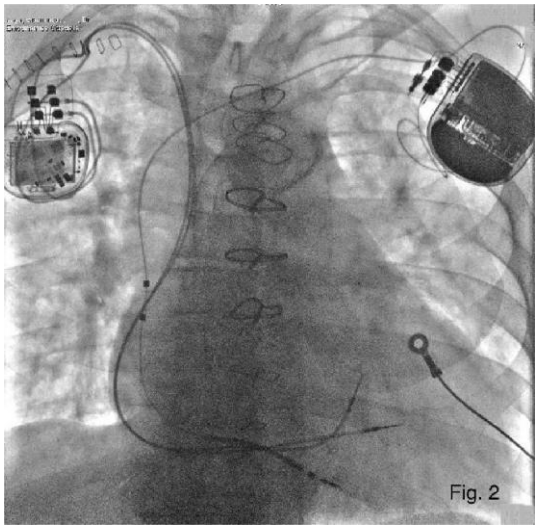

Fig. 2

Abstract citation ID: suag058.414

VDD AND DDD PACING FOLLOWING TRANSCATHETER AORTIC VALVE REPLACEMENT: A THREE–YEAR COMPARATIVE ECHOCARDIOGRAPHIC FOLLOW–UP

M. Giannotti Santoro, S. Latrofa, L. Segreti, R. De Lucia, M. Parollo, A. Canu, V. Barletta, A. Di Cori, G. Mansi, C. Giannini, M. De Carlo, and G. Zucchelli
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Background: In patients undergoing transcatheter aortic valve replacement (TAVR), subsequent pacemaker (PM) implantation has been associated with worsening ventricular function and higher heart failure hospitalization rates. Evidence remains scarce about the long–term effects of single lead atrioventricular sequential (VDD) pacing on left and right ventricular function as compared to dual lead (DDD) pacing.
Purpose: We hypothesized that, in patients undergoing PM implantation following TAVR complications, VDD are not significantly different from DDD concerning left and right ventricular function variation over time, as well as native valvular regurgitation.
Methods: Patients who underwent VDD or DDD implantation secondary to TAVR complications were retrospectively enrolled. Baseline demographic and echocardiographic data were collected the day before TAVR. Clinical reassessment with echocardiography was performed every six months; for each subject.
Results: One hundred eleven patients were enrolled (27 [24%] VDD and 84 [76%] DDD). The population was mainly composed by men (17 [63%] VDD vs. 44 [52%] DDD, p=0.46), presenting with baseline electrocardiographic alterations (17 [63%] VDD vs. 52 [62%] DDD, p=0.93), with a median New York Heart Association (NYHA) class of II (interquartile range, II–III; p=0.49) and a preserved left ventricular ejection fraction (LVEF, 60.0% [55.0–64.0] in VDD vs. 59.5% [55.0–65.0] in DDD, p=0.51). Notably, VDD patients were older than DDD patients (85.0 [81.5–88.0] vs. DDD 82.0 [78.8–85.0] years, p=0.01). Median follow–up time was 1120.0 [823.0–1302.0] days (VDD 1034.5 [895.3–1428.5] vs. DDD 1123.5 [796.3–1277.0] days; p=0.87). Baseline and follow–up echocardiographic data are detailed in Figure 1 and graphically summarized in Figure 2. Median NYHA class at follow–up was similar between groups (class I [I–II] for both groups, p=0.88), and significantly lower than baseline (p‹0.001). Notably, echocardiography parameters were substantially stable over time (LVEF 60.0% [55.0–63.5] in VDD, p=0.59; 60.0% [54.5–63.0] in DDD, p=0.60), except for a significant decrease of pulmonary arterial systolic pressure (PASP) from baseline in DDD (35.0 [30.0–45.0] vs. 30.0 [27.0–39.5] mmHg, p=0.03).
Conclusions. This retrospective analysis of TAVR patients suggests that VDD pacing provides comparable echocardiographic outcomes to DDD pacing, with both groups maintaining stable left and right ventricular function over long–term follow–up.

		VDD	DDD	p-value
LVEF, % [IQR]	Baseline	60.0 [55.0-64.0]	59.5 [55.0-65.0]	0.51
	Follow-up	60.0 [55.0-63.5]	60.0 [54.5-63.0]	0.59
	Baseline vs follow-up (p-value)	0.59	0.60	
EDV, mL [IQR]	Baseline	130.0 [74.0-135.0]	93.0 [80.0-120.0]	0.89
	Follow-up	84.0 [70.0-113.5]	96.0 [81.0-115.5]	0.13
	Baseline vs follow-up (p-value)	0.21	0.68	
ESV, mL [IQR]	Baseline	40.0 [29.0-63.0]	42.0 [33.0-52.0]	0.89
	Follow-up	49.0 [34.5-47.5]	45.0 [38.0-52.0]	0.08
	Baseline vs follow-up (p-value)	0.54	0.18	
Mitral insufficiency, grade [IQR]	Baseline	1 [1-1]	1 [1-2]	0.28
	Follow-up	1 [1-1]	1 [1-2]	**0.05**
	Baseline vs follow-up (p-value)	0.48	0.76	
Tricuspid insufficieacy, grade [IQR]	Baseline	1 [1-1]	1 [1-1]	0.58
	Follow-up	1 [1-1]	1 [1-1]	0.37
	Baseline vs follow-up (p-value)	0.54	0.39	
TAPSE, mm [IQR]	Baseline	20.0 [19.0-23.0]	22.5 [20.0-25.0]	**0.04**
	Follow-up	22.0 [20.0-25.3]	22.0 [19.0-25.0]	0.25
	Baseline vs follow-up (p-value)	0.07	0.16	
PASP, mmHg [IQR]	Baseline	34.0 [29.0-41.0]	35.0 [30.0-45.0]	0.55
	Follow-up	29.5 [27.0-34.5]	30.0 [27.0-39.5]	0.30
	Baseline vs follow-up (p-value)	0.09	**0.03**	

Figure 1

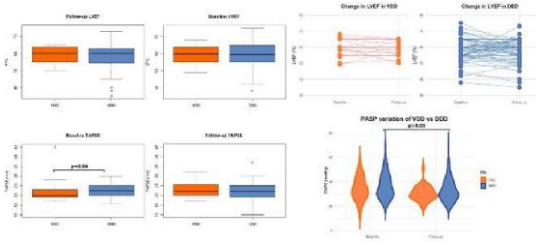

Figure 2

Abstract citation ID: suag058.415

ANTIARRHYTMOGENIC EFFECT OF MULTISITE PACING

G. Incampo, R. Valecce, M. Dadamo, C. Volpe, M. Moramarco, D. Di Nunzio, M. Gentile, G. Genchi, D. Rigida, and M. Bonfantino
Ospedale Di Venere Aslba

From observations of traditional or remote monitoring follow–up, only 2% of 35 patients with CRT–D had episodes of NSVT. In contrast, 25–35 % of patient with single–chamber and/or dual chamber ICDs had episodes of NSVT or ATP interventions or DC shoks for severe arrhythmias. From our follow–up observations on hundreds of patients, it has emerged that multisite pacing of CRT, with high percentages of stimulation (90 – 100 %), compared to single–chamber and dual–chamber devices, in addition to allowing a wide programming reserve in Cardiac Rhythm Management (CRM) and reverse remodeling of the left ventricle, exerts an antiarrhythmic effect on supraventricular and ventricular arrhythmias, with a lower burden of atrial fibrillation , resulting in fewer ATP and DC shock interventions by the devices on malignant arrhythmias. Biventricular pacing, especially with quadripolar leads (Figure 1), provides synchronous orthogonal recruitment of healthy and scarred miocardium; wich reduces the dispersion of refractory periods of pathological substrates, characterized by area of fibrosis, in severe heart desease. The lower heterogenicity of substrates, ultimately generates fewer reentry circuits, reset by multisite pacing, making this type of stimulation safe and effective (Figure 2) in the electromechanical control of heart.

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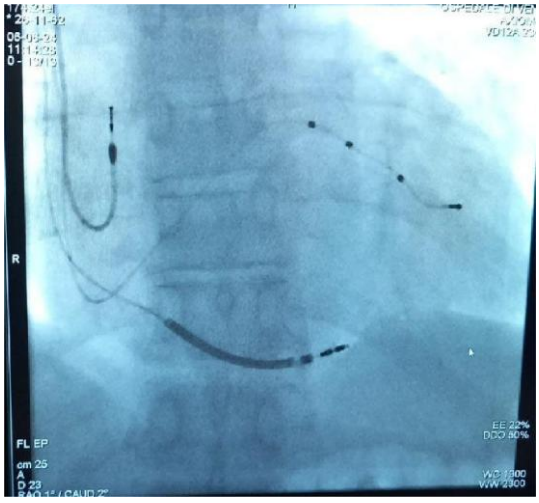

Figure 1

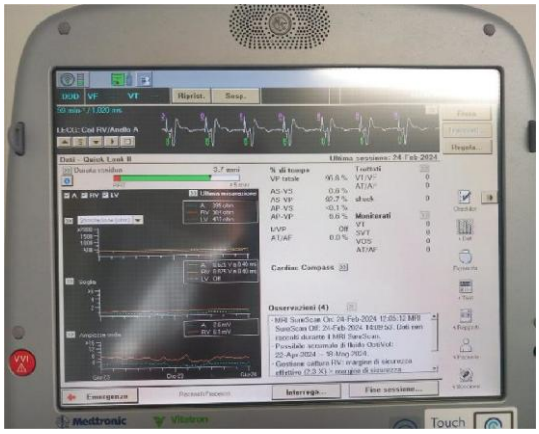

Figure 2

Heart Failure and Care Giving

Abstract citation ID: suag058.416

ROLE OF NURSING INTERVENTIONS IN REDUCING REHOSPITALIZATIONS IN PATIENTS

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Background: Heart failure is a leading cause of hospital readmissions worldwide, with significant clinical and economic burden. Rehospitalizations are often related to inadequate self–care, poor adherence to therapy, and insufficient patient education at discharge. Nursing interventions play a key role in addressing these factors through structured education, follow–up, and transitional care programs.
Objective: To analyze the role of nursing interventions in reducing hospital readmissions among patients with heart failure through a narrative review of the current literature.
Methods: A narrative review was conducted by searching major biomedical databases for studies published in the last two decades focusing on nurse–led interventions in heart failure care. The analysis included randomized controlled trials, systematic reviews, and integrative reviews evaluating educational programs, discharge planning, self–care support, and post–discharge follow–up led by nurses.
Results: The literature consistently shows that nurse–led interventions are associated with a reduction in hospital readmissions and improved clinical outcomes. Structured educational programs enhance patients' knowledge, self–care behaviors, and adherence to pharmacological and non–pharmacological treatment. Transitional care models, including discharge education, telephone follow–up, and home visits, demonstrate a significant impact on continuity of care and early identification of clinical deterioration. Multidisciplinary approaches coordinated by nursing professionals further contribute to improved quality of life and reduced healthcare utilization.
Conclusions: Nursing interventions represent an essential component in the management of patients with heart failure and are effective in reducing rehospitalizations. Integrating structured nurse–led education and follow–up programs into routine clinical practice may improve patient outcomes and optimize healthcare resources. Further research is warranted to standardize interventions and evaluate their long–term effectiveness

Abstract citation ID: suag058.417

A MAN WITH MULTIPLE HEARTS: A CLINICAL ODYSSEY OF SURVIVAL

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Introduction: This case study focuses on the many facets of therapies the patient required. The medical history begins with a severe primary dilated cardiomyopathy (DCM) caused by drug abuse. The DCM required the implantation of an intracavitary cardiac resynchronization defibrillator (CRT–D). After regaining LVEF and cardiac contractility, the patient encountered his first obstacle: severe endocarditis, requiring removal of the leads and generator. After treatment with antibiotics, the patient was protected from fatal arrhythmic events with the implantation of a subcutaneous cardioverter–defibrillator (S–ICD). This reduces the risk of infection, but it did not allow for cardiac resynchronization. Consequently, the left ventricle dilated again, along with the mitral annulus, worsening the failure to a severe degree. Endovascular implantation of a Mitraclip was necessary, which reduced respiratory failure and obstruction. However, this did not last long, and the patient was urgently admitted to intensive care for severe pulmonary edema.
Materials and Methods: We present the clinical history of a 47–year–old man with severe primary dilated cardiomyopathy secondary to substance abuse.
Discussion: The man's heart was severely deteriorated, not only due to the disease but also due to all the previous surgeries. An Impella was placed to support the patient's hemodynamics and he was placed on the emergency regional transplant list, but his heart failed, so a Total Artificial Heart (TAH), the CARMAT, was implanted. The patient underwent surgery, and the postoperative course appeared to be good, although his hemoglobin levels were difficult to recover. The sternal wound began to show signs of leakage, including blood, and so he was placed on VacTherapy, which partially resolved the problem but also worsened it, as the vacuum suction drew more and more blood from the wound. A CT angiogram revealed the diagnosis: "an anastomosis between the Carmat and the ascending aorta had failed, and the patient, already infected, had a high risk of mortality from repeat surgery. Once again added to the national emergency transplant list, a donor was found a few days later, and the patient received the necessary care for a heart transplant. The patient was discharged 10 days after surgery.
Conclusion: This case highlights the extreme complexity of management and the sequence of possible therapeutic strategies, from implantable defibrillator to TAH to transplant.

Abstract citation ID: suag058.418

NURSING WORKLOAD AND FUNCTIONAL AUTONOMY IN PATIENTS WITH ACUTE HEART FAILURE ADMITTED TO THE CICU: THE PROSPECTIVE OBSERVATIONAL PRECARDIO STUDY

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Ausl Piacenza

Background: Acute heart failure is one of the leading causes of admission to Cardiac Intensive Care Units (CICU) and is associated with high nursing workload, clinical frailty, and reduced functional autonomy. However, structured indicators of nursing workload and functional status are not routinely integrated into decision–making processes at the time of transfer or discharge.
Aim: To describe nursing workload and functional autonomy in patients admitted to the CICU for acute heart failure and to analyze their association with organizational outcomes and discharge destination.
Methods: This is a single–center, prospective observational study initiated in October 2025 and currently ongoing. Adult patients admitted for acute heart failure with a BRASS score ≥11 and a Barthel Index ≤90 at admission are enrolled after informed consent. Nursing workload is assessed using the Nursing Activities Score (NAS), while frailty and functional autonomy are evaluated through the BRASS Index and the Barthel Index. Assessments are performed within 24 hours of admission and at the time of transfer or discharge. Essential clinical data and discharge destination are collected. The analysis includes descriptive statistics and evaluation of associations between nursing workload, functional indicators, and organizational outcomes.

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Preliminary results: Preliminary analyses highlight marked heterogeneity in care profiles, with a subset of patients characterized by high nursing workload and reduced functional autonomy, frequently associated with complex discharge pathways and increased need for structured continuity of care.

Conclusions The PRECARDIO study suggests that the systematic integration of nursing workload and functional autonomy indicators in the CICU may support more appropriate transfer planning, improve continuity of care, and contribute to the development of more efficient organizational models in acute heart failure.

Abstract citation ID: suag058.419

CAREGIVER ANXIETY, DEPRESSION AND PREPAREDNESS IN HEART FAILURE: BASELINE DATA FROM A PARTICIPATING CENTER OF THE RE–MOTIVATE HF STUDY

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Background: Heart failure is a chronic and progressive condition requiring complex and continuous management. This burden affects not only patients but also their caregivers, who are often exposed to high psychological and physical stress, particularly when patients show poor self–care.
Aim: To describe levels of anxiety and depression and the degree of role preparedness among caregivers of patients with chronic heart failure and poor self–care.
Methods: This observational study included caregivers of patients followed at the Azienda Socio Sanitaria Territoriale (ASST) of Lodi and enrolled in the RE–MOTIVATE HF study, an ongoing, dyadic, multicenter, randomized controlled trial aimed at evaluating the effectiveness of remote motivational interviewing in improving self–care in patients with heart failure. At baseline, together with self–care, we also evaluated patient anxiety, (with the Hospital Anxiety and Depression Scale (HADS)) and caregiver preparedness (with the Caregiver Preparedness Scale (CPS)). Categorical variables were described using frequencies and percentages, while continuous variables were described using means, standard deviations, or ranges. The association between caregiver preparedness and anxiety and depression levels was explored using Spearman's correlation.
Results: A total of 50 caregivers were included, with the majority being female (80%). Clinically relevant anxiety levels (HADS–A ≥11) were observed in 73.3% of caregivers, while 22.2% showed borderline values. Marked depressive symptoms (HADS–D ≥11) were present in 34.7% of caregivers, and 61.2% reported borderline depressive symptoms. The mean CPS score was 17.8 ± 7.4, with considerable variability (range, 0–31). A trend toward an inverse association between caregiver preparedness and depressive symptoms was observed ($\rho = -0.26$; $p = 0.067$).
Conclusions: Caregivers of patients with heart failure and poor self–care experience high levels of anxiety and a substantial depressive burden, despite a generally sufficient but heterogeneous level of role preparedness. These findings underscore the need for structured psychological, motivational and educational interventions targeting caregivers, designed to reduce emotional distress and enhance disease management.

Organizational Models, Appropriateness and Enhancement Of Nursing Skills

Abstract citation ID: suag058.420

FROM VARIABILITY TO VALUE: A STANDARDIZED NURSE–LED PREOPERATIVE PROTOCOL IN CARDIAC SURGERY

M. Buscema, F. Battaglia, M. Lorenzini, A. Carmignani, B. Pucci, A. Belloni, E. Saraceni, I. Grasso, M. Giubbi, S. Guerriero, N. Platone, M. Speltri, and A. Durante
Fondazione Toscana Gabriele Monasterio

Background: Recent studies have highlighted the effectiveness of in–depth shared preoperative assessment in improving clinical outcomes, patient safety, and quality of care. Although the importance of a comprehensive assessment that also includes nursing assessment has been known for several years, there are a variety of approaches and standards in clinical practice, with a clear lack of consensus on the most effective methodology.
Objective: The proposed study explores the feasibility of a standardized protocol to improve the quality of care in cardiac surgery and reduce anxiety in patients with the main objective of reducing preoperative anxiety by reorganizing the preoperative evaluation by the anesthesia nurse. The secondary objective is to improve user satisfaction and reduce preoperative fear levels.
Methods: This is an ongoing pre–post comparative study in patients undergoing cardiac surgery. In the pre–phase, we measured pre–operative anxiety and fear using the APAIS scale and the Surgical Fear Questionnaire. In the post–operative period, user satisfaction indicators were collected related to the quality of nursing care. The intervention and the post–phase will start in January 2026.
Results: Sixty–five patients have been enrolled for the pre–phase since September 2025. The 33.8% of the sample was anxious according to the APAIS cut–off. The overall need for information was moderate, with a distribution centered around the mean value of the scale and a clinically relevant variability(SD › 2). Pre–operative fear was reported by 40% of patients in the short term, 23.1% in the long term, and 26.2% considering the total value. Patients, regardless of pathology, showed similar levels of anxiety and fear; however, the need for information was different in relation to the type of intervention planned (p=0.004). Due to global variability of responses, it was not possible to localize with statistical certainty which intervention impacted more in the individual subgroups analyzes. In the post–operative period, the satisfaction indicators showed an overall positive assessment of the care aspects, with consistent results also for reception, and staff preparation despite the limited interaction with family members.
Conclusion: In this first exploratory phase we were able to map the actual situation which will constitute our benchmarking in the post–phase and confirm the need of a nursing intervention to reduce information anxiety and surgical fear.

Abstract citation ID: suag058.421

A STANDARDIZED NURSING LANGUAGE TO DRIVE QUALITY AND OUTCOMES IN CARDIOVASCULAR PATIENTS

M. Speltri, L. Fialdini, S. Baratta, M. Vaselli, T. Perrotta, B. Natali, P. Da Valle, D. Granai, D. Luccetti, F. Nardini, S. Raveggi, S. De Marinis, S. Gwynne, V. Tenerani, M. Lazzarini, G. Bartolini, M. Deste, and A. Durante
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Introduction: Standardization of information flows is increasingly essential in the context of rapid digitalization and global e–Health initiatives, supporting personalization, continuity, safety, and quality of care. The use of codified terminology helps reduce data fragmentation by enabling consistent communication and making clinical practice more explicit and measurable. A single–specialty healthcare organization in Tuscany has acquired and implemented the ICNP™ coding system, developing a Cardiovascular Area Catalogue Subset, implementing a digitalized Integrated Nursing Process (INP) module for the adult population. Objective. Identify the most prevalent nursing diagnoses in the cardiovascular area and the nursing interventions implemented.
Methods: An outcome monitoring dashboard was developed to allow retrospective data extraction over a 12–month period starting from July 2024 in adults, while the INP is still under development in the pediatric–neonatal setting.
Results: Data extraction for the 12 months yielded 5,294 patients accessing the hospital, 65,6% was male, the mean duration of hospital stay was 5.76 days (SD ± 6.10). The mean age was 68,1 years (SD 14.5), with 71 as median. 2,639 of the patients had at least a nursing diagnosis with a total of 102,028 nursing assessments recorded. The most prevalent medical diagnosis was coronary atherosclerosis of native coronary artery (14,2%), disorders of the aortic valve (10,4%), atrial fibrillation (8%); while the prevalent nursing diagnoses, a median of 4 per each, included impaired respiratory function (n.19,199), followed by impaired self–care ability (n.18,013), impaired gait (n.16,200), and bedridden, confined to bed (n.13,889). Impaired urinary function (n.8,628) and adherence to fluid intake recommendations, compliance (n.5117) were also frequently identified. There was a moderate to strong positive correlation between the number of nursing diagnoses and length of hospital stay (Spearman's $\rho = 0.594$, $p < .001$).
Conclusions: A document model supported by standardized language and data interoperability ensures information consistency and security, data traceability, comprehensive data extraction, outcome monitoring for secondary analyses, and the development of reporting models to support decision–making, enhancing staff empowerment and accountability.

Abstract citation ID: suag058.422

A MULTIPROFESSIONAL ORGANIZATIONAL MODEL FOR LOW–COMPLEXITY CARDIAC PROCEDURES: A REAL–WORLD EXPERIENCE

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Ausl Piacenza

Background: In cardiology, the management of low–complexity procedures necessitates a shift from traditional organizational models. The development of structured care pathways, grounded in clearly defined multiprofessional collaboration, addresses the critical need for safety, clinical appropriateness, and operational efficiency.

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Aim: To describe the design and implementation of a multiprofessional organizational pathway for the management of low–complexity cardiac procedures.
Methods: A structured organizational pathway was developed within a cardiology unit, based on an analysis of the local operational context and a definition of required professional competencies. The model integrates collaboration among physicians, nurses, and cardiac physiology technicians, supported by dedicated training, shared procedural protocols, and precise role allocation. Governance was maintained through structured organizational tools, including:

- Pre– and post–procedure briefing and debriefing sessions.
- Process flow charts and a defined responsibility matrix .
- Standardized checklists for continuous and final process evaluation. The model's performance was evaluated using predefined process and safety indicators, monitored through periodic reviews.

Results The multiprofessional pathway proved to be both feasible and sustainable in routine clinical practice. The structured integration of professionals led to improved workflow organization, more efficient resource allocation, and the maintenance of high safety standards, thereby ensuring continuity of care within the cardiology service.

Conclusions The implementation of multiprofessional organizational pathways is an effective strategy for managing low–complexity cardiac procedures. This model offers a sustainable and potentially replicable approach that aligns with the evolving organizational requirements of modern cardiology settings.

Abstract citation ID: suag058.423

STRUCTURED JOB ROTATION TO SUPPORT LONGITUDINAL PATIENT CARE AND MULTIPROFESSIONAL COLLABORATION IN COMPLEX CARDIOLOGY SETTINGS

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Ausl Di Piacenza

Background: In complex cardiology settings, patient care pathways involve multiple clinical environments and professional teams. This organization requires continuity of care, effective multiprofessional collaboration and the ability to maintain a global view of the patient across settings. Models that promote shared competencies and cross–setting experience can support coordinated care delivery and enhance both clinical practice and organizational functioning.
Aim: To describe a structured job rotation model designed to support longitudinal patient care, strengthen multiprofessional collaboration and contribute to organizational sustainability in complex cardiology settings.
Methods: A structured job rotation programme was implemented involving trained healthcare professionals rotating across intensive cardiac care units, haemodynamics and electrophysiology. The model is based on defined training pathways, setting specific competency objectives and progressive operational autonomy. The experience was evaluated from an organizational and professional perspective, focusing on continuity of care, integration between settings, team collaboration and impact on daily clinical activities.
Results: Job rotation promoted the development of a longitudinal understanding of the patient care pathway, enabling professionals to recognize clinical and care needs across different phases of treatment. Direct experience in multiple settings enhanced communication and collaboration within the multiprofessional team. Within individual care environments, the presence of professionals with transversal competencies represented an added value, supporting the management of high complexity activities, continuity of care and more flexible use of professional resources. This approach also contributed to workforce sustainability through adaptive allocation of skilled personnel across settings.
Conclusions: Structured job rotation represents a proactive organizational strategy in cardiology, capable of integrating quality of care, professional development and service sustainability. By promoting a global view of the patient and strengthening multiprofessional collaboration, this model supports the functioning of complex cardiology services and may be transferable to similar clinical contexts.

Abstract citation ID: suag058.424

WORKING TOGETHER FOR APPROPRIATENESS: A GOOD PRACTICE SHARED IN THE CARDIOLOGY TEAM

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Introduction: Resource optimization is an increasingly important goal in modern medicine and is strongly supported by the promotion of appropriateness in clinical practice. In cardiology, the high volume of laboratory test requests may lead to increased workload for healthcare professionals, higher costs, and a risk of unnecessary investigations. The aim of this study is to present the experience of the University Hospital of Ferrara (AOUFE) in promoting a more rational use of resources by improving the appropriateness of laboratory test prescribing, reducing variability while maintaining patient safety standards.
Methods: A multidisciplinary working group composed of cardiologists and cardiology nurses was established. The team analyzed laboratory test prescribing patterns, identified areas of inappropriate use, and defined shared criteria based on scientific evidence and actual clinical needs. Standardized laboratory test panels were then defined for the most frequently performed interventional cardiac procedures, both before and after the intervention, while preserving clinicians' autonomy to request additional tests in the presence of specific clinical conditions (e.g., post–procedural complications, symptoms, or electrocardiographic changes). The impact of the intervention was evaluated by comparing the number and type of laboratory tests ordered during the first six months before and after implementation of the new model.
Results: Implementation of the pathway resulted in a significant reduction in unnecessary test requests (–20%), with a corresponding decrease in staff workload and a reduction in direct laboratory costs (–23.8%). No adverse events or diagnostic delays attributable to reduced prescribing were observed, confirming the maintenance of patient safety levels.
Conclusions: A structured and shared approach between cardiologists and nurses can improve the appropriateness of laboratory test prescribing, contributing to more efficient resource utilization without compromising clinical safety. This model is easily transferable to other clinical settings and highlights the importance of regular review of clinical–care processes, as well as close physician–nurse collaboration, to achieve tangible improvements in quality, efficiency, and sustainability.

Advanced Procedures, Electrophysiology and Nursing Management

Abstract citation ID: suag058.425

IDIOPATHIC VENTRICULAR ARRHYTHMIAS IN CHILDREN, WITH A FOCUS ON EXTRASYSTOLES IN STRUCTURALLY HEALTHY HEARTS: FROM RISK STRATIFICATION TO OUTCOMES, THE ROLE OF NURSES IN FOLLOW–UP MANAGEMENT. LITERATURE REVIEW AND FORMULATION OF A SYSTEMATIC META–ANALYSIS

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Introduction: Premature ventricular complexes (PVCs) are common ECG findings in children with structurally normal hearts and usually follow a benign, self–limiting course. Evidence shows frequent spontaneous resolution, although high PVC burden may induce ventricular dyssynchrony and reversible LV dysfunction. This review, developed with the support of the AIAC Working Group on Arrhythmias, outlines current knowledge and shared recommendations. First–line evaluation includes ECG, echocardiography, Holter monitoring and exercise testing to confirm suppression during exertion. Complex PVCs or suspicion of myocarditis/cardiomyopathy may require second–level tests such as cardiac MRI, CT, electrophysiological study or genetic analysis. Annual follow–up is advised. Therapy is generally unnecessary in asymptomatic children with preserved LV function; β–blockers are first–line when symptoms or functional impairment are present. The goal is reducing PVC burden, not full suppression. Ablation is reserved for refractory cases in specialized centres. Overall, PVCs in paediatrics should be managed conservatively to avoid unnecessary interventions.
Methods: A meta–analysis of the literature (2008–2024) was perfomed according to PRISMA guidelines, selecting nine studies for a total of approximately 1,000 children and young adults with structurally healthy hearts and documented PVCs. The primary outcomes were regression of arrhythmic burden and the onset of PVC–related left ventricular dysfunction.
Results: The analysis confirms a favourable outcome, with partial or complete regression of PVCs in 40–60% of cases and an average reduction in burden of –8.9% (Figure 2). Ventricular dysfunction was rare (1.7–15%) and associated with high burden, complex morphologies and wide QRS (Figure 1). In the available case series, PVC–induced cardiomyopathy proved reversible after spontaneous regression or treatment.
Conclusions: In the paediatric population, PVCs are mostly benign, but in specific circumstances, they should be considered a "sentinel event" related to cardiomyopathies or channelopathies. Risk indicators include a positive family history of sudden cardiac death or cardiomyopathy, frequent or polymorphic PVCs, atypical electrocardiographic patterns, and failure to suppress during exercise. A structured diagnostic strategy supported by advanced imaging and genetic testing is essential for accurate risk stratification and prevention of potentially severe arrhythmic complications.

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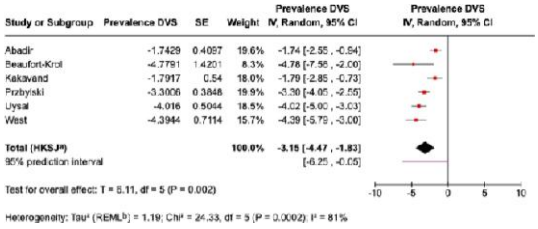

Figure 1

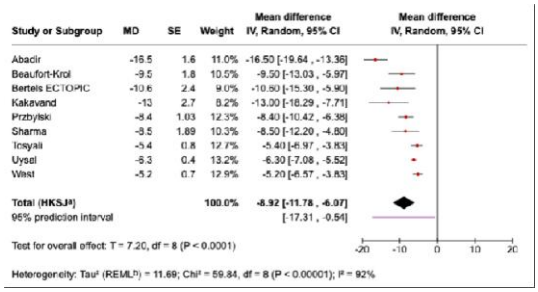

Figure 2

Abstract citation ID: suag058.426

THE ROLE OF THE ANESTHESIA NURSE WITHIN THE ECMO TEAM: A NARRATIVE REVIEW OF ADVANCED CARE COMPETENCIES

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Extracorporeal Membrane Oxygenation (ECMO) is an advanced extracorporeal life support technique increasingly used in patients with severe cardiac and/or respiratory failure, particularly in cases of cardiogenic shock and refractory cardiac arrest. The effectiveness of ECMO is strongly influenced by the organization, expertise, and integration of the multidisciplinary team involved in patient management. Within this context, the anesthesia nurse plays a key role due to advanced competencies in the care of critically ill patients with high clinical complexity. This narrative review aims to describe and map the role and specific competencies of the anesthesia nurse within the care pathway of patients undergoing ECMO support, with particular focus on cardiovascular stabilization and monitoring. A narrative review of the literature was conducted by consulting major scientific databases, including PubMed, CINAHL, Scopus, and the Cochrane Library. Studies relevant to advanced nursing care in ECMO settings were identified using the keywords ECMO, anesthesia nurse, critical care nursing, and extracorporeal life support.

The literature highlights that the anesthesia nurse is actively involved in all phases of the ECMO pathway. Core competencies include patient preparation and advanced airway management, collaboration in deep sedation and mechanical ventilation management, continuous monitoring of hemodynamic and respiratory parameters, and surveillance of ECMO circuit performance. In addition, the anesthesia nurse plays a crucial role in the early recognition and management of major complications such as bleeding, cannula displacement, and circuit malfunction, working in close collaboration with anesthesiologists, intensivists, perfusionists, and other healthcare professionals.

The anesthesia nurse represents a strategic professional figure within the ECMO team, contributing significantly to patient safety, procedural efficiency, and quality of care. Structured integration within the multidisciplinary team and dedicated training programs are essential to optimize clinical outcomes in critically ill cardiac patients.

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KOCH TRIANGLE ELECTROANATOMIC ACTIVATION MAPPING TECHNIQUE IN PATIENTS WITH DUAL AV NODE PHYSIOLOGY

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Introduction: Slow pathway ablation is currently the target for AV nodal reentrant tachycardia (AVNRT) with a high success rate. Kock triangle (KT) mapping is helpful to define the fast pathway location. We aimed to describe the KT mapping by means of electroanatomic (EA) local activation mapping (LAT) technique of fast pathway location performed beside the conventional EP mapping.

Methods: KT was mapped as follows: atrial pacing from peri–Hisian antero–septal (AS), mid–septal (MS) and postero–septal (PS) regions, by means of 4 mm ablating catheter beside a quadripolar diagnostic catheter placed on His region. The LAT was performed by means of Ensite X system (Abbott Medical) in all patients; the window of interest was set from 10 msec after the pacing atrial spike to the ventricular EGM on the His catheter tracing. The spike–to–His deflection (S–H) interval was measured to define the fast pathway location and activation gradient. On the ablator catheter tracing the annotation was set (ROV), timed to the His deflection on His tracing. The annotation was set even when no His deflection was recorded on ablator tracing as in MS and PS regions ("mirroring"). The KT was mapped before and after successful elimination of the slow pathway

Results: Seventeen consecutive AVNRT patients were included who underwent to a successful slow pathway elimination. In all cases, at baseline pre–ablation mapping a progressive prolonged S–H interval was found (AS‹MS‹PS) depicted as activation gradient, traditionally meaning as anteroseptal fast pathway physiologic location, confirmed by the EA LAT (Fig 1). As compared to pre–ablation, the post–ablation LAT mapping showed the same activation gradient in all patients (Fig 2).

Conclusion: KT mapping by means of LAT, may help to define the AV node dual physiology beside the conventional EP mapping; it may also define a safer region for slow pathway ablation.

Fig 1: pre-ablation Kock triangle activation mapping

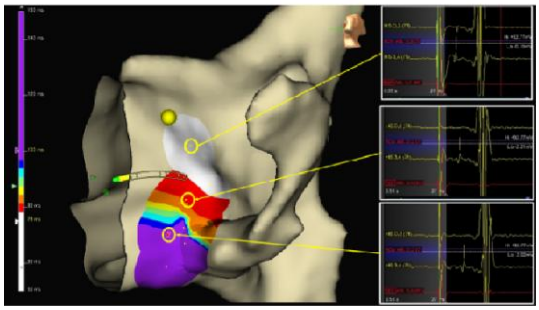
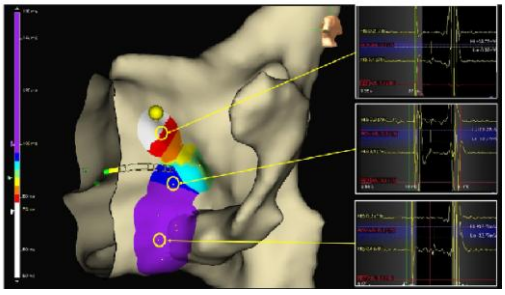


Fig 2: post-ablation Kock triangle activation mapping



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POCKET–SITE COMPLICATIONS IN CIED PATIENTS: CLINICAL INCIDENCE AND ASSOCIATED RISK FACTORS

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Background: The rise in cardiac implantable electronic device (CIED) procedures necessitates timely management of pocket–site complications, where nursing care is crucial. This study assessed the incidence of major surgical site complications and identified their associated risk factors within our center's clinical practice.

Methods: We conducted a retrospective observational study of patients undergoing CIED implantation, revision, or generator replacement at our institution from January to May 2024. The study assessed the incidence of post–operative pain, infection signs, allergic reactions, and pocket swelling. Logistic regression explored associations between clinical/procedural factors and complication risks.

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Results: A total of 119 patients were included in our analysis (median age 74 years, 71% male). Most patients underwent a primary CIED implantation (n=75), 35 generator replacements, 3 upgrades, and 6 revisions. Cefazolin prophylaxis and skin antisepsis with chlorhexidine were standardized. Post–operative management involved a 5 kg weight and ice application in 115 patients (96.6%) while 3.4% were treated with a pneumatic dressing. The initial flat dressing was maintained for 10 days by 87.4% of patients; 12.6% replaced it earlier (primarily due to accidental detachment or soiling). Surgical site pain was reported by 16.8% (3.4% with NRS › 5). Other findings included erythema (5.9%), fever (0.8%), and pruritus (17.6%). Pocket swelling occurred in 9 patients (7.6%); 8 were managed conservatively. The patient whose swelling did not resolve was the only one with a confirmed diagnosis of infection (0,8%), necessitating surgical revision and device extraction. Anticoagulant therapy was never interrupted. No factors were significantly associated with pain or pruritus. However, the risk of pocket swelling decreased with age (OR 0.95; 95% CI 0.91–0.99; p=0.0322) and increased in patients with diabetes (OR 4.9; 95% CI 1.1–21.3; p=0.0331) and chronic kidney disease (OR 7.5; 95% CI 1.7–33.7; p=0.0086).
Conclusions: Our study confirms a low incidence of major complications following CIED procedures, supporting current standardized nurse–centered protocols. Younger age, diabetes, and chronic kidney disease are significant risk factors for pocket swelling, requiring targeted nursing surveillance to optimize patient safety.

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IMPACT OF ADAPTED CLINICAL MANAGEMENT ON OUTCOMES IN LEFT ATRIAL APPENDAGE CLOSURE (LAAC): A FOCUS ON PATIENT'S COMORBIDITY AND LENGTH OF STAY

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Background: Left atrial appendage closure (LAAC) is a standard treatment for patients with atrial fibrillation (AF) facing high risks of both thromboembolism and bleeding. The procedure is performed via a femoral venous approach, guided by intracardiac or transesophageal echocardiography (TEE). Essential to successful outcomes are nursing management focused on patient monitoring, complication detection, pain control and vascular access care.
Objective: This study aimed to evaluate shifts in patient profiles, clinical management and procedural results for LAAC performed at our institution between 2022 and 2025.
Methods: We conducted a comparative analysis of two consecutive two–year cohorts (2022–2023 vs. 2024–2025), focusing on baseline patient characteristics, procedural success rates, intrahospital events and average length of stay.
Results: The later cohort (2024–2025) presented with slightly older patients (78.5 vs. 77.4 years) and a similar male predominance (63% vs. 60%) respect the first cohort. Notably, the comorbidity burden significantly increased, evidenced by a higher Charlson Comorbidity Index (5.14 vs. 4.33, p‹0.05). Changes in AF patterns included a decrease in permanent cases (51.4% vs 42.6%, p‹0.05), increase in paroxysmal AF (23.7% vs 44.4%, p‹0.05) and a substantial rise in cancer patients (29.3% vs 72.2%, p‹0.05) in the last two years. Stroke and bleeding risk scores (CHA2DS2–VASc and HAS–BLED) remained consistent. Reflecting evolving post–LAAO protocols, there was increased baseline use of NOACs (26.7% vs 64.8%, p‹0.05) and increased use of aspirin at discharge (67.9% vs 80.0%, p‹0.05). Procedural complexity rose due to the adoption of newer device technologies, increased TEE utilization (10.4% vs 21.3%, p‹0.05), and longer procedural times (66.7 vs 78.3 min, p‹0.05). Despite this increased complexity, procedural success remained high (~98%), the hospital stay was stable (~3.5 days) and major complication rates were unchanged (5.1% vs. 5.6%, p=1.00), with no in–hospital mortality.
Conclusion: Despite the increasing complexity of patients over this four–year period, favorable outcomes and stable hospital lenght of stay were successfully maintained thanks to the optimization of nursing and medical management and advances in procedural techniques. Integrating nursing fragility scores during the pre–admission phase enables more accurate patient stratification, helping prevent adverse events post–procedure.

Technological Advances, Digital Health and Artificial Intelligence

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SMALLER, SAFER, SMARTER: THE FUTURE OF CARDIAC PACING IS LEADLESS

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A.O.R.N. S. Anna E S. Sebastiano

In recent years, electrostimulation has undergone a significant transformation, shifting from bulky devices to increasingly compact, safe, and efficient solutions. The pacemaker we are all familiar with is an implantable device measuring about 4–5 cm, used to treat bradyarrhythmias by delivering controlled electrical impulses to the heart to correct a slowed heart rate. This device requires the implantation of a generator in a subcutaneous pocket, which is connected to the heart through one or more leads. However, the presence of the subcutaneous pocket, leads, and connecting elements can lead to complications such as infections, thrombosis, lead dislodgement, and mechanical wear over time. To overcome these issues, the leadless pacemaker was developed, an innovative solution that completely removes the use of leads and the subcutaneous pocket (Figure 2). This device is implanted directly into the ventricle or atrium through a percutaneous transfemoral approach (Figure 1); it is extremely compact (approximately 2.5 to 3.8 cm) and is anchored directly to the myocardium. The minimally invasive approach dramatically reduces complications related to leads and improves patient comfort by eliminating visible scars, swelling, and post–operative functional limitations. This allows for a faster return to daily activities and promotes greater patient acceptance and adherence to therapy. Clinical studies have also demonstrated high procedural success rates, with proven safety and electrical reliability in the medium and long term, making leadless devices a promising perspective for the future of cardiac pacing therapy.

Figure 1. Atrial device release

Figure 2. Device preparation

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TASK SHIFTING IN ADVANCED NURSING MANAGEMENT OF IMPLANTABLE LOOP RECORDERS: A SCOPING REVIEW OF ROLES, COMPETENCIES, AND CLINICAL IMPACT

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Introduction: Recent advances in cardiology have enabled the use of miniaturized implantable loop recorders (ILRs) for long term cardiac rhythm monitoring. Traditionally physician led, ILR implantation and follow up are increasingly performed by nurses within advanced practice models, improving efficiency and patient centered care. This scoping review aimed to map existing evidence on nurse led ILR management, identify required competencies, and summarize clinical and organizational outcomes.
Methods: A scoping review, guided by Arksey and O'Malley's framework, was conducted through PubMed, CINAHL, and Scopus to identify studies published between 2014 and 2024. Search terms included "implantable loop recorder" with "nurse led," "nursing management," and "advanced nursing competencies." Eligible peer reviewed studies in English described nurse led ILR implantation or follow up with outcomes related to safety, workflow, or training. Data were extracted on study design, population, competencies, and outcomes, and were synthesized thematically.
Results: Of 217 records screened, five met the inclusion criteria. All were single center, observational studies. Nurse led ILR programs showed safety and efficacy comparable to physician led models, with similar complication and therapy modification rates. Patients reported high satisfaction and lower post procedural discomfort. Organizational advantages included shorter waiting lists, higher procedural throughput, and cost savings. Core nursing skills comprised sterile technique, device implantation, programming, arrhythmia recognition, and patient communication. Studies emphasized the need for structured training, competency assessment, and formal certification for advanced practice nurses. The integration of digital monitoring and remote follow up emerged as a key enabler for efficiency and outcome optimization.
Conclusions: Nurse led ILR implantation and follow up are feasible, safe, and beneficial for patients and healthcare systems. With structured training and adherence to protocols, nurses can achieve outcomes comparable to those of physicians while enhancing patient experience and organizational performance. Task shifting initiatives, such as nurse led ILR implantation outside the electrophysiology laboratory, highlight the expanding scope of advanced nursing practice and its positive impact on patient care and healthcare efficiency.

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IMPACT OF THE CR2 WI–FI DEFIBRILLATOR WITH AI ON NURSING PRACTICE: A PILOT STUDY

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Introduction: The spread of semi–automatic defibrillators (AEDs) with Wi–Fi connectivity represents a significant innovation in the field of public health and emergency medical services, enabling constant monitoring of the devices and more efficient management of their maintenance. The aim of this study is to evaluate how the integration of Wi–Fi connectivity in defibrillators can improve monitoring, management, and timeliness of interventions, while ensuring safety and efficiency compared to traditional devices.
Materials and Methods: The experimental study was conducted by administering a structured questionnaire to a sample of 75 nurses from the Emergency Department of the "C. & G. Mazzoni" and "Madonna del Soccorso" of the Local Health Authority (AST) of Ascoli Piceno from July 28, 2025, to August 21, 2025.
Results: The results show that the sample is mainly composed of female subjects with an average age between twenty–five and thirty years. The majority of participants have more than ten years of work experience and theoretical–practical training. It should also be noted that the majority of subjects have obtained a three–year degree. The analysis highlighted a statistically significant link between the perception of a positive impact of technology on clinical outcomes and the desire to further their skills through additional training. ANALYSIS: Pearson's test was used for the inferential analysis of associations between categorical variables. In cases where variables had only two modes, Yates'continuity correction was applied. The level of statistical significance was set at $p < 0.05$. All analyses were performed using Microsoft Excel and RStudio (version 4.5.1) software.
Discussion: The study highlighted a generally positive perception among nursing staff regarding the implementation of Wi–Fi–connected defibrillators, despite some difficulties related to device management. While considering the limitations related to the sample size, the self–reported nature of the responses, and the cross–sectional design of the study, the results provide useful insights into the perceptions of operators regarding connected defibrillators and guide future research. Therefore, Wi–Fi–connected defibrillators represent a concrete opportunity for innovation in the emergency field and are valuable tools for optimizing interventions, ensuring constant and cross–cutting training and organizational planning across all care settings.

Variables analyzed	Statistical Test	χ^2 value	gdl	p-value
Type of training and specific training on CR-2 use	Chi-Square	3.2557e-31	1	1
Type of training and perception that technology improve clinical outcomes	Chi-Square	1.7232	1	0.1893
Type of training and desire for additional training	Chi-Square	0.78125	1	0.3768
Specific training on CR-2 use and perception that technology improves clinical outcomes	Chi-Square	0.0021281	1	0.9632
Formazione specifica sull'utilizzo del CR-2 e la tecnologia migliora gli esiti clinici	Chi-Square	1.0134	1	0.3141
Perception that technology improves clinical outcomes and desire for additional training	Chi-Square	15.635	1	7.681e-05 X-squared 0.45

Table 1. Associations between training, perceived technological impact on clinical outcomes and desire for further education.

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MECHANICAL CARDIOPULMONARY RESUSCITATION WITH LUCAS® AND AUTOPULSE® DURING INTERVENTIONAL CARDIOLOGY PROCEDURES: A NARRATIVE REVIEW

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Introduction: Cardiac arrest in the interventional cardiology laboratory (cath lab) is a critical emergency that demands high–quality cardiopulmonary resuscitation (CPR), often under complex conditions and with significant radiation exposure risk for staff. Mechanical chest compression devices, such as LUCAS® and AutoPulse®, provide an alternative to manual CPR, particularly during ongoing interventional procedures. This study aims to summarise the existing literature on the use of such devices in the cath lab, with a focus on their role and impact on nursing practice.
Methods: A narrative review of the recent literature was conducted to identify and summarise key findings related to the clinical use of mechanical chest compression devices in interventional cardiology, with specific attention to team dynamics and the role of nursing staff.
Results: The reviewed literature highlights several advantages of mechanical CPR devices in the cath lab, particularly from the nursing perspective. Key benefits include the reduction of ionising radiation exposure for staff and the provision of consistent, high quality chest compressions, thereby freeing nurses to carry out other critical life saving tasks. The nursing role emerges as pivotal, encompassing responsibilities in preparation, application and monitoring of the device, as well as coordination with the rest of the team. However, the literature also emphasises the need for specific training and strict adherence to protocols for effective implementation. Comparative studies and meta-analyses have reported conflicting results regarding the superiority of mechanical devices versus manual CPR in terms of long-term survival, but confirm their value in specific settings, such as during ongoing CPR through angioplasty.
Conclusions: Use of mechanical cardiopulmonary resuscitation devices in the cath lab is a feasible and advantageous practice for managing cardiac arrest, especially with respect to nursing staff safety and CPR quality. To maximise benefit, appropriate training, clear protocols, and effective integration of the device into the team's workflow are essential. The 2025 European Society of Cardiology (ESC) guidelines on mechanical CPR advise against routine use. However, they suggest that mechanical CPR may be considered in specific situations where high–quality manual compressions are difficult or pose a risk; the primary objective remains to perform high–quality manual CPR with minimal interruptions.

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Figure 1 (A) Manual chest compression, (B) mechanical chest compression with a piston device (Lucas®), and (C) mechanical chest compression device that uses a band to provide cardiopulmonary resuscitation (AutoPulse®).

Abstract citation ID: suag058.434

AI–ASSISTED CHECKLIST IN THE CATH LAB: ENHANCING PATIENT SAFETY THROUGH INTEGRATED DIGITAL WORKFLOW

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Introduction: Patient safety in interventional cardiology laboratories remains a critical challenge due to the high procedural complexity and technological intensity of these environments. Although international guidelines provide general recommendations, the absence of tools specifically adapted to catheterisation laboratory workflows may limit the effectiveness of quality and risk management processes. This project aims to structure and design an artificial intelligence supported checklist to improve procedural safety, operational efficiency, and patient centred care.
Methods: A multidisciplinary and multicentre survey was conducted involving cardiovascular healthcare professionals, relevant scientific societies, the Nursing Professions Association, and the clinical risk management unit. Through this collaborative approach, the checklist was developed and optimized for interventional cardiology workflows.
Results: The checklist encourages accurate documentation, reduces errors, and improves clinical risk management. With AI support, it enables continuous procedural monitoring and timely anomaly detection, which allows anticipation of complications. These improvements benefit clinical outcomes and help optimise resources. Additionally, using the checklist facilitates compliance with safety regulations and professional liability requirements. This, in turn, supports a more predictive and personalised patient care approach.
Conclusions: This initiative represents the first Italian implementation of an AI–integrated checklist specifically designed for the cath lab. Integrating artificial intelligence into cath lab workflows has the potential to reshape clinical practice by enabling real time procedure monitoring, early identification of risk patterns, and the use of machine learning based predictive models. The most impactful element, however, lies in its seamless connection with electronic health record systems, which is essential to fully harness the clinical and organizational benefits of AI. Direct integration with electronic medical records allows automatic retrieval of comprehensive patient data, including medical history, laboratory values, imaging reports, and demographic information providing a holistic patient overview while minimizing manual data entry. This streamlined workflow reduces the risk of errors and accelerates clinical decision–making, ultimately supporting safer and more efficient practice.

Secondary Prevention

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THE NURSE AS A CLINICAL PREDICTOR: LISTENING, EMPATHY AND THE NANDA–NIC–NOC MODEL IN THE TIMELY MANAGEMENT OF ACUTE PULMONARY EMBOLISM

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A young female patient was admitted to the ICU in critical condition due to acute pulmonary embolism with hemodynamic instability and severe respiratory impairment. The nurse, as a key member of the interdisciplinary team, recognizes early predictive signs of clinical deterioration and formulates NANDA diagnoses (clinical judgment about a person's, family's or community's responses to actual or potential health problems and life processes) such as "Impaired Gas Exchange", "Ineffective Cardiopulmonary Perfusion", "Risk for Bleeding" and "Anxiety". The ICU nurse, through advanced technical expertise in hemodynamic monitoring, ventilatory support, and the management of complex therapeutic regimens, ensures a safe and highly effective standard of care. The nursing care plan is based on a systematic process that integrates technical and scientific competencies with the ability to recognize and respond to the patient's psychological and relational needs. Family support constitutes an essential component of the care pathway, contributing to stress reduction, enhanced communication and continuity of therapeutic management. The corresponding NOC (Nursing Outcomes Classification, standardized classification of patient outcomes developed to evaluate the effects of nursing interventions) allows timely and targeted care planning. NIC (Nursing Interventions Classification, standardized classification of evidence–based nursing interventions that describes the treatments nurses perform to enhance patient outcomes) guides acute–phase management, including advanced vital signs monitoring, non–invasive ventilation, management, regulation of anticoagulant therapy and implementation of bleeding and infection prevention strategies. Continuous interaction with the medical team allows immediate life–saving interventions and dynamic evaluation of clinical response. Active listening and empathy play a crucial role in modulating anxiety, supporting coping, and enhancing therapeutic adherence. The nurse facilitates communication between patient and team, contributing to decision–making and personalized care pathways. Progressive respiratory and hemodynamic stabilization, effective management of complications, reduction of oxygen therapy and recovery of autonomy, confirm the achievement of the planned NOC outcomes. The transition to oral anticoagulant therapy marks the end of the care pathway, highlighting the impact of a nursing approach based on diagnosis, planned interventions and outcome evaluation.

Abstract citation ID: suag058.436

NURSING MANAGEMENT OF PAIN IN PATIENTS WITH NSTEMI: FROM THE EMERGENCY DEPARTMENT TO INPATIENT CARE

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Introduction: Non–ST–elevation myocardial infarction (NSTEMI) is a critical cardiac emergency often presenting with severe chest pain. In the Emergency Department (ED), timely assessment and relief of pain are essential to limit myocardial ischemia and reduce anxiety. Nurses play a central role in identifying symptoms, initiating early interventions, and coordinating multidisciplinary care.
Methods: A narrative review of literature from 2018–2024 and clinical observation in emergency and cardiac care units were performed to describe nursing strategies for pain control in NSTEMI. The analysis was structured through NANDA–I, NOC, and NIC frameworks, focusing on comprehensive pain assessment, medication management, vital signs monitoring, and emotional support across care settings.
Results: Early and structured pain assessment in the ED—using standardized scales and continuous monitoring—allowed rapid recognition of ischemic pain and prompt pharmacological intervention (oxygen therapy, nitrates, morphine as prescribed). Nursing collaboration with physicians reduced treatment delays and improved hemodynamic stability. Patients receiving consistent analgesic and supportive care reported lower pain intensity and higher comfort scores. Transition to inpatient care maintained benefits through continuity of nursing monitoring and communication.

Discussion: Effective nursing management of pain in NSTEMI begins at ED triage and continues throughout hospitalization. The integration of evidence–based protocols, early recognition, and empathetic communication not only relieves pain but may also positively influence myocardial outcomes. Developing shared guidelines and continuous nursing education enhances safety and quality in acute cardiac care.

Keywords: NSTEMI, pain management, emergency nursing, cardiac care, nursing interventions, patient–centered care.

Abstract citation ID: suag058.437

ONE–YEAR FUNCTIONAL, METABOLIC, AND PSYCHOLOGICAL OUTCOMES OF A MULTIDISCIPLINARY CARDIAC REHABILITATION PROGRAM: A NURSING PERSPECTIVE

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Background: Cardiac rehabilitation (CR) is a cornerstone of secondary prevention after cardiac intervention. Nurses play a central role in patient education, behavioural change, and long–term adherence. Evaluating one–year

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outcomes is essential to document the real–world effectiveness of multidisciplinary CR programs.
Methods: We analysed data from 179 patients enrolled in a structured one–year cardiac rehabilitation (CR) program following cardiac intervention in 2023. Participants were evaluated at baseline, 6 months, and 12 months. Functional capacity was assessed using the Incremental Shuttle Walk Test (ISWT). Cardiovascular risk factors included lipid profile, blood pressure, waist circumference (according to European guideline targets), glycaemic control assessed by HbA1c in patients with diabetes, and smoking status. Psychological outcomes were evaluated using the Hospital Anxiety and Depression Scale (HADS) and the Global Mood Scale (GMS). Longitudinal changes were analysed using paired t–tests for continuous variables and McNemar tests for paired categorical outcomes.
Results: At 12 months, functional capacity improved significantly, with a mean ISWT increase of +30.3 m (95% CI 5.3–55.3; p=0.018); 65.9% of patients achieved a clinically meaningful improvement (≥30 m). The proportion of patients achieving LDL–cholesterol ‹70 mg/dL increased from 16.2% at baseline to 63.1% at one year (McNemar p‹0.001), with a mean LDL reduction of –50.5±46.3 mg/dL. Smoking prevalence decreased from 24.6% to 11.3%; among baseline smokers, 58.3% achieved sustained cessation. Glycemic control improved markedly, with 73.2% of patients achieving HbA1c ‹7% at follow–up compared with 42.9% at baseline. Blood pressure control remained high throughout follow–up, while waist circumference target attainment showed a modest, borderline change. Anxiety and depression scores decreased significantly (HADS–A –0.77, p=0.007; HADS–D –1.00, p‹0.001), alongside an improvement in positive mood (GMS +2.67, p‹0.001).
Conclusions: Over one–year, cardiac rehabilitation was associated with clinically meaningful improvements in functional capacity, cardiovascular risk factor control, smoking cessation, and psychological well–being. These findings highlight the central role of multidisciplinary, nursing–led interventions in achieving and sustaining preventive targets in contemporary cardiac rehabilitation programs.

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EARLY RECOGNITION OF ACUTE MYOCARDIAL INFARCTION IN WOMEN: VALIDATION OF THE MAPMISS TOOL AND EXPLORATION OF CARE–SEEKING DELAYS

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Acute myocardial infarction in women is challenging to recognise early because symptoms are frequently atypical, varied, underestimated, and may appear long before the acute event. Gender stereotypes such as the Yentl syndrome, together with biological, cultural and social factors, reduce women's risk awareness and delay help–seeking. Additional barriers include family responsibilities, previous healthcare experiences, and the influence of relatives on decision–making.The study had two aims (a) to validate an Italian version of the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS), evaluate its predictive capacity, test a possible cut–off score to facilitate its implementation in screening contexts, and identify prodromal symptom clusters (thoracic and general) in women with AMI; (b) to describe behaviours and factors causing delays in accessing care for women affected by AMI. A multicentre observational design was used for the validation phase, including linguistic and cultural adaptation, a pilot test with AMI patients, and test–retest reliability in a subgroup reassessed after 7–14 days. Predictive validity and symptom clustering were evaluated by comparing women with AMI enrolled within five days of the event with healthy controls recruited in outpatient cardiology settings. For the qualitative phase, 22 phenomenological interviews were conducted with women hospitalised within five days after PCI. Among 125 participants (52 AMI; 73 controls), women with AMI most frequently reported chest pain, unusual fatigue, sleep disturbances, and anxiety. The MAPMISS showed excellent internal consistency ($\alpha \geq 0.90$), strong test–retest reliability ($r = 0.973$), and high predictive accuracy, with an optimal cut–off demonstrating good sensitivity and specificity. Logistic regression confirmed a significant association between general and chest symptoms and AMI onset. The qualitative analysis revealed five themes: vivid memory of the event, knowledge and perceptions of AMI, decision–making and help–seeking, influence of others, and reflections on post–AMI choices. Overall, women often misinterpret prodromal symptoms, delaying diagnosis; the MAPMISS identifies key predictive clusters, and cognitive, emotional and social factors contribute to delays, underscoring the importance of screening tools, awareness, and nursing support.

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NURSING ROLE IN SECONDARY PREVENTION AFTER ACS: A MULTIDIMENSIONAL APPROACH

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Utic; Medicina; Cardiologia; Professioni Sanitarie

Introduction: secondary prevention in cardiovascular disease is essential to reduce the risk of recurrence and improve patient outcomes. The latest guidelines recommend a multidisciplinary, integrated approach involving multiple healthcare professionals. In this context, the Coronary Care Unit (CCU) nurse plays a key role in patient education, promotion of therapeutic adherence, and support in lifestyle modification, starting from the early stages of hospitalization.
Objective: to implement a structured, multidisciplinary secondary prevention pathway, initiated upon clinical stabilization of the patient hospitalized in CCU, and continued throughout the first year after discharge.
Methods: inclusion criteria: patients admitted to CCU for Acute Coronary Syndrome (ACS) presenting at least one modifiable risk factor (smoking, obesity/overweight, poor therapeutic adherence, substance abuse, sedentary lifestyle, or anxiety/stress). The pathway included: – identification of modifiable risk factors and patient consent; – targeted individual nursing counselling; – delivery of educational materials; – planning and implementation of multidisciplinary interventions based on identified risk factors (psychologist, dietitian, sociologist, addiction services); – telephone follow–up at 1, 3, 6, and 12 months post–discharge. Monitored indicators: therapeutic adherence, smoking cessation, physical activity, dietary habits, substance use, clinical parameters, and blood test values.
Results: the project showed improved empowerment of both patients and caregivers, with positive effects on risk factor management and effective linkage between hospital and community–based services.
Conclusions: lifestyle modification is a cornerstone of secondary prevention after ACS. The integration of a personalized, structured nursing pathway started during CCU hospitalization promotes healthy behaviors and improves cardiovascular prevention outcomes, enhancing quality of life after an acute cardiac event. The nurse's intervention is a key element in ensuring continuity of care post–ACS.

Empowerement and Quality of Life

Abstract citation ID: suag058.440

HEALTH–RELATED QUALITY OF LIFE IN YOUNGER ADULTS WITH ATRIAL FIBRILLATION: EVIDENCE FROM RECENT STUDIES

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Background: Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia. While its prevalence rises with age, an increasing number of new diagnoses occur in individuals under 65. In younger adults, AF may significantly affect health–related quality of life (QoL), work capacity, and psychosocial functioning. Most evidence focuses on elderly populations, leaving the impact in younger cohorts underexplored.
Methods: A narrative review was performed using PubMed, Embase, and CINAHL (2022–2025). Studies assessing QoL in AF patients aged ‹65 or reporting age–specific analyses were included. Validated instruments (AFEQT, SF–36, EQ–5D, EHRA) were considered. Five primary studies met inclusion criteria: Johnson et al., Nakamaru et al., Theunissen et al., Rush et al., and Linde et al. Supplementary data from observational and interventional studies were used for context.
Results: Younger AF patients (‹65) consistently reported impaired QoL, particularly in physical, emotional, and social domains. Compared with older adults, they showed greater improvement after rhythm–control interventions, especially catheter ablation and structured treatment programs. QoL scores measured by AFEQT and SF–36 improved by 15–25 points within 6–12 months post–treatment. Younger age was associated with higher baseline functional status and larger post–treatment QoL gains. Persistent factors affecting QoL included anxiety, sleep disturbance, and comorbidities such as obesity and hypertension.
Conclusions: AF in adults younger than 65 substantially affects daily functioning and perceived QoL. Early, targeted rhythm–control strategies and comprehensive risk–factor management yield significant improvements. Literature is limited by few randomized trials and age–specific analyses. Future research should prioritize QoL as a primary outcome in younger AF populations to guide personalized management and rehabilitation.

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BRIDGING SYMPTOM BURDEN AND QUALITY OF LIFE: NURSING ASSESSMENT AND MANAGEMENT OF FATIGUE IN CARDIAC PATIENTS

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Background: Fatigue is a highly prevalent yet under–recognized symptom in individuals with cardiovascular disease (CVD), particularly in those with heart failure. It is strongly associated with reduced exercise tolerance, functional impairment, and diminished quality of life (QoL), and has relevant prognostic implications. Despite its clinical impact, fatigue is not routinely or systematically assessed in cardiovascular care. Nursing advocacy plays a pivotal role in promoting standardized symptom assessment and the implementation of evidence–based fatigue management strategies.
Methods: A narrative review of the literature was conducted to examine fatigue in adults with cardiovascular conditions and its relationship with QoL. Eligible studies included adult populations with CVD, employed validated instruments to assess fatigue and/or QoL, and reported clinically meaningful outcomes. Data were synthesized using thematic analysis, with particular attention to underlying pathophysiological mechanisms, patient–reported outcomes, and the role of nursing–led interventions in fatigue management.
Results: Fatigue in CVD, especially in heart failure, arises from complex interactions among hemodynamic impairment, neurohormonal dysregulation, inflammatory activation, and psychological factors. The use of validated assessment tools allowed reliable quantification of fatigue severity and demonstrated a consistent association with poorer QoL and functional status. Nursing–led interventions—such as systematic fatigue assessment, individualized patient education, psychosocial support, and multidisciplinary care coordination were associated with improved symptom recognition, enhanced self–management, and better patient–reported QoL outcomes. Standardized measurement approaches also improved comparability across studies and supported personalized, evidence–based nursing care.
Conclusions: Fatigue represents a key determinant of QoL in patients with cardiovascular disease. Integrating validated fatigue assessments and structured nursing interventions into routine cardiovascular care may substantially improve symptom management and patient–centered outcomes. Strengthening the role of nurses in fatigue assessment and management should be considered a priority in contemporary cardiovascular practice.

Abstract citation ID: suag058.442

IMPROVING BETA–BLOCKER ADHERENCE IN MEN WITH ERECTILE DYSFUNCTION: A NURSING EDUCATION PERSPECTIVE

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Background: Therapeutic adherence is a major determinant of clinical outcomes in patients with chronic cardiovascular diseases. Beta–blockers represent a cornerstone of cardiology practice due to their proven benefits in reducing morbidity and mortality. However, long–term adherence to beta–blocker therapy is frequently suboptimal. In male patients, erectile dysfunction (ED) is a common condition that may negatively affect quality of life and contribute to poor adherence, either as a consequence of cardiovascular disease itself or as a perceived adverse effect of pharmacological treatment.
Aim: To evaluate the impact of erectile dysfunction on adherence to beta–blocker therapy in male cardiovascular patients and to highlight the role of nursing education in improving treatment persistence and patient–centered care.
Methods: A narrative review of the literature was conducted using major biomedical databases, focusing on studies addressing beta–blocker therapy, erectile dysfunction, and therapeutic adherence in male patients. Particular attention was paid to nursing–led educational interventions, including patient counseling, adherence monitoring, and management of therapy–related adverse effects. Educational strategies aimed at improving patient awareness, communication, and empowerment were analyzed.
Results: The reviewed evidence indicates that erectile dysfunction is significantly associated with reduced adherence to beta–blocker therapy. Patients experiencing or fearing sexual dysfunction were more likely to modify dosage or discontinue treatment without medical supervision. Nursing education was shown to improve adherence by enhancing patient understanding of treatment benefits, reducing misconceptions regarding sexual side effects, and facilitating early identification of adherence issues. Nursing interventions were also associated with improved treatment persistence and reduced rates of unsupervised therapy discontinuation.
Conclusions: Erectile dysfunction represents a relevant but often underestimated determinant of poor adherence to beta–blocker therapy in male patients. The integration of structured nursing education into cardiology care pathways may significantly improve therapeutic adherence, optimize clinical outcomes, and preserve quality of life. A multidisciplinary approach that includes nursing–led patient education should be considered an essential component of comprehensive cardiovascular care.

Abstract citation ID: suag058.443

HEALTH LITERACY IN CARDIOVASCULAR DISEASE: A SCOPING REVIEW ON EVIDENCE AND NURSING'S ROLE IN PATIENT EMPOWERMENT

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Background: Health literacy (HL) the ability to access, understand, evaluate, and apply health information, is a critical determinant of cardiovascular disease (CVD) outcomes. Effective management of CVD requires adherence to complex therapies, lifestyle changes, and active self care. Limited HL impairs these processes, leading to poor adherence, worse clinical outcomes, and reduced quality of life. Nurses are uniquely positioned to address HL gaps through patient education and sustained clinical engagement.
Objective: To map evidence on HL in adults with CVD, including prevalence, determinants, outcomes, and nursing contributions to HL promotion and patient empowerment.
Methods: A scoping review was conducted following the PRISMA–ScR guidelines. PubMed, Scopus, CINAHL, and Web of Science were systematically searched for studies published within the last ten years examining health literacy (HL) among adults with cardiovascular disease (CVD). Data on HL prevalence, measurement tools, associated factors, interventions, and nursing roles were extracted and synthesized using a thematic analysis approach.
Results: Low HL affected 30–40% of patients and was associated with older age, lower education, limited income, comorbidities, and system level factors. Low HL correlated with poor adherence, reduced self care, difficulty recognizing warning signs, and higher hospitalization and mortality risks (patients with low HL had a 1.6–fold higher risk of hospitalization and a 1.4–1.6–fold higher risk of mortality). Nurse led interventions using simplified materials, teach back methods, motivational interviewing, and structured follow up improved HL, adherence, self management, and clinical outcomes. Nurses also contributed to creating health literate environments and supporting digital HL.
Conclusions: HL is prevalent and modifiable in CVD. Nurses are pivotal in assessing HL, delivering tailored education, supporting behavior change, and empowering patients. Integrating HL into nursing education, clinical practice, and digital health strategies is essential to improve adherence, self management, and cardiovascular outcomes while promoting equitable, patient centered care.

Abstract citation ID: suag058.444

NORDIC WORKING AS A TOOL TO IMPROVE THE QUALITY OF LIFE IN PEOPLE WITH CORONARY ARTERY DISEASE: A LITERATURE REVIEW

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Introduction: Cardiovascular diseases, particularly coronary artery disease, are the leading cause of death worldwide, especially in economically and socio–health developed countries. Therapeutic education plays a fundamental role in improving the quality of life and preventing recurrences. In this context, Nordic Walking, a group activity that is accessible and easy to practice, could represent an opportunity to promote a healthy lifestyle.
Objective: To evaluate whether Nordic Walking in adults with coronary artery disease is effective in improving the quality of life, and to analyse the role of the nurse in this activity.
Matherial and methods: A literature review was conducted on PubMed, Cinhal, and Web of Science (from July 2024 to January 2025) using the PICO framework to formulate the research question. Studies involving adults with coronary artery disease engaged in Nordic Walking programs were selected, while other cardiac conditions or different sports activities were excluded. The analysis included randomized controlled trials and systematic reviews.
Results: Six studies were included in the literature review. Nordic Walking, when integrated into cardiac rehabilitation programs, led to significant improvements in terms of physical performances (6MWT test, METs, UGT) and, in several cases, in quality of life (SF–36, WHOQOL–BREF). The activity proved to be safe, well–tolerated, and effective on both physical and psychological factors.

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Discussion and conclusion: Nordic Walking is considered an effective intervention to improve the quality of life in patients affected by coronary artery disease, thanks to the complete activation of muscle groups, improved circulation and positive effects on psychological and social well–being. The nurse plays a crucial role in clinical monitoring during the activity, in educating patients on self–assessment of vital parameters, and in promoting this discipline as a tool for secondary prevention. Evidence suggests a positive impact, especially when Nordic Walking is integrated into standard cardiological rehabilitation programs. However, further studies are needed to establish standardised protocols and to fully assess the preventive and therapeutic potential of this discipline.

Pericardial Disease

Abstract citation ID: suag058.445

GENETIC PREDISPOSITION IN RECURRENT PERICARDITIS: CLINICAL IMPLICATIONS FOR DIAGNOSIS AND TREATMENT

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Background: Recurrent pericarditis (RP) has traditionally been classified as idiopathic in most patients. Over the last decade, however, accumulating evidence suggests that a subset of RP is driven by underlying genetic and autoinflammatory mechanisms. Variants affecting innate immunity pathways have been increasingly reported, particularly in patients with early disease onset, systemic inflammatory features, and a refractory clinical course. Clarifying the genetic background of RP may improve patient stratification and support a more individualized therapeutic approach.
Methods: A systematic review of the literature was performed using MEDLINE, Embase, and Scopus databases, covering the period from 2012 to September 2025. Eligible studies included patients with recurrent pericarditis or pericarditis with autoinflammatory features who underwent germline genetic testing. Data extraction focused on variant type, associated clinical phenotypes, and potential therapeutic implications, particularly response to interleukin–1 (IL–1) inhibition.
Results: Across referral–center cohorts and smaller observational series, variants in genes involved in innate immunity—most commonly MEFV, NLRP3, and TNFRSF1A—were identified in a relevant proportion of patients with difficult–to–treat RP. Genetic positivity was consistently associated with younger age at onset, systemic inflammatory manifestations such as fever or polyserositis, and steroid dependence or colchicine resistance. These patients frequently exhibited an autoinflammatory disease profile and tended to show a more predictable and sustained clinical response to IL–1 inhibitor. Emerging studies also report novel or rare variants, highlighting the need for standardized genetic panels and harmonized data collection.
Conclusions: Current evidence supports a contributory genetic role in a subset of recurrent pericarditis. Selective genetic testing in early–onset or refractory cases may refine diagnostic evaluation, facilitate risk stratification, and guide earlier initiation of targeted anti–inflammatory therapies. Prospective multicenter studies and genotype–guided registries are warranted to further define the role of genetics in personalized management of recurrent pericarditis.

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RIGHT ATRIAL MASS ASSOCIATED WITH PERICARDIAL EFFUSION

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Aorn Cardarelli

Background: Right atrial masses associated with pericardial effusion represent a rare but clinically relevant diagnostic challenge, requiring a multimodality imaging approach to differentiate between neoplastic, inflammatory, and infectious etiologies.
Case Presentation: A 56–year–old woman presented to the ED with progressive dyspnea for one month. In the week before admission, she reported flu–like symptoms with low–grade fever, asthenia, myalgia, and diarrhea. Her medical history was unremarkable. On examination, she appeared mildly distressed with tachypnea. Blood pressure was normal, heart rate mildly elevated, and oxygen saturation slightly reduced on room air. Cardiac auscultation revealed muffled heart sounds; lung examination was normal, and no peripheral edema was observed. Laboratory tests showed mildly elevated inflammatory markers with normal cardiac enzymes. TTE revealed a circumferential pericardial effusion without tamponade and preserved ventricular EF. Chest CT suggested a primary pericardial neoplasm, with hemangioendothelioma as the leading differential diagnosis, although secondary inflammatory involvement could not be excluded. (Figure 1, 2 and 3).

Discussion and Conclusions: The coexistence of a right atrial mass and pericardial effusion posed a major diagnostic challenge. Differential diagnoses included primary cardiac tumors, metastatic disease, pericardial mesothelioma, and inflammatory or infectious conditions. Recent flu–like and gastrointestinal symptoms suggested a possible inflammatory trigger; however, a neoplastic etiology remained likely. This case highlights the importance of multimodality imaging in patients with unexplained systemic symptoms. Early identification of cardiac masses with pericardial involvement is essential for timely diagnosis and management.

Figure 1: Contrast-enhanced CT scan of the chest in the arterial phase (axial view) showing a large, hypervascularized mass (approximately 6x5 cm) located anterior to the right atrium. The lesion exerts a significant mass effect, resulting in the compression and displacement of the right atrium and the distal superior vena cava. A circumferential pericardial effusion (maximum thickness 2 cm) with blood-type density is also visible surrounding the cardiac structures.

Figure 2: Contrast-enhanced CT scan in the arterial phase (axial view) showing cardiac involvement.

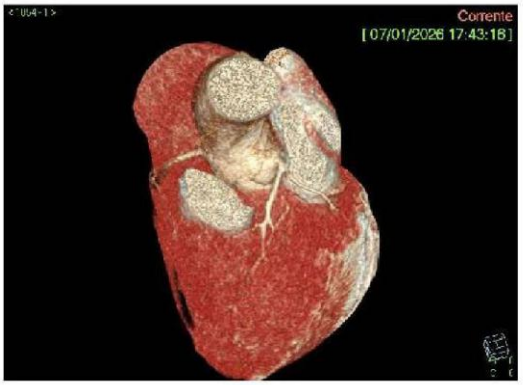

Figure 3: Multi-phase contrast-enhanced CT imaging, including arterial and venous phases, supplemented by 3D volume rendering reconstructions to characterize the hypervascular pericardial mass and its anatomical mass effect.

Abstract citation ID: suag058.447

A CASE OF CONSTRICTIVE PERICARDITIS

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Introduction: Constrictive pericarditis is a pericardial syndrome characterized by pericardial rigidity, with possible thickening and calcification, leading to impaired diastolic filling.
Case report: A 55–year–old man with a medical history of systemic arterial hypertension, active smoking, previous cocaine abuse, and seropositive rheumatoid arthritis. The patient had been complaining of exertional dyspnea for approximately two years. In 2023, he was admitted to the Cardiology Department for chest pain; coronary angiography showed normal coronary arteries, while cardiac magnetic resonance imaging revealed thickened pericardial layers, pericardial edema, and constrictive physiology. In the following months, he was rehospitalized for signs and symptoms of right–sided heart failure, and low–dose furosemide therapy was initiated. In January 2025, the patient was admitted again for worsening exertional dyspnea (NYHA class III). Physical examination revealed jugular venous distension, hepatomegaly, pulsus paradoxus, positive hepatojugular reflux and peripheral edema. Laboratory tests showed elevated cholestatic indices and transaminases and low NT–proBNP levels. Transthoracic echocardiography demonstrated preserved left ventricular systolic function, normal valvular morphology and function, abnormal interventricular septal motion (septal bounce), marked respiratory variation of the mitral E–wave, ventricular interdependence, and an inverted medial–to–lateral e' ratio (annulus paradoxus) (Figure 1-2). Cardiac catheterization revealed equalization of ventricular end–diastolic pressures during inspiration and a “dip–and–plateau” pattern of right ventricular pressure. Contrast–enhanced cardiac computed tomography confirmed constrictive physiology and pericardial thickening (Figure 3). The case was discussed with the Rheumatology team, who hypothesized an association between rheumatoid arthritis and constrictive pericarditis. The patient was therefore referred for cardiothoracic surgical evaluation, and pericardiectomy was indicated. After surgery, the patient remained clinically and laboratoristically stable.
Conclusions: Constrictive pericarditis should be suspected in the presence of systemic congestion signs and symptoms, NT–proBNP levels disproportionally low relative to the degree of congestion, and a normal first–level echocardiographic assessment; particularly in patients with a history of recurrent pericarditis, systemic inflammatory diseases, or prior chest radiotherapy.

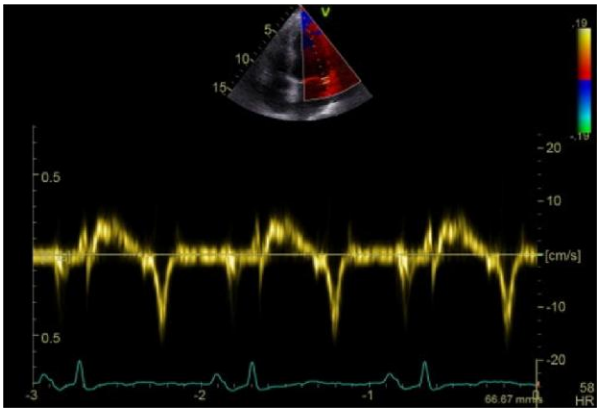

Figure 1

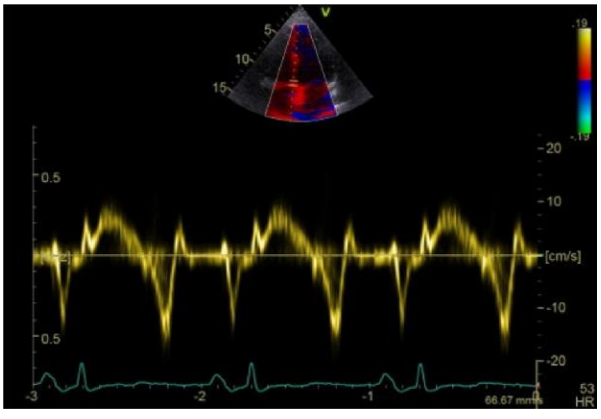

Figure 2

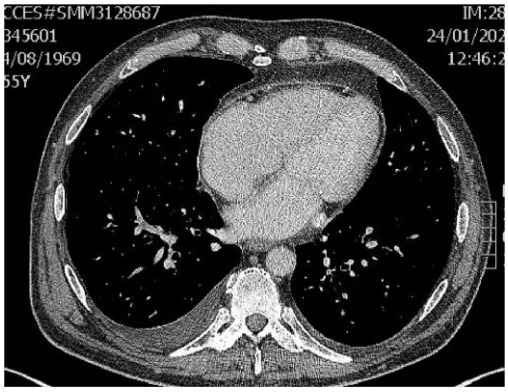
Figure 3

Abstract citation ID: suag058.448

MANAGEMENT OF PLEURO–MYOPERICARDITIS IN A FRAIL OLDER PATIENT: GAP IN EVIDENCE AND LIMITS OF GUIDELINE–BASED THERAPY IN A GERIATRIC DEPARTMENT FOR EMERGENCY CARE

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Introduction: The ESC guidelines recommend high–dose NSAIDs combined with colchicine as first–line treatment for acute pericarditis. However, these recommendations are mainly based on studies conducted on young, clinically stable patients, while frail elderly patients are underrepresented.

Case Presentation: An 87–year–old man with multiple comorbidities, chronic renal failure and recent orthopaedic surgery was admitted to hospital with fever and atypical chest symptoms. Diagnostic tests revealed pleuro–myopericarditis with moderate–severe pericardial effusion, without haemodynamic instability. (Figure 1,2,3). In accordance with ESC guidelines, treatment with ibuprofen and colchicine was initiated but suspended early due to the onset of severe epigastric pain and worsening renal function, which persisted despite a reduction in dosage. It was therefore necessary to switch to systemic corticosteroids, with progressive clinical improvement, slow reduction of pericardial effusion and improving renal function.

Discussion: The case highlights the limitations of the first–line therapy recommended by the ESC guidelines in geriatric clinical practice. In frail elderly patients, the frequent coexistence of renal failure, polypharmacy and reduced physiological reserve exposes them to a high risk of intolerance and early discontinuation of NSAIDs and colchicine. In this context, corticosteroids, although associated with a higher risk of recurrence, may represent more pragmatic and clinically appropriate treatment option.
Conclusion: In frail older patients with acute pericarditis, the application of guidelines must be adapted to the individual risk profile. The choice of treatment should prioritise safety and tolerability, integrating ESC recommendations with clinical judgement and overall geriatric assessment: in the real world, the best treatment is not always that recommended by the guidelines, but that which is truly sustainable for the patient. Further research focused on older populations with acute pericarditis is needed to define more appropriate and safe therapeutic strategies.

Figure 1

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Figure 2

Figure 3

Abstract citation ID: suag058.449

CARDIAC COMPLICATIONS OF MILIARY TUBERCULOSIS: A CASE REPORT

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Miliary tuberculosis (MT) is a life–threatening condition resulting from massive lympho– hematogenous dissemination of Mycobacterium tuberculosis from a focal lesion ruptured into the blood or lymphatic flow. It is commonly found in children, young adults and HIV–infected patients. Its diagnosis may be very challenging due to clinical polymorphism and lack of bacteriological proof in most cases. Mortality rate of TB pericarditis complications is up to 40%, emphasizing the importance of early diagnosis and management. A 19–year–old man presented with fever, dry cough, and constitutional symptoms for 2 weeks. The electrocardiogram showed low–voltage complexes, chest X–ray showed unspecific changes, and blood work revealed mild anaemia and a slight elevation of inflammatory parameters. An in–depth clinical and instrumental diagnostic work–up allowed to perform a diagnosis of miliary tuberculosis (MT) so he was admitted to Infectious Disease Unit and promptly received tetraconjugate management with an adequate clinical response. About three weeks later, he started complaining with worsening exertion fatigue and an increase in cardiothoracic index was noted on chest X–ray. Further imaging studies by CT and echocardiography revealed a moderate pericardial effusion (PE) without echocardiographic signs of hemodynamic instability. Tuberculosis is responsible for approximately 4% of cases of acute pericarditis, 7% of cardiac tamponade and 6% of constrictive pericarditis. The diagnosis is based on demonstration of tubercle bacilli in pericardial fluid or on histologic section of the pericardium, or proof of tuberculosis elsewhere in a patient with otherwise unexplained pericarditis. Treatment consists of triple drug therapy for at least 9 months (isoniazid, rifampin, and streptomycin or ethambutol). Adjunctive corticosteroids may be beneficial in patients with tuberculous pericarditis. Close echocardiographic monitoring of pericardial effusion is mandatory to look for any signs of hemodynamic involvement that would require pericardiocentesis thus emphasizing the pivotal role of transthoracic echocardiography in the diagnosis and monitoring of cardiac involvement of MT. Follow–up echocardiographic assessment showed mild PE with no constrictive physiology. Increase in TB cases in non–endemic countries justify the need for a high clinical suspicion in order to ensure early diagnosis and treatment thus reducing complications and mortality of this disease.

Cardiovascular Disease Prevention

Abstract citation ID: suag058.450

PREVALENCE OF SELF–AWARENESS ABOUT THE RELEVANCE OF CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH CORONARY ARTERY DISEASE

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Background and aims: coronary artery disease (CAD) is major cause of death worldwide. Major cardiovascular risk factors are a leading cause of CAD. However, the self–awareness of patients with CAD regarding the prognostic role of those factors remains unknown.
Methods: consecutive patients with CAD hospitalized at one Italian centre were included. All subjects were asked to solve a questionary regarding their grade of awareness on major cardiovascular risk factors.
Results: Overall, 302 subjects were included (206 males and 96 females), with a median age of 73 years. Of them, 90% were aware of the risks associated with hypertension, despite only 56% used to consistently check for their tensive values. Notably, monitoring blood pressure was not associated with improved tensive control. The risks associated with diabetes were known to 85% of subjects. Within 70 diabetic subjects, only 33% were aware of their glycaemic status, and half of them could not report their glycated haemoglobin. Hypercholesterolemia was recognized as a major risk factor by the 90% of patients, however only 9% of them knew their LDL values. Eventually, the risks of smoking were known by 95% of subjects, with 11% active smokers.
Conclusions: the prevalence of self–awareness regarding the cardiovascular impact of major risk factors in patients with CAD is generally high. Nevertheless, this consciousness doesn't translate into active preventive strategies and behaviours, highlighting the need for dedicated sensibilization campaigns.

Abstract citation ID: suag058.451

IMPACT OF GENDER ON FUNCTIONAL RECOVERY ACTIVITIES IN CARDIOLOGIC REHABILITATION: A RETROSPECTIVE ANALYSIS OF HEART FAILURE PATIENTS

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Ics Maugeri Pavia

Background: Scientific research has now amply demonstrated the existence of differences between sexes in the context of different areas of exercise, in terms of physical performance, response and adaptation to exercise.
Purpose: This study aimed to assess sex–related differences in baseline and post–rehabilitation test performance among patients with heart failure, and to determine the impact of sex on health status and functional recovery.
Methods: The population examined comprised a total of 114 patients, 34 women (age 76.8±10.5) and 80 men (68.2±13.1). On admission and discharge, the two samples were subjected to the following assessment tests: Short Physical Performance Battery, 6 Minutes Walking Test, EuroQol VAS and Handgrip. The intake included two rehabilitation activities in the gym during the day: the first was a moderate intensity aerobic workout and the second were respiratory exercises, stretching, coordination and balance exercises.

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Results: The results show that the total SPPB improved significantly over time in both sexes (p=0.0002), with no statistically significant differences between sexes(p=0.09). For the 6MWT, there are statistically significant improvements between the initial and final tests in both sexes(p‹0.0001), while no statistically significant differences emerge between sexes(p=0.54). In contrast, for the subjective perception of health status, the difference is statistically significant both over time for both sexes(p‹0.0001) and between sexes (p=0.005). Finally, for Handgrip (bilaterally), no clinical or statistical improvements are observed over time in either sex. However, a significant difference emerges between sexes (p‹0.0001), with both initial and final values in men being twice those of women (Table 1).
Discussion: Cardiac rehabilitation improved functional autonomy, motor performance, and exercise tolerance in both sexes, as indicated by gains in 6MWT and total SPPB scores. In contrast, the sit–to–stand and Handgrip tests showed no clinically or statistically meaningful improvement. Women's perceived quality of life remained largely unchanged, suggesting the influence of external factors. Additionally, the number of patients able to complete the assessments differed between admission and discharge, representing a clinically relevant finding.
Conclusion: Despite overall improvements, upper and lower limb muscle strength did not increase significantly, indicating the need for more targeted rehabilitation interventions for both sexes.

	N	Group	T_0	T_1	P time	P sex
BALANCE	19	Women	2.7±1.2	3.5±0.7	0.004	0.13
	64	Men	3.3±1.0	3.4±1.0		
GAIT SPEED 4M	19	Women	2.9±1.2	3.2±1.0	0.007	0.20
	64	Men	3.1±1.1	3.6±0.8		
SIT TO STAND 5X	19	Women	1.3±1.2	1.5±1.3	0.016	0.14
	64	Men	1.5±1.3	2.1±1.3		
SPPB TOT	19	Women	6.9±3	8.2±2.3	0.0002	0.09
	64	Men	8.0±2.7	9.1±2.7		
6MW T(m)	19	Women	277.7±94.7	312.8±78.3	<0.0001	0.54
	52	Men	287.2±118.3	343.2±122.7		
EuroQOL VAS	34	Women	53.4±21.9	60.3±31.3	<0.0001	0.005
	80	Men	60.4±20.2	75.4±18.9		
Handgrip DX (Kg)	30	Women	14.6±4.3	14.9±5.8	0.5	<0.0001
	79	Men	29.0±9.6	30.1±10.4		
Handgrip SX (Kg)	30	Women	13.8±4.7	13.3±5.6	0.6	<0.0001
	79	Men	26.7±10.0	28.2±9.7		

Table 1

Abstract citation ID: suag058.452

INSOMNIA DUE TO HYPERTRIGLYCERIDEMIA CAN BE TREATED BY ROSUVASTATIN/EZETIMIBE

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Background: Metabolic syndrome associated with elevated fasting triglyceridemia (TG) is often associated with insomnia. The new guidelines of ESC for dyslipidemia advice the statin and/or ezetimibe treatment like fist line therapy in patients with hypertriglyceridemia, also before then fibrates or omega 3. We examined the impact of rosuvastatin/ezetimibe treatment in reduction of insomnia in patents with hypertriglyceridemia
Methods: In this study was enrolled a group of 148 patients with hypertriglyceridemia and insomnia. Patients were screened for severe insomnia, defined by a score of four or more on the three Hamilton Depression Rating Scale (HDRS) sleep items, and for HTG characterized by TG≥200mg/dL. The duration of sleep was evaluated with smartwatch every 7 days. Mean age was 61,12 years. All patient was admitted in ambulatory of cardiology and were in wash out treatment for dyslipidaemic syndrome. In all we added 20 mg of rosuvastatin plus 10 mg of ezetimibe daily to therapy and reassessed patients after 30 days (Figure 1).
Results: Rosuvastatin/ezetimibe treatment was effective as add–on therapy in reduction of insomnia . All treated patients reported an improvement in symptoms. After 30 days, insomnia disappeared in 69% of patients and was reduced in 21% of patients. The number of the sleeping hours improved from 5:35 min to 7:25 minutes. Therapy was well tolerated in 99% of patents, and stopped only in 2 cases.
Conclusions: Our initial experience with rosuvastatin/ezetimibe in hypertriglyceridemia treatment suggests that this therapy may play a role in the treatment of insomnia.

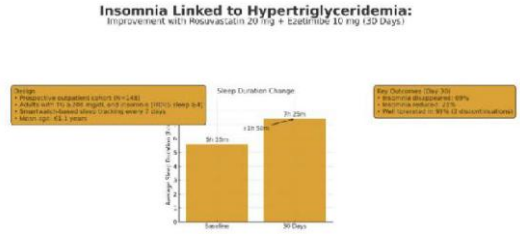

Figure 1

Abstract citation ID: suag058.453

HEART AND SELF–ESTEEM: NURSE–LED OPPORTUNISTIC CARDIOVASCULAR PREVENTION IN AESTHETIC MEDICINE CLINICS

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Irccs Aou Di Bologna Policlinico Sant'Orsola

Aesthetic medicine clinics attract a heterogeneous population seeking wellbeing, improved body image and greater self–esteem. Many of these individuals, often adults aged 30–65 years, present unrecognized or inadequately managed cardiovascular risk factors and rarely access conventional cardiology pathways spontaneously, making this setting an unconventional gateway of extraordinary potential for both primary and secondary prevention. Nurses, thanks to advanced skills in assessment, communication and patient–centred education, can position themselves as frontline professionals capable of early detection of such risks and of guiding patients towards the most appropriate care pathways. The project proposes a nurse–led integrated model of opportunistic cardiovascular screening delivered directly within aesthetic medicine clinics, evaluating its feasibility, acceptability and clinical relevance. The model includes, before the aesthetic procedure and without requiring additional appointments, a dedicated nursing encounter comprising structured history taking, targeted symptom exploration, blood pressure measurement, opportunistic ECG acquisition when indicated and use of validated cardiovascular risk estimation tools. This approach enables the identification of clinically significant red flags such as arrhythmic symptoms, previously undiagnosed hypertension, family history of premature cardiovascular disease, metabolic abnormalities (dyslipidaemia, glycaemic alterations), smoking habit and sedentary lifestyle, as well as conditions of particular vulnerability such as the postpartum period. Special attention is devoted to smoking status and physical activity levels, with brief motivational counselling specifically aimed at smoking cessation and promotion of regular moderate–to–vigorous intensity physical activity, fully integrated into the aesthetic–wellbeing plan. Patients with positive findings are fast–tracked to cardiology, while all clients receive short nurse–led counselling linking self–esteem, body image, smoking, physical activity and long–term cardiovascular health. Initial applications demonstrate very high acceptability by both patients and aesthetic physicians, who perceive nurse–led screening and counselling on modifiable risk factors – particularly previously unknown hypertension, dyslipidaemia, smoking and sedentary behaviour – as a genuine added value rather than a workflow disruption.

Abstract citation ID: suag058.454

ELASTIC (EFFECT OF NEW LIPID–LOWERING THERAPIES ON ARTERIAL STRUCTURAL AND FUNCTIONAL PROPERTIES) STUDY: NO SIGNIFICANT EFFECTS ON ARTERIAL STRUCTURAL AND FUNCTIONAL PROPERTIES OF PCSK9 INHIBITORY MONOCLONAL ANTIBODIES

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Background: Proprotein Convertase Subtilisin/Kexin type 9 (PCSK9) inhibitor antibodies reduce the frequency of new cardiovascular (CV) events through Low–Density Lipoprotein Cholesterol (LDL–C) reduction and plaque stabilisation. However, only a few studies have evaluated whether this effect is also determined by an improvement in arterial functional and structural parameters. We aimed to evaluate aortic stiffness (carotid–femoral Pulse Wave Velocity – PWV), arterial structure (carotid Intima–Media Thickness – IMT), and endothelial function (brachial Flow Mediated Dilatation – FMD) in patients treated with Alirocumab and Evolocumab.
Methods: This is a monocentric, prospective, longitudinal study on patients who received antibody–based PCSK9–i therapy at the cardiac rehabilitation and CV prevention outpatient clinic of our hospital. All patients starting a PCSK9–i on a clinical basis were enrolled and underwent PWV, FMD, and IMT measurement at three timepoints: the same day of the first injection (T0), after 6 months (T1), and after 12 months (T2).
Results: 84 patients concluded the 12–months period. The population's mean age was 67±8.2 years, and most of them were male (70.2%). LDL–C had a significant reduction during the follow–up (117.6±35.6 vs 37.5±26.2 mg/dL, p‹0.001). However, there were no significant changes in PWV (10.6±2.8 vs 10.6±2.3 m/s, p=0.124), FMD (7.0±8.6 vs 8.3±10.8%, p=0.474) and IMT (719.2 ±184.9 vs 740.9±170.2 μm, p=0.386) values.
Conclusions: In our population, PCSK9 inhibitors showed neither significant benefits nor changes in vascular properties; however, the stability of these parameters may indicate a deceleration in the progression of atherosclerotic disease, which might otherwise have worsened in this high–risk population.

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Abstract citation ID: suag058.455

INTEGRATED CARDIOVASCULAR RISK STRATIFICATION IN FAMILIAL HYPERCHOLESTEROLEMIA BY CORONARY ARTERY CALCIUM SCORE AND CAROTID ULTRASOUND

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Background: Familial hypercholesterolemia (FH) is a major risk factor for cardiovascular disease (CVD), due to chronically elevated levels of low–density lipoprotein cholesterol (LDL–C). The objective of this report was to assess the impact of clinical and genetic factors in FH, with particular attention to cumulative LDL–C exposure,on the coronary artery calcium (CAC) score obtained by coronary computed tomography and carotid ultrasound.
Methods: In this real–world cohort, CAC scores were obtained in 15 genetically confirmed FH patients, including 14 heterozygotes (LDLR variants) and one homozygote (LDLRAP1variant). None of the patients had a history of cardiovascular events at clinical evaluation. Associations between CAC score and clinical features, maximum LDL–C levels, cumulative LDL–C exposure and genetic variables was therefore investigated.
Results: CAC scores were distributed as follows: 0 (N=4, 26.6%), 1–99 (N=5,33.3%), and ≥100 (N=8, 53.3%). Patients with CAC›0 showed a higher prevalence of xanthomas (N=10, 67%)and a family history of coronary artery disease(CAD) (N=12,80%). Carotid ultrasound findings showed a discordant pattern compared with CAC scores in the intermediate group. Specifically, patients with CAC scores between 1 and 99 did not exhibit significant carotid stenosis (‹30%), despite evidence of coronary calcification. In contrast, patients with CAC ≥100 consistently showed more rilevant carotid stenoses (range 35–55%), indicating a more advanced atherosclerotic burden. The CAC ≥100 group exhibited the highest maximum LDL–C levels (405.1 mg/dL vs. 265.2 mg/dL in the CAC=0 group). Age at genetic diagnosis was similar between groups (41.8 years in CAC ≥100vs. 40.0 years in CAC=0 group). However, patients with CAC ≥100 started lipid–lowering therapy (LLT) later than those with CAC=0 (30.2 vs. 23.7 years), resulting in a significantly higher lifetime cumulative LDL–C exposure (17,293.0 mg/dL for CAC ≥100 vs. 11,376.5 mg/dL for CAC=0).
Conclusions: Early diagnosis and timely LLT are essential for reducing lifelong cholesterol burden in FH patients.The observed heterogeneity in vascular involvement and the discordance between coronary and carotid imaging in patients with intermediate CAC scores underscore the need for an integrated imaging approach.High CAC values (≥100) identify patients with more advanced and systemic atherosclerosis, supporting the role of CAC scoring combined with carotid ultrasound for improved cardiovascular risk stratification.

Abstract citation ID: suag058.456

CAROTID WEB IN A 35–YEAR–OLD ASYMPTOMATIC WOMAN: CASE REPORT AND LITERATURE REVIEW

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Carotid web is a rare abnormality of the arterial wall, considered a variant of intimal fibromuscular dysplasia, and has been associated with cryptogenic ischemic stroke in young adults. Its detection by Doppler ultrasound of the supra–aortic trunks remains a diagnostic challenge, as it is often under–recognized and misinterpreted as artifacts or thin atherosclerotic plaques. We report the case of a 35–year–old woman, asymptomatic at vascular follow–up, in whom ultrasound revealed a thin intraluminal membrane at the carotid bulb, with the characteristic “shelf–like“ appearance and a “fish–mouth“ pattern. This case raises questions about the management of asymptomatic patients and the indications for second–level imaging or preventive treatment.**History:** A 35–year–old woman, with no cardiovascular risk factors, under routine vascular follow–up for a family history of atherosclerosis. No history of cerebrovascular events or neurological symptoms. Physical examination: Normal blood pressure, no vascular bruits. Neurological examination within normal limits.
Ultrasound findings:

- B–mode imaging of the supra–aortic trunks revealed a thin, hyperechoic intraluminal membrane protruding from the posterior wall of the ICA bulb, without crossing the lumen entirely.
- Transverse view showed the classic “fish–mouth“ appearance.
- Color Doppler demonstrated laminar flow in the common carotid artery, but local turbulence and small areas of vortex stagnation adjacent to the membrane (Figure 2).
- No hemodynamically significant stenosis was detected (ICA PSV ‹ 120 cm/s).

Initial follow–up: The patient remained asymptomatic. A CT angiography was recommended for diagnostic confirmation and risk stratification (Figure 1).

This case highlights that carotid web may be incidentally identified in young asymptomatic patients. Accurate diagnosis is essential to differentiate it from ultrasound artifacts or thin atherosclerotic plaques. In asymptomatic individuals, management remains debated: currently, the most widely accepted approach involves clinical and ultrasound surveillance combined with antiplatelet prophylaxis, with second–level imaging indicated for confirmation. Prospective studies are needed to define risk criteria and optimal therapeutic strategies.

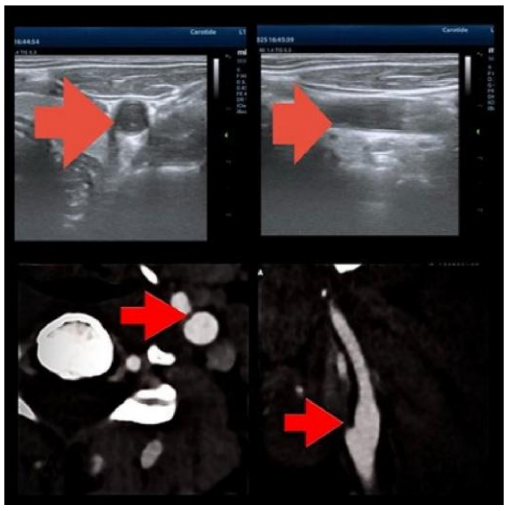

Figure 1

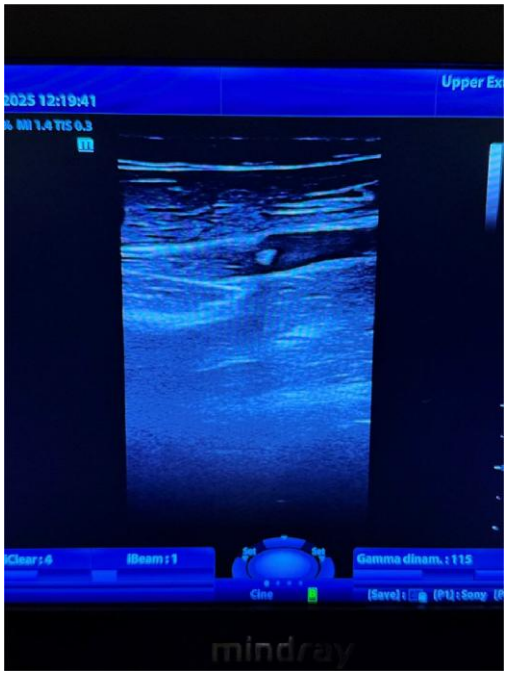

Figure 2

Prevention and Rehabilitation

Abstract citation ID: suag058.457

URBAN–RURAL DISPARITIES IN CARDIOVASCULAR RISK, LIFESTYLE, AND PSYCHOSOCIAL BURDEN AMONG CARDIAC OUTPATIENTS

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Abc Study On Heart Disease Foundation E.T.S.

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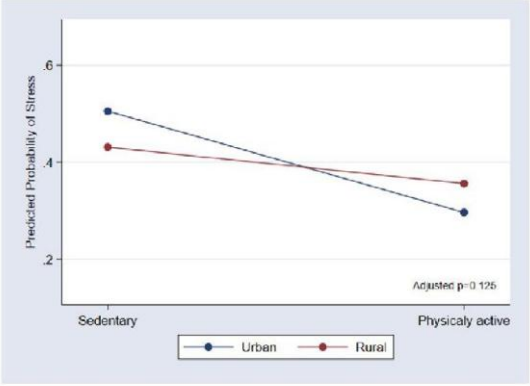
Background: Geographical factors may influence cardiovascular risk, lifestyle behaviors, and psychosocial stress. Data on urban–rural disparities in Italian outpatient cardiology populations remain limited. We aimed to compare cardiovascular risk factors, physical activity, psychosocial stress, and pharmacological treatment between urban and rural cardiovascular outpatients in Veneto.
Methods: We performed a cross–sectional analysis of 649 consecutive cardiovascular outpatients (urban n = 169; rural n = 480). Data included age, sex, systolic (SBP) and diastolic (DBP) blood pressure, hypertension, diabetes mellitus, physical activity, psychosocial stress, and use of antihypertensive or psychotropic drugs. Multivariable linear and logistic regression models were used to assess independent associations.
Results: Urban and rural patients had similar SBP (147.6 ± 21.8 vs 146.3 ± 22.7 mmHg, p = 0.507) and DBP (81.6 ± 11.4 vs 81.6 ± 11.1 mmHg, p = 0.931). Prevalence of hypertension (51.5% vs 55.6%, p = 0.352), diabetes (9.5% vs 11.0%, p = 0.568), physical activity (63.9% vs 62.5%, p = 0.746), psychosocial stress (36.7% vs 38.5%, p = 0.669), and medication use did not differ significantly. Multivariable analyses confirmed that rural residence was not independently associated with cardiovascular risk factors, lifestyle, or stress. Physical activity was independently associated with lower stress (OR 0.39, 95% CI 0.20–0.76, p = 0.006), with no significant interaction by area of residence.
Conclusions: In this cohort, urban and rural outpatients showed similar cardiovascular and psychosocial profiles, suggesting equitable care and effective access across areas. Physical activity was associated with lower stress in both groups, highlighting a modifiable lifestyle factor with consistent benefits. These results indicate that geography alone does not determine outcomes, supporting a preventive and lifestyle–focused interventions for all patients regardless of residence.

Figure 1: Predicted probability of psychosocial stress by physical activity and area of residence.



Physical activity is associated with lower stress in both urban and rural patients. Interaction between area of residence and physical activity was not statistically significant.

Abstract citation ID: suag058.458

SEX DIFFERENCES IN FUNCTIONAL OUTCOMES FOLLOWING CARDIAC SURGERY: IMPLICATIONS FOR CARDIAC REHABILITATION

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Ics Maugeri Irccs Pavia

Background: This paper underscores the significance of gender medicine, advocating for a critical reassessment of medical practices that incorporates gender differences into healthcare delivery. Historically, medical research and clinical practice have predominantly focused on male health, yet it is crucial to address the impact of gender on female health as well. The paper specifically explores the influence of sex and gender on the primary causes of morbidity and mortality in cardiology, examining the roles of genetic and hormonal factors in the pathophysiology of cardiovascular diseases. It emphasizes the necessity of a gender–sensitive approach in cardiac rehabilitation, advocating for individualized care that considers the biological, genetic, and environmental determinants that influence patient outcomes.
Materials and Methods: The study population included 383 patients, aged between 40 and 81 years, of whom 111 were women and 272 were men. The participants had undergone cardiac surgery, including both surgical and interventional procedures. Both groups were assessed at admission and discharge using the following evaluation tools: The Short Physical Performance Battery (SPPB) (Figure 1A-1B), the 6–Minute Walking Test (6MWT), and the EuroQol Visual Analog Scale (VAS). The rehabilitation program consisted of two daily gym sessions: a moderate–intensity aerobic workout, assessed using the Borg CR10 scale, and respiratory exercises. The program also focused on muscle function restoration and included additional aerobic exercises.
Conclusions: The results showed that both groups experienced significant improvements after rehabilitation, particularly in autonomy, functional recovery, and effort tolerance.Women showed greater improvements in gait speed compared to men (Figure 2A-2B), but there were no significant differences between the two groups in strength or balance.These findings suggest that gender–tailored rehabilitation programs, with specific interventions, could help address individual deficits and provide a more personalized approach to meet each patient's needs.

SHORT PHYSICAL PERFORMANCE BATTERY (SPPB) FEMALE GROUP				
Statistical median (25°-75°)		*min*	*max*	*mean±sd*
entry	6(3,5-8)	0	12	5,65±3,21
discharge	9(7,5-10)	1	12	8,55±2,32
P value <0,0001				
SHORT PHYSICAL PERFORMANCE BATTERY (SPPB) MALE GROUP				
entry	8(6-10)	0	12	7,53±3,49
discharge	10(9-11)	0	12	9,84±2,17
P value <0,0001				

Figure 1A

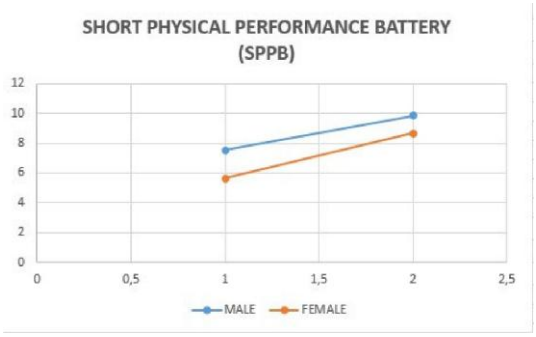

Figure 1B

GAIT SPEED FEMALE GROUP				
Statistical median (25°-75°)		*min*	*max*	*mean±sd*
entry	2(1-3)	0	4	2,15±1,34
discharge	4(3-4)	1	4	3,45±0,78
P value <0,0001				
GAIT SPEED MALE GROUP				
entry	3(2-4)	0	4	2,89±1,37
discharge	4(4-4)	0	4	3,71±0,75
P value <0,0001				

Figure 2A

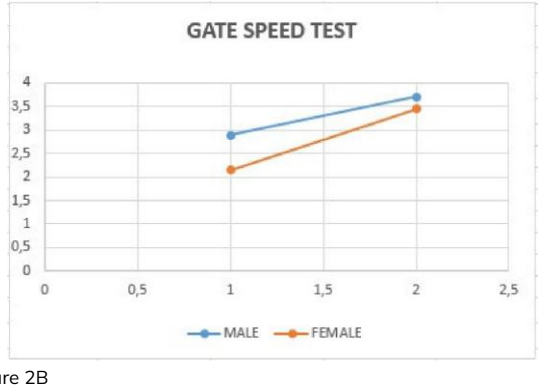

Figure 2B

Abstract citation ID: suag058.459

HIGH PREVALENCE OF ADVANCED CARDIOVASCULAR–KIDNEY–METABOLIC SYNDROME IN CARDIAC REHABILITATION PATIENTS AND THERAPEUTIC IMPLICATIONS: A SINGLE–DAY OBSERVATIONAL STUDY

F. Monego, C. Milan, and L. Severino
Asst Gom Niguarda; Fondazione Irccs San Gerardo Dei Tintori

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Background: Cardiovascular–Kidney–Metabolic Syndrome (CKM syndrome) is a clinical entity with major prognostic implications, characterized by a complex interrelationship between cardiac, renal, and metabolic dysfunctions, for which several therapeutic strategies have proven highly effective. While often associated with advanced chronic kidney disease (CKD), its prevalence in cardiac patients without severe renal impairment may be underestimated. The aim of this study was to evaluate the prevalence and severity of CKM syndrome, as well as the need for treatment optimization in a cohort of patients admitted to a Cardiac Rehabilitation Unit.
Methods: We conducted an observational study on the 30 patients enrolled in a cardiac rehabilitation program at Carate Brianza Hospital (ASST Brianza) on a chosen day (September 24th 2025), both as outpatients (MAC A/B) and inpatients (REP). Clinical and biochemical data were collected at admission, and pharmacological data at both admission and discharge. Patients were classified based on CKM syndrome stages, according to the 2023 American Heart Association presidential advisory, and CKD severity, according to the 2024 KDIGO classification. We focused of key drugs for CKM syndrome management: RAAS blockers, SGLT2 Inhibitors, GLP–1 agonists and cholesterol–lowering agents.
Results: Out of the 30 patients, 26 (86.7%) presented with advanced CKM syndrome, ie. stage 4 (fig.1). Only 7 (23%) had moderate–to–severe CKD (fig.2). Metabolic and cardiovascular disorders were highly prevalent: type 2 diabetes was present in 8 (26.7%), heart failure in 15 (50%), hypertension in 19 (63.3%) and dyslipidemia in 25 (83.3%). During the rehabilitation program, a further optimization of CKD treatment was possible for 11 patients (36.7%) (fig.3).
Conclusions: Our findings reveal a strikingly high prevalence of advanced CKM syndrome among cardiac rehabilitation patients, even in the absence of severe renal impairment, though the availability of spot urine albumin instead of urine albumin/creatinine ratio might have led to an underestimation of CKD severity. Despite most patients having been recently hospitalized in an acute care setting, therapeutic optimization was still possible in a significant percentage, underlying the central role of Cardiac Rehabilitation in managing cardiovascular, renal and metabolic dysfunctions. The high prevalence of stage 4 CKM syndrome at admission highlights the need for early multidisciplinary management.

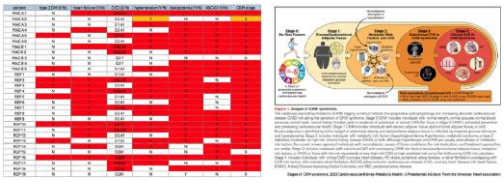

Figura 1

Figura 2

Figura 3

Abstract citation ID: suag058.460

THE SALENT–IMA PREVENTION NETWORK: ORGANIZATIONAL MODEL FOR CONTINUITY OF CARE BETWEEN HOSPITAL AND TERRITORY

A. Picciolo, F. Sturdà, F. Germinal, A. Mandurino Mirizi, M. Trianni, G. De Benetictis, C. Tritto, L. Corlianò, S. Cozza, P. De Paolis, M. Rollo, S. Sicuro, M. Marenaci, M. De Filippis, M. Elisabetta, S. Albano, G. Pepe, D. Fischetti, and G. Colonna

U.O. Cardiologia – Utic Con Emodinamica, Lecce; U.O. Di Cardiochirurgia, Lecce; Cardiologia Territoriale,
Martano-Lecce-Maglie-Tricase-Casarano-Poggiardo-Nardo'-Gallipoli; U.O. Cardiologia, Galatina.

Introduction: Since 2010, we have established a secondary prevention clinic for ischemic heart disease (IHD) dedicated to patients discharged after percutaneous myocardial revascularization, whether for elective PTCA or acute coronary syndrome (ACS) with or without ST–segment elevation (STEMI/NSTEMI).
Materials & Methods: Patients attending the clinic are stratified based on their thrombotic risk and risk of left ventricular dysfunction and followed with a specific diagnostic and therapeutic pathway, including monitoring adherence to including monitoring adherence to prescribed therapy and implementation of recommended lifestyle changes. Once the patient has been correctly stratified and the therapeutic targets required by the guidelines for proper secondary prevention have been reached, they are referred to the Community Cardiology Unit of the facility or of the relevant districts through a scheduled appointment with an exclusive booking diary.
Results: 1,093 patients were followed (899 men, 194 women; mean age 65.46 years). Of these, 22.6% had a history of chronic ischemic heart disease. The rehospitalization rate, to our unit or other departments in the Province, of the 1,054 patients who completed follow–up at the hospital outpatient clinic was 1.9% one year after the acute event. Furthermore, 89% of patients continuing follow–up at the Community Cardiology units continue to have LDL cholesterol levels within target range, according to the ESC Guidelines.
Conclusions: Given the results obtained, we believe the time has come to consider coronary revascularization as the initial therapeutic approach for acute coronary syndrome (ACS). This treatment must be complemented by ongoing stratification of the patient's residual risk, risk factor management, and lifestyle modification.

Abstract citation ID: suag058.461

ADHERENCE TO PHARMACOLOGICAL THERAPIES AND LIFESTYLE RECOMMENDATIONS AFTER HOSPITALIZATION FOR ACUTE MYOCARDIAL INFARCTION: RESULTS OF THE DIMACC PROJECT

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Ospedale Pio Xi; Casa Di Comunita'; Universita' Degli Studi Torino; Polo Territoriale Asst Brianza; Universita' Degli Studi Milano; Business Integration Partners Spa

Background: The year following hospitalization for Acute Myocardial Infarction (AMI) represents a vulnerable phase, characterized by substantial mortality and rehospitalization rates, favoured by treatment discontinuation and suboptimal adherence to lifestyle recommendations. The DIMACC Project ("Dimissioni Accompagnate", i.e. Accompanied Discharge) was initiated on May 1st, 2023 to implement a structured post–discharge follow–up for patients admitted with AMI to the Intensive Cardiac Care Unit (ICCU) and the Cardiology ward of Pio XI Hospital in Desio.
Aim: To assess adherence to pharmacological therapies and lifestyle recommendations during the first year after discharge.
Methods: DIMACC is a prospective quality improvement study conducted in routine clinical practice. Patients followed a predefined program of physician–nurse outpatient visits and diagnostic assessments over a 12–month period. Information on adherence to medical therapy and lifestyle behaviours was collected by nursing staff during scheduled follow–up visits. Differences between baseline and final evaluations were analysed using the chi–square test, with statistical significance set at $p < 0.05$.
Results: From May 1, 2023, to April 30, 2024, 396 patients were admitted for AMI to our ICCU and Cardiology ward. Of these, 351 were discharged home or to a cardiovascular rehabilitation centre, and 263 were included in the project. Among these patients, 11 did not attend the first follow–up visit, 4 died before the final visit, 30 were lost to follow–up, and 222 completed the 12–month follow–up. The percentage of the latter patients reporting good adherence to pharmacological therapies and recommended lifestyle measures at the initial and final visits is shown in Table 1. At the beginning of follow–up, adherence to pharmacological therapies was very high, in contrast to adherence to recommended lifestyle measures, which was generally lower. No statistically significant changes were observed during follow–up for any of the variables considered, except for a significant increase in patients who resumed smoking.
Conclusion: In patients hospitalized for AMI, a structured post–discharge follow–up pathway is effective in sustaining adherence to pharmacological treatments but appears insufficient to significantly improve lifestyle behaviours. Dedicated interventions aimed at promoting healthy diet, regular physical activity, smoking cessation, and psychological well–being are warranted.

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ADHERENCE TO PRESCRIBED DRUG THERAPY AND LIFE STYLE RECCOMENDATIONS DURING THE YEAR FOLLOWING HOSPITALIZATION FOR ACUTE MYOCARDIAL INFARCTION

OBJECTIVES	INITIAL VISIT (n = 222)	FINAL VISIT (n = 222)
Adherence to prescribed drug therapy		
Taking all prescribed medications (n, %)	199 (89.6)	194 (87.4)
Daily medication intake (n, %)	263 (92.3)	188 (84.7)
Taking medications at the correct time (n, %)	214 (96.4)	202 (91.0)
No discontinuation when feeling well (n, %)	219 (98.6)	220 (99.1)
No discontinuation even when feeling unwell (n, %)	216 (98.2)	221 (99.5)
Adherence to recommended lifestyles		
Fruit intake ≥2 servings/day (n, %)	131 (59.0)	148 (66.7)
Vegetables intake ≥2 servings/day (n, %)	120 (54.1)	101 (45.5)
Fish intake ≥1 serving/week (n, %)	195 (87.8)	190 (85.6)
Physical activity for ≥30 minutes on ≥5 days/week (n, %)	87 (39.2)	88 (39.6)
Smoking cessation among 47 smokers (n, %)	68 (72.3)	54 (57.1) *
Absence of anxiety/depression (n, %)	141 (63.5)	145 (65.3)

* p<0.05

Table 1

Abstract citation ID: suag058.462

RELATIONSHIP BETWEEN ARTERIAL STIFFNESS INDEX AND THE EXTENT OF NOCTURNAL BLOOD PRESSURE REDUCTION IN AN ADULT POPULATION

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Introduction: The Ambulatory Arterial Stiffness Index (AASI), obtained through 24–hour ambulatory blood pressure monitoring (ABPM), has been proposed as an indirect and simplified measure of arterial stiffness. AASI is associated with both cardiovascular mortality and the presence of target organ damage. Although some studies have highlighted an inverse association between AASI and nocturnal blood pressure reduction, the nature of this relationship has not been fully clarified.
Objective: Analyze the type of relationship between AASI and nocturnal blood pressure dipping in an adult population undergoing 24–hour ambulatory blood pressure monitoring.
Methods: 188 consecutive subjects (104 men, 84 women) attending our clinic were included in this study. In addition to ABPM, information regarding main cardiovascular risk factors was collected into a predefined medical history form. AASI was calculated as 1 minus the linear regression coefficient of diastolic blood pressure values on systolic blood pressure values (24 hours). Nocturnal blood pressure dipping was determined by the difference between the mean values of day–time and night–time mean arterial pressure according to latest ESH guidelines.
Results: The mean age was 56 years; mean BMI was 28.8 kg/m²; mean AASI was 0.40. 64% of our subjects were hypertensive, 11% diabetic, 46% had a family history of cardiovascular disease and 28% were smokers. In the total sample, the relationship between AASI and nocturnal dipping was non–linear. In hypertensive subjects (n=121), a direct relationship was observed for AASI values ‹0.35 and an inverse relationship for values ›0.35. In normotensive subjects (n=67), however, the relationship was linear and inverse, becoming significant starting from AASI ›0.42. The associations were found to be independent of major confounding factors such as age, sex, BMI, anti–hypertensive therapy, smoking, diabetes mellitus, and hypercholesterolemia.
Conclusions: These results highlight, for the first time, a non–linear relationship between AASI and nocturnal blood pressure reduction in hypertensive subjects, whereas in normotensive subjects, the relationship appears consistently inverse, suggesting distinct pathophysiological mechanisms.

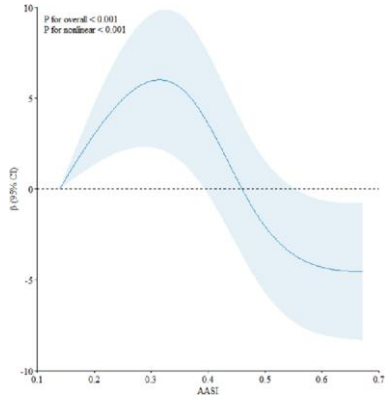

Figure 1. Association between the ambulatory arterial stiffness index (AASI) and changes in mean arterial pressure (MAP) between daytime and nighttime (mmHg), using a restricted cubic spline (RCS) regression model in hypertensive patients. The solid lines represent the beta coefficient, while the shaded areas indicate the 95% confidence intervals (CI). P for overall: Test for global effect. P for non-linear: Test for non-linearity

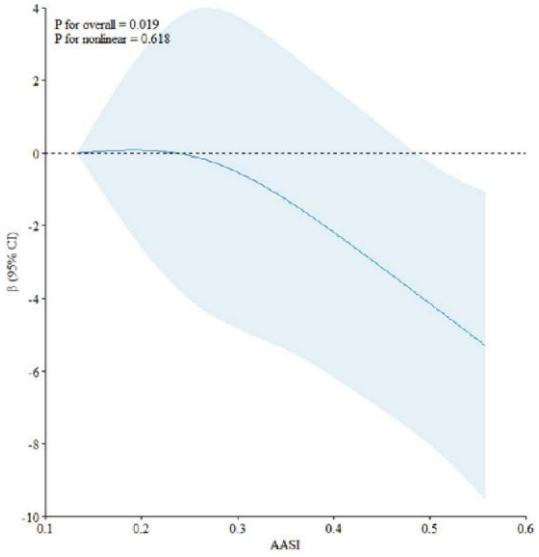

Figure 2. Association between the ambulatory arterial stiffness index (AASI) and changes in mean arterial pressure (MAP) between daytime and nighttime (mmHg), using a restricted cubic spline (RCS) regression model in normotensive subjects. The solid lines represent the beta coefficient, while the shaded areas indicate the 95% confidence intervals (CI). P for overall: Test for global effect. P for non-linear: Test for non-linearity

Cardiovascular Rehabilitation

Abstract citation ID: suag058.463

THE ITACARE–P CARDIOREHAB REGISTRY: REAL–WORLD DELIVERY AND RESULTS IN PATIENTS WITH HEART FAILURE AND CORONARY ARTERY DISEASE FROM ITALIAN CARDIAC REHABILITATION NETWORK. PRELIMINARY DATA

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Background: Cardiac rehabilitation (CR) is the standard of care for patients with coronary artery disease (CAD) and heart failure (HF) in the post–acute phase and represents the most cost–effective secondary prevention strategy. In 2025 the first Italian national prospective multicenter registry on CR in HF and CAD patients was initiated.
Aims: 1) to describe CR delivery models for CAD and HF patients in Italy;
2) to evaluate CR effectiveness at program completion and up to 12 months in achieving secondary prevention targets and improving quality of life (QoL).
Methods: The registry will collect clinical, biochemical and functional data from 1,600 consecutive CAD and HF patients undergoing CR. Continuous variables are reported as medians (IQR) and categorical variables as counts and percentages. The primary outcome is change from admission to discharge in NT–proBNP (HF) and LDL cholesterol (LDLc, CAD). Secondary outcomes include therapeutic adherence, functional capacity, QoL, psychological status, mortality, hospitalizations and major adverse cardiovascular events.
Results: To date, 238 patients were enrolled in 9 of 23 centers (35.4% HF, 64.6% CAD) with discharge data available for 184 patients. Given the preliminary and incomplete dataset, analyses are descriptive. At admission BNP was 233 pg/ml

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(IQR 130–442), NT–proBNP 1721 pg/ml (IQR 836–3064); discharge values, where available, showed a lower trend (NT–proBNP 1215 pg/ml [IQR 868–2926]). LDLc decreased from 66 mg/dl (IQR 49–92) to 51 mg/dl (IQR 39–65). At baseline, quality of life was assessed with HeartQoL and KCCQ, with scores of 26 and 58, respectively, alongside perceived health status measured by EQ–VAS (score 60). Anxiety and depression scores measured by GAD–7 and PHQ–9 were both 5; cognition MoCA was 26. At discharge, GAD–7 and PHQ–9 scores changed to 2, EQ–VAS to 80, MoCA score was 25. Functional autonomy and frailty also changed (Barthel Index from 90 to 100 and RCS–E from 11 to 1). **Conclusions:** These preliminary real–world data describe the multidimensional profile of patients undergoing CR in Italy and suggest favourable trends from admission to discharge across biochemical, functional, psychological and QoL domains. A nationwide CR registry may optimize the cost–effectiveness of cardiovascular care by improving target control, therapeutic adherence, functional recovery and QoL, potentially improving number and duration of rehospitalizations and efficient resource utilization.

Table 1. Baseline Characteristics of the Study Population (N=238)

Age (years), median [IQR]	67 [57–74]
Sex, n (%)	
Male	188 (79.0)
Female	50 (21.0)
Days from acute-care admission to discharge, median [IQR]	11 [7–20]
Acute Care Facility Type, n (%)	
Cardiology	120 (52.6)
Cardiac surgery	102 (44.7)
Other	6 (2.6)
Index Event Type, n (%)	
First event	168 (73.4)
Recurrence	61 (26.6)
Index Event indicating CR, n (%)	
Heart failure	81 (35.4)
ACS with PCI	75 (32.8)
Elective CABG	47 (20.5)
ACS with CABG	19 (8.3)
Elective PCI	4 (1.7)
ACS without revascularization	2 (0.9)
Other	1 (0.4)
Co-pathologies / Co-treatments, n (%)	
None	160 (69.9)
Valvular surgery / large-vessel procedures	27 (11.8)
CIED implantation	14 (6.1)
PAD with revascularization	13 (5.7)
PAD without revascularization	4 (1.7)
Other	11 (4.8)
Acute Phase Complications	
AF/atrial flutter, n (%)	60 (25.2)
Infections, n (%)	57 (23.9)
None, n (%)	56 (23.5)
Transfusions, n (%)	32 (13.4)
Acute renal failure, n (%)	24 (10.1)
Severe ventricular hyperkinetic arrhythmias, n (%)	23 (9.7)
ACS (excluding existing comorbidities), n (%)	12 (5.0)
Severe bradyarrhythmias, n (%)	11 (4.6)
Liver/pancreatic failure, n (%)	10 (4.2)
Minor bleeding (BARC 1,2), n (%)	10 (4.2)
Major blooding (BARC ≥3), n (%)	8 (3.4)

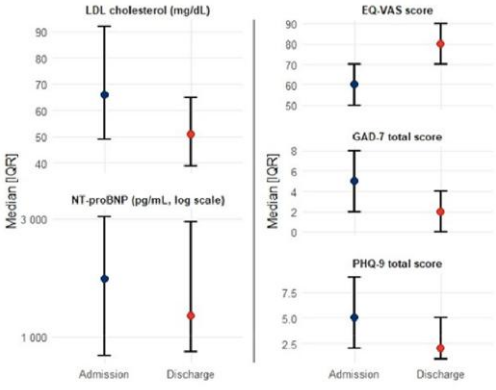

Figure 1. Admission-to-discharge changes in LDL cholesterol (ischemic patients, upper left panel), NT-proBNP (heart failure patients, lower left panel), and EQ-VAS, GAD-7, and PHQ-9 scores (right panels) during the post-acute rehabilitation period.

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CARDIOPULMONARY TESTING AS A TOOL FOR CORRECT EXERCISE PRESCRIPTION IN CARDIAC REHABILITATION

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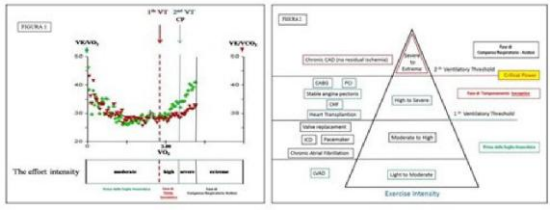
In the field of cardiac rehabilitation, but not only, it is essential to have respiratory parameters and functional capacity derived from instrumental tests that can guide the correct prescription of physical exercise. One of the most comprehensive instrumental tests in functional assessment is the cardiopulmonary exercise test (CPET). During the CPET, numerous parameters can be measured: O2 and CO2 gas kinetics, ventilation, workload, electrocardiogram and heart rate monitoring, and hemoglobin saturation. The graphical representation and analysis of the data breath by breath and their relationship/ratio make up the final panel of 9 plots on which the final report is ultimately based. The measurement of peak oxygen consumption (PeakVO2) defines the functional capacity of the subject, but the complete analysis of the data and graphs obtained allows for the identification of numerous other parameters and, above all, the definition of the transition through the different phases of the exercise.

The phases that may be evident during CPET are:

(1) identification of the anaerobic threshold (1Vt);
(2) the isocapnic buffering phase during which lactic acid is buffered by bicarbonates with consequent production of CO2 and H2O;
(3) the respiratory compensation point CP (or second threshold 2 Vt); 4) respiratory compensation for acidosis.

The behavior of the ventilatory equivalents (VE/VO2 and VE/VCO2) shown in Figure 1 defines the different phases, which are closely related to exercise intensity. Figure 2 shows and correlates the recommended exercise intensity for different clinical conditions.**Conclusions:** In addition to its diagnostic, prognostic, and functional assessment role, CPET offers the opportunity to obtain numerous parameters on which to base a correct and guided prescription of physical exercise not only in patients (rehabilitation exercise) but also in healthy subjects (training exercise). Certainly, not all patients who undergo cardiac rehabilitation will have performed a CPET, but when available, in our experience, it is particularly helpful. Furthermore, it is advisable to perform a follow–up CPET (4–6 months) after a cycle of physical rehabilitation or training in order to document the results and any functional improvements and validate the correct prescription of the type of exercise.



Abstract citation ID: suag058.465

DETERMINANTS OF FUNCTIONAL AND PSYCHOLOGICAL RECOVERY AFTER CARDIAC REHABILITATION IN CORONARY AND VALVULAR HEART DISEASE PATIENTS: A 1–YEAR LONGITUDINAL STUDY

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Background: Cardiac rehabilitation (CR) improves exercise capacity and psychological well–being after cardiac interventions; however, determinants of functional and psychological recovery and their inter–relationship over time remain incompletely defined, particularly across different cardiac diagnoses.
Methods: In this prospective longitudinal study, patients with coronary artery disease (CAD) or valvular heart disease (VHD) enrolled in a structured 1–year CR program in 2023, were evaluated at baseline, 6 months, and 12 months. Functional capacity (FC) was assessed using the Incremental Shuttle Walk Test (ISWT). Psychological outcomes included anxiety and depression, measured by the Hospital Anxiety and Depression Scale, and positive mood, assessed by the Global Mood Scale (GMS). Longitudinal trajectories were analyzed using linear mixed–effects models with time, diagnosis, and time × diagnosis interaction as fixed effects and patient as a random intercept, adjusting for baseline demographic, clinical, metabolic, and functional variables. Associations between changes in ISWT and psychological outcomes were explored using change–score analyses (Figure 1).

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Results: Exercise capacity improved significantly over time, with an increase in ISWT at 12 months (adjusted p=0.013), independent of diagnosis (time × diagnosis p=0.35). Anxiety and depression scores decreased significantly (all p ‹ 0.01), while positive mood increased over time (p‹ 0.001). Baseline FC emerged as a robust independent determinant of recovery. Higher baseline ISWT was associated with greater functional performance at follow–up (β= 0.78; 95% CI 0.69–0.87; p‹0.001) and more favorable psychological trajectories, independently predicting lower anxiety (β= −0.004; p=0.018) and depression (β= −0.004; p=0.006). Improvements in ISWT over 12 months were associated with concurrent reductions in anxiety (p‹ 0.001) and depression (p=0.010), and with improved positive mood (p=0.021). Older age and female sex independently predicted lower exercise performance, while female sex was also associated with higher anxiety; other clinical variables showed weaker or borderline associations.
Conclusions: Cardiac rehabilitation is associated with parallel improvements in functional capacity and psychological well–being over one year, irrespective of cardiac diagnosis. Baseline functional status is a key determinant of recovery, supporting integrated functional and psychological assessment within comprehensive CR programs.

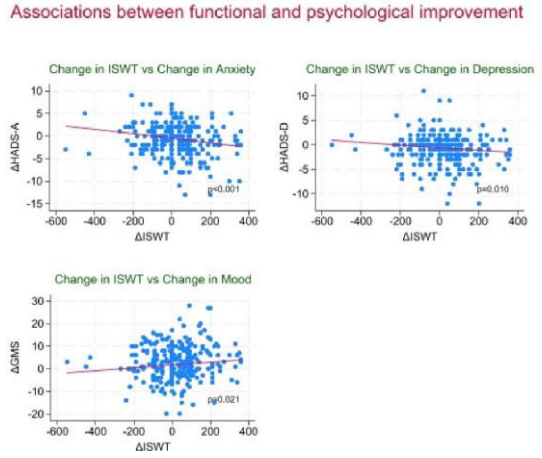

Figure 1

Abstract citation ID: suag058.466

CARDIAC REHABILITATION: CAN THIS CHOICE CHANGE YOUR FUTURE PROGNOSIS?

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Introduction: Cardiovascular disease (CVD) remains the leading cause of morbidity and mortality worldwide. Cardiac rehabilitation (CR) is a cornerstone of secondary prevention after ischemic events, but adherence and access to structured programs remain suboptimal.
Aim: This retrospective case–control study aimed to evaluate the clinical, metabolic and therapeutic effects of a structured CR program in patients after an acute CVD, in comparison to usual care.
Methods: Sixty patients who completed CR program after an acute CVD, were compared with fifty–four patients with comparable clinical characteristics who did not undergo CR. Clinical, hemodynamic, and biochemical parameters were analysed during hospitalization, at the time of CR and after 6 months only among those who participated in CR, and after 12 months in the overall group.
Results: We examined 114 patients, mean age of 60.8 ± 8.6 years (range 40–78), average BMI of 28.1 ± 4.7 kg/m², 85.1% males. Clinical presentation at enrolment was: 67.5% STEMI/NSTEMI treated with PCI, 13.2% aortocoronary bypass surgery, 12.3% stable angina, and 7.0% unstable angina. No statistically significant difference was observed for prevalence of smoking habit, diabetes mellitus, arterial hypertension, dyslipidaemias, pharmacological treatment prescribed and baseline metabolic data between CR and control group (p › 0.05 for all). At 6 months, the CR group showed significant improvements of body mass index (−0.52 kg/m², p=0.007), LDL cholesterol (−17.9 mg/dL, p=0.003), and heart rate (−3.9 bpm, p=0.001). After 12 months, patients who underwent CR maintained better LDL (49.6 ± 16.5 vs 69.9 ± 23.6 mg/dl, p‹0.001) and glycaemic control (HbA1c 5.88 ± 0.29 vs 6.76 ± 0.72%, p‹0.001) and lower blood pressure (124.9 ± 8.6/74.2 ± 7.6 vs 135.1 ± 15.6/80.4 ± 9.4 mmHg, p=0.001/0.003) compared with controls. Greater adherence to pharmacological therapy, particularly to ezetimibe and PCSK9 inhibitors, was also observed. Moreover, those engaged into CR maintained a greater adherence to physical activity program (63.3% performed moderate to intensity physical activity, vs 31,5%, p=0.011).
Conclusions: Participation in structured CR is associated with improved metabolic and hemodynamic outcomes, as well as higher adherence to evidence–based therapies. CR remains an essential component of comprehensive secondary prevention for ischemic heart diseases.

Abstract citation ID: suag058.467

CONTRIBUTION OF THE 6–MINUTE WALKING TEST (6MWT) TO THE DEFINITION OF EXERCISE INTENSITY IN CARDIAC REHABILITATION

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The target heart rate (THR), calculated using the Karvonen formula after a maximal exercise test (ET), defines the correct exercise intensity for each patient (pt). However, some pts referred for cardiac rehabilitation (CR) may not have undergone a ET yet due to clinical or organisational delays. Until an ET is available, it is common practice to empirically set the THR between 30 and 50 % above the resting heart rate (HR). However, while this method has been shown to meet safety criteria, there is a risk of underestimating the intensity of the training. We wanted to verify whether the HR achieved at the end of the 6MWT (a test that physiotherapists can conduct independently) can be used to guide the choice of correct exercise intensity in the early stages of CR.**Patient and methods:** the study took into consideration 124 pts (108 male and 16 female; mean age: 61.85 ± 9.8 years) who were enrolled in an outpatient CR programme between September 2024 and August 2025. Of these, 80 (64,5%) had experienced acute coronary syndrome, 28 (22,6%) had undergone cardiac surgery, 14 (11,3%) had heart failure, 1 (0,8%) had suffered a massive pulmonary embolism and 1 (0,8%) had obstructive peripheral artery disease. All pts underwent both the 6MWT and the ET on a cycle ergometer, with an interval of no more than two weeks between the two tests. No changes had been made to the β–blocker therapy in the meantime. The THR was defined as 50–80% of the HR reserve, as calculated using the Karvonen formula. It was therefore verified whether the HR achieved at the end of the 6MWT fell within the THR range of ± 5 beats per minute (bpm). In fact, a difference of ± 5 b.p.m. is not considered significant for training planning.
Results: in our case series 89 pts (71.77%; 95% CI: 62–79%) had a HR at the end of the 6MWT that fell within the THR range ± 5 bpm. A maximum HF at the 6MWT below the THR range was observed in 21 pts (16.93%). Only 14 pts (11.29%) had a maximum HR at 6MWT above the THR range.
Conclusions: due to its selfpaced natuta, it is possible that the 6MWT sometimes underestimates functional capacity. Less frequently the 6MWT and ET results can differ significantly because some pts find walking more suitable than cycling. However, it is likely that the 6MWT can correctly and safely guide the initial sessions of CR programme, especially if supplemented by another assessment tool, such as the Borg Scale of Perceived Exertion.

Abstract citation ID: suag058.468

CONSIDERATIONS ON A CASE OF MYOCARDIAL INFARCTION AND LERICHE SYNDROME

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We know from international registry data that approximately 5% of patients (pts) have both ischaemic heart disease (CAD) and obstructive peripheral artery disease (PAD). After adjusting for risk factors, this association was found to be associated with a doubling of mortality and a 60% increase in the risk of major adverse cardiac events (MACE). In the context of polyvascular disease, PAD therefore identifies a subgroup of pts who are at very high risk and require specific secondary prevention strategies: e.g. new antiplatelet and antithrombotic regimens, as well as more stringent lipid targets.

This paper presents a case of polyvascular disease that was diagnosed and managed in an outpatient cardiac rehabilitation setting. A 46–year–old man who was a heavy smoker (26 pack–year) and had a family history of CAD, dyslipidaemia (LDL cholesterol 132 mg/dl), and impaired glucose tolerance (HbA1c: 6.3%) was referred to us following a recent anterior STEMI. The pt underwent prompt reperfusion therapy by means of primary angioplasty and implantation of two DES at the IVA–diagonal bifurcation. Upon admission to Cardiac Rehabilitation (CR) the pt was haemodynamically stable and asymptomatic for angina, with mild impairment of left ventricular systolic function (EF 50%). However, his ability to undertake aerobic training was limited by significant muscle weakness in his lower limbs, with a walking range of 300 m. Physical examination revealed that the arterial pulses in both lower limbs were reduced. On Doppler ultrasound, there was monophasic flow along the entire arterial axis bilaterally up to the distal level. A CT angiogram was requested due to suspected aortoiliac pathology. This led to a diagnosis of Leriche syndrome. Six months after STEMI, the aortoiliac pathology was

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corrected via an endovascular procedure. The pt managed to stop smoking. Dysglycaemia was corrected through nutritional measures. The target level of LDL cholesterol of ‹40 mg/dl was achieved. The pt was advised to follow a walking training programme.

PAD does not always present with the typical symptom of intermittent claudication; sometimes it presents with non–specific symptoms in the lower limbs. It is easier to diagnose PAD in CR, where pts are supervised during physical reconditioning programmes. CAD pts must be carefully checked for PAD as clinically evident atherosclerosis in multiple arterial beds, is increasingly identified as a particularly malignant cardiovascular disease

Cardiovascular Rehabilitation Post Cardiac Surgery

Abstract citation ID: suag058.469

EVALUATION OF THE EFFECTIVENESS OF A MUSCLE STRENGTHENING PROTOCOL AS AN ADJUNCT TO REHABILITATION TRAINING IN PATIENTS WITH HEART FAILURE

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Background: Heart failure is a syndrome characterized by reduced cardiac output and/or increased ventricular filling pressures, leading to functional impairment, commonly manifested by dyspnea and reduced exercise tolerance. Traditional cardiac rehabilitation mainly relies on pharmacological therapy and aerobic training aimed at improving cardiovascular performance. However, increasing evidence highlights the role of peripheral factors, particularly skeletal muscle dysfunction and systemic inflammation, in limiting exercise capacity. Recent studies and meta–analyses suggest that combined aerobic and resistance training provides greater benefits in muscle strength and quality of life than aerobic training alone.
Objective: To evaluate the effectiveness of a muscle–strengthening protocol as a complement to traditional rehabilitation training in patients with heart failure, focusing on the impact of a multi–joint exercise such as the progressive load box squat on physical performance and quality of life.
Methods: Twenty–two clinically stable patients with chronic heart failure, of both sexes, independent in daily activities and enrolled in a rehabilitation program, were included. Assessments at admission and discharge comprised the Short Physical Performance Battery (SPPB), the 6–Minute Walking Test (6MWT), and handgrip strength. The experimental group performed aerobic exercise, calisthenics, and daily box squat training. Load progression was applied using a weighted vest from 0% to 10% of body weight over six consecutive days. Each session consisted of five sets of five repetitions, with a maximum recovery of four minutes between sets. Statistical analysis was conducted using repeated–measures ANOVA, with $p < 0.05$ considered significant.
Results: Patients undergoing the combined protocol showed significant improvements in SPPB strength–related components and 6MWT performance. A positive trend was also observed in exercise tolerance and perceived well–being.
Conclusions: The integration of multi–joint strength exercises, such as box squats, into cardiac rehabilitation programs for patients with heart failure appears effective in improving physical performance and quality of life. Further studies with larger samples and longer follow–up are needed to confirm these findings.

Abstract citation ID: suag058.470

POSTURE MATTERS: EFFECTS OF EXERCISE POSITION ON CARDIOPULMONARY EXERCISE TEST PARAMETERS AND NON–INVASIVE CARDIAC OUTPUT ASSESSMENT IN HEALTHY SUBJECTS

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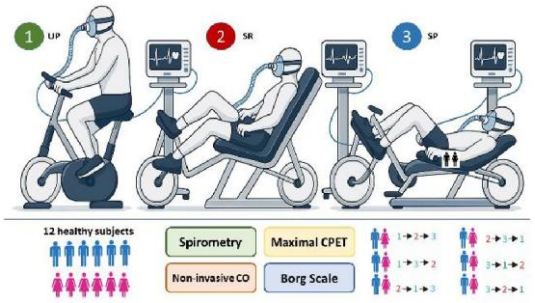
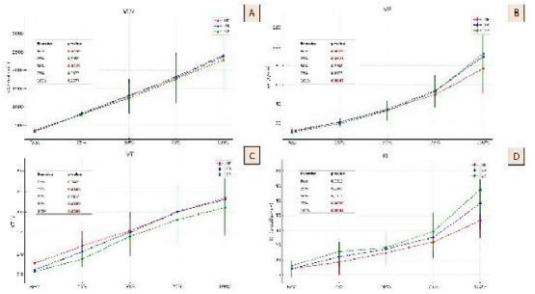
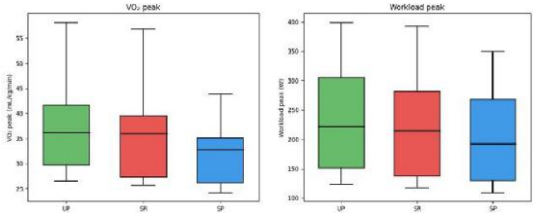
Background: Cardiopulmonary Exercise Testing (CPET) is the gold standard for the integrated assessment of cardiovascular, respiratory, and metabolic function during exercise. Physiological responses may vary according to body posture: upright (UP), supine (SP), and semi–recumbent (SR). Previous studies have reported differences in CPET parameters (VO_2peak, VE/VCO_2 slope, anaerobic threshold, O_2 pulse, peak heart rate), but the available evidence remains heterogeneous and does not allow definitive conclusions. Moreover, non–invasive hemodynamic monitoring through thoracic bioimpedance (PhysioFlow®) enables the assessment of cardiac parameters (stroke volume, cardiac output, cardiac index) during exercise. A standardized comparative analysis of UP, SP, and SR postures, integrating both respiratory and hemodynamic data, is therefore crucial to improve CPET interpretation and to support the development of shared operational protocols.
Methods: Twelve healthy subjects (30.9±4.4 y/o, 50% females) were enrolled and randomly assigned to perform three CPETs in different postures: UP, SP, and SR (Figure 1). Throughout all CPET sessions, non–invasive hemodynamic monitoring was performed using PhysioFlow®, and perceived exertion was assessed with the Borg scale. Data were collected and analyzed at baseline, anaerobic threshold, intermediate exercise steps, and peak exercise.
Results: At rest, significant reductions were observed in heart rate (HR, $p = 0.002$; p for trend = 0.007) and a decreasing trend in VO_2 and VE, mainly explained by lower tidal volume (VT) with stable respiratory rate (RR). At the anaerobic threshold, VO_2 values were reduced (p for trend = 0.017) with evidence of an earlier threshold across positions (Figure 2). At peak exercise, VO_2 remained significantly lower, while cardiac output (CO) showed no significant variation despite the decrease in watts (Figure 3). Dyspnea perception, measured by the Borg scale, significantly decreases at peak exercise in parallel with the reduction in workload (watts).
Conclusions: SR and SP positions are associated with a progressive reduction in exercise performance, while cardiac output remains stable. The functional limitation appears to be driven by a reduction in tidal volume. Further iso–watt comparisons are underway.







Abstract citation ID: suag058.471

SEQUENTIAL THERAPY WITH ORAL SUCROSOMIAL IRON ON FERRIC CARBOXYMALTOSE FOR IRON DEFICIENCY ANEMIA AFTER CARDIAC SURGERY: FINAL RESULTS

E. Venturini, S. Salvini, R. Duccio, and F. Giallauria
Uo Riabilitazione Cardiologica, Ospedale Civile Di Cecina; Uo Riabilitazione Cardiologica, Ospedale Civile Della Valdinievole; Dipartimento Di Medicina Interna, Università Federico Ii

Background: intravenous ferric carboxymaltose (FCM), may increase the risk of oxidative stress and cardiomyocyte toxicity, through direct entry into the cell, bypassing the physiological reticuloendothelial system pathway. Oral SI compared to FCM, after cardiac surgery (CS), was able to induce a similar improvement in key hematological parameters (HP) reducing ferritin (F). Aim of the study was to evaluate whether the dual therapy can mitigate the rise of F and C–reactive protein (CRP).

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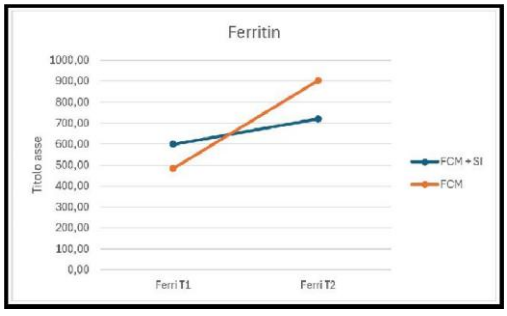
Methods: 104 consecutive patients (P) admitted to cardiac rehabilitation, after CS, with iron deficiency anemia IDA (mean age 71.3 ± 8.9 years), with normal ventricular function (EF: 54.5 ± 6.3), were all treated with FCM (group A) and a portion (group B, n = 52) also with SI. The study design included a single dose of 1000 mg of FCM at T1 (8–10 days after CS) and then a dose of 60 mg of SI daily to T2 (the day of discharge) until T3, 15 days later. Efficacy measures: changes from baseline in HP and CRP.
Results: Statistical analysis was performed with the non–parametric Mann–Whitney test (see Table for results). Hb increased significantly, with no differences between the two groups, as did transferrin saturation (TSAT) and serum iron (I). However, Hb, TSAT were significantly lower at T1 in group B with a greater increase in Δ (for Hb (g/dl) 2.59 and 2.27, for TSAT (%) 11.54 and 10.20, I (μg/dl) 37.6 vs. 34.71, respectively in the group B vs. A). Also, basal F was higher in group B. At T3 its level was lower in the B group with a statistically lower increase in ΔF (121.77±347.88 (B) vs. 420.30±521.06 (A) ng/ml, p.0005). This translated into a 20% increase in F vs. 87% in group A. Basal CRP was higher in group B, with no difference at T3, but with a significantly higher decrease in ΔCRP for dual therapy (–4.22±4.94 (B) vs. –2.44±3.14 (A), p.031). See the figure describing the time course of F.
Conclusions: FCM rapidly corrects HP, but abruptly increasing the I, can stimulate its deposition in the form of F, activating macrophages through the release of cytokines. The end result is exacerbation of the inflammation after CS. SI can mitigate the increase in F and CRP strengthening the reticuloendothelial pathway, thus reducing oxidative stress on the myocardium. Although sequential therapy has not induced final significant improvement of other HP, the lower baseline levels of IgG, Hb, and TSAT suggest the possibility that it may promote more rapid resolution of IDA.

	FCM + SI		FCM		FCM vs. FCM + SI
	Mean	SD	Mean	SD	
Hb T1	10,09	1,15	10,59	1,24	0,0364
Hb T2	11,27	1,16	11,52	1,27	ns
Hb T3	12,68	1,27	12,86	1,38	ns
Delta Hb (3-1)	2,59	1,13	2,27	1,22	ns
Iron T1	31,91	9,82	36,20	10,34	0,0307
Iron T2	69,51	18,98	70,91	24,63	ns
Transferrin T1	186,98	33,18	184,74	39,14	ns
Transferrin T2	212,62	32,14	204,66	35,54	ns
TSAT T1	12,17	3,54	13,91	3,60	0,0139
TSAT T2	23,71	6,28	24,11	7,58	ns
Ferritin T1	598,53	305,54	482,40	294,72	0,0118
Ferritin T2	720,30	298,71	902,70	549,83	ns
delta Ferritin	121,77	347,88	420,30	521,06	0,0005
CRP T1	5,74	4,78	4,25	3,17	ns
CRP T2	1,63	1,16	1,39	1,40	ns
CRP T3	0,75	0,77	1,15	1,26	ns
delta CRP (3-1)	-4,22	4,94	-2,44	3,14	0,031



	FCM + SI		FCM		FCM vs. FCM + SI
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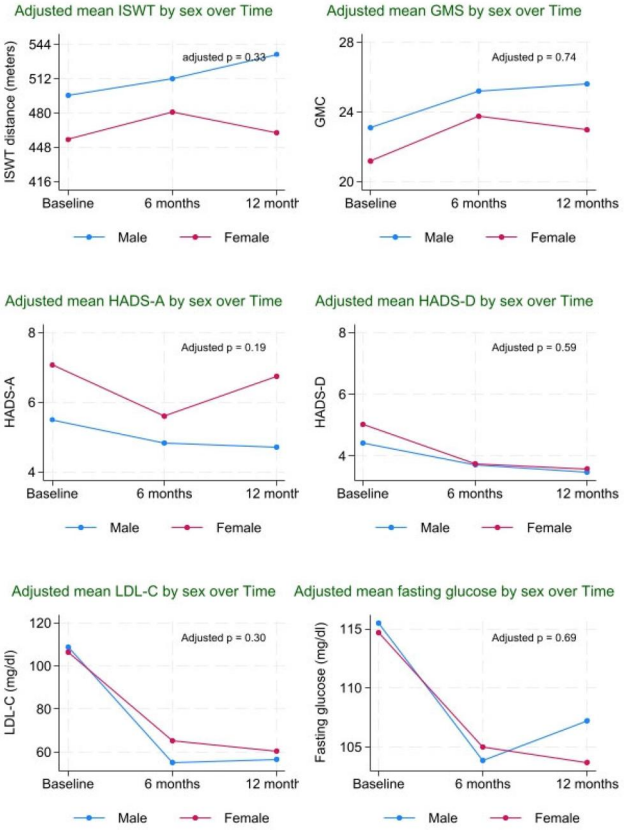
Abstract citation ID: suag058.472

SEX–SPECIFIC RESPONSES TO CARDIAC REHABILITATION: FUNCTIONAL, METABOLIC, AND PSYCHOLOGICAL OUTCOMES

H. Mahmoud, M. Mahmoud, F. Filippi, G. Toffanin, L. Menti, E. Apolloni, B. Martini, F. Bordin, G. Dalle Molle, and S. Cozzi
Cardioaction; Santorso Ospedale

Background: Sex–related differences may influence functional, metabolic, and psychological recovery during cardiac rehabilitation (CR) following cardiac intervention; however, longitudinal data simultaneously addressing these domains remain limited.
Methods: In this prospective cohort study, 179 enrolled in a structured 1–year CR program after cardiac intervention (surgical or percutaneous) were evaluated at baseline, 6 months, and 12 months. Functional capacity was assessed using the Incremental Shuttle Walk Test (ISWT). Psychological outcomes included anxiety and depression (Hospital Anxiety and Depression Scale) and positive mood (Global Mood Scale, GMS). Metabolic outcomes included LDL–cholesterol and fasting glucose. Linear mixed–effects models examined the effects of time, sex, and time × sex interaction, with patient as a random intercept, adjusting for age, diagnosis, smoking status, blood pressure, waist circumference, baseline metabolic values, and baseline ISWT.
Results: Functional capacity improved significantly at 12 months (ISWT +38.3 m vs baseline; p = 0.001), with no sex–specific differences in recovery trajectories (time × sex p = 0.33). Women exhibited lower adjusted ISWT values across follow–up (baseline 455.3 m vs 496.6 m in men). Anxiety and depression decreased significantly over time (HADS–A: –0.67 at 6 months, p = 0.021; –0.78 at 12 months, p = 0.009; HADS–D: –0.69 at 6 months, p = 0.006; –0.94 at 12 months, p ‹ 0.001), with parallel improvements in both sexes (time × sex p › 0.19). Women showed consistently higher anxiety levels throughout follow–up. Positive mood improved similarly in men and women (GMS +2.12 at 6 months and +2.52 at 12 months; both p ‹ 0.001; time × sex p = 0.74). LDL–cholesterol and fasting glucose decreased markedly during CR (all p ‹ 0.001), without sex–specific trajectories.
Conclusions: Cardiac rehabilitation is associated with significant functional, metabolic, and psychological benefits over one year. Sex differences primarily reflect baseline disparities rather than differential recovery patterns, underscoring the importance of early functional assessment to optimize individualized CR strategies.



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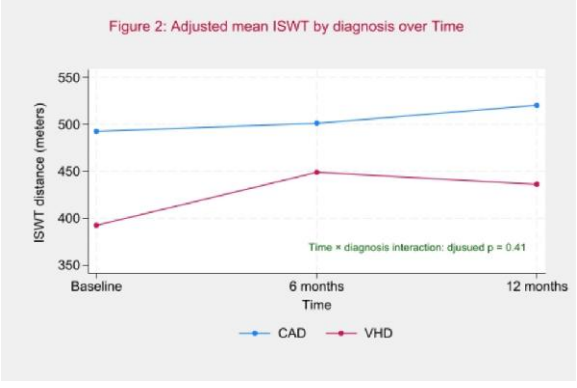
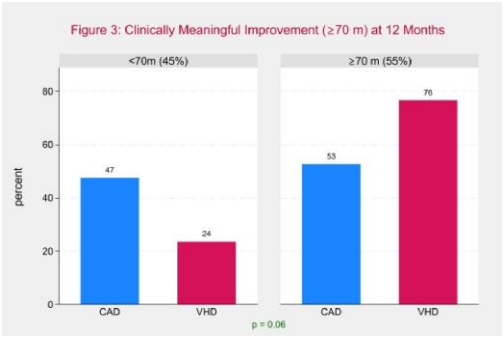
Abstract citation ID: suag058.473

LONGITUDINAL FUNCTIONAL RECOVERY DURING CARDIAC REHABILITATION AFTER CARDIAC INTERVENTION: A COMPARISON BETWEEN CORONARY AND VALVULAR HEART DISEASE

H. Mahmoud, E. Apolloni, G. Toffanin, M. Liana, F. Filippi, M. Mahmoud, F. Bordin, G. Dalle Molle, B. Martini, and S. Cozzi
Ospedale Di Thiene; Cardioaction; Ospedale Di Santorso

Background: Cardiac rehabilitation (CR) is essential for functional recovery after cardiac intervention, yet real–world data on longitudinal functional trajectories and differences between coronary artery disease (CAD) and valvular heart disease (VHD) patients are limited. This prospective observational study evaluated the evolution of functional capacity (FC) over 12 months in a mixed cohort of post–intervention patients enrolled in a structured CR program.
Methods: We included 171 consecutive patients enrolled in our one–year CR program following cardiac intervention for CAD or VHD in 2023. Functional capacity was assessed using Incremental Shuttle Walk Test (ISWT) at baseline, 6 months, and 12 months. Longitudinal changes in FC were analysed using adjusted mixed–effects linear regression models, with time as a fixed effect and patient as a random effect. Time–by–disease interaction terms were included to evaluate differences in recovery trajectories between CAD and VHD. A clinically meaningful improvement was defined as an increase in ISWT ≥70 m.
Results: At baseline, VHD patients exhibited significantly lower FC compared with CAD patients (402±202 vs 495±173 m; p=0.040). In the overall cohort, ISWT increased progressively over time, with a significant improvement at 12 months compared with baseline (+27m, 95%CI 5.0–49.8; p=0.016). After multivariable adjustment, the improvement at 12 months remained significant (+29 m, p=0.013). Although VHD patients maintained lower absolute ISWT values throughout the follow–up, no significant interaction between time and disease category was observed (p for interaction =0.35), indicating comparable recovery trajectories. At 12 months, 55% of patients achieved a clinically meaningful improvement, with a higher proportion among VHD compared with CAD patients (76% vs 53%, p = 0.06). In adjusted analysis, VHD diagnosis was independently associated with a higher likelihood of clinically meaningful improvement (β =1.38, 95%CI 0.1–2.6; p=0.032).
Conclusions: Cardiac rehabilitation is associated with a significant and sustained improvement in functional capacity up to 12 months after cardiac intervention. Despite lower baseline functional capacity, patients with VHD achieve meaningful gains comparable to those with CAD, supporting the effectiveness of comprehensive CR across different cardiac disease categories.





Abstract citation ID: suag058.474

THE CARDIOACTION PROGRAM: DEVELOPMENT, OBJECTIVES, AND PROTOCOL OF A MULTIDISCIPLINARY MODEL FOR SECONDARY CARDIOVASCULAR PREVENTION

H. Mahmoud, G. Toffanin, L. Menti, M. Mahmoud, F. Filippi, B. Martini, G. Dalle Molle, F. Bordin, E. Apolloni, and S. Cozzi
Cardioaction; Santorso Ospedale

Background and Rationale: Despite robust evidence supporting the effectiveness of cardiac rehabilitation (CR), the real–world implementation of comprehensive secondary prevention programs remains heterogeneous. The CardioAction program, active since 2005, was developed in Thiene (VI) within the Cardiology and Cardiac Rehabilitation services of ULSS 7 Pedemontana in response to the need for a structured, sustainable, and multidisciplinary model of cardiovascular prevention. Inspired by major European initiatives, the EUROASPIRE surveys and the EUROACTION project, and aligned with ESC prevention guidelines, CardioAction aims to translate evidence–based recommendations into routine clinical practice through a family–centered approach.
Program Description and Objectives: CardioAction is a hospital–based, family–centered cardiac rehabilitation and prevention program targeting patients with coronary artery disease or valvular heart disease following an event and/or intervention.
The primary objectives are:

(1) achievement and long–term maintenance of guideline–recommended lifestyle and cardiovascular risk factor targets;
(2) improvement of functional capacity;
(3) promotion of psychological well–being; and
(4) empowerment of patients and caregivers through structured education and shared responsibility in disease management.

Protocol and Structure: The program follows a standardized, stepwise pathway. Eligible patients undergo a comprehensive baseline multidisciplinary assessment including clinical evaluation, cardiovascular risk profiling, functional capacity assessment using the Incremental Shuttle Walk Test, metabolic evaluation, and psychological screening. Family members are actively involved from the initial assessment. The intervention phase integrates supervised and home–based exercise training, nutritional counseling based on Mediterranean diet principles, smoking cessation support, psychological counseling, and structured educational sessions delivered by a dedicated multidisciplinary team. Follow–up assessments are conducted at 6 and 12 months, with reinforcement of individualized goals and long–term secondary prevention strategies.
Conclusions: CardioAction represents a reproducible, real–world model of integrated cardiac rehabilitation and secondary cardiovascular prevention embedded within the Italian public healthcare system, providing a comprehensive framework to support sustainable cardiovascular risk reduction and long–term patient engagement.

Complex Clinical Scenarios

Abstract citation ID: suag058.475

AN ATYPICAL CASE OF BIVENTRICULAR TAKOTSUBO SYNDROME IN A ELDERLY MAN

D. Caraceni, I. Concetti, A. Bontempo, R. Antonicelli, and A. Dello Russo
I.R.C.C.S. Inrca; Azienda Ospedaliero Universitaria Delle Marche

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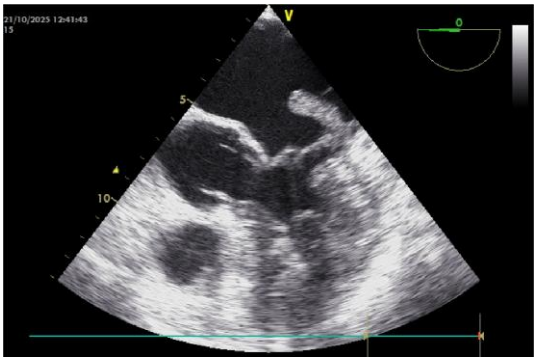
Takotsubo Syndrome (TTS) is an acute, reversible form of non–ischemic cardiomyopathy characterized by transient left ventricular systolic dysfunction that mimics acute coronary syndrome without obstructive coronary artery disease. It is typically triggered by intense emotional or physical stress, resulting in catecholamine–mediated myocardial stunning. TTS commonly presents with acute chest pain, electrocardiographic abnormalities, and modest elevation of cardiac biomarkers. While the prognosis is generally favorable, the condition can lead to significant acute complications and long–term morbidity. The involvement of male patients, especially in advanced age, remains underreported. We describe an unusual case of TTS in an 86–year–old man who presented to the Emergency Department with acute chest pain radiating to the left arm, lasting for two days. No recent emotional stressors or other physical triggers were reported, except for the sudden onset of severe chest pain itself. The patient had a history of chronic ischemic heart disease (previous PTCA with DES placement in the RCA and proximal–mid LAD). Admission ECG showed a known right bundle branch block, mild ST–segment elevation in the inferior leads (II, III, aVF), reciprocal ST–segment depression in lateral leads (I and aVL), and ST–segment depression in precordial leads V2–V3. High–sensitivity troponin was mildly elevated (43 ng/L). Coronary angiography revealed a moderate (50–60%) stenosis of the LAD proximal to the stent and mild in–stent restenosis, findings that did not fully account for the ECG changes. Transthoracic echocardiography demonstrated right ventricular apical akinesia and left ventricular apical hypokinesia, with basal hypercontractility and a markedly reduced ejection fraction, findings absent on previous examinations. On the following day, deep, diffuse T–wave inversions in all precordial and peripheral leads and marked QTc prolongation (640 ms) were recorded. Based on the combination of ECG abnormalities, echocardiographic wall motion defects, and modest troponin elevation, a diagnosis of biventricular Takotsubo syndrome was established, likely triggered by coronary vasospasm. This case illustrates an atypical presentation of Takotsubo syndrome in an elderly male patient with biventricular involvement and absence of classical emotional triggers. It underscores the importance of considering TTS in diverse populations and highlights the disease's wide clinical spectrum.

Abstract citation ID: suag058.476

WHEN LESS IS MORE: CONSERVATIVE MANAGEMENT OF LARGE MITRAL VEGETATION

F. Moschella Orsini, I. Passarelli, S. Burocchi, and A. Antinori
Inmi – I.R.C.C.S. Lazzaro Spallanzani

Introduction: The management of mitral infective endocarditis associated with large vegetations and embolic complications generally involves a combined medical and surgical approach. However, in selected cases, antibiotic therapy alone may lead to a favorable outcome. We report a case of significant regression of a mitral vegetation in a patient who did not undergo surgery due to refusal of the procedure.
Case report: A 64–year–old man with paroxysmal atrial fibrillation and multiple sclerosis presented to our hospital with bilateral pleuritis in the setting of SARS–CoV–2 infection and a concomitant genitourinary infection. Blood cultures were positive for Escherichia coli. Transthoracic echocardiography revealed a vegetation attached to the posterior mitral leaflet (10 × 13 mm) associated with severe mitral regurgitation; transesophageal echocardiography confirmed the presence of a vegetative lesion measuring 26 × 12 mm (image 1) with severe valvular regurgitation (image 2). Total–body computed tomography and brain magnetic resonance imaging documented multiple lesions consistent with cerebral, splenic, and renal septic emboli. Despite a surgical indication, the patient refused cardiac surgery and therefore continued targeted antibiotic therapy until blood culture negativization. Follow–up echocardiography after one month showed a marked reduction of the vegetation to 9 × 8 mm (image 3), with mild–to–moderate mitral regurgitation.
Discussion: Regression of the vegetation in the absence of surgery raises the hypothesis of a potential curative role of antibiotic therapy alone, possibly supported by ongoing anticoagulation. The lack of histological and microbiological confirmation of the valvular mass limits diagnostic certainty. Moreover, although the radiological findings were suggestive of septic emboli, the differential diagnosis remains broad, including sterile ischemic, neoplastic, and inflammatory conditions.
Conclusions: This case suggests that, under selected clinical conditions and with careful monitoring, a conservative approach may represent a temporary or, rarely, definitive option in patients who are not surgical candidates or who decline surgery. Nevertheless, surgical intervention remains the standard of care in the presence of large vegetations and embolic complications.



Imagine 1

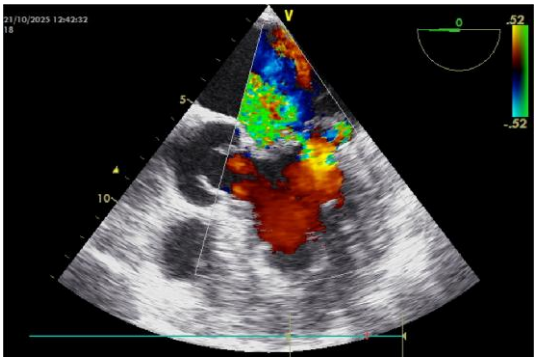


Image 2

Image 3

Abstract citation ID: suag058.477

NON–INVASIVE DIAGNOSIS OF CORONARY MICROVASCULAR DISFUNCTION: IS CORONARY FLOW RESERVE BY DIPYRIDAMOLE STRESS ECHOCARDIOGRAPHY A RELIABLE TOOL?

P. Frangi
Azienda Ospedaliera Di Perugia

Coronary Microvascular Dysfunction (CMD) is defined as the limitation of coronary flow in the absence of obstructive epicardial lesions, driven by impaired arteriolar vasodilatory capacity. Diagnosis remains a clinical challenge. Transthoracic Doppler Echocardiography (TTDE) allows for the non–invasive quantification of Coronary Flow Velocity Reserve (CFVR), providing a reliable functional assessment of the microvasculature. A 58–year–old female with type II diabetes presented for a routine exercise stress test. During peak

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effort, she developed asymptomatic non–sustained monomorphic ventricular tachycardia (NSVT) lasting 20 beats. Invasive coronary angiography (ICA) revealed no obstructive lesions, though mild vasospasm was noted in the proximal Left Anterior Descending (LAD) artery during catheterization. The arrhythmia was initially interpreted as a vasospastic equivalent, and high–dose diltiazem (540 mg/day) was started. Despite treatment, a follow–up stress test showed recurrent NSVT and angina at peak load. Cardiac Magnetic Resonance (CMR) excluded structural heart disease, showing no edema or late gadolinium enhancement (LGE). A cold pressor test during echocardiography was negative. Subsequently, a pharmacological stress echo with dipyridamole was performed. Diastolic flow velocities in the LAD were measured at baseline and during hyperemia. The CFVR index was 1.3 (normal value ›2), confirming the diagnosis of CMD. Treatment was adjusted according to the microvascular phenotype, resulting in significant symptomatic improvement.

This case highlights the innovative role of CFVR in phenotyping patients with INOCA (Ischemia with Non–Obstructive Coronary Arteries). While ICA and CMR were unremarkable, the blunted CFVR identified a specific microvascular impairment. Crucially, the presence of NSVT suggests that microvascular ischemia can induce a dispersion of myocardial refractoriness, acting as an arrhythmogenic substrate even in the absence of macroscopic fibrosis. The failure of calcium channel blockers and the negative cold pressor test further differentiated this as a structural/remodelled microvascular phenotype rather than a purely vasomotor disorder.**Conclusion:** CFVR assessment by TTDE with dipyridamole is a feasible, cost–effective, and safe technique for diagnosing CMD. It provides critical prognostic information and guides targeted therapy in patients with angina and normal coronary arteries, avoiding the risks of repeat invasive procedures.

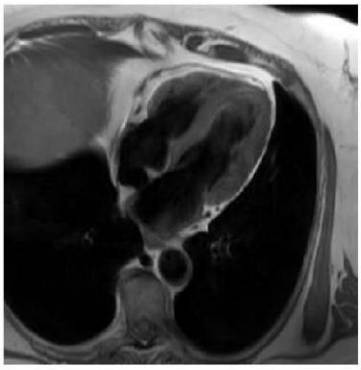

Figure 1: Cardiac Magnetic Resonance imaging showing absence of myocardial fibrosis or structural alterations.

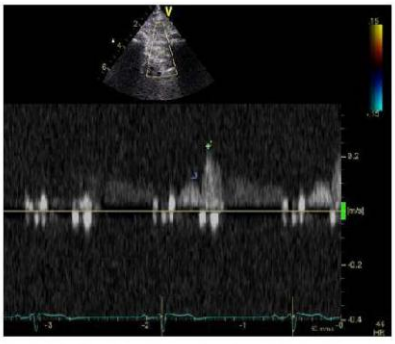

Figure 2: Transthoracic Doppler echocardiography of the left anterior descending artery during dipyridamole stress test.

Abstract citation ID: suag058.478

INCIDENCE OF STROKE AFTER SEVERE AORTIC STENOSIS TREATMENT: A NETWORK META–ANALYSIS COMPARING SEVERAL STRATEGIES OF INTERVENTION

A. Dalu, F. Giacobbe, M. Nebiolo, A. Morena, F. D'Ascenzo, F. Bruno, O. De Filippo, F. Conrotto, A. Montefusco, P. Omedè, and G. De Ferrari
Aou Citta' Della Salute E Della Scienza; Universita' Degli Studi Torino

Background: Transcatheter aortic valve implantation (TAVI) with third generation devices has become the standard of care for many patients with severe aortic stenosis. Stroke is a non–negligible complication after TAVI that may affect post–procedural and long–term outcomes, leading to disability. However, comparative data on neurological outcomes across different transcatheter heart valve (THV) models are limited.
Methods: A Network Meta Analysis was performed including all randomized controlled trials comparing third–generation THV, surgical aortic valve replacement (SAVR) and clinical surveillance, with available data on neurological outcomes. The primary endpoint was stroke; major adverse cardiovascular and cerebrovascular events (MACCE) were the secondary ones.
Results: A total of seven randomized trials encompassing 5,232 patients were analysed. The mean age of the study population was 80.2 years, with a slight prevalence (54%) of females. Hypertension (84.8%), dyslipidemia (63.1%), and coronary artery disease (47%) were the most prevalent comorbidities. Procedural success was achieved in 96.6% of cases, with transfemoral access used in 95%. The majority of patients received the Edwards Sapien bioprosthetic valve (40.2%), followed by Evolut R/PRO (20.7%), Acurate NEO (14.7%), and Portico (7.1%). A small subset of patients (8.7%) underwent SAVR, while 446 patients (8.6%) received clinical surveillance alone. No significant differences in the risk of stroke or MACCE were observed across the different THV types (stroke incidence rate ratio [IRR] 0.56, 95% CI 0.21–1.52; MACCE IRR 0.59, 95% CI 0.30–1.17). In contrast, clinical surveillance was associated with significantly worse outcomes for both endpoints, while SAVR was linked to an increased risk of MACCE and showed a non–significant trend toward higher stroke rates. At SUCRA analysis, PORTICO valve resulted the device with the highest probability of preventing strokes. A Sensitivity analysis restricted to THV comparisons confirmed the absence of between–device differences.
Conclusions: In this comprehensive network meta–analysis encompassing different strategies of severe aortic stenosis management no device demonstrated superiority in reducing the risk of stroke or MACCE. Among THV models, PORTICO was the highest ranking in terms of stroke prevention. Conversely, both conservative management and SAVR were associated with less favorable outcomes compared to TAVI.

Abstract citation ID: suag058.479

ROLE OF TRANSESOPHAGEAL ECHOCARDIOGRAPHY IN THE DETERMINATION OF DEATH DURING CDCD PROCEDURES

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Background: In Italy, death can be determined using either cardiac or neurological criteria. In selected patients in whom death cannot be declared by neurological criteria (Maastricht III; withdrawal of life-sustaining therapy), when death occurs after cardiac arrest, the law mandates continuous electrocardiographic monitoring for at least 20 minutes, recorded on paper or digital support. In our institution, during donation after circulatory death (DCD) procedures, electrocardiographic monitoring is combined with transesophageal echocardiography (TEE) to assess cardiac mechanical activity. This approach allows death determination based on mechanical criteria (absence of aortic valve opening on TEE) even in the presence of QRS complexes on ECG (electromechanical dissociation).
Objectives: To determine, in patients undergoing cDCD, the time interval between circulatory arrest documented by transesophageal echocardiography (absence of aortic valve opening) and the last QRS complex recorded on electrocardiography, in order to estimate the ischemic time saved compared with a procedure based solely on electrocardiographic asystole.
Methods: We performed a retrospective review of cDCD procedures, analyzing the timing of circulatory arrest assessed by echocardiographic and electrocardiographic criteria. Specifically, we evaluated the proportion of patients in whom death occurred due to electromechanical dissociation versus primary asystole and quantified the time elapsed between the last ventricular complex on ECG and the completion of the legally required 20-minute no-touch period, as well as the mean ischemic time saved.
Results: Among 51 patients included, 31 died due to electromechanical dissociation, while primary asystole was observed in 20 patients. The use of echocardiographic criteria to identify circulatory arrest resulted in a mean reduction of ischemic time of 3.5 minutes compared with the standard procedure based solely on electrocardiographic criteria (20 minutes of asystole).
Conclusions: The introduction of transesophageal echocardiography for cardiac death determination during cDCD procedures represents a safe, ethical, and easily implementable innovation that reduces tissue and organ ischemic time. This approach has the potential to improve graft quality and, consequently, transplant outcomes.

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ESBL–PRODUCING MORGANELLA MORGANII CIED INFECTION WITH SUSPECTED MECHANICAL MITRAL PROSTHETIC VALVE ENDOCARDITIS

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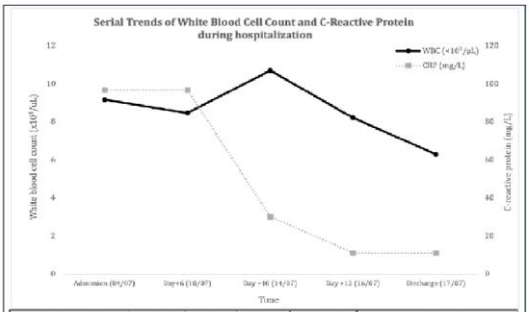
Background: Cardiac implantable electronic device (CIED) infections are most often caused by staphylococci and, once established, usually require complete hardware removal. Gram–negative pathogens are uncommon; when ESBL producers are involved, timely targeted therapy and reimplant planning become even more challenging.
Case presentation: A 75–year–old man with diabetes, stage 3 chronic kidney disease, permanent atrial fibrillation on warfarin and a mechanical mitral prosthesis underwent ICD upgrade for worsening left ventricular function. After an early wound bleed treated in the community, he developed pocket dehiscence with generator exposure. He was clinically stable and afebrile, but inflammatory markers were markedly elevated. Empiric therapy with piperacillin/tazobactam plus daptomycin was started and blood cultures were obtained. Transthoracic echocardiography showed no definite endocarditis. The entire system was extracted, including an abandoned ventricular lead. A transient acute kidney injury required dose adjustment. One blood–culture set grew coagulase–negative staphylococci and was judged likely contamination after subsequent negative samples. Culture from the proximal defibrillator lead yielded ESBL–producing Morganella morganii, susceptible to carbapenems; therapy was switched to meropenem (renal–dosed) while continuing Gram–positive coverage. Given the arrhythmic risk and the absence of persistent bacteraemia, a contralateral single–chamber ICD was reimplanted a few days after extraction. Surveillance blood cultures remained negative. On follow–up echocardiography, a new small, mobile peri–annular mass adjacent to the mechanical mitral valve raised suspicion of prosthetic valve endocarditis, but the patient declined transoesophageal echocardiography and further imaging. He completed a prolonged antibiotic course, with falling inflammatory markers, renal recovery and good wound healing at 30–90 day follow–up.
Conclusions: Even rare ESBL–producing Gram–negative organisms can underlie CIED infection. Complete extraction, rapid culture–driven escalation to a carbapenem, and careful dosing in renal dysfunction were key. In patients with prosthetic valves, a new post–extraction echocardiographic lesion should trigger an aggressive search for prosthetic valve endocarditis (TEE or alternative imaging when needed), even when cultures turn negative after antibiotics.



CLINICAL SETTING	WBC (×10³/μL)	CRP (mg/L)	PCT (ng/mL)	Creatinine (mg/dL)	Clinical notes
Admission (04/07)	9.16	96.8	0.30	1.49	Empiric antibiotic therapy started
Day +4 (08/07)	11.18	—	—	2.54	Post-extraction (07/07)
Day +5 (09/07)	9.81	—	—	2.94	AKI: antibiotic dose adjustment
Day +6 (10/07)	8.47	96.8	0.22	2.93	Blood cultures: 1/4 CoNS, TTP ~15 h
Day+7 (11/07)	8,56	—	—	2.45	Culture of the proximal segment of the defibrillator lead yielded ESBL-producing Morganella morganii. Targeted therapy was initiated.
Day +9 (13/07)	10.68	—	—	1.51	Surveillance blood cultures: negative
Day +10 (14/07)	10.7	30.2	0.10	1.68	Targeted therapy continued
Day +12 (16/07)	8.21	11.1	—	1.47	TTE: filamentous finding on the mitral prosthesis
Discharge (17/07)	6.3	11.1	0.05	1.40	Transferred to rehabilitation; follow-up

Normal reference limits: WBC (white blood cell count): 3.91 – 8.77 ×10³/μL; CRP (C-reactive protein): < 5.4 mg/L; PCT (procalcitonin): 0 – 0.05 ng/mL; Serum creatinine: 0.67 – 1.17 mg/dL

Figure 1. Serial inflammatory markers and renal function during hospitalization. *Line plot showing serial trends in white blood cell count (WBC, ×10³/μL; left y-axis) and C-reactive protein (CRP, mg/L; right y-axis) from admission (04/07) to discharge (17/07). The table summarizes key laboratory values (WBC, CRP, procalcitonin [PCT], and serum creatinine) and the main clinical events: initiation of empiric antibiotics at admission, device extraction (07/07) followed by acute kidney injury (AKI) with antibiotic dose adjustment, a blood culture set positive for CoNS (TTP ~15 h), identification of ESBL-producing Morganella morganii from the proximal segment of the defibrillator lead with initiation of targeted therapy, negative surveillance blood cultures, and TTE showing a filamentous finding on the mitral prosthesis. Normal reference limits are reported at the bottom of the figure.*

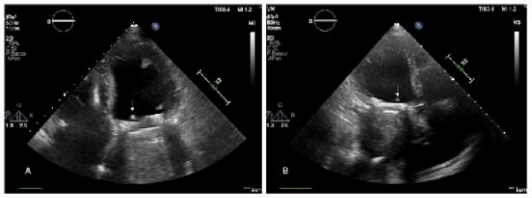


Figure 2. *Transthoracic echocardiography: apical four-chamber (A) and apical three-chamber (B) views show a rob-centinearic, oval, iso-to-hyperechoic peri-annular mass, exhibiting intrinsic mobility independent of the cardiac cycle. In the context of an infectious clinical and laboratory profile, this finding is highly suggestive of endocarditis.*

Figure 3. Chest radiograph (anteroposterior (AP) projection, supine patient). *(A) Pre-extraction film: ICD generator in the left infraclavicular region with endocardial leads projected into the right ventricle, evidence of prior sternotomy and a valvular prosthesis. Cardiomegaly is present, No significant acute parenchymal opacities and no obvious pleural effusion. (B) Post-extraction film: removal of the previous left-sided system and right-sided ICD reimplantation with a lead positioned in the right ventricle. Signs of pulmonary vascular congestion with faint bilateral basal opacities, without evidence of significant pleural effusion.*

Acute Heart Failure 2

Abstract citation ID: suag058.481

AUTOIMMUNITY AND MICROVASCULAR DISEASE: A DOUBLE HIT PHENOMENON

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A 63–year–old woman was admitted to Padova University Hospital for STEMI after seeking medical help for typical chest pain. The initial EKG showed a left bundle branch block with significant ST–segment elevation from V2 to V4. After a short pain to balloon time (‹ 2 hours), she underwent coronary angiography, which showed critical thrombotic stenosis (85%, TIMI 1) of the proximal LAD (Figure 1), treated with double DES; transient slow–flow was treated with adenosine and verapamil; the final TIMI flow was 2. The pre–discharge LVEF was 37% (Figure 2).

Eight days after the acute event, cardiac MRI revealed severely reduced LVEF (33%) due to dyskinesia of the apex and akinesia of the whole LAD territory. TIRM sequences showed transmural edema in the same areas; corresponding transmural LGE (ischemic pattern) and dark zone referring to microvascular haemorrhagic damage was noted (Figure 3).

Given the extent and severity of myocardial damage despite the short pain–to–balloon time, microvascular obstruction was hypothesized. Due to enrolment in a research project, functional autoantibodies (AAs) targeting angiotensin II receptor type 1 (AT1R) and endothelin–1 receptor type A (ETAR) were measured, showing significantly high levels (ETAR–AAs 11,12 U/mL and AT1R–AAs 10,87 U/mL, with the cutoff for seropositivity being ›10 U/mL).

Due to multiple episodes of decompensated heart failure, CRT–D was implanted, and double mitral TEER was performed with limited efficacy. Right heart catheterization confirmed combined pre– and post–capillary pulmonary hypertension and severe reduction of cardiac index (1,75 l/min/m2). After a multidisciplinary discussion, the transplantation process was initiated. HLA panel exhibited high immunogenicity, and the calculated Panel Reactive Antibodies (cPRA) was 92%, reducing the chances of finding a suitable organ. Desensitization therapy with plasmapheresis and rituximab was initiated.

In July 2025, she underwent orthotopic heart transplantation. Two endomyocardial biopsies of the graft showed the absence of rejection, confirming the effectiveness of the anti–rejection therapy implemented before and after transplantation.

This case shows how an autoimmune profile (including high AT1R–AAs and ETAR–AAs levels) can affect prognosis and transplantation after an acute coronary syndrome. Nonetheless, immunomodulation can help reduce the risk of graft rejection.

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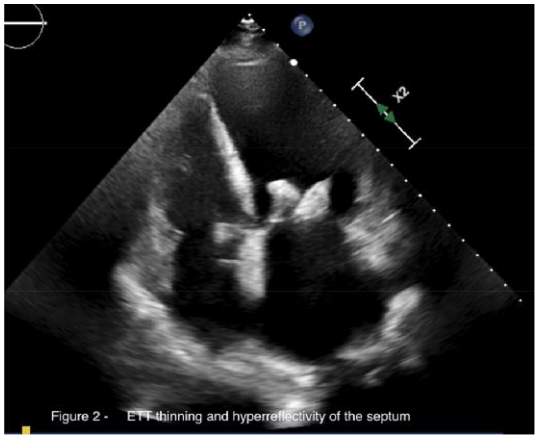
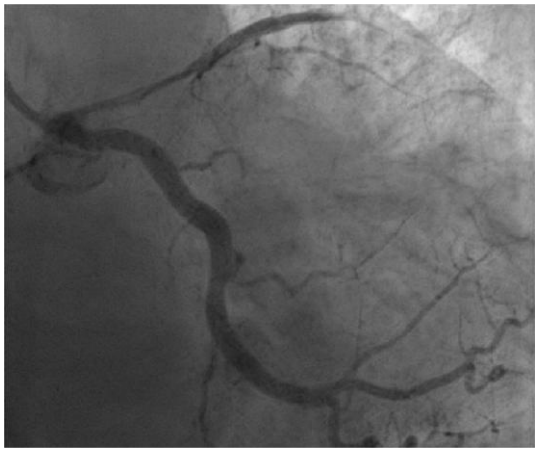


Figure 2 - ETT thinning and hyperreflectivity of the septum



Abstract citation ID: suag058.482

A REVERSIBLE CATASTROPHE: INVERSE TAKOTSUBO SYNDROME PRESENTING WITH CARDIAC ARREST AND CARDIOGENIC SHOCK

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Background: Inverse Takotsubo syndrome is a rare variant of stress–induced cardiomyopathy, characterized by transient basal and mid–ventricular dysfunction with preserved or hyperkinetic apical contraction. Although generally associated with a favorable prognosis, it can occasionally present with complications, including malignant arrhythmias and cardiogenic shock.
Case presentation: We report the case of a 49–year–old woman with no previous clinical history and no cardiovascular risk factors developing sudden cardiac arrest after hysteroscopic endometrial polypectomy. Diffuse ST–segment changes, metabolic acidosis with hyperlactatemia (9 mmol/L) and left ventricular systolic dysfunction without pathognomonic regional dyskinesia was shown at initial evaluation. Urgent coronary angiography revealed angiographically normal coronary arteries and left ventriculography demonstrated akinesia of the mid–basal segments with preserved apical contractility, consistent with inverse Takotsubo syndrome. Despite normal arterial pressure, the patient rapidly deteriorated, developing pulmonary edema, severe left ventricular dysfunction, functional mitral regurgitation, persistent hyperlactatemia, and low cardiac output, fulfilling criteria for normotensive cardiogenic shock. An Impella CP for percutaneous mechanical circulatory support was promptly implanted through an echo–guided puncture of the common right femoral artery. Depth from the aortic annulus with the inflow part was about 40 mm in diastole for the apical hyperkinesia, allowing effective left ventricular unloading. After device implantation, metabolic parameters, end–organ perfusion, and respiratory status improved. Over the following five days, progressive recovery of left ventricular function occurred, enabling stepwise weaning and removal of mechanical support. Hemostasis was achieved with two prostyles, which were pre–implanted in the first procedure.
Conclusions: This case highlights that inverse Takotsubo syndrome may present with cardiac arrest and fulminant cardiogenic shock, even in young patients without comorbidities. Implanting percutaneous mechanical circulatory support in proper position with hyperkinetic apex can be challenging as suction alarm can occur; early recognition and timely use of MCS can be lifesaving.

Bibliography: Kunduvayil A, Elangovan A, Karanth S, Shetty R. Non–invasive investigation of inverse takotsubo cardiomyopathy in a young woman. Br J Hosp Med (Lond). 2015 Sep 2;76(9):544–5.

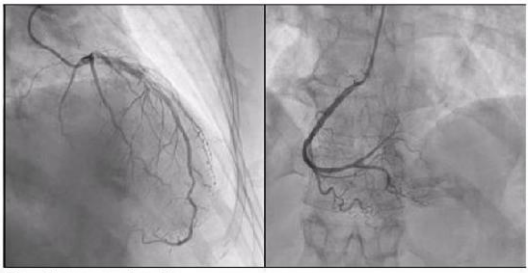
Figure 1: coronary angiography

Figure 2: left ventriculography and MCS with SG

Abstract citation ID: suag058.483

USE OF THE VASOACTIVE INOTROPIC SCORE FOR RISK STRATIFICATION IN RIGHT VENTRICULAR DYSFUNCTION AFTER CARDIAC SURGERY

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Policlinico Campus Bio–Medico

Background and Goal of Study: Right ventricular dysfunction (RVD) is a major postoperative complication after cardiac surgery and is associated with significant morbidity and mortality. Inotropic support is essential for maintaining hemodynamic stability, yet no consensus exists on the optimal agent or intensity of support. The Vasoactive Inotropic Score (VIS) provides an objective measure of circulatory support, but validation in cardiac surgery remains limited. This study evaluated the association between postoperative VIS and intensive care outcomes in patients with RVD and explored the impact of individual inotropic agents.
Materials and Methods: We conducted a retrospective single–centre cohort study including 153 cardiac surgery patients admitted to the Cardiothoracic ICU of Policlinico Universitario Campus Bio–Medico, Rome (January 2021–September 2023). Inclusion criteria were echocardiographically confirmed postoperative RVD and need for inotropic or vasopressor support. Clinical, echocardiographic and pharmacologic data were collected, and VIS 2020 was calculated. Outcomes included mortality, acute kidney injury (AKI), need for

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non–invasive ventilation (NIV), reintubation and ICU length of stay (LOS). Multivariable logistic and linear regression analyses were performed (p ‹ 0.05).
Results and Discussion: Mean age was 70 ± 10 years, with 75% male. VIS was independently associated with NIV (OR 1.04; p = 0.008), reintubation (OR 1.04; p = 0.013), AKI (p = 0.020) and prolonged ICU LOS (β = 0.030; p ‹ 0.001). Each 1–point increase in VIS corresponded to an estimated 3% increase in LOS (Figure 1). These associations remained significant after adjustment for EuroSCORE II (Figure 2) and echocardiographic parameters. In inotrope–specific analyses, dobutamine was associated with reduced risk of NIV (OR 0.25; p = 0.006) and AKI (OR 0.26; p = 0.010).
Conclusions: VIS is a marker of clinical severity and is associated with adverse outcomes in postoperative RVD. Higher VIS values identify patients at increased risk of complications and prolonged ICU stay. Dobutamine use may be linked to favourable renal and respiratory outcomes. At equal EuroSCORE, each 1–point increase in VIS independently prolongs ICU stay by about 3%, indicating that postoperative inotropic burden adds to LOS beyond preoperative surgical risk.VIS may support risk stratification and therapeutic decision–making in postoperative cardiac surgery.

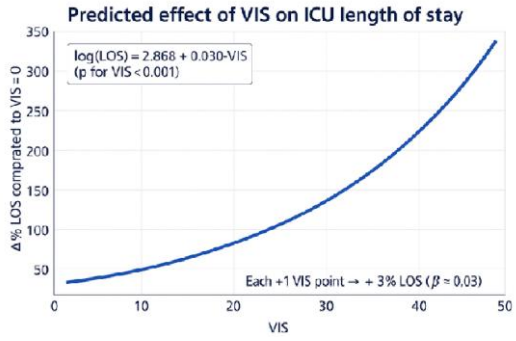

Figure 1

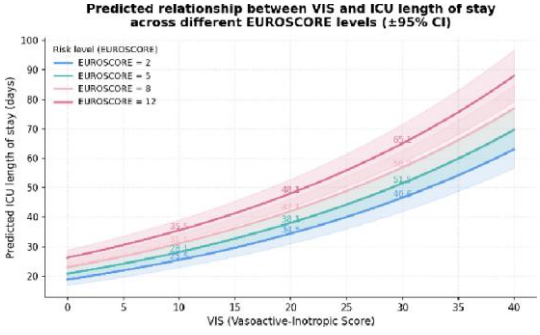

Figure 2

Abstract citation ID: suag058.484

QUALITY OF CARE IN PATIENTS HOSPITALIZED FOR ACUTE HEART FAILURE: RESULTS FROM THE FIRST TWO YEARS OF THE "QUALITY IN CARDIOLOGY" (QIC) PROJECT

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Background: Assessing quality of care is the first step toward improving the management of patients with acute heart failure (AHF). The European Society of Cardiology (ESC) has recently defined a set of quality indicators (QIs) for AHF care provided during hospitalization and after discharge.
Aim: The "Quality in Cardiology" (QiC) Project aimed to evaluate whether systematic measurement of all ESC QIs is feasible in the cardiology department of a secondary–level hospital and whether it is useful for improving patient care.
Methods: The QiC Project is a prospective, 3–year observational quality improvement study conducted in the Intensive Cardiac Care Unit (ICCU) and Cardiology ward of Pio XI Hospital, Desio. For each admission for AHF, physicians and nurses completed standardized data collection forms including all ESC individual QIs (2 QIs on structural framework, 6 on patient assessment, 5 on initial treatment, and 1 on health–related quality of life). Six–monthly audit meetings involving medical and nursing staff were held based on QI analyses. For each QI, the rate of attainment was evaluated during the first, second, third, and fourth semesters of the project among admissions ending with discharge to home or to a rehabilitation centre. Temporal trends were assessed using the chi–square test for trend, with p ‹ 0.05 considered statistically significant.
Results: From May 1, 2023, to April 30, 2025, a total of 303 admissions for AHF occurred in the ICCU and Cardiology ward. One patient denied consent, 9 died during hospitalization, 31 had to be transferred to another hospital and 262 were discharged to home or to a rehabilitation centre. Table 1 shows the percentage of QIs achieved in these admissions for each semester. Of the 14 QIs, seven were achieved in more than 90% of admissions across all semesters. Two QIs showed a significant improvement over time: completion of all recommended laboratory tests during hospitalization and prescription of SGLT2 inhibitors at discharge in patients with reduced ventricular function. No QIs showed a worsening trend over time; however, during the fourth semester, educational sessions for patients and their caregivers were discontinued due to low participation (see 2nd QI).
Conclusions: Quality of care for AHF can be systematically measured in patients admitted to a cardiology department. Periodic audit activities enable identification of critical issues and contribute to improving the quality of care over time.

Abstract citation ID: suag058.485

ROMA HF SCORE: A FIVE–VARIABLE BEDSIDE SCORE FOR RISK STRATIFICATION IN ACUTE HEART FAILURE

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Background: Risk stratification in patients with acute heart failure(AHF) remains challenging. Many available prognostic models rely on complex variables or are poorly applicable at the bedside and do not adequately capture the pathophysiological role of systemic congestion and metabolic impairment, which are key drivers of adverse outcomes.
Methods: A pragmatic bedside risk model was developed (ROMA HF: Risk Of Major Adverse events in Heart Failure) (Figure 1) integrating five readily available variables reflecting congestion and metabolism: systolic pulmonary arterial pressure, mean E/e' ratio, left ventricular outflow tract velocity–time integral, blood lactate, and venous excess ultrasound score(VEXUS). The model was tested in 62 consecutive patients hospitalized for AHF. Logistic regression was used to estimate individual risk for a composite endpoint of all–cause mortality or heart failure rehospitalization. Patients were stratified into tertiles of predicted risk. Model discrimination was assessed using area under the ROC curve with bootstrap validation. Survival analyses were performed using Kaplan–Meier curves. Variable relevance was explored using permutation importance and penalized regression models.
Results: During follow–up, 41/62 (66%) patients experienced the composite endpoint (19/62 deaths, 31%; 22/62 HF rehospitalizations, 35%). Event rates increased across risk tertiles: 19% (low), 30% (intermediate), and 67% (high). Discrimination was good for the composite endpoint (AUC 0.78), and remained consistent for mortality (AUC 0.75) and rehospitalization (AUC 0.72). In permutation importance (Figure 2), the strongest contributors were VExUS (0.095 ± 0.054) and lactate (0.025 ± 0.016), followed by PAPs (0.009 ± 0.009). Penalized models confirmed congestion–related dominance: LASSO retained VExUS (β=0.45) and E/e' mean (β=0.11), while Elastic Net emphasized VExUS (β=0.51) and E/e' mean (β=0.20).
Conclusions: A simple bedside model integrating congestion and metabolic parameters allows effective prognostic stratification in acute heart failure. This approach may support clinical decision–making and prioritization of care pathways in high–risk patients.

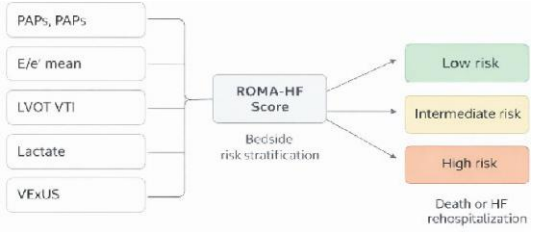

Figure 1

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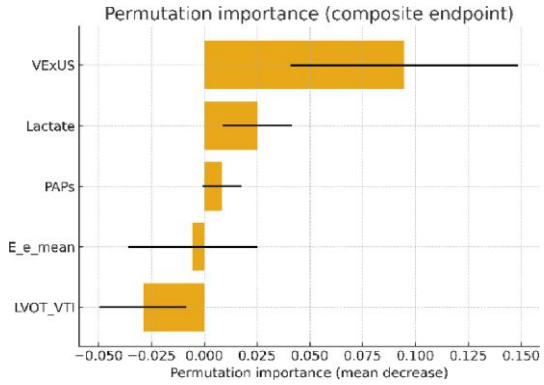

Figure 2

Advanced Heart Failure

Abstract citation ID: suag058.486

THALIDOMIDE FOR REFRACTORY ANGIODYSPLASIA–RELATED GASTROINTESTINAL BLEEDING IN A CONTINUOUS–FLOW LVAD RECIPIENT: A CASE REPORT

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Background: Gastrointestinal (GI) bleeding from intestinal angiodysplasia is a frequent complication of continuous–flow left ventricular assist device (CF–LVAD) support (≈25–30%). About 40% of patients develop recurrences, requiring rehospitalization and an elevated transfusion burden. Supraphysiologic shear stress and reduced pulsatility promote inflammatory/angiogenic mediators (TNF–α, VEGF), leading to maladaptive neovascularization and acquired von Willebrand factor dysfunction due to shear–related unfolding and ADAMTS13–mediated cleavage. After an appropriate diagnostic work–up, first–line management includes endoscopic investigations with direct hemostasis of bleeding lesions, reduction of antiplatelet therapy and INR targets, administration of vWF concentrates, and pharmacologic strategies such as octreotide, desmopressin, thalidomide (anti–TNF–α and anti–VEGF), and bevacizumab. In literature, ~270 angiodysplasia cases treated with thalidomide have been reported, including only 24 LVAD recipients (17 with ›12–month follow–up). We report a refractory CF–LVAD case treated with thalidomide.
Case: A 67–year–old man with permanent atrial fibrillation and idiopathic thrombocytopenia, underwent Jarvik 2000 implantation in 2016 as bridge to transplant for non–ischemic dilated cardiomyopathy with pulmonary hypertension. From 2024 he developed admissions every 3–4 months for severe anemia. Repeated upper endoscopy and colonoscopy (including serial polypectomies) were frequently non–diagnostic as no definite bleeding source was identified; at the last admission both were negative, whereas capsule endoscopy showed small–bowel telangiectasias with intraluminal blood. Despite repeated endoscopic work–up, lowering of the INR target and octreotide, he continued to relapse and experienced complications related to frequent hospitalizations, including septic shock. Given the lack of further options, thalidomide was started at 50 mg/day and up–titrated to 100 mg/day without adverse effects. Given stable hemoglobin values (~10 g/dL), the patient was discharged home on August 2025; close follow–up (weekly, then every 2 weeks) showed a rise to 11.6 g/dL on December, with no need for dose reduction or discontinuation.
Conclusion: Thalidomide may be an effective and apparently safe option for refractory angiodysplasia–related GI bleeding in CF–LVAD recipients with careful counseling and monitoring; however, its use remains off–label due to the lack of controlled studies.

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A CASE OF HEMODYNAMIC PULMONARY HYPERTENSION

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A 44–year–old man presented to the emergency department with progressive dyspnea, peripheral edema, and fever lasting several days. He had no cardiovascular risk factors and had recently returned from Thailand. Initially admitted with suspected pneumonia, he rapidly developed hypotension and anuric acute kidney injury and was transferred to the intensive care unit with mixed shock. Aggressive volume resuscitation and catecholaminergic support with adrenaline (up to 0.1 µg/kg/min) were initiated.

Cardiac catheterization revealed pulmonary hypertension (CI 5,5 L/m PAPs/m/d 65/45/37 mmHg, PAWP 35 mmHg, PVC 20 mmHg, PVR 2 Wood units), leading to the initiation of sildenafil. The patient was subsequently transferred to our Cardiac Intensive Care Unit (CICU) for further evaluation. Transthoracic echocardiography showed a severely dilated and hypokinetic right ventricle with diastolic left ventricular compression and mildly reduced left ventricular systolic function (LVEF 45%) with diffuse hypokinesia. Marked systemic venous congestion was evident, including systolic flow reversal in the hepatic veins, portal vein pulsatility ›30%, and purely diastolic renal venous flow.

Repeat right heart catheterization demonstrated a high–output state with pulmonary hypertension and normal pulmonary vascular resistance (CI 6 L/min/m²; PAP 64/37/25 mmHg; PAWP 13 mmHg; mean right atrial pressure 21 mmHg; PVR 2 Wood units). Infectious etiologies, intra– and extracardiac shunts, and thyroid dysfunction were excluded. Thiamine supplementation was initiated due to suspicion of beriberi. Despite the absence of a definitive diagnosis, a physiology– and hemodynamics–guided strategy was adopted: adrenaline was discontinued, and aggressive decongestive therapy was implemented. After achieving a cumulative negative fluid balance greater than 10 L, normalization of venous congestion indices, pulmonary pressures, and right ventricular function was observed. Cardiac magnetic resonance imaging (Figure 1) showed non–ischemic late gadolinium enhancement in the basal inferior and inferolateral segments, consistent with inflammatory myocardial injury.**Conclusion:** this case underlines the importance of a hemodynamic– and congestion–focused approach in severe cardiac dysfunction. Even in the absence of a clear etiology, targeted decongestion led to reversal of myocardial and renal dysfunction, highlighting the central role of venous congestion in acute heart failure syndromes.

Figure 1

Abstract citation ID: suag058.488

CARDIOPULMONARY TESTING AS A VALUABLE TOOL FOR DIAGNOSIS, PROGNOSIS, AND TREATMENT GUIDANCE

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Cardio–pulmonary exercise testing (CPET) is a well–known method but still relatively little used by cardiologists, both quantitatively and qualitatively. In fact, this application has been mistakenly limited to the assessment of heart failure, usually by observing only the numerical parameter of "peak oxygen consumption (PeakVO2)". The latter is used to quantify functional limitation in patients with chronic heart failure. Numerous parameters derived from cardiopulmonary exercise testing, if well collected and interpreted, prove extremely useful in the hands of the clinician. In particular, CPET is useful for revealing the origin (cardiac–pulmonary–muscular) of any functional limitation or revealing the origin of symptoms such as dyspnea and respiratory disorders and pulmonary hypertension (DIAGNOSTIC role).

This is associated with valuable assistance in the prognostic stratification of the patient (PROGNOSTIC role), in particular:

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(1) a low peakVO2 value is associated with a worse prognosis.
(2) Evidence of a peakVO2 value below 12 ml/kg/min identifies the patient as a possible candidate for transplantation.
(3) Evidence of ventilatory inefficiency assessed by calculating the ventilation/CO2 production ratio slope (Ve/VCO2 slope; the normal value is generally less than 34) stratifies the prognosis (the higher the Ve/VCO2 slope value, the worse the prognosis).
(4) The presence of oscillatory (or periodic) breathing during the active phase of exercise is an independent negative prognostic indicator.
(5) The identification of the anaerobic threshold, the isocapnic buffering phase, and the respiratory compensation point (different phases of exercise) are essential in the assessment and correct prescription of physical exercise.
(6) The peakVO2 and Ve/VCO2 slope parameters derived from CPET are included in the calculation of the risk of death or need for heart transplantation at two years in the recognized and appreciated MECKI score. (Figure 1)

Conclusions: The use of CPET is not particularly widespread in clinical practice, and the correct and apparently complex interpretation of the data and parameters collected often causes uncertainty and difficulty. Despite this, CPET remains a test that produces an accurate "snapshot" of all the components that determine the proper functioning of the body, and the identification of any abnormalities that cause reduced functional capacity is of great help to clinicians in terms of diagnosis, prognosis and treatment.

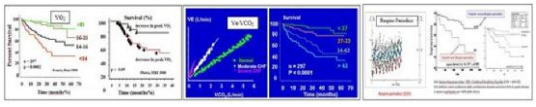

Figure 1

Abstract citation ID: suag058.489

BEYOND EJECTION FRACTION: CPET WITH NON–INVASIVE STROKE VOLUME AND HEART RATE RESERVE PREDICTS EXERCISE CAPACITY IN HEART FAILURE

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Background: Cardiopulmonary exercise testing (CPET) is the gold standard for the integrated assessment of cardiovascular, respiratory, and metabolic responses during exercise. In patients with heart failure (HF), peak oxygen uptake (pVO_2) and the VE/VCO_2 slope are well–established prognostic markers. Beyond these, dynamic parameters such as the variation of heart rate (ΔHR) and the increase in stroke volume (ΔSV) that reflect chronotropic and contractile reserve, respectively, may be more sensitive than left ventricular ejection fraction (LVEF) in predicting functional capacity and outcomes.
Methods: We prospectively analyzed 174 HF patients who underwent CPET with non–invasive cardiac output monitoring (Physioflow) and rest echocardiography between Nov 2024 and Feb 2025 at Centro Cardiologico Monzino, Milan. Continuous variables are expressed as mean ± standard deviation. Correlations between parameters assessed using Pearson's coefficient; ΔSV and ΔHR were stratified into tertiles and compared using one–way ANOVA.
Results: A total of 174 patients were analyzed (mean age 66 years, LVEF 40%). During exercise, both HR and SV increased, with a mean Δ of 46 bpm and 25 ml, respectively. ΔHR showed a strong correlation with pVO_2 (r = 0.53) as well as ΔSV (r = 0.38). Differently, LVEF showed only modest associations with pVO2 (r= 0.22). pVO_2 correlated strongly with oxygen pulse (r = 0.78) and inversely with VE/VCO_2 slope (r = –0.56). Tertile analysis identified functional cut–offs for ΔHR (≤35, 35–56, ›56 bpm) and ΔSV (≤20, 20–29, ›29 ml), which stratified aerobic capacity (p ‹ 0.001).
Conclusion: Exercise performance in HF patients depends primarily on the dynamic increase in HR and SV, rather than resting LVEF. ΔHR and ΔSV emerge as key predictors of aerobic capacity and potential prognostic markers. CPET remains an indispensable tool for functional evaluation and risk stratification, providing insights not accessible through echocardiography alone.

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SAFE RENAL FUNCTION IN LONG TERM HEART TRANSPLANTED PATIENTS (SAREFU)

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SA.RE.FU is a single–centre, prospective, randomized clinical trial which enrolled adult heart transplant patients in Hospital Papa Giovanni XXIII, Bergamo. The study began in 2007, with the aim to verify whether the reduction of cyclosporine dosages associated with everolimus administration may improve renal function as compared to patients maintained on standard immunosuppressive therapy. Heart transplant patients with more than 1 year of follow–up, with creatinine ‹ 3.5 mg/dl and eGFR › 20 ml/min (calculated with Cockcroft–Gault formula) and without prior history of acute rejection within the last 3 months were enrolled and randomized to standard therapy vs everolimus combined with cyslosporine, whose dosage was reduced of 50% after introduction of everolimus. The primary endpoint was renal function, estimated with creatinine, creatinine clearance (MDRD and Cockcroft–Gault) and urinary excretion of protein, albumin and alpha–1–microglobulin. Secondary endpoints were all cause mortality, infections, incidence of acute myocardial rejection, heart failure, chronic rejection and MACE. 213 patients were enrolled, 106 in the control group and 107 in the intervention group. Mean age of patients was 52.6 years, with a mean time from heart transplant of 8.8 years; female were 45 (21%), 110 patients (52%) had dilated cardiomyopathy and 51 had ischemic cardiomyopathy (24%). At baseline mean creatinine was 1.61mg/dl, with a mean eGFR 61.8ml/min/1.73m2 and a mean uACR 220mg/g; 116 patients (54%) had chronic kidney disease of at least stage III (based on eGFR values). At baseline, 47 patients (23%) had cardiac allograft vasculopathy (CAV). After 2 years of follow–up, the mean difference of eGFR between the two groups was 4.4 ml/min/1.73m2 and 6.3 ml/min/1.73m2 (respectively, with Cockcroft–Gault and MDRD formula) with better values in the everolimus group, in which, however, uACR was higher with a mean difference of 70.4mg/gr compared to stardard therapy. In the standard therapy group, mean daily dosage of cyclosporine was 2.54mg/kg with C0–levels of 171 ng/mL compared to mean daily dosage of 1.04mg/kg with C0–levels of 60ng/mL in the everolimus group (respectively, 40% and 35% of standard therapy). The mean dose of everolimus was 1.3mg/day with a mean plasmatic levels of 7.8 ng/mL. Only 15 patients (7%) were on steroid therapy, 35 (16%) had mofetil mycophenolate and 53 (25%) were on azathioprine.

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REVISITING THE 12 ML/KG/MIN THRESHOLD: CONTEMPORARY DATA CHALLENGE HEART TRANSPLANT CRITERIA

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Background: Current guidelines recommend referring ambulatory heart failure (HF) patients for heart transplantation (HTX) when peak oxygen uptake (peak VO_2) is ‹12 mL/kg/min. This threshold, however, is based on decades–old data. As HF management has significantly improved, the relevance of this criterion in today's clinical practice is uncertain.
Methods: We retrospectively selected 1,218 ambulatory patients with HF and reduced or improved ejection fraction (HFrEF or HFimpEF) from the MECKI score registry, with peak VO_2 ‹12 mL/kg/min. Patients were enrolled between 2010 and 2022. Clinical and cardiopulmonary exercise testing (CPET) variables were recorded, with a primary composite outcome of death, LVAD implantation, or HTX. Kaplan–Meier survival curves were compared to contemporary data from heart transplant recipients in the ISHLT registry. We stratified patients by VE/VCO_2 slope (›34 vs. ≤34) and presence/absence of periodic breathing (PB). Sensitivity analyses included adjustment for % predicted peak VO_2 and subgroup evaluation in non–maximal CPET (RER ‹1.05).
Results: Over a median follow–up of 2.3 years, 400 events occurred. Fig. 1A compares the survival of the study population with the survival of HTX recipients. Patients with VE/VCO_2 ≤34 (n=446) had significantly lower 10–year event rates than those with VE/VCO_2 ›34 (26.2% vs. 37.2%, p‹0.001). Survival in the VE/VCO_2 ≤34 group exceeded that of HTX recipients until year 4 (Fig. 1B). Similarly, absence of PB (n=884) was associated with improved outcomes (29.4% vs. 42.7%, p‹0.001), with survival crossing HTX at year 3. Combining VE/VCO_2 and PB defined four distinct prognostic groups. Patients with both VE/VCO_2 ≤34 and no PB had the most favorable outcomes (10–year event rate 23.3%), surpassing HTX recipients at year 5 (Fig. 1C). Prognostic differences persisted after adjustment for % predicted peak VO_2 and were evident even in patients with RER ‹1.05.
Conclusions: In a contemporary cohort, a peak VO_2 ‹12 mL/kg/min alone no longer identifies ambulatory HF patients with a high enough short–term mortality to justify transplant listing. Incorporating VE/VCO_2 slope and PB into CPET interpretation provides significantly improved risk stratification. These findings suggest that current HTX referral criteria might need revision to avoid

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premature listing of low–risk patients and target optimize organ allocation to patients with very poor prognosis.

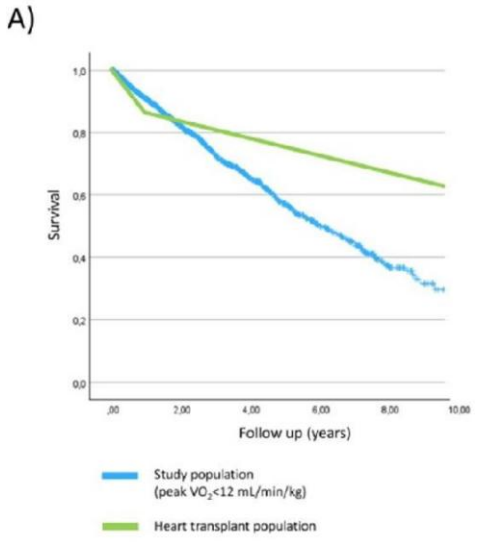

Figure 1 A

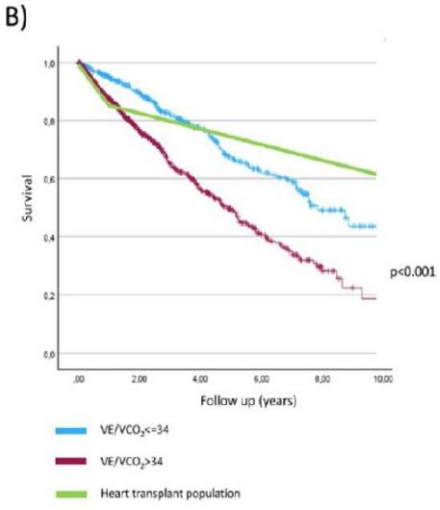

Figure 1B

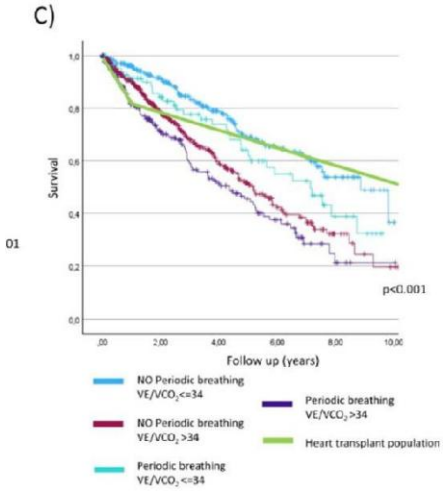

Figure 1C

Abstract citation ID: suag058.492

LEVOSIMENDAN IN PATIENTS WITH ADVANCED RENAL DYSFUNCTION: CLINICAL OUTCOMES AND TOLERABILITY IN A REAL–WORLD COHORT

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Ospedale Alessandro Manzoni; Ospedale San Leopoldo Mandic

Acute heart failure and cardiogenic shock are often associated with renal dysfunction. While Levosimendan can have beneficial hemodynamic effects, its off–label use in patients with eGFR‹30 mL/min requires caution due to limited evidence. This study aimed to evaluate clinical outcomes and treatment tolerability of levosimendan according to renal function.**Methods:** We conducted a retrospective observational study on patients treated with Levosimendan for acute heart failure or cardiogenic shock at Manzoni Hospital from July 2014 to July 2025. We divided patients into two groups based on renal function: eGFR ‹30 and ≥30 mL/min. Levosimendan was administered as a continuous infusion at 0.05–0.1 µg/kg/min over 24 hours, with the dose (12.5 mg or 6.25 mg) determined by the physician's judgment. Endpoints included in–hospital and 30–day mortality, hospital length of stay, renal function changes, need for renal replacement therapy, treatment tolerability, heart failure exacerbation, and inotropic support. A subanalysis compared outcomes in patients with eGFR ‹30 mL/min between the two dosages. Non–parametric and chi–square/Fisher's exact tests were used (p ‹0.05).
Results: Baseline characteristics based on renal function are shown in Table 1. Clinical outcomes by renal function are summarised in Table 2. Patients with eGFR ‹30 mL/min had higher in–hospital mortality, 30–day mortality and highterneed for continuous renal replacement therapy. In the sub–analysis of patients with eGFR ‹30 mL/min (Table 3), Overall outcomes were largely comparable between dosing strategies; however, higher in–hospital mortality and worsening heart failure were observed in the reduced–dose group.
Conclusion: In our cohort, patients with severely reduced renal function who have been treated with Levosimendan showed a higher mortality and a greater need for renal replacement therapy, suggesting a more advanced clinical profile rather than reduced treatment tolerability. Within the subgroup of patients with eGFR ‹30 mL/min, differences in clinical outcomes were observed between full– and reduced–dose regimens; however, these findings should be interpreted with caution due to the non–randomised design and the likely influence of baseline disease severity on dose selection. Overall, levosimendan appeared feasible in patients with advanced renal dysfunction, and prospective studies are needed to clarify the impact of dosing strategies in this high–risk population.

Cross Table for Dependent GFR

	N	>30 (N=45)	<30 (N=38)	Test Statistic
Age	83	67.0 **73.0** 79.3	73.0 **75.0** 81.1	$F_{1,81}$=5.39, P=0.02[3]
Gender : male	83	0.8 35/45	0.8 31/38	X^2_1=0.18, P=0.67[2]
BMI	83	22.9 **25.9** 30.3	23.9 **26.0** 31.0	$F_{1,81}$=0.12, P=0.73[3]
Ipertension : 1	83	0.6 29/45	0.7 25/38	X^2_1=0.02, P=0.90[2]
DIABETE : 1	83	0.3 15/45	0.4 15/38	X^2_1=0.34, P=0.56[2]
Current Smoking : 1	83	0.1 5/45	0.1 2/38	X^2_1=0.91, P=0.34[2]
DISLIPIDEMIA : 1	83	0.6 29/45	0.5 18/38	X^2_1=2.45, P=0.12[2]
PREVIOUS STROKE : 1	83	0.1 5/45	0.2 8/38	X^2_1=1.54, P=0.21[2]
History of CAD : 1	83	0.5 22/45	0.5 19/38	X^2_1=0.01, P=0.92[2]
LVEF	83	20.0 **25.0** 35.0	20.0 **25.0** 35.4	$F_{1,81}$=0.06, P=0.80[3]
Vdxdisfuncion : 1	83	0.4 19/45	0.8 29/38	X^2_1=9.82, P<0.01[2]
eziology	83			X^2_3=0.31, P=0.99[2]
Other		0.2 11/45	0.2 8/38	
Acute IMA		0.1 4/45	0.1 3/38	
CMD post IMA		0.4 17/45	0.4 16/38	
CMD idiopathic		0.2 9/45	0.2 7/38	
Arrhythmia		0.1 4/45	0.1 4/38	

N is the number of non-missing value. [1]Kruskal-Wallis. [2]Pearson. [3]Wilcoxon.

Table 1

Cross Table for Dependent GFR

	N	>30 (N=52)	<30 (N=47)	Test Statistic
Morte intraricovero : 1	99	0.1 3/52	0.2 11/47	X^2_1=6.32, P=0.01[2]
Morte a 30 gg : 1	99	0.0 0/52	0.1 5/47	X^2_1=5.83, P=0.02[2]
Durata ricovero	99	6.4 **11.5** 21.2	8.0 **14.0** 24.7	$F_{1,97}$=2.58, P=0.11[3]
HTx or LVAD : 1	99	0.0 1/52	0.0 1/47	X^2_1=0.01, P=0.94[2]
Necessita MCS : 1	99	0.0 2/52	0.0 2/47	X^2_1=0.01, P=0.92[2]
Necessita inotropi : 1	99	0.1 5/52	0.0 2/47	X^2_1=1.08, P=0.30[2]
CRRT : 1	99	0.0 1/52	0.2 8/47	X^2_1=6.81, P=0.01[2]
Riduzione eGFR : 1	99	0.1 5/52	0.2 10/47	X^2_1=2.61, P=0.11[2]
Worsening HF : 1	99	0.2 9/52	0.3 13/47	X^2_1=1.53, P=0.22[2]

N is the number of non-missing value. [1]Kruskal-Wallis. [2]Pearson. [3]Wilcoxon.

Table 2

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Cross Table for Dependent Terapia levo				
	N	Full dose (N=32)	Half dose (N=15)	Test Statistic
Morte intraricovero : 1	47	0.1 4/32	0.6 7/15	X^2_1=6.65, P=0.01[2]
Morte a 30 gg : 1	47	0.1 3/32	0.1 2/15	X^2_1=0.17, P=0.68[2]
Durata ricovero	47	7.4 **12.0** 21.7	12.2 **18.0** 28.5	$F_{1,45}$=2.86, P=0.10[3]
HTx or LVAD : 1	47	0.0 0/32	0.1 1/15	X^2_1=2.18, P=0.14[2]
Necessita MCS : 1	47	0.0 1/32	0.1 1/15	X^2_1=0.31, P=0.57[2]
Necessita inotropi : 1	47	0.0 1/32	0.1 1/15	X^2_1=0.31, P=0.57[2]
CRRT : 1	47	0.1 4/32	0.3 4/15	X^2_1=1.45, P=0.23[2]
Riduzione eGFR : 1	47	0.2 6/32	0.3 4/15	X^2_1=0.38, P=0.54[2]
Worsening HF : 1	47	0.2 6/32	0.6 7/15	X^2_1=3.98, P=0.05[2]

N is the number of non-missing value. [1]Kruskal-Wallis. [2]Pearson. [3]Wilcoxon.

Table 3

Advanced Heart Failure - Cardiopathy and Myocarditis

Abstract citation ID: suag058.493

IMPLEMENTING THE CARDIO–KIDNEY–METABOLIC (CKM) FRAMEWORK TO BRIDGE THE THERAPEUTIC GAP IN HEART FAILURE: RESULTS FROM A REAL–WORLD QUALITY IMPROVEMENT PROJECT

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Background: The Cardio–Kidney–Metabolic (CKM) syndrome represents a clinical continuum where metabolic disorders, chronic kidney disease (CKD), and heart failure (HF) mutually exacerbate cardiovascular risk. Despite international guidelines recommending SGLT2 inhibitors (SGLT2i) as a cornerstone of treatment across the entire ejection fraction spectrum, a significant therapeutic gap persists in clinical practice. This study evaluates the impact of a targeted clinical intervention ("Gruppi di Miglioramento") on therapeutic optimization in a high–risk cohort.
Methods: We analyzed a cohort of 151 patients (predominantly male, mean age 66 years) characterized by an HFpEF phenotype and comorbid CKD. A specific subgroup of 54 patients with documented therapeutic gaps was followed to assess the impact of a structured clinical audit and optimized pharmacological management on the prescription rates of disease–modifying therapies, with a focus on SGLT2i (Empagliflozin).
Results: Baseline analysis revealed a significant under–treatment in the HFpEF and CKD subgroups. Following the intervention, a dramatic increase in guideline–directed medical therapy (GDMT) was observed. Specifically, SGLT2i coverage increased from 14.7% to 85.3% in HFpEF patients (+70.6%) and from 17.9% to 78.6% in CKD patients (+60.7%). Significant improvements were also noted in patients with Type 2 Diabetes (from 15.4% to 69.2%). Overall, the project achieved a target therapeutic coverage ›85% for cardio–renal protection. Notably, patients with HFpEF reached the same intensity of care as those with HFrEF, ensuring therapeutic equity.
Conclusions: The implementation of a structured "Quality Improvement" strategy effectively bridged the therapeutic gap in a complex CKM population. Targeted clinical interventions can rapidly optimize GDMT, ensuring that high–risk patients, particularly those with HFpEF and CKD, receive evidence–based treatments that simultaneously address cardiac, renal, and metabolic risks, thereby improving long–term prognostic outcomes.

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EPIDEMIOLOGY, CLINICAL CHARACTERISTICS, AND PROGNOSIS OF ACUTE MYOCARDITIS IN A HIGH–VOLUME NON–TRANSPLANT CARDIOLOGY CENTER

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Background: Myocarditis and pericarditis are inflammatory cardiac diseases with heterogeneous clinical presentations, ranging from mild to life–threatening conditions, and occur more frequently in young adult males.
Purpose and Methods: This observational study included adult patients with cardiac magnetic resonance (CMR)–confirmed myocarditis admitted to a high–volume cardiology center between March 2017 and July 2025. The aim was to evaluate in–hospital management and mid– to long–term follow–up in accordance with the 2020 ANMCO/SIC protocol and the 2025 ESC Guidelines for the management of myocarditis and pericarditis.
Results: Seventy patients were enrolled (mean age 34 years, 87% male). Infarct–like chest pain was the predominant presentation (97%). Initial suspicion was myocarditis or myopericarditis in 68.6%, while 27.1% were initially managed as acute coronary syndrome, including STEMI and NSTEMI, with normal coronary angiography. Most patients were classified as intermediate risk (84.3%) (Figure 1), 14.3% as low risk, and one as high risk with fulminant myocarditis. ST–segment elevation was observed in 41.4%, and reduced LVEF (‹55%) in 18.6%. CMR detected late gadolinium enhancement (LGE) in 98.6% of patients, involving ≥2 segments in 72.9%. At discharge, 60 patients were diagnosed with myocarditis and 10 with myopericarditis. At six–month follow–up, residual LV dysfunction was rare (2.9%), while LGE persisted in most cases, though with reduced extension. Holter monitoring and stress testing were largely normal. During follow–up, one recurrence occurred at one year and five at three years; genetic testing identified a pathogenic variant in one recurrent case (Figure 2).
Conclusions: In a non–transplant cardiology center, myocarditis patients predominantly exhibited low– to intermediate–risk profiles and favorable outcomes. These findings support the real–world applicability of the 2025 ESC guideline recommendations.

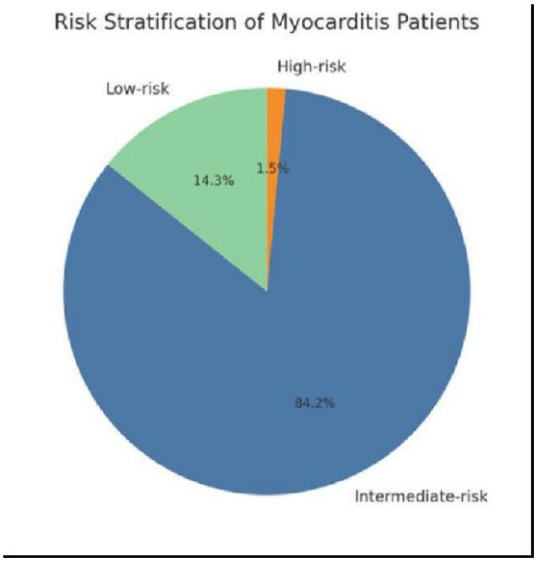

Figure 1

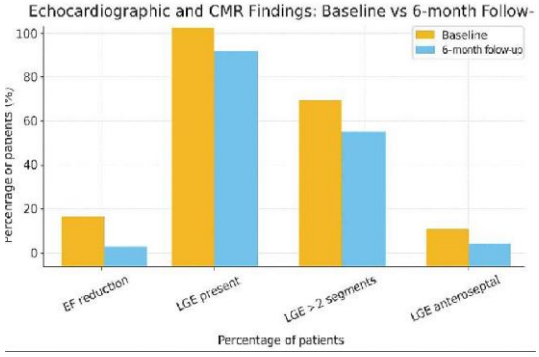

Figure 2

Abstract citation ID: suag058.495

HEART FAILURE AS A CLIMATE–SENSITIVE SYNDROME: ENVIRONMENTAL STRESSORS, VULNERABLE PHENOTYPES, AND CLINICAL IMPLICATIONS

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Background: Climate change and environmental degradation are increasingly recognized as major determinants of cardiovascular health. Heart failure (HF),

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characterized by limited hemodynamic and autonomic reserve, appears particularly sensitive to ambient environmental stressors, yet remains underrepresented in climate–cardiology research.
Objective: To synthesize current epidemiological and mechanistic evidence linking climate–related environmental exposures with HF outcomes, and to frame HF as a climate–sensitive clinical syndrome with distinct vulnerability patterns.
Methods: We performed a narrative synthesis of epidemiological and mechanistic studies published between 2005 and 2025, including large population–based cohorts, multinational registries, and meta–analyses involving millions of individuals across North America, Europe, and Asia. Evidence addressing ambient temperature extremes, air pollution ($PM_{2.5}$, PM_{10}, NO_2, O_3), and wildfire smoke was integrated with established cardiovascular and cardiopulmonary pathophysiological mechanisms.
Results: Population–level studies consistently demonstrate a U– or J–shaped association between ambient temperature and HF outcomes, with extreme cold and heat associated with 12–37% increases in HF mortality and marked seasonal peaks in HF hospitalizations. Long–term exposure to $PM_{2.5}$ is associated with approximately 20% higher HF incidence and ~9% higher HF mortality per 10 μg/m³ increase, while short–term pollution peaks trigger acute HF admissions within days. Wildfire–related $PM_{2.5}$ and compound exposures (heat plus pollution) produce supradditive increases in cardiovascular and respiratory hospitalizations, particularly among older adults. Mechanistically, environmental stressors converge on hemodynamic overload, autonomic imbalance, lung–heart interactions, systemic inflammation, endothelial dysfunction, and microvascular injury, disproportionately affecting patients with HFpEF, right–sided HF, chronic kidney disease, multimorbidity, and socioeconomic disadvantage.
Conclusions: Heart failure emerges as a climate–sensitive cardiovascular syndrome, with environmental exposures acting as predictable and potentially modifiable triggers of decompensation. Integrating climate and pollution variables into HF risk assessment, patient counseling, and preventive strategies may reduce avoidable hospitalizations, while targeted research is needed to define effective mitigation and equity–focused interventions.

Abstract citation ID: suag058.496

PATIENT–REPORTED PSYCHOPHYSICAL WELL–BEING IN TRANSTHYRETIN AMYLOID CARDIOMYOPATHY: A COMPARISON BETWEEN FIVE–YEAR FOLLOW–UP COHORTS OF TAFAMIDIS–TREATED AND UNTREATED PATIENTS

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Background: Transthyretin Amyloid Cardiomyopathy (ATTR–CM) is a rare disease associated with a substantial impairment in patients' psychophysical well–being and quality of life.
Purpose: to describe the difference in anxiety, depression, symptom percepition, and fatigue between five years follow–up patients with ATTR–CM treated with tafamidis and those not receiving ATTR–CM specific therapy.
Methods: We analyzed the clinical and psychological characteristics of two five years follow–up cohorts of patients with ATTR–CM, constituted by 36 patients treated with tafamidis and 5 patients not receiving tafamidis, followed at the Center for Amyloidosis of Florence and the University Hospital of Graz. Patients were evaluated using a sociodemographic questionnaire, the Hospital Anxiety and Depression Scale (HADS) to assess anxiety and depression, the Kansas City Cardiomyopathy Questionnaire (KCCQ) to assess heart failure–related symptom perception in daily life; and the PROMIS Fatigue and Dyspnea questionnaires.
Results: Patients treated with tafamidis were younger (78.5 [75.75–84] vs 88.5 [85.75–89.25]) and had a better NYHA functional class (p=0.01), while left ventricular ejection fraction was similar compared with patients not receiving tafamidis. The KCCQ showed a more favorable symptoms profile in patients treated with tafamidis for the total score (50.9 [22.0–71.3] vs 75.5 [57.9–82.7], p=0.04) and the clinical symptoms score (45.9 [29.8–76.3] vs 83.1 [65.4–92.7], p=0.006). Similarly, patients treated with tafamidis reported low fatigue burden assessed with PROMIS Fatigue score (55.75 [51.85–67.95] vs 48.4 [43.9–54.38], p=0.009). No significant differences were observed in HADs Anxiety or depression score, as for PROMIS Dyspnea score. Patients treated with tafamidis showed a lower impact of cardiac amyloidosis in daily life symptoms respect of the cohort not treated with tafamidis.
Conclusion: In our follow–up cohort, patients with ATTR–CM treated with tafamidis reported higher levels of psychophysical well–being in daily life compared with those not receiving tafamidis. Nevertheless, longitudinal analyses including baseline assessments in the same cohort will be essential to better evaluate the impact of tafamidis treatment on patient–reported psychophysical well–being over time.

Abstract citation ID: suag058.497

LEFT BUNDLE BRANCH PACING AS A PHYSIOLOGICAL RESYNCHRONIZATION STRATEGY IN NONISCHEMIC DILATED CARDIOMYOPATHY

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Aorn Cardarelli

Background: Left bundle branch block (LBBB) is a major determinant of electrical and mechanical dyssynchrony in heart failure with reduced ejection fraction (HFrEF), contributing to adverse ventricular remodeling and poor prognosis. Although cardiac resynchronization therapy improves outcomes, a substantial proportion of patients show limited response. Left bundle branch pacing (LBBP) has emerged as a physiological alternative by directly engaging the His–Purkinje conduction system.
Case presentation: We report the case of a 62–year–old woman with nonischemic dilated cardiomyopathy, severely reduced left ventricular ejection fraction (30%), and complete LBBB (QRS duration 162 ms), who remained symptomatic despite maximally tolerated guideline–directed medical therapy. Advanced echocardiography demonstrated marked mechanical dyssynchrony, severely impaired global longitudinal strain, and functional mitral regurgitation. Cardiac magnetic resonance excluded ischemic scar and revealed diffuse interstitial fibrosis. LBBP was successfully performed, achieving QRS narrowing to 118 ms with stable electrical parameters. At 6–month follow–up, the patient showed marked clinical improvement (NYHA class I–II) and significant reverse remodeling, with left ventricular ejection fraction increasing to 54%, global longitudinal strain improving from −8.2% to −18.8%, reduced mechanical dispersion, and regression of functional mitral regurgitation.
Conclusions: This case highlights the potential of left bundle branch pacing as an effective physiological resynchronization strategy in patients with HFrEF and LBBB, even in the presence of diffuse myocardial fibrosis. Multimodality imaging plays a pivotal role in patient selection and in objectively documenting functional recovery. LBBP may represent a valuable alternative to conventional resynchronization strategies in carefully selected patients.

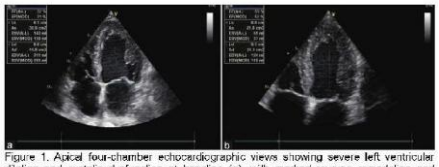

Figure 1. Apical four-chamber echocardiographic views showing severe left ventricular dilation and systolic dysfunction at baseline (a), with marked reverse remodeling and recovery of systolic function at 6-month follow-up after left bundle branch pacing (b).

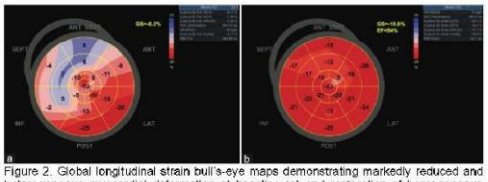

Figure 2. Global longitudinal strain bull's-eye maps demonstrating markedly reduced and heterogeneous myocardial deformation at baseline (a) and restoration of homogeneous contraction with significant improvement in global longitudinal strain at 6-month follow-up after left bundle branch pacing (b).

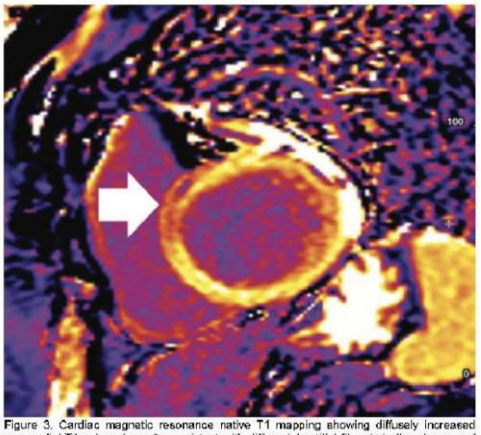

Figure 3. Cardiac magnetic resonance native T1 mapping showing diffusely increased myocardial T1 values (arrow), consistent with diffuse interstitial fibrosis in the absence of focal replacement scar.

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Abstract citation ID: suag058.498

HEART IN RHYTHM: THE IMPACT OF TARGETED TRAINING ON ARRHYTHMIA MANAGEMENT AND ALARM FATIGUE REDUCTION IN CARDIO–THORACIC–VASCULAR INTENSIVE CARE UNITS

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Arrhythmias represent one of the most frequent and clinically significant challenges in Cardio–Thoracic–Vascular Intensive Care Units (CTV–ICUs), where timely recognition and appropriate management of rhythm disturbances are crucial for patient safety and clinical outcomes. Despite technological advances, recent studies have shown that more than 80% of arrhythmia alarms in intensive care settings are false positives. This high rate of false alarms contributes to alarm fatigue, a phenomenon characterized by sensory overload and reduced responsiveness of healthcare professionals to clinically relevant alarms, potentially compromising patient safety and care effectiveness.

The educational project "Heart in Rhythm" was developed to provide physicians, nurses, and cardiovascular perfusion technologists (TFCPC) with theoretical and practical tools for recognizing, interpreting, and managing arrhythmias in critically ill patients. The training program integrated lectures, high–fidelity simulations, and case–based discussions, promoting an interactive and multidisciplinary learning approach.

The initiative aimed not only to strengthen clinical and technical competencies but also to enhance situational awareness and decision–making related to cardiac monitoring and alarm management. By fostering a deeper understanding of arrhythmia detection and response protocols, the course sought to mitigate alarm fatigue and improve the reliability of alarm interpretation within CTV–ICUs.

Outcome evaluation focuses on changes in professionals' perceptions and behaviors toward alarm systems, as well as on the potential reduction of non–actionable alarms and associated workload. This educational intervention represents a concrete step toward improving quality and safety of care in high–complexity cardiovascular settings, highlighting the pivotal role of continuous professional training in addressing alarm fatigue and promoting a culture of clinical vigilance

Acute Coronary Syndrome 1 - Coronary Imaging

Abstract citation ID: suag058.499

MULTIMODALITY IMAGING AND MINOCA: THE ROLE OF CARDIAC MRI IN IDENTIFYING THE CULPRIT LESION

G. Scherillo, A. Aprile, G. Arena, C. D'Amore, G. Granata, C. Palomba, A. Tuccillo, F. Dell'Aversana, F. Tamburro, and B. Tuccillo
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We report the case of a 65–year–old man presenting with chest pain occurring the night before. ECG showed negative T waves in the inferolateral leads. Laboratory revealed rising troponin (0.139 to 0.688 ng/mL). Transthoracic echocardiography demonstrated preserved systolic function without regional wall motion abnormalities (ejection fraction 55%). The day after, complete normalization of the ECG was observed.

Patient underwent coronary angiography which revealed an intermediate stenosis of the left anterior descending artery (LAD) not functionally significant (iFR 0.91, FFR 0.87) (Fig. 1). 24–hour Holter ECG monitoring documented episodes of atrial fibrillation.

He was discharged on day five with a diagnosis of myocardial infarction with non–obstructive coronary arteries (MINOCA) and referred for cardiac magnetic resonance (CMR). Discharge therapy included Aspirin, Edoxaban and Rosuvastatin/Ezetimibe.

Subsequent CMR revealed myocardial edema and late gadolinium enhancement with a transmural ischemic pattern involving the basal inferolateral and anterolateral segments and the apical lateral segment and microvascular obstruction in the basal inferolateral segment, consistent with transmural myocardial infarction (Fig. 2). A subsequent review of the coronary angiogram identified an intermediate, hazy lesion in the proximal circumflex/obtuse marginal branch, compatible with the culprit lesion (Fig. 3).

The patient was contacted and clopidogrel 75 mg daily was added, resulting in triple antithrombotic therapy for one month. At 30–day follow–up, the patient remained asymptomatic.

This case highlights the pivotal role of CMR in clarifying the diagnosis and guiding therapy in MINOCA, even when the underlying etiology remains uncertain between coronary embolism and unstable plaque.

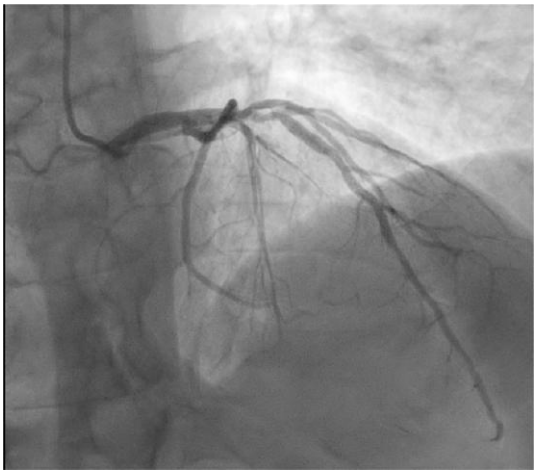

Figure 1

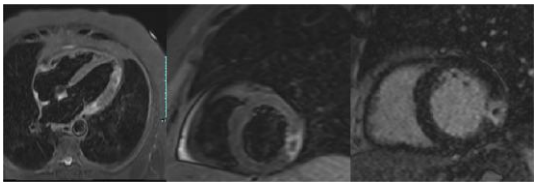

Figure 2

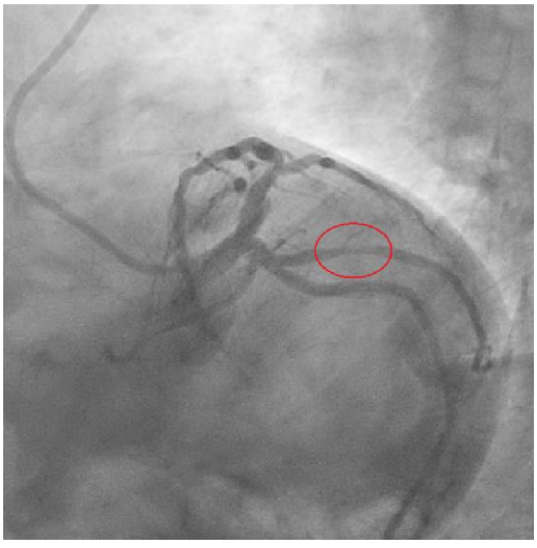

Figure 3

Abstract citation ID: suag058.500

QUALITY OF CARE IN PATIENTS HOSPITALIZED FOR ACUTE MYOCARDIAL INFARCTION: RESULTS FROM THE FIRST TWO YEARS OF THE "QUALITY IN CARDIOLOGY" (QIC) PROJECT

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Background: Assessing quality of care is the first step toward improving the management of patients with acute myocardial infarction (AMI). The European Society of Cardiology (ESC) has defined a set of quality indicators (QIs) for AMI care.

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Aim: The "Quality in Cardiology" (QiC) Project aimed to evaluate whether systematic measurement of all ESC QIs is feasible in the cardiology department of a secondary–level hospital and whether it is useful for improving patient care.
Methods: The QiC Project is a prospective, 3–year observational quality improvement study conducted in the Intensive Cardiac Care Unit (ICCU) and Cardiology ward of Pio XI Hospital, Desio. For each admission for AMI, physicians and nurses completed standardized data collection forms including all ESC individual QIs (5 QIs on centre organization, 5 on reperfusion and invasive strategy, 3 on in–hospital risk assessment, 4 on anti–thrombotic treatment, 3 on secondary prevention, 3 on patient's satisfaction, and 1 on outcome). Six–monthly audit meetings involving medical and nursing staff were held based on QI analyses. For each QI, the rate of attainment was evaluated during the first, second, third, and fourth semesters of the project among admissions ending with discharge to home or to a rehabilitation centre. Temporal trends were assessed using the chi–square test for trend, with p ‹ 0.05 considered statistically significant.
Results: From May 1, 2023, to April 30, 2025, a total of 748 admissions for AMI occurred in the ICCU and Cardiology ward. One patient denied consent, 16 died during hospitalization, 67 had to be transferred to another hospital and 664 were discharged to home or to a rehabilitation centre. Table 1 shows the percentage of QIs achieved in these admissions for each semester. Of the 24 QIs, 15 were achieved in more than 90% of admissions across all semesters. Four QIs showed a significant improvement over time: LDL–cholesterol evaluation, adequate P2Y12 receptor inhibition, duration of dual antiplatelet therapy in the discharge letter, and discharge letter sent to patient. No QIs showed a worsening trend over time.
Conclusions: Quality of care for AMI can be systematically measured in patients admitted to a cardiology department. Periodic audit activities enable identification of critical issues and contribute to improving the quality of care over time.

QUALITY OF CARE DURING HOSPITALIZATION FOR ACUTE MYOCARDIAL INFARCTION: PERCENTAGE OF ADMISSIONS IN WHICH QUALITY INDICATORS WERE MET, WHEN APPLICABLE

DOMAINS AND QUALITY INDICATORS	SEMESTER				χ^2 for trend (p)
	1st (n=157)	2nd (n=194)	3rd (n=149)	4th (n=164)	
Centre organization					
1. Written protocols for network	✓	✓	✓	✓	
2. Hospital use of hs-cTn	✓	✓	✓	✓	
3. Prehospital interpretation of ECG	✓	✓	✓	✓	
4. Participation in a quality assessment program	✓	✓	✓	✓	
5. Assessment of times to reperfusion	✓	✓	✓	✓	
Reperfusion & invasive strategy					
6. Reperfusion for STEMI (%)	98.6	98.6	97.0	98.7	ns
7. Timely reperfusion for STEMI (%)	40.8	38.6	50.3	30.7	ns
8. Coronary angiography <24h for NSTEMI (%)	55.3	46.1	58.7	54.5	ns
9. Use of radial access in invasive strategy (%)	95.3	97.9	93.0	98.1	ns
10. Time between STEMI diagnosis and arterial access (%)	78.9	83.0	80.3	81.3	ns
In-hospital risk assessment					
11. Assessment of left ventricular function (%)	99.4	98.5	96.7	100	ns
12. LDL-cholesterol evaluation (%)	94.9	96.0	97.3	100	0.0085
13. Risk score assessment (%)	70.7	67.0	72.5	64.4	ns
Anti-thrombotic treatment					
14. Adequate $P2Y_{12}$ inhibition (%)	68.7	73.3	77.2	88.1	<0.001
15. Parenteral anticoagulant at admission (%)	94.0	95.8	95.1	92.5	ns
16. DAPT on discharge (%)	94.0	92.5	97.9	93.1	ns
17. Duration of DAPT in the discharge letter (%)	76.6	80.7	93.8	96.6	<0.001
Secondary prevention					
18. High intensity statins on discharge (%)	83.4	88.6	81.2	93.3	ns
19. ACEI (or ARB) on discharge in pts with LVEF <40% (%)	92.3	100	100	100	ns
20. Beta blockers on discharge in pts with LVEF <40% (%)	100	90.9	100	100	ns
Patient's satisfaction					
21. Feedback regarding the patient's experience (%)	100	100	100	100	ns
22. Evaluation of health-related quality of life (%)	63.7	66.5	67.8	65.2	ns
23. Discharge letter sent to patient (%)	39.5	45.5	73.2	86.6	<0.001
Outcome					
24. Assessment of 30-day mortality rate	✓	✓	✓	✓	

✓ – quality indicator fulfilled; ACEI – angiotensin converting enzyme inhibitors; ARB – angiotensin receptor blocker; DAPT – dual antiplatelet therapy; ECG – electrocardiogram; hs-cTn – high sensitivity cardiac troponin; LVEF – left ventricular ejection fraction; LDL – low-density lipoprotein; NSTEMI – non-ST-elevation myocardial infarction; STEMI – ST-elevation myocardial infarction

Abstract citation ID: suag058.501

MANAGEMENT OF A REFRACTORY ELECTRICAL STORM AFTER SUBACUTE MYOCARDIAL INFARCTION

L. Carli, C. Sorini Dini, S. Pavoncelli, and S. Valente
Aous Le Scotte

Background: Electrical storm (defined as ≥ 3episodes of sustained ventricular tachycardia or ventricular fibrillation within 24 h) is a life–threatening condition that may complicate the course of myocardial infarction, often refractory to conventional antiarrhythmic therapies. Overdrive pacing can occasionally provide effective arrhythmic suppression in selected cases, although its use as a rescue therapy remains uncommon.

Case summary: A middle–aged man presented with progressive dyspnea and chest pain in subacute anterior ST–segment elevation myocardial infarction. Coronary angiography revealed proximal left anterior descending artery occlusion, successfully treated with PCI and drug–eluting stent implantation. The clinical course was complicated by acute pulmonary edema, severe left ventricular systolic dysfunction (LVEF 25%) and recurrent ventricular fibrillation consistent with electrical storm, refractory to antiarrhythmic drugs, electrolyte correction and left stellate ganglion block. The patient was trasferred to our CICU in a tertiary center, with a ccardiogenic shock condition (SCAI D) and persistent ventricular arrhythmias and worsening hemodynamics required repeated DC shocks and escalating inotropic support. A temporary transvenous pacemaker was implanted for high–rate ventricular overdrive pacing, starting at 110 bpm and increased up to 125 bpm, resulting in a marked reduction and subsequent complete suppression of VF/VT episodes. Hemodynamic stability was maintained with intra–aortic balloon pump, norepinephrine and dobutamine. The patient required continuous veno–venous hemofiltration for acute kidney injury and showed progressive neurological and ventricular function recovery. The temporary pacemaker was removed after sustained rhythm stabilization, and an implantable cardioverter–defibrillator was subsequently implanted.
Conclusions: This case highlights high–rate ventricular overdrive pacing as an effective bail–out strategy for refractory electrical storm after failure of pharmacological therapy and stellate ganglion block. Suppression of triggering premature beats responsible for R–on–T–induced ventricular fibrillation was achieved. An integrated pharmacological and non–pharmacological approach was essential for managing cardiogenic shock.

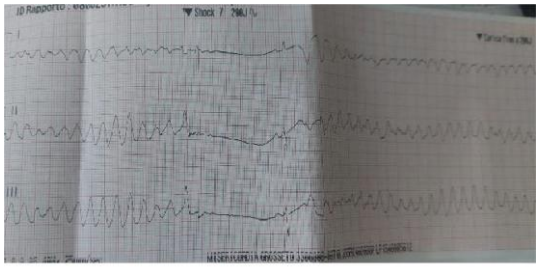

Image 1: ECG showing recurrent polymorphic ventricular tachycardia degenerating into ventricular fibrillation during electrical storm, despite repeated DC shocks.

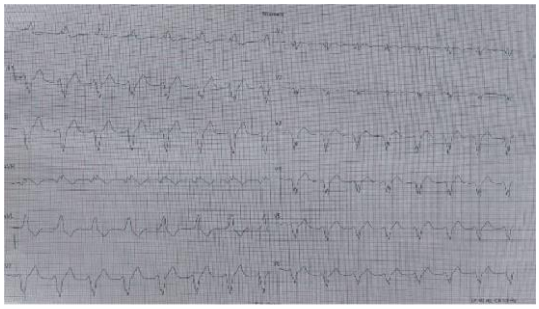

Image 2: ECG tracing during high-rate ventricular overdrive pacing via temporary transvenous pacemaker, showing stable paced rhythm with complete suppression of ventricular ectopy and malignant ventricular arrhythmias.

Abstract citation ID: suag058.502

THE SOUTH AFRICAN FLAG SIGN AS AN ELECTROCARDIOGRAPHIC MARKER OF OCCLUSION MYOCARDIAL INFARCTION: A SCOPING REVIEW

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Background: The South African flag sign (SAFS) is an electrocardiographic (ECG) pattern described by Littmann in 2015 for educational purposes. It is

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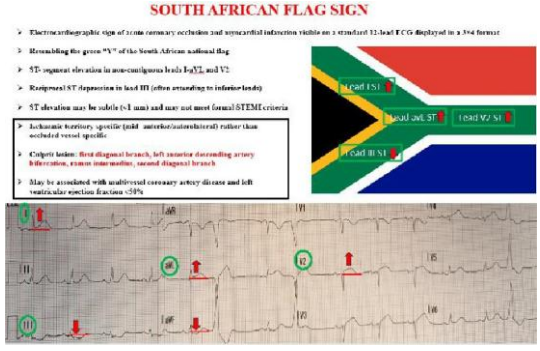
characterised by ST–segment elevation in leads I–aVL and the non–contiguous precordial lead V2, with reciprocal depression in lead III –avF, recreating the Y–shaped green element of the South African flag. Traditionally linked to first diagonal (D1) occlusion it is an increasingly recognized pattern of occlusion myocardial infarction, often not fulfilling classical ST– elevation myocardial infarction (STEMI) criteria. No specific review on this ECG sign has been conducted to date.

Methods: We systematically searched PubMed, MEDLINE, EMBASE, Scopus, Google scholar and grey literature, including reference list screening (2015–December 2025), to identify case reports and small series describing SAFS in acute coronary syndromes. Demographics, clinical, echocardiographic and ECG features, culprit vessel, left ventricular function, treatment and outcomes were extracted.

Results: Most cases were reported in 2025. We identified 21 reports describing 24 patients with SAFS, nearly all of whom underwent coronary angiography. Chest pain was universally present. Patients were diagnosed based on SAFS rather than classical STEMI criteria, reflecting the absence of guideline–specific recommendations. The culprit vessel was D1 or left anterior descending artery (LAD) bifurcation lesion in most cases, but ramus intermedius, multivessel disease, second diagonal branch of LAD, coronary aneurysms or no critical stenosis were also reported. Nearly all patients underwent urgent angioplasty with favourable in–hospital outcomes. Left ventricular ejection fraction was frequently ‹50%. No deaths occurred.

Conclusions: Available evidence indicates that SAFS is an under–recognised marker of acute transmural occlusion myocardial infarction, often not classified as STEMI because ST elevation can be subtle and appears in non–contiguous leads. The ECG pattern localises the ischaemic territory rather than a single culprit vessel and is consistent with transmural ischaemia arising from multiple potential occlusions rather than exclusively D1. Prompt identification of SAFS should trigger immediate coronary angiography and revascularisation. Given its diagnostic and prognostic relevance, this pattern merits formal inclusion in acute coronary syndrome guideline.



Abstract citation ID: suag058.503

WHO ARE LATE PRESENTERS IN STEMI? CLINICAL AND SYSTEM–RELATED DETERMINANTS FROM THE AVAILABLE LITERATURE

F. Veneziano, F. Piccirillo, and F. Gioia
Aulss6; Campus Bio Medico; Campus Bio Medico Di Roma

Background: Despite major advances in reperfusion strategies, late presentation after symptom onset remains common in patients with ST–elevation myocardial infarction (STEMI). Beyond total ischemic time, identifying the clinical and system–related determinants of delayed presentation is crucial to improve patient management and healthcare organization.

Methods: A scoping review of the literature was conducted using PubMed. Observational studies and large registries reporting predictors, clinical characteristics, system–related factors and outcomes associated with late presentation (≥12 hours from symptom onset) in STEMI patients were included.

Results: Twelve studies were included, comprising more than 25,000 STEMI patients, of whom approximately 20–25% presented late. Across cohorts, late presenters were more frequently female (35–45%), diabetic (30–40%), and less likely to report typical chest pain (25–40%) compared with early presenters. System–related determinants were consistently reported, including lower activation of emergency medical services, with ambulance use ranging from 30–50%, as well as delays related to rural residence, lower socioeconomic status and inter–hospital transfer. The use of invasive strategies declined markedly beyond 12 hours, with “no PCI” rates increasing from approximately 5% in early presenters to over 20% in very late presenters. Late presentation was associated with higher crude short– and long–term mortality, reaching 15–17% at 3 years. However, data from large contemporary registries suggest that presentation timing alone is not always an independent predictor of mortality after multivariable adjustment, particularly in selected patients undergoing invasive management.

Conclusions: Late presentation in STEMI affects a substantial proportion of patients and reflects a complex interaction between patient–related and system–related factors. Beyond symptom–to–door time, clinical profiling and healthcare system organization are essential to identify late presenters who may still benefit from tailored invasive strategies in real–world practice.

Abstract citation ID: suag058.504

NON INVASIVE IMAGING FOR THE DIAGNOSIS OF TYPE 3 SPOTANEOUS CORONARY ARTERY DISSECTION: ROLE OF CCTA

G. Scherillo, A. Ianniciello, F. Punzo, G. Coppola, F. Mautone, G. Del Vecchio, C. D'Amore, A. Tuccillo, F. Dell'Aversana, F. Tamburro, and B. Tuccillo
P.O. Ospedale Del Mare – Asl Napoli 1 Centro

We report the case of a 61–year–old woman presenting with chest pain radiating to the left arm. EKG showed inferolateral repolarization abnormalities. Laboratory revealed mild elevation in troponin (0.76). Transthoracic echocardiography demonstrated mildly reduced systolic function with posterolateral wall akinesia (ejection fraction 48%). The patient was referred for coronary angiography showing no significant stenoses; however, a focal narrowing of the proximal circumflex artery (LCX) was observed, consistent with type 3 spontaneous coronary artery dissection (SCAD) according to the Yip–Saw classification (Fig. 1). Given the risk of iatrogenic propagation of the dissection and recommendations to minimize coronary instrumentation in SCAD, intracoronary imaging was avoided, and we performed instead coronary computed tomography angiography (CCTA) demonstrating mild stenosis of the LCX with mural hyperdensity, consistent with an intramural hematoma (Fig. 2). On day four, the patient experienced angina similar to the initial episode, with ECG changes and an increase in troponin (1.2). Repeat coronary angiography demonstrated progression of the dissection from the LCX to the distal segment of the first obtuse marginal branch, corresponding to evolution toward type IIb SCAD (Fig. 3). Given the limited myocardial territory at risk and the absence of ongoing symptoms, conservative management was continued. Patient was discharged on day ten on a beta–blocker and aspirin. with a planned follow–up CCTA at six months. This case highlights that in SCAD, particularly type 3 and proximal lesions, a conservative approach is often the safest strategy, with non–invasive imaging playing a key role in diagnosis, follow–up, and therapeutic guidance.

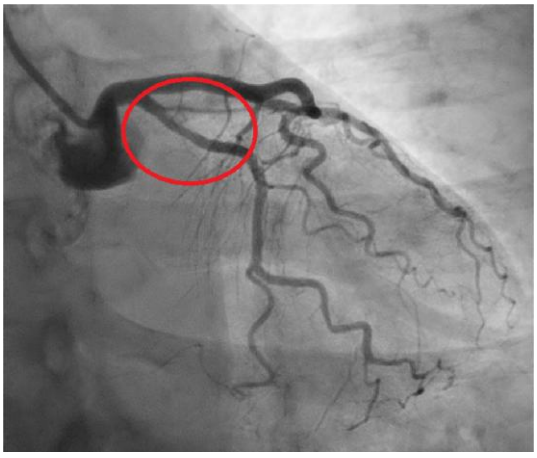


Figure 1

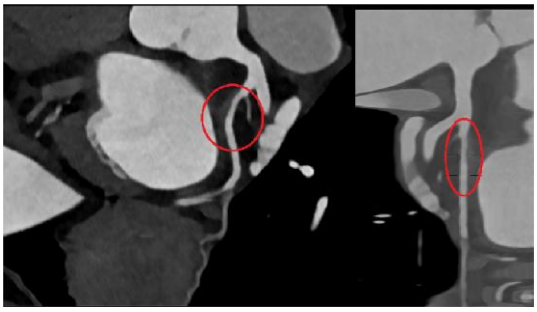


Figure 2

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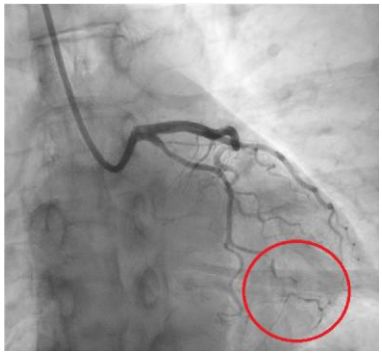

Figure 3

Abstract citation ID: suag058.505

WHEN THE CORONARY ANOMALY OCCURS OUT OF TIME

C. Bova, A. Gambaro, A. Maluta, L. Tomasi, S. Capocci, G. Pesarini, and F. Ribichini
Azienda Ospedaliera Universitaria Integrata Verona

Background: Congenital coronary artery anomalies have an estimated prevalence of approximately 1% in the general population. Some “malignant“ variants, particularly the anomalous origin of the left coronary artery from the right sinus of Valsalva with an interarterial and/or intramural course, are associated with an increased risk of myocardial ischemia and sudden cardiac death. These anomalies are generally diagnosed at a young age, often during sports medicine screening.
Case presentation: A 63–year–old man was admitted to the cardiac intensive care unit after a witnessed out–of–hospital cardiac arrest occurring at rest, successfully treated in the pre–hospital setting for ventricular fibrillation with 2 defibrillation shocks and 1 mg of epinephrine. His medical history included treated arterial hypertension and known left bundle branch block (LBBB); occupation: butcher. On admission to the emergency department, electrocardiography showed sinus rhythm with LBBB, severe hypokalemia (K⍰ 2.6 mmol/L), and elevated troponin T (peak 205 ng/L). Transthoracic echocardiography (bad quality) revealed septal dyssynergy and mildly reduced left ventricular ejection fraction. Coronary angiography (CGF) (Figure 1) showed no significant coronary stenoses and an ectopic origin of the left coronary artery from a non–coronary sinus, without clear definition of its course. Cardiac magnetic resonance imaging (MRI) was negative for fibrosis, necrosis, or myocarditis. During the diagnostic work–up, suspicious pelvic bone lesions were detected but subsequently ruled out as neoplastic by MRI and PET–CT. To complete the cardiological assessment, coronary computed tomography (CT) (Figure 2) demonstrated origin of the left coronary artery from the right coronary sinus, with an acute take–off angle (‹45°), a probable short intramural course, and an interarterial course between the aorta and pulmonary artery. Based on these findings, surgical correction with an unroofing procedure (Figure 3) was indicated.
Conclusions: This case represents an atypical presentation of a “malignant“ coronary anomaly given the age and mode of onset, occurring at rest in an adult patient. CGF and MRI may be insufficient in the anatomical characterization of coronary anomalies, while coronary CT remains the method of choice for defining the course and therapeutic strategy. Clinical suspicion remains a fundamental element in identifying causes of cardiac arrest that are only apparently idiopathic.

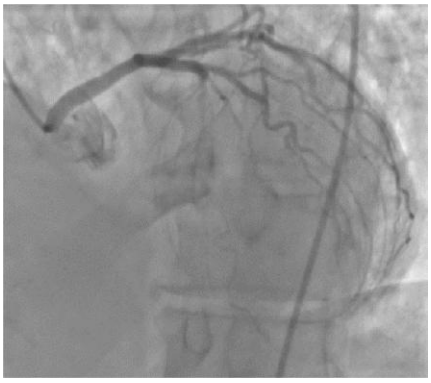

Figure 1

Figure 2

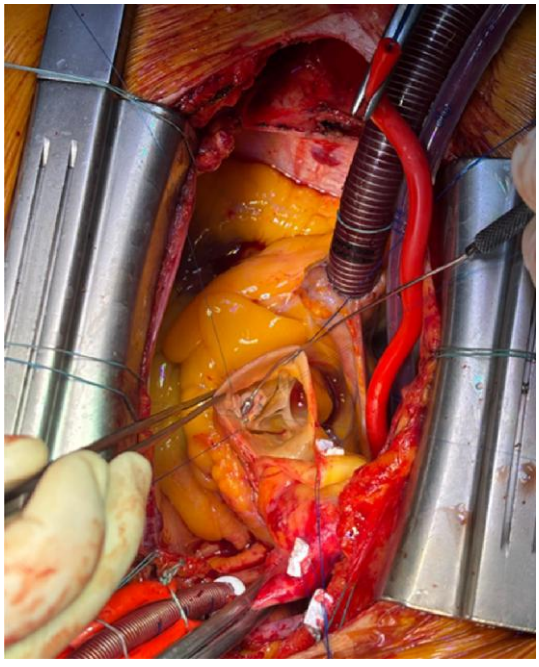

Figure 3

Acute Coronary Syndrome 2 - Pharmacological Therapy

Abstract citation ID: suag058.506

DRUG–COATED BALLOON VERSUS DRUG–ELUTING STENT IN DE NOVO SMALL–VESSEL CORONARY DISEASE: UPDATED META–ANALYSIS OF RANDOMIZED TRIALS

M. Meco and E. Agosteo
Clinica San Carlo

Background: Drug–coated balloons (DCB) enable a “leave–nothing–behind” strategy in de novo small–vessel coronary disease, potentially reducing metal burden while maintaining efficacy. We synthesized randomized evidence versus contemporary drug–eluting stents (DES).
Methods: Systematic search for randomized controlled trials comparing DCB–only versus DES in de novo small coronary vessels (≤3.0 mm). Primary endpoint: 12–month major adverse cardiac events (MACE; trial–defined). Secondary endpoint: ischemia–driven target lesion revascularization (TLR) when available. Risk ratios (RR) were pooled using a random–effects model; heterogeneity was assessed with I^2.
Results: Two trials reporting comparable 12–month MACE were included (n=972). In PICCOLETO II, MACE occurred in 6/108 (5.6%) with DCB and 8/106 (7.5%) with DES. In BASKET–SMALL 2, 12–month MACE was 7.5% with DCB and 7.3% with DES (Figure 1). Overall, DCB was not associated with a

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difference in MACE versus DES (pooled RR 0.99, 95% CI 0.63–1.55; I²=0%) (Figure 2). For ischemia–driven TLR (2 trials, n=442), rates were low: PICCOLETO II 6/108 (5.6%) vs 6/106 (5.6%); RESTORE SVD China 5/114 (4.4%) vs 3/114 (2.6%). The pooled RR for ischemia–driven TLR was 1.20 (95% CI 0.50–2.85; I²=0%) (Figure 3).

Conclusions: In de novo small–vessel PCI, DCB and contemporary DES showed comparable 12–month clinical outcomes with low revascularization rates. DCB appears a reasonable alternative in selected lesions, warranting larger trials powered for patient–centered endpoints and standardized definitions.

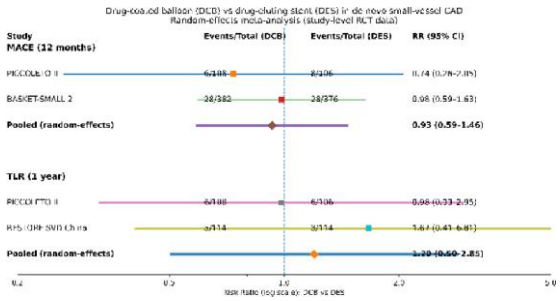

Figure 1

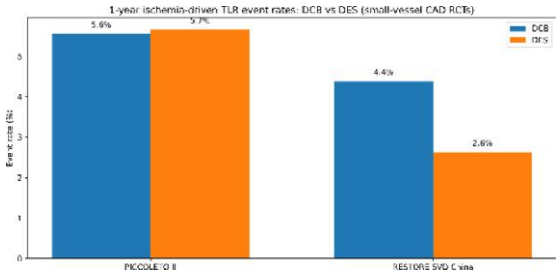

Figure 2

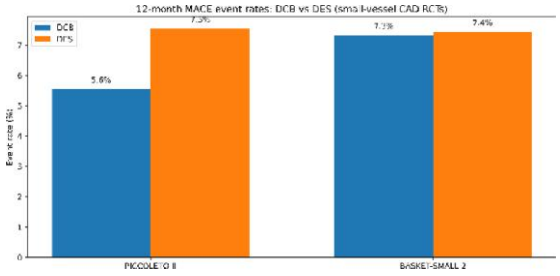

Figure 3

Abstract citation ID: suag058.507

STENT OPTIMIZATION USING OCT: DIFFERENCES BETWEEN MEASURED AND EXPECTED DIAMETERS AND AREAS

D. Formigli, S. Vetrano, L. Rossi, G. Esposito, F. Moscato, S. Covino, A. Parente, V. Franco, S. Cocozza, and M. Scherillo
UOC Cardiologia Utic Con Emodinamica Interventistica, Azienda Ospedaliera San Pio

Introduction: OCT is superior to IVUS for assessing correct coronary stent implantation. The few articles in the literature directly comparing OCT and IVUS show an underestimation of OCT diameters and areas from 5 to 14%. The aim of our study is to evaluate the difference between OCT–based diameters and areas obtained after stent implantation compared to expected values.

Methods: Between April and December 2025, 27 OCT studies were performed to optimize Percutaneous Coronary Intervention (PCI) with single stent implantation in 26 patients. The mean age of the patients was 70±8 years, with 81% male. PCI was performed for CCS (n=10), NSTEMI (n=7), UA (n=6), completely post–ACS (n=2), and STEMI (n=1). PCIs involved the LAD (n=18), Cx (n=5), CDx (n=3), and Intermediate (n=1). Mean In–stent lumen expansion was 81.85±11.24%; ≥ 70% in 25 of 27 cases. Mean Diameter and MSA analysis were performed at three levels: 2 mm from the proximal edge of the stent (Point A); at the center of the stent (Point B); and 2 mm from the distal edge of the stent (Point C) (Figure 1).

Results: The mean diameter of the implanted stent was 3.26 ± 0.45 mm, with a mean length of 23.41±8.45 mm. Post–dilation was performed in 89% of cases, 88% of which with a larger balloon size. At Point A, the mean OCT diameter was 8.8±5.3% lower than the mean expected diameter (3.36±0.48 mm vs 3.70 ±0.56 mm;P=0.021) and the Minimal Stent Area on OCT was 16.4±9.4% lower than the Expected Minimal Stent Area (9.09±2.68 mm² vs 10.98±3.37 mm²; P=0.026); at Point B the mean OCT diameter was 13.3±6.6% lower than the mean expected diameter (3.20±0.57 mm vs 3.69±0.57 mm;P=0.003) and the Minimal Stent Area on OCT was 24.6±11.4% lower than the Minimal Stent Area Expected (8.27±3.19 mm² vs 10.94±3.42 mm²;P=0.005); At Point C, the mean OCT diameter was 13.7±6.9% lower than the mean expected diameter (3.07±0.59 mm vs. 3.55±0.60 mm; P=0.004), and the minimal stent area on OCT was 25.1±11.5% lower than the expected minimal stent area (7.65±3.08 mm² vs. 10.18±3.52 mm²; P=0.007). The highest correlation between mean OCT diameter and mean expected diameter (Pearson R=0.916) and between minimal stent area on OCT and expected minimal stent area (Pearson R=0.917) was observed at Point A (Figure 2-3)).

Conclusions: the mean diameter and minimal stent area assessed by OCT are 8.8% to 13.8% and 16.4% to 25.1% lower, respectively. The choice of balloons to optimize stent expansion must take this underestimation into account.

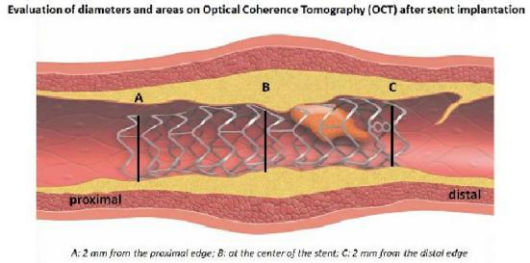

Figure 1

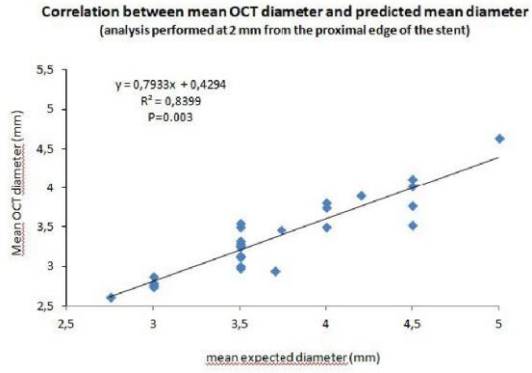

Figure 2

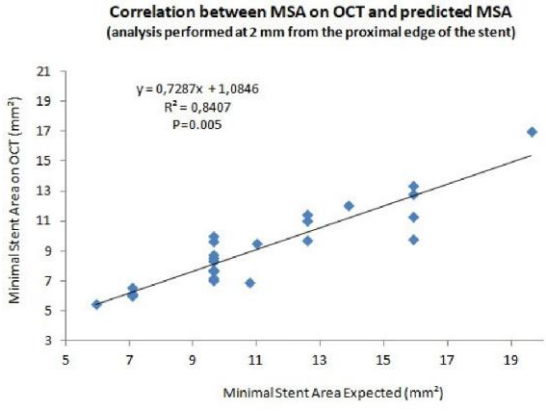

Figure 3

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Abstract citation ID: suag058.508

META–ANALYTIC INSIGHTS ON LIPOPROTEIN{A) FOR THE INTERVENTIONAL CARDIOLOGIST: CORONARY ANATOMY, PLAQUE VULNERABILITY, AND OUTCOMES AFTER PCI

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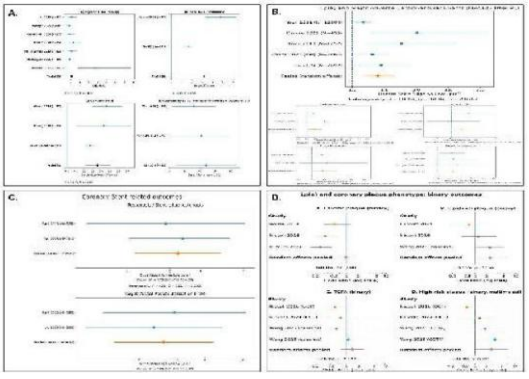
Asst Santi Paolo E Carlo; Università Milano; University of Milan; Centro Medico Santagostino

Background: Lipoprotein(a) [Lp(a)] is a genetically determined cardiovascular risk factor. However, its impact on coronary anatomy, plaque biology, and outcomes after percutaneous coronary intervention (PCI) remains incompletely defined from an interventional perspective.
Methods: We performed a systematic review and random–effects meta–analysis of observational studies comparing high versus low Lp(a) levels in a pooled population of more than 40,000 patients. Prespecified outcomes included coronary anatomica! complexity (binary high SYNTAX, continuous SYNTAX, and Gensini score), major adverse cardiovascular events (MACE) after PCI, stent–related outcomes (in–stent and stent–edge restenosis, target vessel revascularization), and coronary plaque characteristics assessed by multimodality imaging (OCT, IVUS, CCTA). Pooled estimates were derived using random–effects models.
Results: Elevated Lp(a) was associated with greater coronary anatomica! complexity (pooled OR 1.5, 95% CI 1.3– 1.6). High Lp(a) predicted worse post–PCI prognosis with higher MACE (pooled HR 1.5, 95% CI 1.3– 1.7). From a procedura! perspective, elevated Lp(a) significantly increased in–stent and stent–edge restenosis (OR 3.2, 95% CI 2.2– 4.8) and the need far target vessel revascularization (OR 2.6, 95% CI 1.6–4 .4). Lp(a) was not associated with coronary calcific plaque but was significantly linked to vulnerable plaque phenotypes, including lipid–rich plaque and thin–cap fibroatheroma (high–risk plaque OR 2.1, 95% CI 1.4– 3.1; TCFA OR 2.0, 95% CI 1.3– 3.0).
Conclusions: Lp(a) bridges laboratory data and interventional decision–making, supporting a biologically infarmed approach that integrates anatomica! complexity, procedura! risk, and plaque vulnerability into PCI planning and fallow–up. These findings reinfarce the raie of Lp(a) as a key biomarker in advanced dyslipidemia and multimodality coronary imaging far personalized risk stratification.



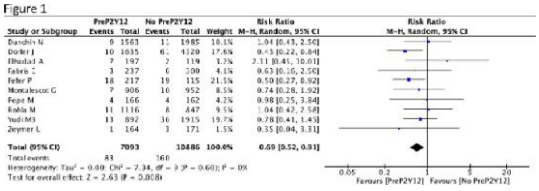
Abstract citation ID: suag058.509

P2Y12 INHIBITORS PRETREATMENT STRATEGY IN PATIENTS WITH STEMI: A SYSTEMATIC REVIEW AND META–ANALYSIS

L. Buioni, V. Palmas, M. Casula, G. Binaghi, L. Semeraro, P. Orrù, A. Pani, D. Riganelli, A. Boi, F. Sanna, B. Loi, and M. Corda
Arnas G.Brotzu

Introduction: Although current European Society of Cardiology guidelines state that a P2Y12 inhibitor pretreatment strategy may be considered in STEMI patients undergoing a primary percutaneous coronary intervention (PCI) strategy (Class IIb), solid evidence to support this choice in clinical practice remains lacking. The aim of this study was to summarize the latest available evidence on this topic.
Methods: Electronic databases were searched for observational and randomized studies (RCT) comparing P2Y12 inhibitor pretreatment strategy versus downstream strategy (i.e., loading dose administered at the time of primary PCI) in patients with STEMI candidate to primary PCI. The studied outcomes were early reinfarction, death, stroke, stent thrombosis, and major bleeding. The statistical software Review Manager 5.4 was used to conduct a random–effect study–level metanalysis. The overall effect was reported as risk ratio (RR) and relative 95% confidence interval (CI).
Results: After the selection process a total of 15 studies (3 RCT, 1 post–hoc analysis of RCT and 11 observational) including 65.144 patients (45.915 pretreated and 19.227 no pretreated) were included in our analysis. The mean age of the included patients was 64±2 years and the mean reported time between P2Y12 administration and primary PCI in the pretreated group was 63±24 minutes. Patients pretreated with a P2Y12 inhibitor had a statistically significant lower risk of early reinfarction as compared with patients treated with P2Y12 at the time primary PCI (RR 0,69; 95% CI 0,52–0,91; p=0,008 – Figure 1). No significant differences were detected for the risk of death (RR 0,88; 95% CI 0,68–1,12; p=0,30), stroke (RR 0,83; 95% CI 0,59–1,18; p=0,30), stent thrombosis (RR 0,68; 95% CI 0,42–1,10; p=0,12), and major bleeding (RR 1,03; 95% CI 0,83–1,26; p=0,80) – Figure 2.
Conclusion: The results of our study–level meta–analysis suggest that a P2Y12 inhibitor pretreatment strategy in STEMI patients undergoing primary PCI may be associated with a reduced risk of early reinfarction, without a significant increase in the risk of major bleeding. Further studies are warranted to evaluate the impact of the time interval between P2Y12 inhibitor loading and primary PCI on clinical outcomes in pretreated patients.

Figure 1



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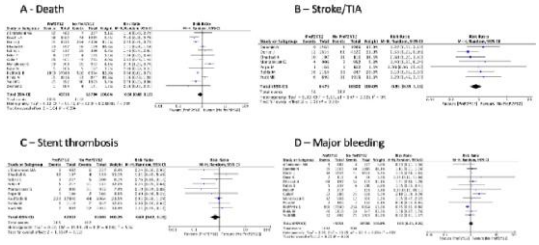

Abstract citation ID: suag058.510

BETA–BLOCKER TREATMENT AFTER MYOCARDIAL INFARCTION: A SYSTEMATIC REVIEW AND META–ANALYSIS

S. Di Fusco, A. Matteucci, A. Alonzo, A. Spinelli, L. Castello, G. Marino, S. Aquilani, S. Fedele, F. Nardi, and F. Colivicchi
Ospedale San Filippo Neri; Ospedale Pertini; Ospedale Santo Spirito

Background: The clinical benefit of beta–blocker treatment in patients with a previous myocardial infarction (MI) and without a reduced left ventricular ejection fraction (LVEF) is not established. This study aims at assessing the impact of beta–blocker treatment after an MI based on the type of MI at presentation, the LVEF, and the patient's sex in the setting of contemporary management of MI.
Methods: We searched PubMed and Cochrane Library databases for randomized clinical trials reporting the impact on prognosis by MI type at presentation (with ST segment elevation, STMI, or without ST segment elevation, NSTEMI), LVEF, and sex. A meta–analysis was performed to assess the association between the non–use of beta–blockers and outcomes in different patient subgroups. Publication bias and small–study effects were assessed by funnel plots, with asymmetry tested using regression–based methods and corrected estimates explored via the trim–and–fill method.
Results: The non–use of beta–blockers was found to be associated with a greater risk of adverse outcomes in NSTEMI patients (RR 1.13; 95% CI 1.02–1.25; I² 18%) and in patients with mildly reduced LVEF (RR 1.24; 95% CI 1.03–1.49; I² 0%) (Figure 1). No significant association between beta–blocker treatment and adverse outcomes was found in patients with a previous STEMI, in patients with preserved LVEF, in males and in females.
Conclusions: Among patients with a previous MI and LVEF ›40%, those not treated with beta–blockers seem to have a higher risk of adverse outcomes when the index event was a NSTEMI or when LVEF was mildly reduced.

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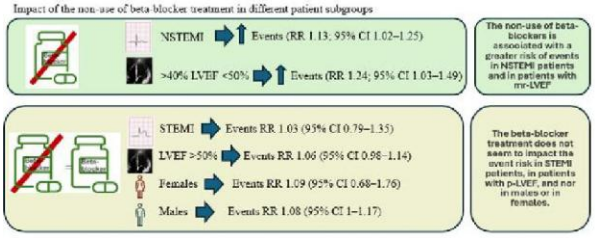


Figure 1

Acute Coronary Syndrome - Clinical Cases 1

Abstract citation ID: suag058.511

A STEMI IN POEMS SYNDROME: A CASE REPORT

M. Pezzella, S. Benedetta, G. Brunetti, F. Donato, L. Licchelli, P. Naso, and L. Cacciavillani
Azienda Ospedale Università Di Padova

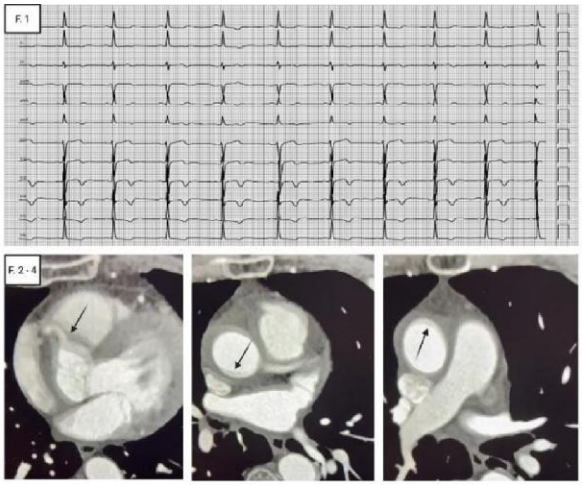
Background: POEMS (polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy, skin lesions) syndrome is a rare systemic hematological disorder with multi–organ involvement. Though pathophysiology is incompletely understood, cytokine dysregulation is thought to play a central role and VEGF levels are frequently high.
Case summary: A 42–year–old woman with no previous cardiovascular history presented to the ED with a 3–day history of worsening intermittent and oppressive chest pain radiating to the left arm. Her father suffered from ischemic heart disease and no other conventional risk factor was known. 10 months earlier she was diagnosed with POEMS syndrome after the onset of sensory–motor polyneuropathy of the lower limbs. At the admission the patient was hemodynamically stable. ECG revealed a ST–segment elevation in the anterolateral leads and a diagnosis of STEMI was made. Transthoracic echocardiography showed a mild circumferential pericardial effusion and acute mechanical complications were promptly excluded by a cardiac CT. The patient underwent emergent coronary angiography which revealed a thrombotic sub–occlusive stenosis of the mid left anterior descending artery and no other significant coronary artery disease. PCI was performed with optimal angiographic result. Dual antiplatelet therapy with ticagrelor and acetylsalicylic acid and a high–intensity lipid–lowering treatment were started. A comprehensive echocardiography showed a mildly reduced ejection fraction of the left ventricle due to akinesia of the apex, the mid anterior and septal walls with the persistence of a minimal pericardial effusion. During hospitalization the patient remained hemodynamically stable and asymptomatic. LDL was 83 mg/dL and Lp(a) was on desirable levels. High–sensitivity troponin peak level was 9758 ng/L and subsequently decreased. Mild thrombocytosis was observed on admission and progressively normalized and VEGF was significantly increased. After optimization of the medical therapy, the patient was discharged home in good clinical condition.
Discussion: The association between POEMS syndrome and acute myocardial infarction is poorly understood as myocardial ischemia is not a typical manifestation of the disease and only few cases have been reported in literature. The cytokine–mediated endothelial dysfunction and the prothrombotic mechanisms have been proposed as potential driving mechanisms in the development of coronary events in these patients.

Abstract citation ID: suag058.512

TYPE A INTRAMURAL HAEMATOMA MIMICKING ACUTE CORONARY SYNDROME: THE VALUE OF A MULTIMODALITY DIAGNOSTIC PATHWAY

S. Saraullo, M. Rizzuto, V. Zuardi, A. Mazzei, R. Magnano, D. Rossi, C. Scollo, M. Di Marino, L. Pezzi, E. Genovesi, M. Gravina, M. Primavera, A. Odoardi, B. Iadanza Lanzaro, D. Clemente, R. Carnesale, R. Spina, L. Stoduto, T. Civitarese, F. Fulgenzi, P. Vitulli, D. Forlani, G. D'Angelo, A. D'Alleva, U. Benedetto, and M. Di Marco
UOC Cardiologia–Utic Ospedale Santo Spirito Pescara; Università Degli Studi G. D'Annunzio Chieti–Pescara; UOC Clinica Cardiochirurgica Ospedale Ss Annunziata Chieti; Dipartimento Cuore – UOC Clinica Cardiochirurgica Ospedale Ss Annunziata Chieti

A 67–year–old man presented to the ED with acute radiating chest pain. He was haemodynamically stable but unresponsive to intravenous nitrates. The ECG showed an ACS–like pattern with persistent T–wave inversion in the inferior and V3–V4 leads, biphasic T waves in the lateral leads, resembling a Wellens type A–like pattern (Fig. 1). Biomarkers were discordant: high–sensitivity troponin was negative, D–dimer was at the upper reference limit. Urgent transthoracic echocardiography demonstrated a non–dilated left ventricle with mildly reduced systolic function and regional hypokinesia of the basal interventricular septum and inferior wall. The aortic root and ascending aorta were dilated (50 mm; 28 mm/m²), in the setting of a tricuspid aortic valve with mild–to–moderate aortic regurgitation. Focal aortic wall thickening/lamination raised suspicion of acute aortic syndrome, with a small pericardial effusion. Computed tomography angiography confirmed a crescentic hyperattenuating mural thickening (10 mm) along the right lateral ascending aorta and aortic arch, consistent with type A intramural haematoma with right coronary ostial involvement and haemopericardium (Fig. 2–4). The patient was transferred to a tertiary aortic centre for high–risk features. He underwent urgent open repair with ascending aortic resection and replacement using a 30–mm Gelweave graft. The postoperative course was uneventful. Prediscarge TTE showed mildly reduced LV systolic function with persistent inferior wall hypokinesia, and the patient was discharged on postoperative day 9 to cardiac rehabilitation. Acute aortic syndromes (AAS) are the "great mimickers". IMH, accounting for approximately 5–25% of AAS, reflects haemorrhage within the aortic media. Type A IMH may mimic ACS and, albeit rarely, present as STEMI when compromises a coronary ostium (most often the right coronary artery). Presentation mimicking a Wellens type A pattern classically linked to critical proximal LAD occlusion (OMI), is exceptional and increases the risk of diagnostic anchoring. Because outcomes are profoundly time dependent—particularly with coronary or cerebral malperfusion—misdiagnosis may be catastrophic, and an ACS–driven pathway (urgent angiography and antithrombotic escalation) may be hazardous. This case supports a deliberate bedside "rule–out" strategy for acute aortic syndrome in ED chest–pain pathways, expecially with discordant clinical or laboratoristic findigs.



Abstract citation ID: suag058.513

ELDERLY PATIENTS WITH LOWER BLOOD HEMOGLOBIN LEVELS DURING ACUTE CORONARY SYNDROME HAVE HIGHER GLOBAL MORTALITY RISK IN THE LONG–TERM FOLLOW UP

D. Merotto, H. Mahmoud, M. Dario, R. Cordiano, A. Dal Bo, P. Visentin, E. Selvestrel, F. Cavuto, and G. Berton
Abc Study On Heart Disease Foundation E.T.S.

Introduction: The impact of baseline blood hemoglobin (Hb) levels, as a marker of anaemia, on long–term mortality after acute coronary syndrome (ACS) is not well established.
Methods: To evaluate the association between low Hb levels during hospitalization for ACS and very long–term overall mortality, we enrolled 571 patients admitted with ACS to three Italian hospitals and discharged alive. Patients were followed prospectively for 26 years or until death. Continuous variables were analyzed as tertiles, and categorical variables as proportions. Survival analysis was performed using Cox regression models. All analyses were carried out using STAT 18.0 StataCorp LLC, (TX) USA.
Results: All but three patients completed follow–up, for a total of 7091 person–years. The mean age was 66±12 years, and 30% were female. Baseline Hb levels were 13.5±0.8 g/dL overall, 14.0±1.6 in males and 12.6±1.5 in females (p<0.0001). During follow–up, 483 patients (85%) died from any cause. The incidence rate was 68 per 1000 person–years, 60 in males and 97 in females. At univariable analysis, baseline Hb was not associated with mortality (HR: 0.9; 95% CI: 0.8–1.0; z=–1.8; p=0.07). After adjustment for age and gender, Hb remained not associated with the outcome (age: HR: 3.0; 95% CI: 2.6–3.4;

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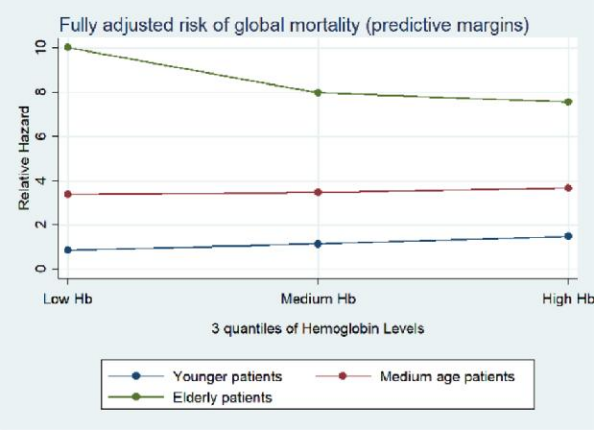
z=16.0; p<0.0001; female gender: HR: 1.0; 95% CI: 0.8–1.2; z=–0.1; p=0.95). When a formal interaction term was set in the Cox model, Hb showed a positive association with mortality (HR: 1.5; 95% CI: 1.1–2.2; z=2.6; p=0.01) and a negative interaction with age (HR: 0.8; 95% CI: 0.7–0.9; z=–2.6; p=0.01). Results remained very similar in the fully adjusted model (HR: 0.8; 95% CI: 0.7–0.9; z=–2.5; p=0.01). Covariates included in the fully adjusted model were gender, heart failure, hypertension, antiplatelet treatment, history of acute myocardial infarction, and estimated glomerular filtration rate.

Conclusions: This very long–term prospective study suggests that older patients with low blood Hb levels during ACS have a higher long–term overall mortality risk than elderly patients with higher Hb levels and young patients. This observation highlights the prognostic importance of anaemia chiefly in elderly ACS patients.

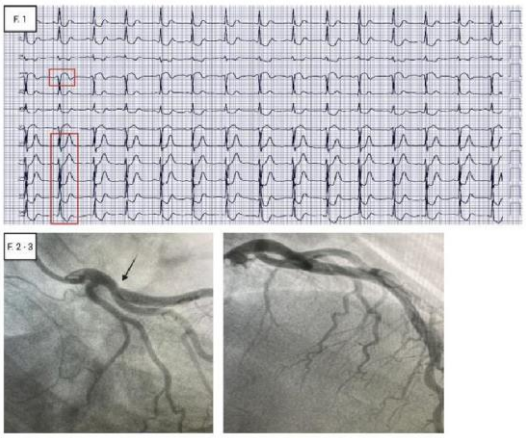


Abstract citation ID: suag058.514

SPONTANEOUS CORONARY ARTERY DISSECTION PRESENTING WITH DE WINTER ECG PATTERN

S. Saraullo, D. Rossi, V. Zuardi, M. Rizzuto, R. Magnano, C. Scollo, M. Di Marino, A. D'Alleva, E. Genovesi, L. Pezzi, B. Iadanza Lanzaro, M. Primavera, N. De Luca, M. Gravina, E. Verrengia, T. Civitarese, F. Fulgenzi, P. Vitulli, D. Forlani, and M. Di Marco
UOC Cardiologia–Utic Ospedale Santo Spirito Pescara; Università Degli Studi G. D'Annunzio Chieti–Pescara

A 44–year–old woman of sub–Saharan origin presented to the Emergency Department with intermittent, oppressive, radiating chest pain unresponsive to nitrates. She had no prior cardiovascular history; multiple spontaneous miscarriages. The 12–lead ECG showed sinus tachycardia with tall, symmetric hyperacute T waves in V2–V4 accompanied by upsloping ST–segment depression. Mild ST–segment elevation was present in aVR and V1, with widespread downsloping ST depression in the remaining leads—features consistent with a de Winter pattern (Fig. 1), a STEMI equivalent, suggestive of occlusive myocardial infarction (OMI). Laboratory testing was unremarkable except for an elevation in high–sensitivity troponin I above the 99th percentile upper reference limit. Urgent transthoracic echocardiography demonstrated a non–dilated left ventricle with moderately reduced systolic function (LVEF 45%), driven by hypokinesia of the mid–to–apical interventricular septum and the anterior apex, with no significant valvular disease and no signs of central congestion. The patient was managed as a high–risk NSTEMI and underwent urgent coronary angiography, which revealed a flow–limiting spontaneous coronary artery dissection (type 2B) involving the proximal LAD–first diagonal bifurcation. Direct implantation of a single drug–eluting stent achieved an excellent final angiographic result. The in–hospital course was uncomplicated, with recovery of global and regional left ventricular function, and she was discharged on dual antiplatelet therapy on the fourth day. The de Winter pattern accounts for ~2% of acute LAD occlusions, rarely in SCAD–related events. Diagnostic criteria comprise hyperacute, symmetric precordial T waves with ›1 mm upsloping ST–segment depression in V2–V6, absence of anterior ST elevation, and 0.5–1 mm ST elevation in aVR. These features reflect a proximal ischaemic injury vector directed away from the anterior precordial leads, producing reciprocal ST depression with prominent T waves, while the concomitant ST elevation in aVR represents its projection toward the right–superior quadrant, consistent with a large, proximal ischaemic territory. This case underscores that de Winter is a time–critical STEMI equivalent (OMI) and highlights SCAD as an important mechanism in young women; prompt recognition should trigger an immediate invasive pathway to mitigate adverse short– and long–term outcomes in these situations.



Abstract citation ID: suag058.515

STENT THROMBOSIS: AN UPDATED CLINICAL OVERVIEW FROM CLASSIFICATION TO MANAGEMENT

L. Granata, M. Marchetta, and G. Alagna
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Stent thrombosis (ST) remains one of the most feared complications of percutaneous coronary intervention (PCI). Although its incidence has markedly declined with new–generation drug–eluting stents (DES), ST still commonly presents as sudden cardiac death or ST–elevation myocardial infarction and is associated with high morbidity, mortality, and risk of recurrence. The progressive shift from early to very late ST, driven by complex biological, device–related, pharmacological, and procedural factors, has renewed interest in its mechanisms and prevention. This narrative review summarizes contemporary evidence on the epidemiology, temporal classification, pathophysiological mechanisms, diagnostic approaches, and management of ST in the modern PCI era. A narrative literature review was conducted using PubMed, Embase, and major cardiology guidelines up to November 2025, including data from randomized trials, large registries, intracoronary imaging studies, and key DES development research, without formal systematic methodology. Current–generation DES have reduced ST incidence to approximately 0.5–1% during the first year and 0.2–0.6% annually thereafter (Figure 1), with very late events accounting for the majority of cases. ST is multifactorial and involves patient–related comorbidities, complex coronary anatomy, high thrombotic burden, suboptimal stent expansion or malapposition, premature interruption of dual antiplatelet therapy (DAPT), delayed endothelialization, neoatherosclerosis, and hypersensitivity reactions (Figure 2). Intravascular imaging, particularly optical coherence tomography and intravascular ultrasound, plays a central role in identifying procedural mechanisms, optimizing stent implantation, and clarifying causes of both early and late events. Acute management remains challenging because large thrombus burden and microvascular obstruction reduce procedural success compared with PCI for de novo lesions. High–pressure post–dilatation, selective thrombus aspiration, potent P2Y12 inhibitors, glycoprotein IIb/IIIa inhibitors in selected cases, and individualized antithrombotic strategies represent key therapeutic options (Figure 3). Despite major advances, ST remains a rare but devastating event. Prevention, through meticulous imaging–guided PCI, personalized DAPT strategies, aggressive risk–factor control and careful stent selection, remains the most effective approach in contemporary practice.

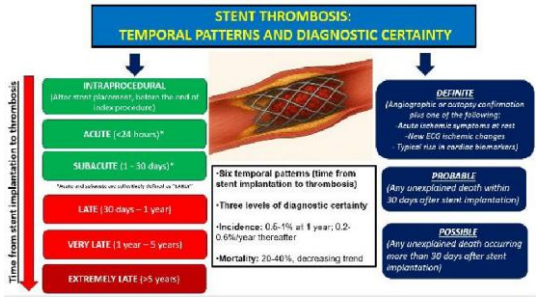

Figure 1. Temporal pattern, diagnostic certainty, incidence and mortality

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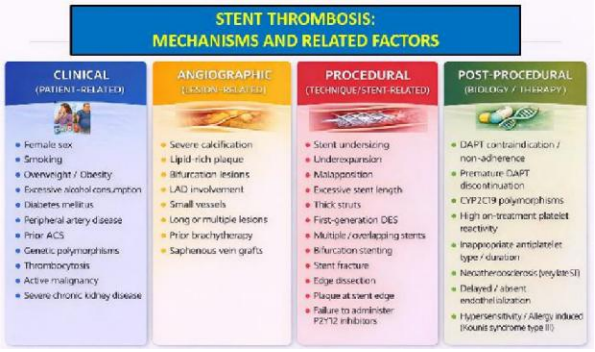


Figure 2. Mechanism and related factors

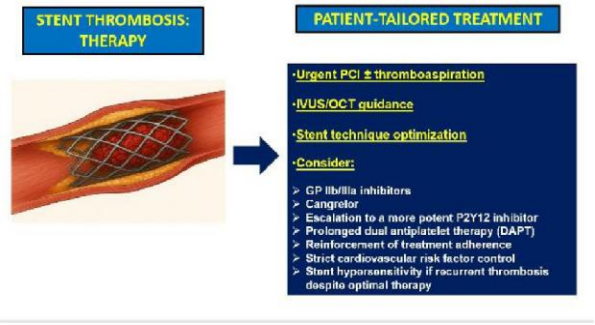
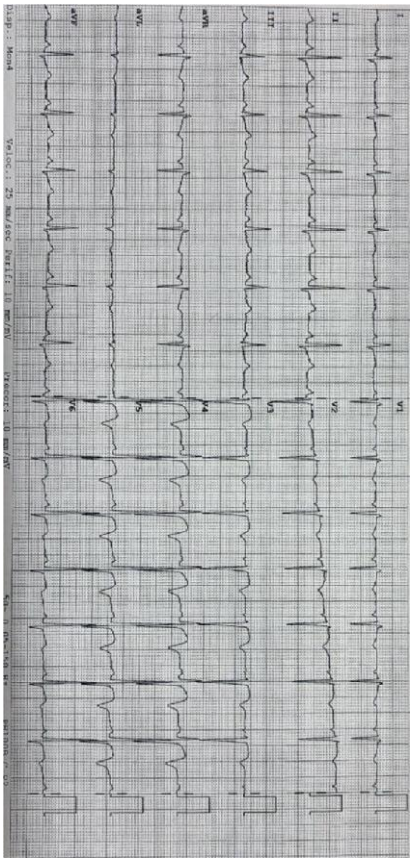
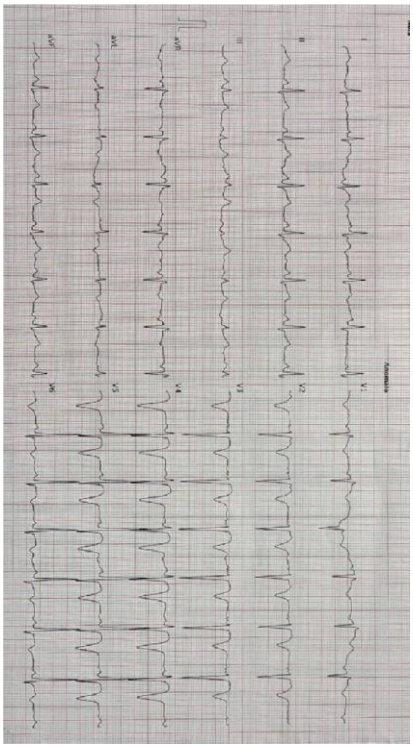


Figure 3. Therapy and patient-tailored treatment





Abstract citation ID: suag058.516

PROGRESSIVE EVOLUTION OF WELLENS SYNDROME: A CASE REPORT OF ECG PATTERN CHANGE AND SUCCESSFUL PCI

A. Nardone, S. Testa, L. Falcone, D. Mandunzio, D. Centorame, C. Romano, L. Guerrera, A. Trivisonno, and A. Colavita
Cb; Osp.Cardarelli

Wellens syndrome is an electrocardiographic pattern characterized by biphasic (type A) or deeply inverted (type B) T waves in leads V2–V3. It is typically caused by temporary obstruction of the left anterior descending (LAD) coronary artery due to rupture of an atherosclerotic plaque, leading to occlusion. We present a clinical case of a patient whose ECG evolved from type A to type B.

Case Presentation: A patient arrived in the Emergency Department (ED) due to recurrent episodes of oppressive chest pain lasting about 10 minutes, resolving spontaneously. The ECG showed a Wellens pattern of type A, which gradually progressed to type B. Echocardiography revealed apical akinesia and moderately reduced global systolic function. Urgent coronary angiography revealed a sub–occlusion of the proximal LAD. A PCI was performed with implantation of a DES TC–LAD and kissing balloon TC–LAD–Cx. TIMI flow was 3. A follow–up echocardiogram showed improvement in the previously altered kinetic abnormalities. The patient was discharged asymptomatic and in good general condition.

Discussion: Wellens syndrome is a strong predictor of impending anterior myocardial infarction, often due to transient LAD obstruction. The progression from type A to type B suggests worsening ischemia and instability of the coronary lesion. Our patient's evolution in ECG pattern emphasized the need for urgent intervention. The successful PCI with DES implantation restored coronary perfusion and improved myocardial function, confirming the effectiveness of early treatment.**Conclusions:** This case highlights the importance of recognizing Wellens syndrome early to prevent myocardial infarction. Timely PCI and the use of drug–eluting stents effectively restored coronary flow, improving myocardial function. Early intervention is crucial in managing Wellens syndrome and preventing irreversible heart damage.

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Abstract citation ID: suag058.517

THE HEART THAT FALLS INTO THE DECEPTION OF CATECHOLAMINES

S. Testa, D. Mandunzio, M. Veleno, A. Viele, A. Trivisonno, and A. Colavita
Ospedale Cardarelli

MINOCA is a heterogeneous syndrome encompassing various pathophysiological mechanisms, including vasospasm, microvascular dysfunction, spontaneous coronary artery dissection, and systemic conditions that result in a mismatch between oxygen supply and demand. Less common, but clinically relevant, causes include adrenergic crisis from pheochromocytoma, which can mimic acute myocardial infarction. We present the case of an 87–year–old patient with MINOCA secondary to catecholaminergic crisis from pheochromocytoma, a rare condition in this age group. An 87–year–old man presented to the emergency department with acute chest pain associated with marked elevation of the blood pressure. The ECG showed an anterior QS and ST–segment elevation with homologous RV atypia and elevated myocardial necrosis enzymes (Figure 1). The echocardiogram showed a moderate reduction in global systolic function with total apical akinesia. The patient underwent urgent coronary angiography, which demonstrated a coronary circulation free of significant stenosis. During hospitalization, marked and persistent hypertension emerged, poorly responsive to conventional therapy, associated with tachycardia and profuse sweating. Given the possible endocrine nature of the condition, an abdominal CT scan was performed, which revealed a large adrenal mass compatible with pheochromocytoma (Figure 2). Further investigations confirmed catecholaminergic hyperproduction and the diagnosis. Based on the coronary angiography and laboratory findings, the final diagnosis was MINOCA secondary to adrenergic crisis caused by pheochromocytoma. The subsequent hospital stay was uneventful, with a progressive reduction in hsTnI and an improvement in the ECG. After the cardiac status stabilized, the patient was referred to a level II center for treatment of the pheochromocytoma. In this case, the failure of the hypertension to respond to conventional therapies and the discordance between the ECG/enzyme findings and coronary angiography led to further endocrinological evaluation. This case highlights the importance of considering pheochromocytoma among the possible causes of MINOCA, even in advanced age. The integrated evaluation of clinical, biochemical and instrumental data is essential to avoid diagnostic delays.

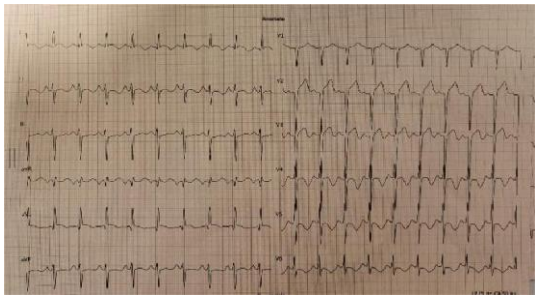

Figure 1

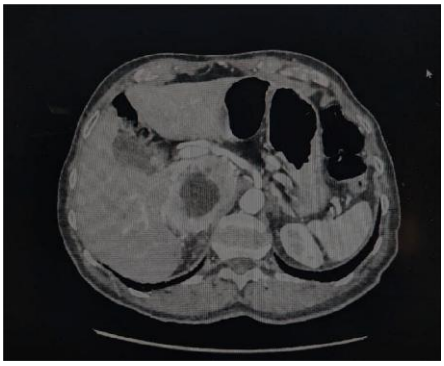

Figure 2

Acute Coronary Syndrome - Clinical Cases 2

Abstract citation ID: suag058.518

WHEN 4 MINUTES CAN CHANGE A LIFE FOREVER. A CASE OF VASOSPASTIC ANGINA WITH POLYMORPHIC VENTRICULAR ARRHYTHMIA

D. Barbisan, N. Gasparetto, V. Menegon, M. Possamai, T. Sciarretta, M. Malasisi, Y. Caldarella, and C. Cernetti
Unit of Cardiology, Neuro–Cardio–Vascular Dpt, Aulss 2 Marca Trevigiana, Hospital of Treviso, Treviso, Italy

Background: Myocardial Infarction with Non–Obstructive Coronary Arteries (MINOCA) is a challenging clinical scenario because of its heterogeneous aetiologies. Among the clinical conditions considered causes of MINOCA, epicardial coronary artery spasm (variant angina, Prinzmetal angina) should be considered, especially when symptoms occur at rest.

Abstract: Herein, we describe a case of a 51–year–old man who presented to the local emergency department with many episodes of chest pain at rest, followed by rapid palpitations and dizziness. During cardiological evaluation, the patient was asymptomatic, with grade 1 hypertension, without symptoms or signs of heart failure. The echocardiogram was unremarkable, while the electrocardiogram (ECG) demonstrated right bundle branch block with T waves in V1 to V3 initially negative, then positive (Figure 1). Blood tests showed a rise in troponin T from 53 to 205 ng/l, with no alterations in hemoglobin or renal function. Based on these findings, the young man was hospitalized in Coronary Intensive Care Unit. Coronary angiography showed ‹ 50% stenosis of the anterior descending artery and right coronary artery, without any left ventricular wall motion abnormalities or elevations in end–diastolic left ventricular pressure. A diagnosis of MINOCA was established, so the patients underwent cardiac magnetic resonance, but even this investigation was normal. One day, after dinner, the patients alerted the medical staff because of constrictive chest pain, followed by palpitations. Telemetry monitoring showed a 4–minute transient ST elevation, followed by rapid, polymorphic ventricular tachycardia (Figure 2). After ST resolution, the ECG was normal (Figure 3). Therapy with diltiazem and nitrates was established, without further episodes of transient ST elevation. Because of the presence of rapid, polymorphic ventricular tachycardia during epicardial coronary spasm, a bicameral implantable cardiac defibrillator (ICD) was implanted to titrate Ca–antagonist therapy.

Conclusions: Vasospastic angina is a potentially life–threatening condition that should always be considered in the MINOCA clinical setting. During transient ST elevations, rapid and polymorphic ventricular arrhythmias can occur, so ICD implantation should be considered to protect patients from sudden death.

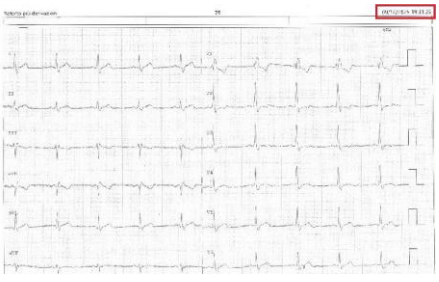

Figure 1

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Figure 2

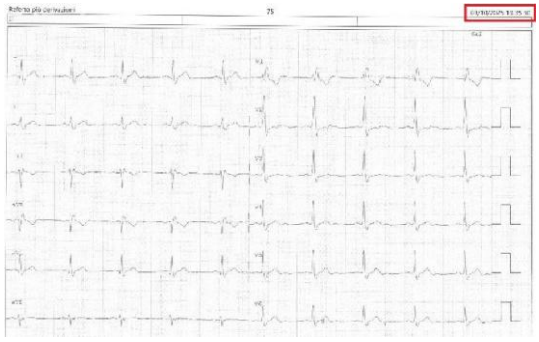
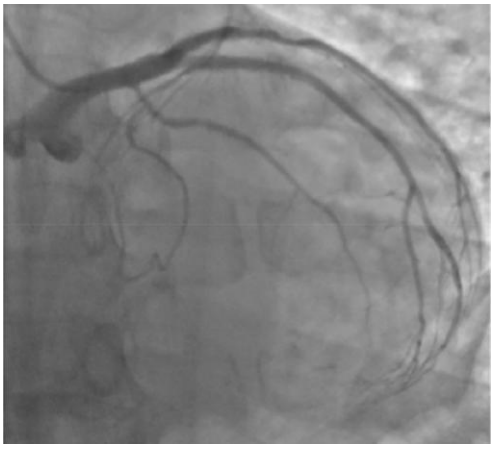


Figure 3



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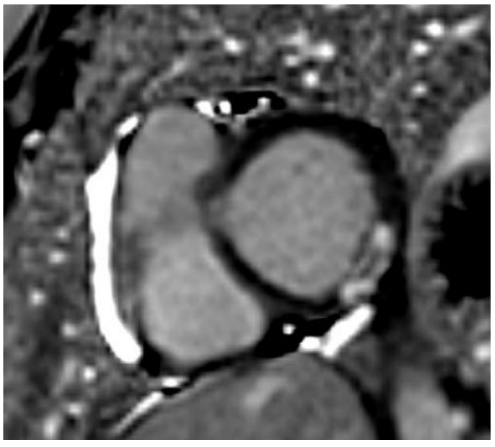

Figure 2

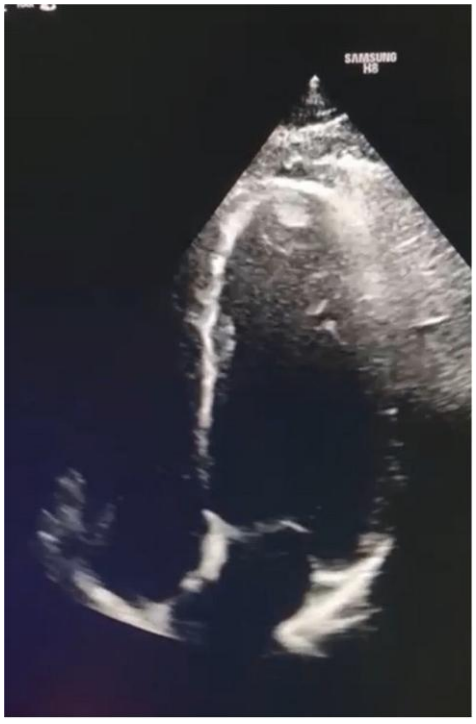

Figure 3

Abstract citation ID: suag058.519

ONE SHOT, TWO KILLS: AN APICAL THROMBUS CAUSING CONCOMITANT CEREBROVASCULAR STROKE AND MINOCA

M. Milo, M. Rella, A. De Castro, M. Gioia, A. Leopizzi, E. Muscogiuri, and E. Pisano' P.O. A. Perrino

A 41–year–old man with a history of prior anterior myocardial infarction (MI), previously treated with primary percutaneous coronary intervention (PCI) of the left anterior descending artery (LAD) and staged PCI of the left circumflex (LCx) and right coronary artery, was admitted for sudden left–sided paraesthesia. Blood tests revealed marked myocardial injury (peak high–sensitivity troponin 21,931 ng/mL), and ECG showed silent ischemic changes. Transthoracic echocardiography demonstrated chronic apical akinesia with a newly detected, round, homogenous hyperechoic apical thrombus measuring 10 mm (Fig. 3). Given the risk of haemorrhagic transformation while on triple antithrombotic therapy [1]—and in the absence of clinical instability—coronary angiography was deferred. Initial head CT was unremarkable; however, brain MRI performed the following day revealed a large right occipito–mesial infarction with ipsilateral thalamic involvement. Anticoagulation with adjusted–dose low molecular weight heparin (LMWH) was initiated in agreement with neurology. Follow–up CT at day 5 excluded haemorrhagic conversion. Cardiac magnetic resonance imaging confirmed a minute apical thrombus and demonstrated an acute basal posterior myocardial infarction with microvascular obstruction (Fig. 2). Subsequent coronary angiography revealed chronic LAD stent occlusion with patency of previously implanted LCx and RCA stents (Fig. 1). Overall, the findings were consistent with myocardial infarction with non–obstructive coronary arteries (MINOCA), most likely of cardioembolic origin [2]. The patient was discharged with neurological improvement on aspirin and therapeutic LMWH, with transition to oral anticoagulation planned after 1–month CT reassessment. Simultaneous cardioembolic stroke and MINOCA remain a rarely reported association. This case highlights the importance of considering an embolic mechanism in patients presenting with neurological symptoms and evidence of myocardial ischemia. Multimodality imaging improved diagnostic accuracy. Management was particularly challenging because the need for anticoagulation coexisted with the risk of haemorrhagic transformation. The decision to postpone coronary angiography, guided by symptoms, proved appropriate.

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Abstract citation ID: suag058.520

BEYOND THE USUAL ACS: AN ATYPICAL HEART UNDER STRESS

V. Ligorio, M. Peronti, A. Craiescu, A. Spagnolo, A. Segreti, S. Crispino, M. Ciancio, G. Ussia, and F. Grigioni
Policlinico Campus Bio–Medico

A 60–year–old woman, recently diagnosed with invasive lobular breast carcinoma, presented with oppressive chest pain radiating to the left shoulder, lasting 15–30 minutes and resolving spontaneously. The electrocardiogram demonstrated sinus tachycardia, ventricular ectopy, including couplets, and a known left bundle branch block, in the absence of ST–T segment abnormalities. The troponin levels were elevated, rising from 1,442 to 13,396 ng/L in 1 hour. Transthoracic echocardiography revealed dyssynchrony of the interventricular septum with marked apical hypokinesia and basal segment hypercontractility.

Based on the clinical presentation, characteristic wall motion abnormalities and elevated troponin levels in the absence of ischemic ECG changes, a preliminary diagnosis of Takotsubo syndrome (TTS) was made. Recent huge emotional distress related to the diagnosis of a breast lesion, further supported this diagnosis.

To exclude obstructive coronary artery disease, coronary angiography was performed which revealed no critical stenoses in the epicardial coronary arteries but demonstrated a spontaneous coronary artery dissection (SCAD) in a distal coronary branch.

To further investigate, a cardiac magnetic resonance was performed and revealed a dilated left ventricle with globally reduced systolic function (LVEF 44%) and regional wall motion abnormalities, including hypokinesia of the apical and mid–ventricular segments, associated with septal dyssynchrony. Furthermore, CMR demonstrated T2 hyperintensity involving the mid–apical anterior wall, tissue characterization (LGE) involving the mid–apical anterior wall, consistent with sub–acute myocardial infarction in the distal left coronary artery territory, and myocardial edema.

The prevalence of TTS is around 1–2% of all acute coronary syndromes, while SCAD accounts for approximately 1–4% of all acute myocardial infarctions. This case illustrates the concomitant occurrence of Takotsubo syndrome and spontaneous coronary artery dissection in a patient with newly diagnosed breast cancer. Both conditions are uncommon, and their association is exceedingly rare, particularly in the cardio–oncology setting. The overlap between these entities highlights the importance of systematic multimodal assessment to avoid misdiagnosis and to guide optimal management. Increased awareness of this association may contribute to improved risk stratification and tailored treatment in oncologic patients presenting with acute chest pain.

Abstract citation ID: suag058.521

RECURRENT MYOCARDIAL INFARCTION IN A PATIENT WITH CORONARY ARTERY ECTASIA: WHEN SLOW FLOW BECOMES THE ENEMY

E. Soranzo, R. Andrico, G. Sinagra, and M. Imazio
Ospedale Cattinara, Soc Cardiologia, Asugi, Trieste; Ospedale Santa Maglia Degli Angeli, Soc Cardiologia, Asufc, Pordenone; Ospedale Santa Maria Della Misericordia, Soc Cardiologia, Asufc, Udine

Background: Coronary artery ectasia (CAE) represents an uncommon angiographic finding, defined as a coronary dilatation exceeding 1.5 times the diameter of an adjacent normal segment. CAE may predispose to slow coronary flow, thrombosis, and recurrent ischemic events. Optimal management remains controversial due to the absence of randomized controlled trials and standardized antithrombotic strategies.
Case Presentation: A 45–year–old man with hypercholesterolemia, family history of ischemic heart disease presented recurrent episodes of myocardial infarction despite tailored antithrombotic regimens. The first inferior ST–elevation myocardial infarction (STEMI) occurred in 2022 revealing a tortuous, diffusely ectatic right coronary artery (RCA) with slow flow and distal thrombotic occlusion in the absence of atherosclerotic plaque. Thrombophilia testing was negative. The patient was discharged on warfarin and aspirin. In 2024, after warfarin discontinuation, a recurrent inferior STEMI occurred, treated with percutaneous transluminal coronary angioplasty (PTCA) and thromboaspiration of the distal RCA. The patient was discharged on warfarin and clopidogrel. Warfarin was later replaced with rivaroxaban, leading to another episode of inferior non–ST–elevation myocardial infarction (NSTEMI). Angiography demonstrated a markedly aneurysmal RCA with slow flow and critical proximal stenosis (Figure 1, 2, 3). PTCA or stent implantation was deferred due to the absence of suitable device sizes and the patient was discharged with warfarin lifelong indication.
Discussion: CAE is a rare condition, observed in 0.3–5% of patients undergoing coronary angiography. In adults, the most common cause is atherosclerosis, followed by connective tissue diseases, rheumatologic conditions, and infections. Angiography remains the gold standard for assessing the location, size, and morphology of the aneurysm. This clinical case underscores the therapeutic complexity of coronary ectasia. Invasive and surgical options remain technically challenging and individualized and may include balloon angioplasty, implantation of covered stents, coil embolization for peripheral saccular aneurysms, or, in rare cases, surgical resection of the aneurysm. While medical therapy continues to rely on expert opinion. Long–term anticoagulation may represent the cornerstone of secondary prevention in patients with recurrent thrombotic events and flow disturbances related to coronary ectasia.

Figure 1

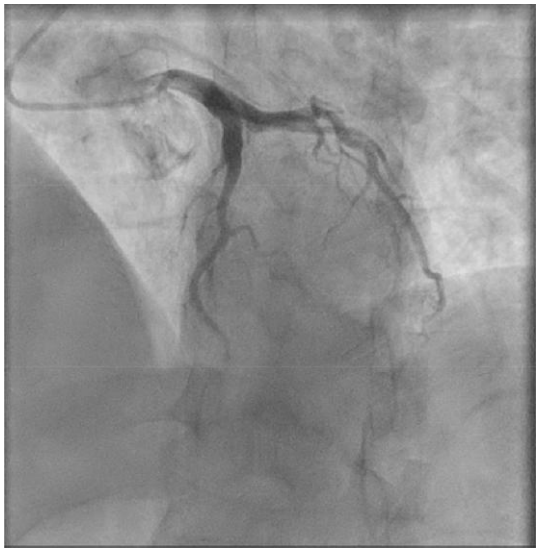

Figure 2

Figure 3

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Abstract citation ID: suag058.522

SPONTANEOUS CORONARY ARTERY DISSECTION (SCAD) IN A YOUNG, HEALTHY MALE: A RARE CASE OF ACUTE MYOCARDIAL INFARCTION

A. Nardone, L. Falcone, I. Gianfrancesco, S. Testa, D. Mandunzio, F. D'Amico, A. Viele, N. Porchetta, and A. Colavita
Osp Cardarelli

SCAD is a rare but increasingly recognized cause of AMI. SCAD is characterized by the formation of an intramural hematoma within the arterial wall, which leads to compression of the coronary lumen, resulting in myocardial ischemia. We present case of young male patient was admitted in emergency room cause of oppressive thoracic painful. A 41–year–old male patient, a regular athlete with no cardiovascular risk factors, presented to the emergency department with oppressive chest pain radiating to his left arm. The ECG showed ST–segment elevation in the inferior leads without mirror–image changes. An urgent coronary angiography, performed due to suspicion of inferior STEMI, revealed a critical reduction in caliber at the distal right ventricular branch of the right coronary artery, consistent with a type 2 coronary dissection. Importantly, there was no obstruction to antegrade flow. Given the angiographic findings and the absence of hemodynamic instability, a conservative management strategy was initiated. The patient's clinical course was uneventful, with a gradual decrease in myocardial injury markers. An echocardiogram revealed no abnormalities in left ventricular function or wall motion. He was discharged in good general condition. The clinical management of SCAD has evolved in recent years, with evidence suggesting that conservative treatment is often effective. Most patients experience spontaneous healing of the arterial dissection, and interventions such as PCI are generally reserved for cases involving hemodynamic instability or proximal coronary involvement. Early identification and careful monitoring are essential, as SCAD patients may experience recurrent events or progression of dissection. In this case, the decision to adopt a conservative approach was supported by the patient's stable condition and the absence of significant coronary flow limitation. The patient's favorable outcome further underscores the importance of conservative management in the majority of SCAD cases. SCAD is an uncommon but important cause of acute myocardial infarction, particularly in young, healthy males without traditional cardiovascular risk factors. Early diagnosis and conservative management are key to a favorable outcome. Conservative treatment should be the first–line approach in most cases of SCAD. Further research is needed to better understand the pathophysiology of SCAD in men and to refine management strategies for this rare condition.

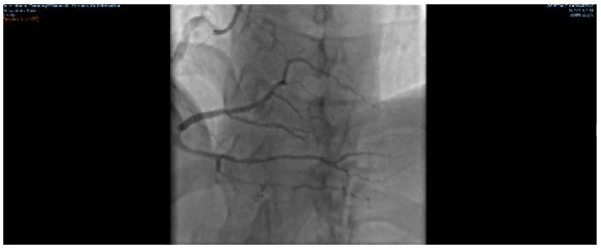

Figure 1: subocclusive stenosis of the anterior interventricular arteria

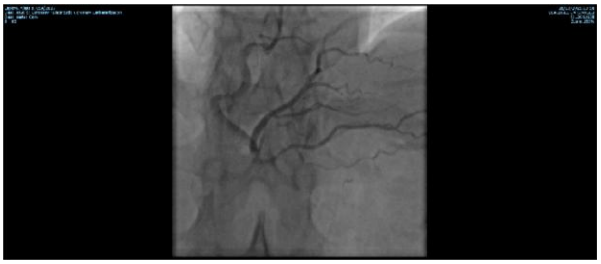

Figure 2: subocclusive stenosis of the anterior interventricular arteria

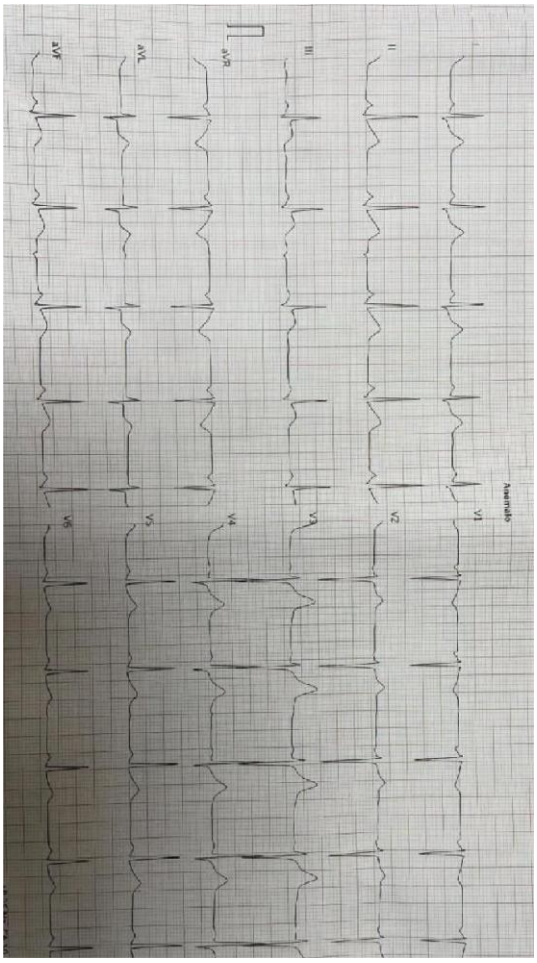

Figure 3: ECG graphic changes

Abstract citation ID: suag058.523

INFERO–LATERAL STEMI COMPLICATED BY DRESSLER'SSYNDROME WITH MASSIVE PERICARDIALEFFUSION: INTEGRATED MANAGEMENT AND VENTRICULAR RECOVERY

A. Nardone, S. Testa, D. Mandunzio, F. D'Amico, B. Cuzzola, A. Viele, A. Trivisonno, and A. Colavita
Ospedale Cardarelli

Background: Dressler'ssyndrome, a rare post–infarctioninflammatorycomplication in the era of earlymechanicalreperfusion, mayoccurseveral days after the acute ischemic event. We report a case of infero–lateral STEMI complicated by no–reflow and subsequentpleuro–pericardialeffusion, successfullymanagedthrough a multidisciplinaryapproach.
Case Presentation: A 66–year–old obese, hypertensive man in good therapeutic control presented with chestpainduringexertion. ECG showed an evolved infero–lateral STEMI. Echocardiographyrevealed an ejectionfraction (EF) of 30% with infero–posterolateralakinesia.
Urgentcoronaryangiographydemonstrateddiffuselyatheromatous vessels and a rightcoronaryartery (RCA) with muralaneurysms and TIMI 1–2 flow. PCI with drug–elutingstentimplantation on the distal RCA wasperformed. No–reflowoccurred and wastreated with intracoronary adenosine and tirofibaninfusion (Figure 1). The coursewascomplicated by intermittent second–degree AV block (2:1) (Figure 2) and a circumferentialpericardialeffusion (28 mm) with earlyright–sidedcompression, treated with colchicine, NSAIDs, and pericardiocentesis (900 mL of citro–hematicexudate). Bilateralpleuraleffusion (55 mm on the left one) wasdrained (2 L of citrine fluid) (Figure 3).

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Discussion: This case underscores the complexity of post–STEMI evolutioneven in the reperfusion era. The coexistence of no–reflow, conductiondisturbances, and Dressler'ssyndromerequiresvigilant monitoring and prompt, coordinated management of inflammatory and mechanicalcomplications. Early use of colchicine, NSAIDs, and drainage led to resolution of effusions and hemodynamicstabilization.
Conclusions: Although rare, Dressler'ssyndromeremains a possible late inflammatoryevolution after STEMI. Earlyrecognition and integrated treatment allowed clinical improvement and partial recovery of leftventricularfunction (EF 37% atdischarge).

Figure 1

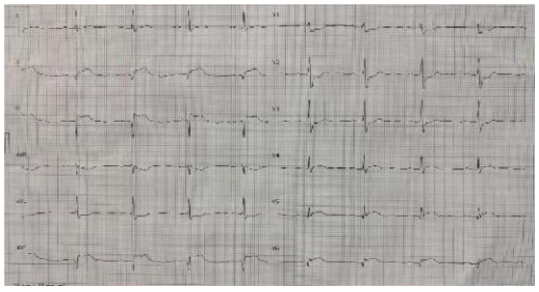

Figure 2

Figure 3

Abstract citation ID: suag058.524

COMPLEX PTCA AND ACUTE IN–STENT THROMBOSIS IN A SUSPECTED CLOPIDOGREL–RESISTANT PATIENT: PRASUGREL–BASED TRIPLE THERAPY AS A BAIL–OUT STRATEGY

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Background: In the concomitant management of coronary artery disease and atrial fibrillation, the choice of an antithrombotic strategy balancing ischemic and bleeding risks represents a therapeutic dilemma. Current guidelines recommend triple antithrombotic therapy followed by dual antithrombotic therapy, in which clopidogrel is the P2Y12 inhibitor of choice, discouraging the use of more potent agents such as ticagrelor or prasugrel due to excessive bleeding risk. However, the guidelines do not provide standardized decision–making pathways that consider clopidogrel resistance and in–stent thrombosis.
Case summary: We report the case of a 70–year–old dyslipidemic patient who presented with extertional dyspnea and severe left ventricular dysfunction (LVEF 22%). Coronary angiography revealed a significant bifurcation lesion involving the left anterior descending artery (LAD) and the second diagonal branch (D2). After initiation of dual antiplatelet therapy with aspirin and clopidogrel, the patient underwent PCI with two drug–eluting stent (DES) implantation by step mini–crush technique, intraprocedurally complicated by endoluminal thrombosis, resolved by DES post–dilatation and implantation of an additional DES in the mid–LAD. Given the high thrombotic risk related to procedural complexity, tirofiban infusion was started. However, the patient developed recurrent chest pain with ST–segment elevation a few hours later. Repeat coronary angiography documented recurrent acute in–stent thrombosis, successfully treated by re–PCI with plain old balloon angioplasty (POBA). Suspecting clopidogrel resistance, therapy was switched to prasugrel. The clinical course was further complicated by the onset of atrial fibrillation. Given the patient's high thrombotic risk and low bleeding risk, triple antithrombotic therapy with unfractionated heparin, aspirin and prasugrel was chosen, with no further events during hospitalization.
Conclusions: This case falls within an evidence gap: the need for triple antithrombotic therapy in the presence of suspected clopidogrel failure. Although guidelines recommend clopidogrel in triple therapy to reduce bleeding risk, suspected clopidogrel resistance associated with very high ischemic risk and low bleeding risk prompted the use of triple therapy with aspirin and prasugrel. This case highlights how, in selected patients, the use of prasugrel within triple antithrombotic therapy may represent a necessary rescue strategy.

Abstract citation ID: suag058.525

ST–SEGMENT ELEVATION MYOCARDIAL INFARCTION IN SEVERE HEMOPHILIA A: MULTIDISCIPLINARY MANAGEMENT OF A HIGH–RISK CASE

I. Pasquino, M. Orlandi, A. Guerra, L. Torlai Triglia, G. Magnani, M. Noni, R. Giacalone, G. Paoli, M. Bianconcini, A. Guidorossi, and G. Niccoli
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We report the case of a middle–aged man with severe hemophilia A poorly responsive to conventional treatment and multiple cardiovascular risk factors who presented with an infero–lateral ST–segment elevation myocardial infarction (STEMI). (Figure 1). Upon admission, echocardiography showed severely reduced left ventricular function, and an apical thrombus. (Figure 2) Emergency coronary angiography was performed, revealing a thrombotic occlusion of the right coronary artery in the context of aneurysmal vessels, and critical stenoses of the left anterior descending and circumflex arteries. (Figure 3) Several attempts at percutaneous revascularization failed due to unfavorable anatomy and lack of distal reperfusion. Anticoagulation was initiated with strict monitoring, maintaining factor VIII levels above 50% through targeted replacement therapy, and serial imaging showed persistent regional wall–motion abnormalities, but progressive resolution of the ventricular thrombus. Given the coexistence of severe bleeding risk, intracardiac thrombus, and complex coronary anatomy, the case was discussed by a multidisciplinary Heart Team, including hemophilia specialists, and surgical revascularization was preferred over further percutaneous interventions. The patient underwent off–pump minimally invasive direct coronary artery bypass grafting with left internal mammary artery grafting to the left anterior descending artery. The postoperative course was uneventful, with stable factor VIII levels, no major bleeding, and no need for transfusion. Warfarin and aspirin were safely reintroduced and maintained under hematologic supervision. This case highlights the complexity of managing STEMI in patients with severe hemophilia emphasizing the importance of coordinated multidisciplinary decision–making. It also demonstrates that, when carefully planned with adequate coagulation support, minimally invasive surgical revascularization can be safely performed and can be a valid alternative in such high–risk patients.

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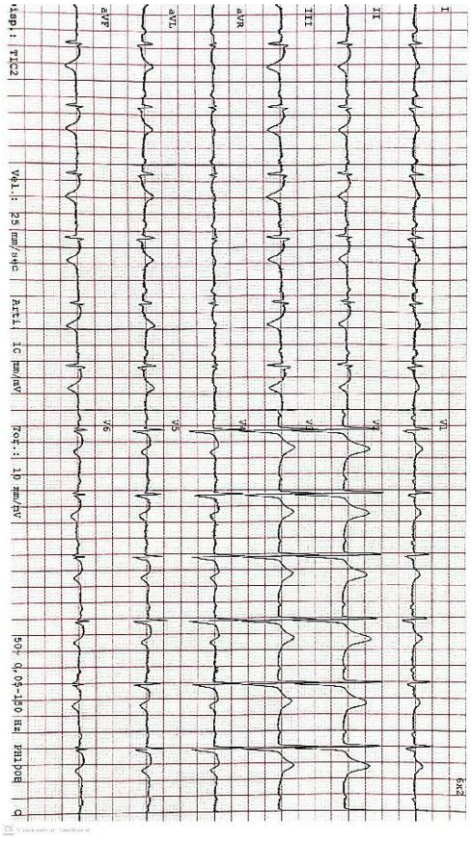

Figure 1

Figure 2

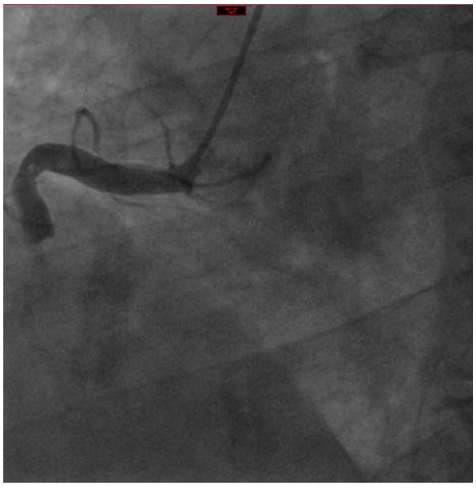

Figure 3

Branch Stimulation/Pacing

Abstract citation ID: suag058.526

IMPACT OF LEFT BUNDLE BRANCH AREA PACING ON CLINICALLY SIGNIFICANT TRICUSPID REGURGITATION: A SINGLE–CENTRE COHORT

G. Mansi, A. Agresti, F. Buoncristiani, S. La Trofa, S. Garibaldi, M. Nesti, A. Rossi, L. Panchetti, U. Startari, M. Piacenti, and G. Mirizzi
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Background: Tricuspid regurgitation (TR) of moderate or greater severity is increasingly recognized as an independent predictor of adverse outcomes. Cardiac device implantation with transvenous leads has been suggested to potentially worsen TR, with reported incidences ranging from 7 to 30%. Left bundle branch area pacing (LBBAP) restores physiological ventricular activation and may offer haemodynamic advantages over traditional right ventricular pacing, potentially alleviating secondary TR. However, there are limited data on the impact on worsening.
Purpose: We sought to evaluate the impact of LBBAP on TR in patients presenting with clinically significant valve dysfunction.
Methods: We retrospectively analyzed consecutive LBBAP patients. Patients having baseline TR less than moderate (TR ‹ 2) and patients without complete echocardiographic follow–up were excluded. The primary endpoint was the change in TR grade. Paired analyses were performed using Wilcoxon or paired t–tests, as appropriate.
Results: Of 130 patients receiving LBBAP, 50 had complete echocardiographic follow–up (median follow–up 9,5 months) and, of these, 29 (58.0%) had TR ≥ moderate at baseline and were included in the analysis. TR improved in 13/29 (44.8%), was stable in 15/29 (51.7%), and worsened in 1/29 (3.4%). The overall reduction in TR grade was statistically significant (Wilcoxon p = 0.0048, Figure 1). Left ventricular ejection fraction (LVEF) significantly increased from baseline (median +6.4%, p = 0.002). Estimated pulmonary artery systolic pressure (PASP) decreased (median –3.2 mmHg, p = 0.045). These changes occurred in the absence of worsening TR in any patient and were consistent across the cohort.
Conclusions: In patients with moderate–to–severe TR at baseline, LBBAP was associated with a significant reduction in TR severity, together with improved left ventricular function and a favorable trend in pulmonary pressures. These findings support LBBAP as a safe pacing strategy regarding the potential worsening effect on TR and suggest it may even be protective in patients with tricuspid valve dysfunction. Confirmation in larger controlled cohorts is warranted.

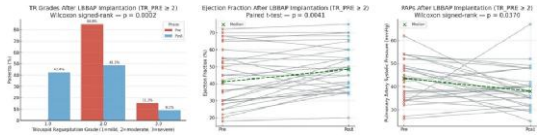

Figure 1

Abstract citation ID: suag058.527

LEFT BUNDLE BRANCH PACING IN A SPECIAL POPULATION: EIGHT CASES OF PEDIATRIC AND GUCH PATIENTS WHO EXPERIENCED PHYSIOLOGICAL PACING

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Background: Left Bundle Branch Area Pacing (LBBAP) has become over the last years a promising pacing strategy by avoiding the desynchronization of the left ventricle. Many data confirm the safety and the clinical performance of this technique in adult patients with indication for pacing. On the contrary, only few case series have been reported about LBBAP in children and in GUCH patients.
Methods: We report successful implantation of LBBAP in eight consecutive patients (4 children and 4 GUCH patients) and their further follow–up. A written informed consent was obtained before the procedure. The procedures performed in children were undertaken under general anaesthesia.
Results: Four pediatric patients met indication for permanent pacing (2 Male, mean age at implant 11,4 years). Three of them had a structural normal heart and underwent pacemaker implantation because because of symptomatic complete atrio–ventricular block (AVB). The fourth patient, an 8–year–old male who underwent urgent single lead pacemaker implantation for complete AVB in another centre, developed a severe biventricular disfunction. Due to

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worsening heart failure, he was referred to our centre and he underwent up–grading to CRT–P; coronary sinus was impossible to cannulate so we performed LBBAP as bail–out strategy after failure of biventricular pacing. Four GUCH patients (two patients with atrioventricular canal, two with coronary artery anomalies), underwent pacemaker implantation, three because of complete AV block, one because of atrial fibrillation with low ventricular rate. In these eight patients we used a Medtronic Select Secure (Model 3830) lumenless lead, all implanted via left axillary or subclavian vein puncture in the interventricular septum in the region of the left bundle branch. Electrical parameters at implant (R–wave peak time in V6; V6–V1 interpeak interval) confirmed the capture of the conduction system. There were no adverse events neither at implantation nor during follow up, and the electrical parameters of the right ventricular lead remained stable.
Conclusions: LBBAP is a promising and safe pacing strategy also in the pediatric and GUCH populations, both for patients with complete AV block and a prediction of 100% ventricular pacing and for patients in whom resynchronisation therapy is not feasible. One concern, particularly in children, may be the performance of LBBAP during the growth of the patients and of its conduction system.

Abstract citation ID: suag058.528

THE ELECTROCARDIOGRAPHIC DIAGNOSIS OF MYOCARDIAL INFARCTION IN CSP ERA

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Ospedale Generale Regionale F. Miulli

Background: Electrocardiographic diagnosis of acute myocardial infarction (AMI) during cardiac pacing is challenging. The original Sgarbossa criteria, validated for left bundle branch block and right ventricular pacing, have not been evaluated in the newer setting of conduction system pacing (CSP), where the pacing stimulus directly activates the His–Purkinje system. To date, there are no recommendations on ECG criteria for AMI during CSP.
Case presentation: We describe a 74–year–old hypertensive woman with recurrent traumatic syncopal episodes and documented bradycardia, admitted to the emergency department. The ECG showed complete atrioventricular block and she was transferred to our ICU and treated with EV isoprenaline. Echocardiography revealed preserved left ventricular ejection fraction and mild aortic stenosis. In anticipation of the high burden of ventricular pacing we opted for the implantation of a PM with Hisian pacing. After the procedure, sudden agitation was followed by arterial hypotension. Echocardiography revealed a non–tamponading pericardial effusion, which rapidly increased, together with new repolarization abnormalities during His–bundle pacing. In particular, we noted a subtle ST–segment elevation in V1 and V2 of about 1 mm. The patient underwent urgent pericardiocentesis with drainage of 200 mL of blood fluid followed by prompt clinical improvement. Subsequent venography excluded perforation with active pericardial bleeding. Persistent ECG changes led to coronary angiography, which demonstrated a functionally critical mid–proximal LAD stenosis successfully treated with a drug–eluting stent.
Conclusion: The diagnosis of myocardial infarction is complex in cases of pacemaker–induced rhythms. Currently, there are no dedicated algorithms for the diagnosis of acute coronary syndrome in patients treated with physiological pacing. Our case highlights that Hisian pacing may reveal subtle repolarization alterations that would normally go undetected.

Figure 1. ECG showing ST elevation in V1 and V2 with mirror repolarization abnormalities in the lateral lead during pericardial effusion causing hypotension and anemia

Figure 2. ST segment isoelectric reversion and normalization of repolarization alterations in lateral leads after pericardiocentesis

Abstract citation ID: suag058.529

WHEN CARDIAC RESYNCHRONIZATION THERAPY VIA CORONARY SINUS IS STILL THE BETTER CHOICE

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Ospedale Generale Regionale F. Miulli; Ospedale Di Venere; A.O.U. Policlinico Di Bari

We describe the case of a 62–yo female patient with permanent atrial fibrillation, who underwent aortic, mitral and tricuspid valve replacement with mechanical prostheses (during surgery an epicardial bipolar lead was placed for potential future use). In August 2024 she had a syncope and was admitted to Cardiology Unit as an echocardiogram showed severe LV dysfunction. Holter ECG found AF with phases of bradycardia and tachycardia. She was on digoxin, metoprolol, furosemide and warfarin therapy. Coronarography showed no coronary lesions. Spironolactone and empagliflozin were added before discharge. In November 2024 she was admitted to our Department for further evaluation, reporting dyspnea with minimal exertion (NYHA III). ECG showed high ventricular rate AF with LBBB (QRSd 140 ms). Echocardiogram confirmed severe LVEF reduction. We decided to implant a Pacemaker with CSP aiming LVEF improvement. Crossing the tricuspid mechanical prosthesis with leads was excluded, due to high risk of damage and/or rupture in the short–medium term. The only way for CSP was HBP by the atrial side. In the operating room we made a skin incision at left subclavian level and isolated the connector pin of the epicardial lead. After left subclavian vein cannulation, through a deflectable catheter and a lead for CSP, we found a low voltage His signal on the polygraph, but unfortunately pacing output threshold was very high, likely due to post–surgical fibrosis. So we decided to shift to CRT via coronary sinus. The CS angiography showed an optimal target vein in the LV lateral wall. A quadripolar lead was successfully placed. A CRT–P device was implanted, connecting the epicardial lead to the RV port and the CS lead to the LV port, while the atrial port was capped. Post–procedural ECG showed significant QRS narrowing. Given the severe LVEF reduction the patient was discharged with a wearable cardioverter–defibrillator and the same OMT. At 1–month follow–up LVEF showed initial improvement and at 3 months it reached 50%, with marked reduction in patient's dyspnea. The WCD was subsequently removed. In the comparison between conventional CRT and CSP there isn't a clear winner and they should be considered as backups for each other, as both are valid alternatives that can bring significant benefits to the patient. We have shown how using this type of hybrid stimulation could lead to satisfactory results in terms of QRSd, LVEF recovery and consequently improvement in patient's symptoms.

Abstract citation ID: suag058.530

HOW IMPORTANT IS THE ATRIUM IN CARDIAC RESYNCHRONIZATION THERAPY!

S. Maffè, P. Paffoni, L. Bergamasco, S. Ticozzi, E. Prenna, S. Ariotti, A. Paino, and P. Dellavesa
Divisione Di Cardiologia, Ospedale Ss Trinità, Asl No

We present the case of an 85–year–old patient with hypokinetic cardiomyopathy, mitral bioprosthesis, complete LBBB on ECG. The patient underwent biventricular ICD implantation in 2013 with good clinical and echocardiographic response, without hospitalization for 10 years. He presented with an intriguing ECG: sinus rhythm with biventricular stimulation and a narrow paced QRS complex. However, the paced QRS complex, although good, varies from beat to beat depending on whether the atrium is sensed or paced (Fig 1). Specifically, the QRS complex is narrower when it follows a sensed atrium. The patient's spontaneous rhythm was sinus rhythm 55–60bpm, PQ of 200 msec, atrial ectopic beats, and a QRS complex with a LBBB morphology and a width of 160 msec. Programming the device to DDD 40 bpm we see a ventricular rhythm that was still atrial–guided and a narrow QRS complex of 100 msec, but the rhythm was disturbed by numerous ectopic beats (Fig 2).Programming the device to DDD 70 bpm with an AV delay of 150 msec we see a rhythm that was still atrial and ventricular paced, but the QRS complex appeared significantly wider, approximately 120 msec, and the tracing was regular with no ectopic beats (Fig 3). Therefore, biventricular pacing appears to be preferable when atrial depolarization is spontaneous and not electrically induced. This also corresponds to better left ventricular performance when assessed by echocardiographic perspective: longitudinal strain assessment shows better synchrony when ventricular pacing is atrial–sensed; aortic VTI is also better in this mode, especially when the AV interval is optimized. In our clinical case, we programmed the device to DDD 60/min with a 150 msec AV interval, to obtain a valid compromise between sensed and paced atrium, limiting extrasystoles, and an AV interval that favored a good ratio between E and A waves on mitral Doppler. The atrial rhythm induced by pacing (right atrial appendage) causes a delayed left atrial contraction, resulting in a reduction in diastolic ventricular filling; atrial sensing results in improved QRS fusion, which may be related to early activation of the right bundle branch simultaneous with left ventricular activation induced by left pacing. This is why the AV delay is programmed slightly longer on atrial pacing than on sensed atrial beats. This case reminds that the atrium also has a great importance in the response to cardiac resynchronization therapy.

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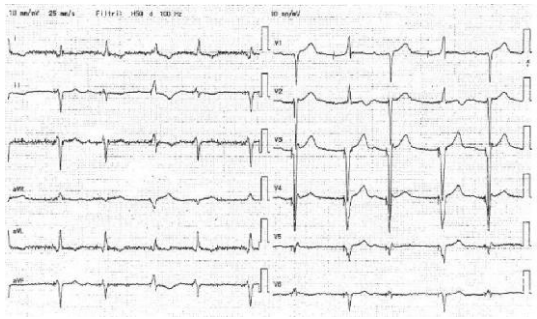

Figure 1

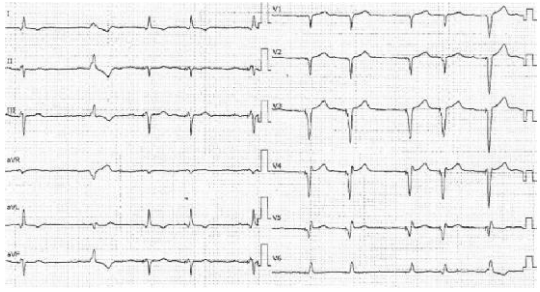

Figure 2

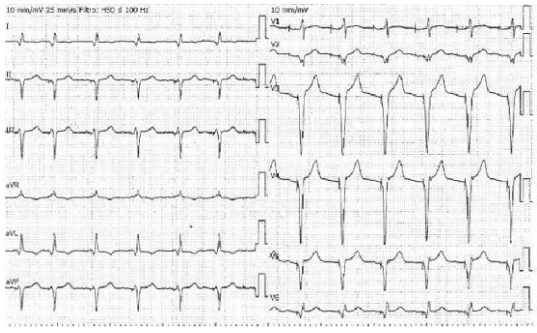

Figure 3

Electrical Cardiac Stimulation - Clinical Cases

Abstract citation ID: suag058.531

ROLE OF NURSES AND ARTIFICIAL INTELLIGENCE IN REMOTE MONITORING OF INSERTABLE LOOP RECORDERS: EXPERIENCE AT ANNUNZIATA HOSPITAL, COSENZA

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Azienda Ospedaliera Universitaria Di Cosenza

Background: Remote monitoring (RM) of insertable loop recorders (ILRs) generates high volumes of transmissions, often increasing clinic workload. We evaluated the impact of cloud–based AccuRhythm™ AI algorithms combined with structured nursing oversight on transmission volume and clinical workload.
Methods: Retrospective analysis of 103 consecutive patients implanted with LINQ II ICMs at Ospedale Annunziata, Cosenza, monitored between 2022 and 2025. Nursing staff programmed individualized alert settings and performed primary triage of transmitted events. AccuRhythm filtering was applied via CareLink; transmitted events were reviewed by the nursing team and supervising electrophysiologists. Outcomes were reduction in false alerts, number of eliminated alerts, and estimated nursing time saved.
Results: The combined approach produced substantial reductions in non–actionable alerts: pause alerts decreased by ~99% and AF alerts by ~50%, yielding 1,782 fewer false alerts during the study period. Time–motion estimates indicate a conservative nursing time saving of 336 hours overall (≈100 hours/year), equivalent to ~6% of a full–time nurse equivalent. Nurse expertise was critical for personalized alert tuning, ensuring preservation of clinically relevant transmissions and appropriate escalation.
Conclusion: In this real–world single–center experience, AI–enhanced filtering paired with dedicated nursing management markedly reduced non–actionable transmissions and decreased clinical workload while maintaining diagnostic yield. Optimal RM for ILRs requires integration of advanced algorithms and continuous nurse–driven parameter optimization to maximize efficiency and patient safety.

Abstract citation ID: suag058.532

CASE SERIES OF LEADLESS DEVICE IMPLANTATIONS IN A PERIPHERAL CENTER: ANALYSIS OF INDICATIONS AND OUTCOMES

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Sc Cardiologia, Ospedale Agnelli, Pinerolo, Aslto3

Background: Leadless intracardiac pacemakers have been developed to reduce complications associated with conventional cardiac implantable electronic devices (CIEDs), particularly pocket– and lead–related complications, including infections, lead dislodgement, fracture, and system–related septicemia
Methods: From September 2022 to December 2025, 63 leadless pacemakers were implanted in our center: 30 single–chamber devices, 32 VDD dual–chamber devices, and one dual–chamber system. Patients were predominantly male (49/63), with a mean age of 80.5 years and a mean follow–up of 528 days. Comorbidities included diabetes (25%), hypertension (73%), anticoagulant therapy (59%), and renal insufficiency (41%), including 8 patients with severe renal failure (predialysis or dialysis). Seventeen patients had a history of congestive heart failure; mean left ventricular ejection fraction at implantation was 55.4%. High–risk clinical features included prior CIED infection (n=3), limited vascular access (n=18), valvular prostheses (n=6), immunosuppression (n=25), recurrent sepsis (n=23), and active competitive endurance sports (n=2)
Results: Between 2024 and 2025, 668 conventional CIED procedures were performed at our center, with an overall acute complication rate of 10.8%, including pneumothorax (5.1%), pocket hematoma (5.7%), late lead dislodgement (5.4%), pocket revision for skin erosion (1.2%), and device–related infection (1.8%), with systemic involvement in three cases. Among the 63 leadless pacemaker implantations, only one mild vascular complication occurred (arteriovenous fistula with inguinal hematoma), successfully treated surgically without impact on survival. No acute pericardial effusion, device dislodgement, or loss of capture was observed during follow–up. No hospitalizations for device–related sepsis were reported
Conclusions: In a real–world population characterized by advanced age and high clinical risk, leadless pacemakers demonstrated an excellent safety profile, with a markedly lower rate of complications and infections compared with conventional CIED implantation. The absence of transvenous leads eliminates lead–related complications, while standardized implantation techniques enhance procedural safety. Despite higher upfront costs, leadless pacing represents a valuable option in selected patients at high septic risk or with limited vascular access, where reduced hospitalizations and avoidance of prolonged antibiotic therapy may offset initial expenses

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Abstract citation ID: suag058.533

CHALLENGING PACEMAKER IMPLANT IN SINUS NODE DYSFUNCTION AND CARDIAC INVOLVEMENT IN ERDHEIM–CHESTER DISEASE: A MULTIMODALITY IMAGING GUIDED PROCEDURE

S. Maffè, P. Paffoni, L. Bergamasco, S. Ticozzi, S. Ariotti, E. Prenna, A. Paino, and P. Dellavesa
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Erdheim–Chester disease (ECD) is a rare systemic non– Langerhans cells histiocytosis of unknown etiology characterized by multiorgan xanthomatous infiltration by foamy histiocytes. Cardiovascular involvement in ECD is frequent, at level of the right atrium and superior vena cava. We present the case of a 67–year–old woman with history of ECD and cardiac involvement, referred to our attention following syncopal episodes and paroxysmal atrial fibrillation alternating with phases of marked sinus bradycardia and asystolic pauses. Transesophageal echocardiogram and cardiac MRI (Fig 1) confirmed the increased wall thickness and the marked reduction of the internal diameter of the superior vena cava and of the right atrium. The clinical cardiological problem was the need to submit the patient to the implantation of a dual–chamber pacemaker for sick sinus syndrome. Despite the stenosis at the level of the superior vena cava and the involvement up to the brachiocephalic veins, we decided to try an implant with a traditional approach from the left axillary vein, aiming for a dual–chamber stimulation, following the procedure with fluoroscopic and ultrasound guidance. The ultrasound images also showed that the right atrial appendage appeared spared by the disease and with regular thicknesses (Fig 2), thus representing a good target where insert the atrial lead. During pacemaker implantation, we followed the passage of the two leads at the level of the stenosis with ultrasound and fluoroscopic imaging, limiting the risk of complications, given the resistance and the need to force the push using more rigid stylets (Fig 3). Particularly delicate the positioning of the active fixation electrode in the atrium (the area most affected by histiocytosis), where ultrasound guidance was useful for the control of any bleeding or perforation of the electrode. The implantation was completed without complications and the electrical parameters of the pacemaker were optimal. This case confirms how a multimedial imaging approach is crucial to organize and best perform electrostimulation procedures in particular anatomical contexts such as in ECD with cardiac involvement, minimizing the risks.

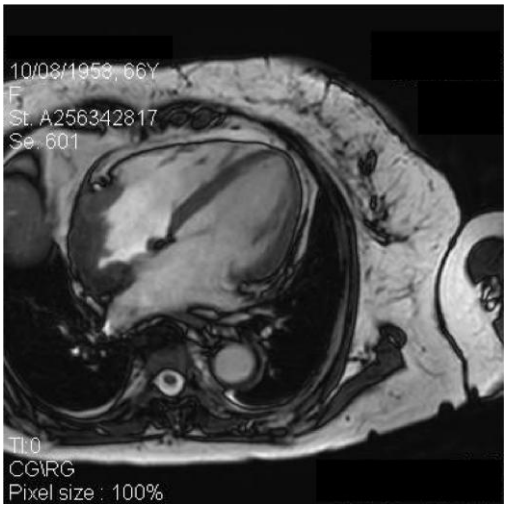

Figure 1

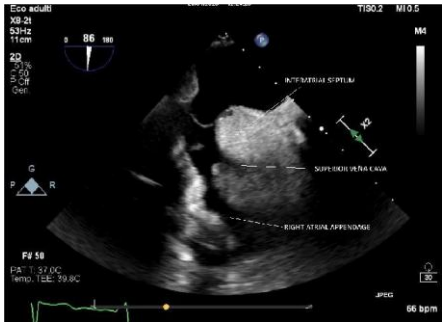

Figure 2

Figure 3

Abstract citation ID: suag058.534

EVALUATING CORRECT S–ICD POSITIONING IN ANATOMIC ANOMALIES: WHEN TWO PROJECTIONS X–RAY ARE NOT ENOUGH

E. Sanna, A. Frau, M. Casula, E. Cesarano, E. Agus, A. Setzu, B. Schintu, G. Tola, and M. Corda
Cardiologia P.O San Michele Arnas Brotzu

Background: Growing evidence supports omitting defibrillation testing (DFT) during subcutaneous ICD (S–ICD) implantation. The PRAETORIAN score, based on two–view chest X–ray findings, accurately predicts defibrillation efficacy, allowing clinicians to avoid discomfort and risks associated with DFT. However, certain anatomical variations may limit its applicability.
Case presentation: We present the case of a 76–year–old male who underwent S–ICD implantation for primary prevention of sudden cardiac death. His history included severe left ventricular dysfunction due to chronic coronary syndrome, permanent atrial fibrillation, and two cardiac surgeries (mitral valve plastic with concomitant coronary artery bypass grafting and subsequent bioprosthetic mitral valve replacement). The second cardiac surgery was complicated by left phrenic nerve palsy and associated hemidiaphragm elevation. Pre–implantation fluoroscopy in the supine position confirmed the hemidiaphragm elevation and a slight rightward shift of the cardiac silhouette. The procedure was completed without complications, showing optimal S–ECG signals (Figure 1) and system impedance (55 ohm). Despite an optimal PRAETORIAN score (30 points), the post–implantation standing X–ray revealed a marked rightward mediastinal shift (Figure 2), suggesting the ventricular mass was almost entirely outside the defibrillation field and raising suspicion of high DFT failure risk. To better evaluate the three–dimensional (3D) relationship between the ventricular mass, the device can, and the lead, a chest CT scan was performed. The CT confirmed that the ventricular mass was appropriately contained within the defibrillation shock vector (Figure 3). Following consultation with technical support, we decided to omit DFT. The patient remains under remote monitoring with an uneventful follow–up.
Conclusions: Although the PRAETORIAN score is a reliable tool, specific anatomical conditions like phrenic nerve palsy can complicate radiological assessment. Image acquisition in the standing position and during deep inspiration may alter anatomical relationships, potentially leading to discrepancies between standard orthogonal views and the actual 3D shock vector. In such cases, a 3D CT evaluation can provide crucial clarification of the anatomical relationships between the device and the heart, potentially supporting the safe omission of DFT even when standard X–rays appear ambiguous.

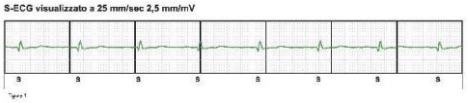

Figure 1

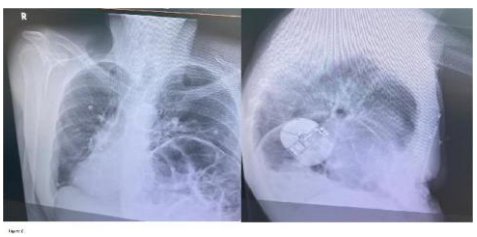

Figure 2

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Figure 3

Abstract citation ID: suag058.535

A MIDDLE GROUND BETWEEN TRANSVENOUS AND SUBCUTANEOUS DEFIBRILLATION: EXTRAVASCULAR ICD IN A YOUNG HCM PATIENT WITH LEAD FAILURE

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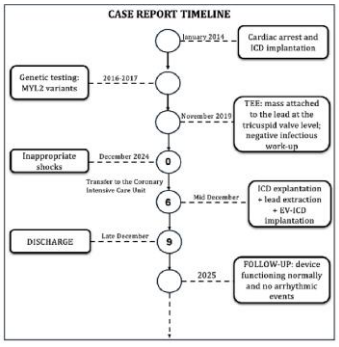
Background: In hypertrophic cardiomyopathy (HCM), an implantable cardioverter–defibrillator (ICD) is a Class I recommendation according to ESC guidelines after resuscitated ventricular fibrillation. In young patients, however, decades of exposure to transvenous leads translate into a meaningful risk of lead failure, venous obstruction and infections. Subcutaneous ICDs avoid the vascular system and cardiac chambers but still cannot deliver antitachycardia pacing (ATP). The extravascular ICD (EV–ICD) places the lead in the substernal space, aiming to combine vascular sparing with ATP.
Case presentation: A 25–year–old man with HCM suffered an exercise–related cardiac arrest in 2014 (documented VF) and received a single–chamber transvenous ICD for secondary prevention. He presented with shocks occurring during sleep. Device interrogation showed five inappropriate shocks due to intermittent ventricular lead noise, and an elective replacement indicator (likely triggered by the shocks), while sensing and impedance were otherwise within range. Echocardiography confirmed severe septal hypertrophy (up to 28 mm), preserved ejection fraction (58%) with reduced global longitudinal strain (–10.9%), chordal systolic anterior motion and no significant intraventricular pressure gradient. A previously reported mobile mass adherent to the lead at the tricuspid annulus had remained clinically silent with a negative infectious work–up. Given recurrent inappropriate therapies, young age and the desire to limit long–term endovascular burden, the transvenous system was removed and the lead extracted. An EV–ICD (Aurora, Medtronic) was then implanted with a substernal lead and a left lateral generator pocket. Induced VF was promptly detected and terminated with a 30–J shock. The patient was discharged three days later and remained event–free with normal device function at early and mid–term follow–up.
Conclusions: In selected young patients with strong ICD indications and transvenous lead complications, EV–ICD can represent a pragmatic compromise, reducing intravascular hardware while preserving defibrillation efficacy and ATP capability



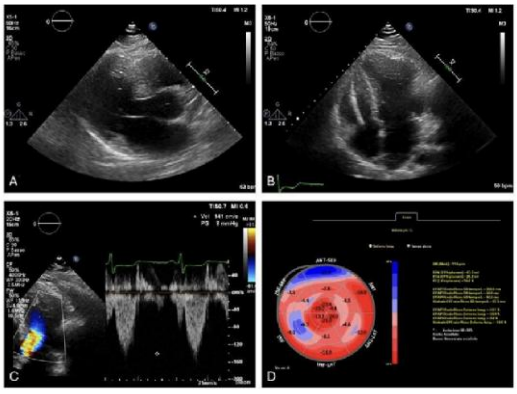


Figure 2. Transthoracic echocardiography prior to ICD extraction: the lead is still in place (B). Severe interventricular septal hypertrophy is evident (A), with no dynamic intraventricular gradient (C) and reduced global longitudinal strain (GLS) (D).

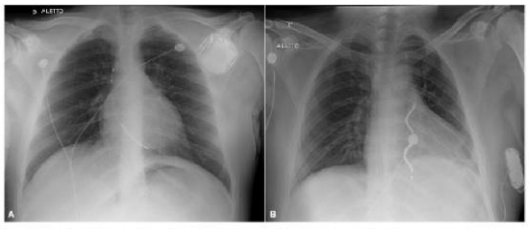


Figure 3. Chest X-ray (AP projection, supine patient). (A) Pre-procedural chest X-ray: a left subclavian generator of a transvenous ICD is visible, with an endocardial lead following a transvenous course and its tip in the right ventricle; no radiographic discontinuities are evident along the lead course. (B) Post-procedural chest X-ray (after explantation/extraction and re-implantation): absence of the previous transvenous system; presence of an EV-ICD with the generator in the left lateral thoracic position and a lead running substernally and along the left parasternal line, with the expected tortuous appearance.

Abstract citation ID: suag058.536

DUAL–CHAMBER LEADLESS PACEMAKER PACING AS A POTENTIAL STRATEGY IN ISOLATED LEFT SUPERIOR VENA CAVA

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A 67–year–old man was referred for catheter ablation and permanent pacing due to symptomatic bradycardia–tachycardia form of sinus node dysfunction (SND), characterized by paroxysmal atrial fibrillation (AF), intolerance to antiarrhythmic therapy related to sinus bradycardia and chronotropic incompetence. Transthoracic echocardiography demonstrated preserved left ventricular systolic function and a markedly dilated coronary sinus (CS). Contrast–enhanced computed tomography revealed a persistent left superior vena cava (LSVC) draining into the CS, with congenital absence of the right superior vena cava, consistent with isolated LSVC (ILSVC). After 3D reconstruction of the left atrium and LSVC, bilateral complete first–pass pulmonary vein isolation was achieved without complications. Because of persistent sinus bradycardia and unfavorable venous anatomy, dual–chamber leadless pacemaker implantation was planned a few months later. Under general anesthesia and transesophageal echocardiographic (TEE) guidance, the ventricular leadless device was implanted in the right ventricular (RV) apical septum via the right femoral vein. After right atrial (RA) angiography, the atrial leadless device was positioned in the RA appendage. Post–procedural TEE confirmed correct device positioning, with no pericardial effusion or tricuspid regurgitation. Device interrogation showed stable electrical parameters: RA sensing 4.8 mV, threshold 0.5 V at 0.4 ms, impedance 400 Ω; RV sensing 9 mV, threshold 0.5 V at 0.4 ms, impedance 860 Ω. The system was programmed to AAIR 60 bpm with VVI backup at 40 bpm. Post–procedural chest X–ray confirmed correct device positioning, and the ECG showed atrial pacing at 60 bpm. At one–month follow–up, the patient reported symptomatic improvement with stable atrial pacing and normal device function. ILSVC is a rare congenital anomaly associated with increased risk of AF and SND and poses significant challenges for conventional transvenous pacing due to complex venous anatomy. Leadless pacing systems overcome these limitations by avoiding transvenous leads. Moreover, the dual–chamber leadless system enables true physiological atrioventricular pacing through inter–device communication, addressing the limitations of earlier first–generation leadless systems. This case demonstrates the feasibility and safety of dual–chamber leadless pacemaker implantation in ILSVC, supporting its role in patients with complex venous anatomy requiring permanent pacing.

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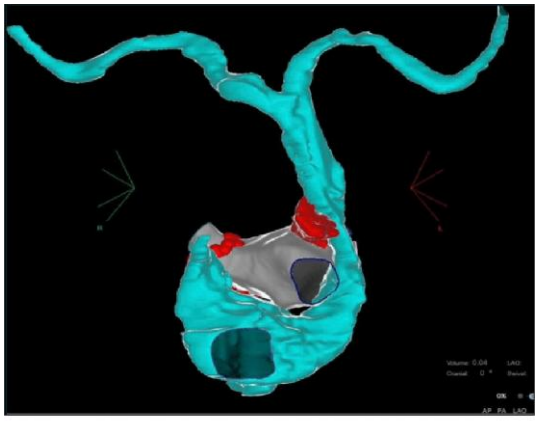

Figure 1: Three-dimensional CT reconstruction merged with electroanatomical mapping demonstrating atresia of the right superior vena cava and a persistent isolated left superior vena cava.

Figure 2: Post-implantation anteroposterior chest X-ray demonstrating appropriate positioning of the AVEIR DR dual-chamber leadless pacemaker.

Figure 3: Twelve-lead ECG showing stable atrial pacing at 65 bpm with preserved atrioventricular synchrony.

Abstract citation ID: suag058.537

LEADLESS ATRIAL PACEMAKER WITH S–ICD IN AN HOCM PATIENT: A CASE REPORT

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Background: Managing patients who require both atrial pacing and sudden cardiac death (SCD) prevention is challenging, especially in young individuals who may face repeated device implantations. Combining a leadless atrial pacemaker with a subcutaneous defibrillator (S–ICD) can provide effective atrial pacing with preserved arrhythmic protection, minimizing infective and procedural risks inherent to transvenous systems.
Clinical Case: We present a 59–year–old man with hypertrophic obstructive cardiomyopathy (HOCM) and mitral valve disease. A single–chamber transvenous defibrillator (TV–ICD) was implanted in 2012 for primary prevention. In 2014, he underwent Morrow septal myectomy with mitral valve repair for severe regurgitation. Subsequently, he developed ischemic strokes in the setting of new–onset atrial fibrillation (AF). In 2023 transthoracic echocardiographic showed left ventricular hypertrophy with obstruction (gradient 80/39 mmHg), preserved function, systolic anterior motion with moderate MV regurgitation. In May 2025, device interrogation revealed ventricular pacing at 40 bpm (VVI 40 bpm) with underlying sinus rhythm at 38 bpm, first–degree atrioventricular block, and paroxysmal AF with ventricular rate up to 140 bpm, consistent with tachy–brady syndrome. Ventricular pacing burden was 12%. Defibrillation coil impedance was 120–130 Ohm. No ventricular arrhythmic episodes were registered on chronic amiodarone and beta–blocker therapy. Patient remained asymptomatic and clinically stable. After multidisciplinary discussion, a leadless atrial pacemaker was implanted in the right atrial appendage (Figure 1), followed one week later by an S–ICD (Figure 2), to provide atrial pacing and SCD prevention while avoiding the risks of repeated TV–ICD implantation. An implantable loop recorder was also implanted for continuous arrhythmic monitoring.
Conclusion: This case highlights the feasibility and effectiveness of combining a leadless atrial pacemaker with an S–ICD in a complex HOCM patient with tachy–brady syndrome and high arrhythmic risk. This approach provides reliable atrial pacing and sudden cardiac death protection while minimizing infection and extraction risks associated with transvenous systems.

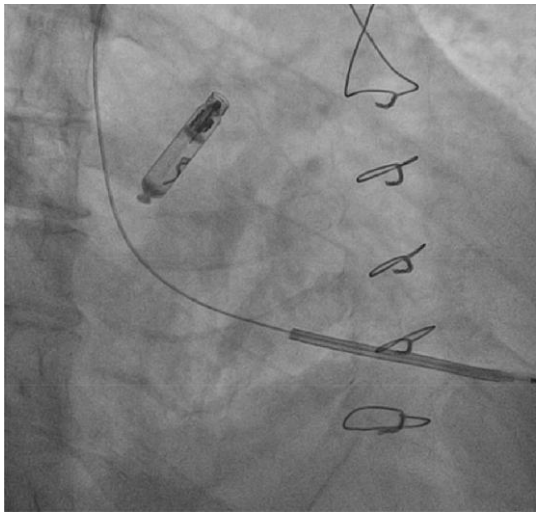

Figure 1

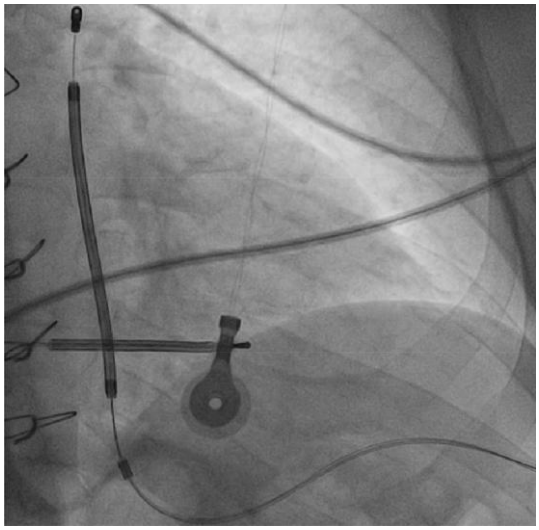

Figure 2

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Dislipidaemia Therapy 1

Abstract citation ID: suag058.538

EFFICACY AND SAFETY OF BEMPEDOIC ACID ADDED TO STANDARD HYPOLIPIDEMIC THERAPY ON LIPID TARGET ACHIEVEMENT IN HIGH RISK PATIENTS: RESULTS IN A REAL WORLD SETTING

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Background: Bempedoic acid (BA) is approved for the reduction of LDL–C in addition to or instead of statin therapy and ezetimibe.
Aim: to assess impact of BA addition to statin therapy at the maximum tolerated dose and ezetimibe 10 mg on the achievement of therapeutic targets of LDL–C values in patient with previous acute coronary syndrome (ACS) and in follow up (FU) post–discharge.
Methods: The routine data of 195 patients (154 M/41 F) mean aged 60 ± 8 years, in FU after ACS, treated with usual lipid lowering therapy (LLT) (high efficacy statins at maximum tolerated dose and ezetimibe 10 mg) who did not reach the lipid target and BA was added at dose of 180 mg once daily, were analysed. All patients underwent lipid profile and creatine phosphokinase (CPK) dosage at baseline and at 12 months after the start of therapy. Renal and hepatic function was also assessed. The efficacy of the drug was assessed by the reduction in LDL–C at 12 months and compared to baseline. The results were compared to those observed before the addition of BA.
Statistical Analysis: Normally distributed variables are presented as mean ± standard deviation (SD) and were compared by Student's t–test for paired data. A p≤0.05 value was considered statistically significant.
Results: the observation period lasted 19 ± 7 months. At 12 months, the LDL–C values were 47,5±9,0 vs 62,9±5,7 mg/dL (p ‹0.001). These levels were maintained over time (in 38% of patients who continued FU beyond 12 months, in some cases with a maximum observation period of 30 months). Renal function assessed by estimated glomerular filtration rate did not change statistically significantly, from 58.12 ± 12,0 to 55,6 ± 14,7 mL/min per 1.73 m2 (P‹0.36). No statistically significant changes were observed in CPK values (p=NS). Significant changes were observed in uric acid values (5,2 ± 1,2 vs 6,2 ± 1,6 mg/dl – p ‹0.05) but were no clinically relevant.
Conclusions: The results of our analysis of aggregated data in the archive are in line with previously published clinical trials and confirm the effectiveness of bempedoic acid as additional LLT in a real–world setting. The average LDL–C reduction was highest among patients without LLT, and lower if bempedoic acid was added on to a pre–existing LLT.

Abstract citation ID: suag058.539

INCLISIRAN IN TWO VERY–HIGH CV RISK PATIENTS WITH ADVANCED CHRONIC KIDNEY DISEASE

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Background: Dyslipidemia, a major contributing factor to cardiovascular disease, is increasingly prevalent in patients with renal disease. Low–density lipoprotein cholesterol (LDL–C) have been identified as a primary culprit of cardiovascular risk and individuals with hyperlipidemia face a significantly elevated risk of cardiovascular events. Inclisiran has shown promise in the management of dyslipidamia; however, safety and efficacy in patients with renal disease remain to be elucidated.
Case 1: A 77–year–old patient with a history of ischemic heart disease and chronic kidney disease (stage V, creatinine 4.2 mg/dL; urea 110 mg/dL) was initially treated with rosuvastatin 20 mg plus ezetimibe 10 mg, with poor efficacy. Ezetimibe was subsequently discontinued due to gastrointestinal side effects. Rosuvastatin was replaced with atorvastatin 20 mg plus bempedoic acid 180 mg; however, LDL–C levels remained above 70 mg/dL. In February 2025, treatment with inclisiran 284 mg s.c. was initiated. After 3 and 12 months, he attained the LDL–C target of ‹ 55 mg/dL.
Case 2: A 69–year–old female patient with a history of ischemic stroke and chronic kidney disease (stage IV, creatinine: 2.4 mg/dL; CrCl 21 mL/min) exhibited persistently elevated LDL–C levels (›70 mg/dL) despite optimal lipid–lowering treatment with a high–intensity statin (atorvastatin 20 mg, maximal tolerated dose) plus ezetimibe 10 mg. The addition of inclisiran led to a substantial reduction in LDL–C, achieving the target of ‹55 mg/dL after 3 months, which was confirmed at 12 months.
Conclusion: inclisiran enabled achievement of LDL–C targets in both patients after 12 months, with no reported adverse events. In the short term, inclisiran appears to be an effective and safe therapeutic option for patients with advanced renal impairment. However, long–term efficacy and safety of inclisiran in the setting of chronic kidney disease require further investigation.

Abstract citation ID: suag058.540

PCSK9 INHIBITORS "FAST TRACK" USE VERSUS "STEPWISE" LIPID LOWERING THERAPY IN PATIENTS WITH ACUTE CORONARY SYNDROME: A RETROSPECTIVE SINGLE–CENTER STUDY IN A "REAL–WORLD" POPULATION

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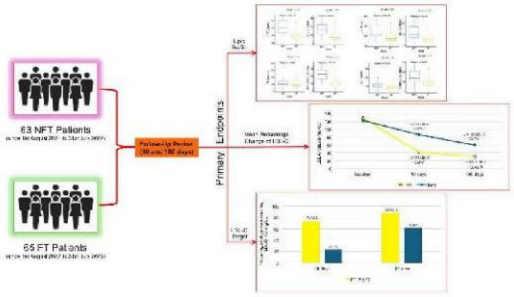
Aorn Cardarelli

Background: The "fast track" addition (within 48 hours) of proprotein convertase subtilisin/kexin type 9 inhibitors (PCSK9i) to the oral optimized lipid lowering therapy (LLT) during hospitalization for acute coronary syndrome (ACS) has been shown to rapidly achieve the low–density lipoprotein cholesterol (LDL–C) therapeutic targets. However, so far, its efficacy in real–world settings remains understudied.
Methods: We retrospectively analyzed 128 ACS patients treated at our center, comparing "PCSK9i fast track" use within 48 hours to standard "stepwise" LLT. Lipid levels and incidence of major adverse cardiovascular events (MACEs) were evaluated at 30 and 180 days.
Results: The "PCSK9i fast track" group achieved significantly lower LDL–C levels at 30 days (41.5 ± 27.5 vs. 85.6 ± 35.9 mg/dL, p ‹ 0.001) and 180 days (29.6 ± 21.0 vs. 59.0 ± 32.4 mg/dL, p ‹ 0.001). Recommended LDL–C targets (‹55 mg/dL) were met by 88.3% of "PCSK9i fast track" group at 180 days, compared to 61.9% of controls (p ‹ 0.001). No significant differences in MACEs were observed between groups. No adverse effects from PCSK9i use were noted.
Conclusions: The "PCSK9i fast track" strategy was safe and effective in achieving LDL–C targets more rapidly than conventional approaches in real–world ACS patients.

Figure caption. The "PCSK9i fast track" strategy in patients admitted to our hospital with ACS was associated with significantly lower TC, LDL-C, TG, and non-HDL-C values compared to "guidelines-driven LLT", at 30 and 180 days of follow-up. At 30 and 180 days, the difference in mean percentage change of LDL-C from baseline to follow up (Δ 0–30 and Δ 0–180, respectively) was significantly higher in "PCSK9i FT" group compared to "PCSK9i NFT" group. The percentages of patients in the "PCSK9i FT" group that reached the recommended LDL-C target (‹55 mg/dL) were prominent compared to the "PCSK9i NFT" group (73.8% versus 25.8% and 88.3% versus 61.9%, at 30 and 180 days, respectively).
FT: fast-track; LDL-C: low density lipoprotein cholesterol; LLT: lipid lowering therapy; NFT: non fast-track; non-HDL: non-high density lipoprotein; TC: total cholesterol; TG: triglycerides.
* p‹0.001 versus baseline; § p‹0.001 versus "PCSK9i NFT" group.



Abstract citation ID: suag058.541

EARLY USE OF INCLISIRAN AS A LIPID LOWERING AGENT IN PATIENTS WITH RECENT ACUTE CORONARY SYNDROME

G. Ratti, M. Grieco, F. Ratti, M. Cecere, T. Fedele, E. Russolillo, M. Mallardo, and F. Scotto Di Uccio
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Background: Early and intensive low–density lipoprotein cholesterol (LDL–C) reduction after recent acute coronary syndrome (ACS) may reduce recurrent CV event risk.
Aim: To evaluate the efficacy in LDL–C lowering added to usual care, of inclisiran administrated in outpatient with recent ACS.
Methods: The routine data of 31 patients (27 M/4 F) with mean age 62± 5 years, scheduled to S. Giovanni Bosco Hospital (Naples) in follow–up after recent ACS,

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treated with usual lipid lowering therapy (LLT) (high efficacy statins at maximum tolerated dose and ezetimibe 10 mg) and inclisiran 284 mg prescribed according to clinical indications (LDL–C values ≥70 mg/dL), were analysed. The outpatient follow–up program after hospitalization provides a visit on day 30 after discharge, then after 3 months, continuing with six–monthly checks. All patients underwent lipid profile and CPK dosage at baseline and at 3 months after the start of therapy. Renal and hepatic function was also assessed. The efficacy of the drug was assessed by the reduction in LDL–C compared to baseline. In all patients at baseline and after 3 months, clinical examination and standard ECG, were performed.

Statistical Analysis: Normally distributed variables are presented as mean ± standard deviation (SD) and were compared by Student's t–test for paired data. A p≤0.05 value was considered statistically significant.

Results: Median follow–up was 9,8 ± 6 months. At 3 months compared to baseline, statistically significant differences were observed in LDL–C values (median LDL–C levels were 39±12 mg/dL vs baseline 89±11 mg/dL) (p ‹0.001). After 3 months of treatment, baseline LDL–C decreased about 50% and these levels were maintained over time, with a median LDL–C of 50 (32–50) mg/dL at 9 months (in 6 patients) and 15 months (in 10 patients). In all patients, at 3 months after the start of therapy, no significant changes in creatinine, transaminase or CPK values were observed.

Conclusions: Our data suggests that inclisiran 284 mg plus usual care is effectiveness in the management of patients with elevated LDL–C post–ACS despite receiving statin therapy. Certainly larger supporting studies are needed.

Abstract citation ID: suag058.542

ELIGIBILITY FOR ICOSAPENT ETHYL IN PATIENTS UNDERGOING CARDIAC REHABILITATION: A REAL–WORLD COHORT STUDY

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Introduction: Despite optimal lipid–lowering therapy, many patients with established cardiovascular disease (CVD) maintain elevated triglyceride (TG) levels, contributing to residual risk. Icosapent ethyl (IPE) has shown clinical benefit in patients with moderate hypertriglyceridemia. This study aimed to evaluate eligibility for IPE treatment based on REDUCE–IT and Italian Drugs Administration (AIFA) eligibility criteria.

Methods: We retrospectively analyzed 1129 patients referred to a cardiac rehabilitation program for a recent acute coronary syndromes or with a chronic coronary syndromes between 2012 and 2025. Fasting TG and LDL were assessed at admission and discharge. We identified patients eligible for IPE treatment based on REDUCE–IT (TG 135–499 mg/dL, LDL 40–100 mg/dL, statin therapy) and AIFA eligibility criteria (TG ≥200 mg/dL, LDL ‹70 mg/dL, BMI ≥27 kg/m², statin + ezetimibe therapies, age 18–80).

Results: Median TG values significantly decreased from 117 (IQR 86–159) mg/dL at admission to 99 (79–132) mg/dL at discharge (p‹0.001). LDL also decreased from 106.7 ± 40.1 to 62.8 ± 24.8 mg/dL (p‹0.001). Based on REDUCE–IT criteria, 117 patients (10.4%) were eligible for IPE while only 6 patients (0.53%) met all AIFA eligibility criteria.

Conclusions: In a large real–world cohort of acute and chronic coronary syndrome undergoing cardiac rehabilitation, over 10% of patients were theoretically eligible for IPE based on clinical trial criteria. However, less than 1% met current AIFA eligibility conditions due to added restrictions, highlighting a significant barrier to implementation in clinical practice.

Abstract citation ID: suag058.543

ARTERIAL FUNCTIONAL AND STRUCTURAL EFFECTS OF PCSK9 INHIBITORS: A COMPARISON BETWEEN ANTIBODY AND SMALL INTERFERING RNA

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Background and Objectives: Proprotein Convertase Subtilisin/Kexin type 9 inhibitors (PCSK9–i) are used to reduce LDL cholesterol in dyslipidemic patients who do not adequately respond to traditional therapies. PCSK9 can be inhibited through monoclonal antibodies (Alirocumab, Evolocumab) or siRNA (Inclisiran). Their lipid–lowering efficacy is established, but effects on vascular structure/function remain uncertain. This study evaluated whether these properties change after starting PCSK9–i during a 1–year follow–up, comparing Inclisiran to antibodies.

Methods: This prospective longitudinal study enrolled all patients who began Evolocumab, Alirocumab, or Inclisiran in our cardiology department. Antibodies were self–administered every 2 weeks, while Inclisiran was administered by healthcare professionals at baseline, 3 months, and then every 6 months. Carotid–femoral Pulse Wave Velocity (cf–PWV), carotid Intima–Media Thickness (cIMT), and brachial Flow–Mediated Dilation (FMD) were assessed at T0 (the day before PCSK9–i start), 6 months (T1), and 12 months (T2). Statistical analysis included 42 patients treated with antibodies and 42 treated with Inclisiran, matched by age, sex, and BMI.

Results: Both groups had a mean age of 69.1±8.8 years, 78.6% male, BMI 26.9 ±3.2 kg/m². LDL–C significantly decreased in both groups (Inclisiran ΔT0–T2 = 60.6±37.2 mg/dL; PCSK9i–Ab ΔT0–T2 = 71.1±10.0 mg/dL; p‹0.001). A borderline HDL–C increase (49.4±14.7→52.5±14.5 mg/dL; p=0.032) occurred with antibodies, while a borderline triglyceride reduction (115.3±48.2→100.8 ±36.6 mg/dL; p=0.048) occurred with Inclisiran. Systolic blood pressure decreased with Inclisiran (131.8±15.3→125.5±11.2 mmHg; p=0.001), whereas diastolic pressure decreased with antibodies (80.1±13.1→75.2±9.3 mmHg; p=0.020). No significant changes were seen in IMT or FMD. PWV significantly decreased only in the Inclisiran group (10.9±2.4→10.4±2.5→10.3±1.8 m/s; p=0.013), unlike the antibody group.

Conclusions: PCSK9–i confirmed LDL–C reduction in both groups, while only Inclisiran appeared to reduce arterial stiffness. This finding was associated with a significant systolic pressure reduction, the main determinant of PWV. Larger studies are needed to clarify the effects of PCSK9–i on vascular structure and function.

Abstract citation ID: suag058.544

EFFECTS OF BEMPEDOIC ACID ON ARTERIAL STRUCTURAL AND FUNCTIONAL PARAMETERS

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Background and Objectives: Bempedoic Acid (BA) is one of the most recent therapeutic agents approved for the reduction of LDL–C. Its potential effects on arterial structural and functional parameters have never been evaluated. The aim of this study was to longitudinally evaluate these properties in patients initiating BA therapy and to compare them with those of a matched cohort receiving PCSK9–inhibitors (PCSK9i).

Methods: All patients who began BA therapy at the cardiology department of our hospital were enrolled. Carotid–femoral Pulse Wave Velocity (PWV), carotid Intima Media Thickness (IMT) and brachial Flow Mediated Dilation (FMD) were evaluated before the first administration (T0) and after 6 months (T1) and 1 year (T2). Data from 20 patients with a 1–year follow–up were analysed and compared with a matched (sex, age, and Body Mass Index – BMI) cohort of 20 PCSK9i patients.

Results: Mean age in the BA group was 65.3±7.9 years, with 55.0% male participants and a BMI of 25.7±2.9 kg/m2. Baseline LDL–C was lower in the BA group when compared to PCSK9i (101.5±36.9 vs 122.0±31.4 mg/dL) and the more frequent indication was primary prevention for BA (65.0%) and secondary prevention for PCSK9i (75.0%). Statins were used respectively by 45.0% and 40.0% in the bempedoic acid and PCSK9i groups, and ezetimibe by 80.0% in both groups. After the 1 year's follow–up, a significant reduction in LDL–C was observed in both groups, the values were 77.6±37.3 mg/dL with Bempedoic Acid and 46.1±30.4 mg/dL with PCSK9i (p‹0.001). No statistically significant changes were observed in PWV (from 9.7±2.3 to 9.4±1.2 m/s, p=0.466), FMD (from 6.7±5.2 to 6.3±5.9 %, p=0.071), or IMT (from 715.2±153.4 to 678.6±180.9 μm, p=0.239) within the bempedoic acid group. Similarly, no significant changes were found in the PCSK9i group and in the between–group comparison.

Conclusions: Bempedoic acid was confirmed to be a highly effective LDL–C–lowering agent. However, no significant improvements were observed in arterial structural or functional parameters, either within the bempedoic acid group or in comparison with the PCSK9i group.

Dislipidaemia Therapy 2

Abstract citation ID: suag058.545

NOCEBO AND PLACEBO–DRIVEN STATIN SIDE EFFECTS: CLOSING THE GAP BETWEEN TRIALS AND REAL–WORLD CARE

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Background: Statins are a cornerstone of LDL–cholesterol lowering, but perceived intolerance—especially muscle complaints—remains a leading cause of discontinuation and loss of cardiovascular protection.

Aim: To review evidence that contextual mechanisms (nocebo/drucebo) account for a substantial share of symptoms attributed to statins, and to translate this evidence into pragmatic clinical steps.

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Methods: Narrative review of double–blind randomised trials and meta–analyses on statin adverse events, integrated with n–of–1 and crossover studies that compared statin, placebo and/or no–tablet periods in patients with previous statin cessation. Key consensus recommendations on statin intolerance were also considered.
Results: In large, blinded trials, the absolute excess of muscle symptoms with statins versus placebo is minimal, and serious muscle toxicity is uncommon. Conversely, n–of–1/crossover studies (e.g., SAMSON, StatinWISE) report comparable symptom intensity during statin and placebo exposure, with markedly lower scores during no–tablet periods, supporting a predominant role for expectations and attribution. Sharing individual blinded symptom trajectories increased patients' confidence and willingness to restart treatment. Clinical implications include ruling out alternative causes (e.g., thyroid dysfunction, vitamin D deficiency, drug–drug interactions), using structured dechallenge/rechallenge, and adopting stepwise options such as switching statin, lowering dose, intermittent dosing and combination therapy with non–statin agents to maintain LDL–C targets.
Conclusions: A large proportion of real–world statin side effects is explained by nocebo/drucebo rather than pharmacological toxicity or side effects. Early recognition, careful communication and flexible treatment strategies may improve adherence and help preserve the cardiovascular benefit of statin therapy.

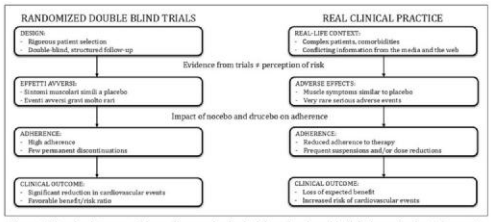

Figure 1. Paradox between evidence from randomized trials and real-world clinical practice in statin use. In double-blind trials, with strict patient selection and structured monitoring, the incidence of muscle symptoms is only slightly higher than with placebo, adherence is high, and the net balance in terms of prevented cardiovascular events is clearly favorable. In routine clinical practice, by contrast, exposure to partial or misleading information, the presence of comorbidities, and nocebo and drucebo phenomena lead many patients to attribute a wide range of nonspecific complaints to statins, reducing adherence and, consequently, the expected clinical benefit.

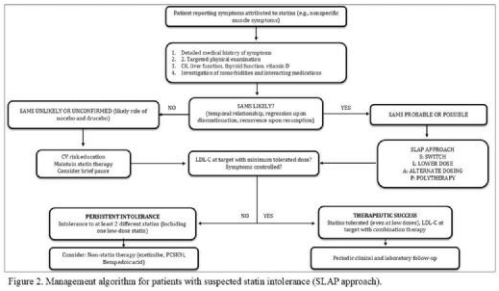

Figure 2. Management algorithm for patients with suspected statin intolerance (SLAP approach).

Trial (year, journal)	Design	Study population	Treatment dose	Duration schedule	N (randomized completed)	Primary outcome	Results
SAMSON — N-of-1 trial (2020, NEJM, Wood et al.)	Series of randomized, double-blind N-of-1 trials with 3 types of 1 month (statin/placebo/no treatment).	Patients who discontinued statins due to side effects occurring within 2 weeks of initiation.	Atorvastatin 20 mg vs. placebo, plus "empty" months (no tablets).	12 months: 12 bottles per month (8 statin, 4 placebo, 4 empty).	60 randomized; 49 completed 12 months.	Daily symptom intensity (scale 0–100) and calculation of the nocebo ratio.	Mean symptom score: no tablet 8.0; placebo 15.4; statin 16.5. Greater symptoms in months with tablet (statin or placebo) vs. no treatment ($p < 0.001$); no difference between statin and placebo ($p = 0.30$). Nocebo ratio (aggregate analysis) = 0.98. At 6 months after the trial, 30/40 (58%) had resumed statins.
StatinWISE — series of N-of-1 RCTs (2021–, NIHR/BTR, BMJ/SHTA)	Series of 200 randomized, double-blind, placebo-controlled N-of-1 trials (aggregate analysis between individual N-of-1 trials).	Primary care patients who were considering discontinuing or had discontinued statins due to suspected myalgia.	Atorvastatin 20 mg daily vs placebo (matched).	1 year per participant: 6 periods of 8 weeks (5 statin + 3 placebo).	200 randomized; 151 (for primary analysis) with at least one statin period and one placebo period.	VAS for muscle symptoms (last week of each period); mean analysis of statin vs. placebo.	No significant difference at population level: mean diff statin vs placebo = −0.11 (95% CI −0.36 to 0.14; p = 0.398). Similar withdrawals and adherence in the two periods. The majority of completers decided to resume statin therapy but a small proportion experienced worsening with statin therapy and chose not to continue.
Howard et al. — "Side Effect Patterns in a Crossover Trial of Statin, Placebo, and No Treatment" (2021, JACC)	Randomized crossover (monthly), daily symptom measurement with app; nocebo ratio calculation; design similar to the SAMSON trial (same study cohort reported in detail).	Participants who had discontinued statins due to side effects.	Atorvastatin 20 mg (4 months' supply distributed) vs placebo vs months without tablets.	12 months (12 bottles per month: 8 statin, 4 placebo, 4 empty); evaluated daily each month.	60 randomized; 49 completed the protocol.	Daily symptom intensity (scale 1–100); comparison of statin vs placebo vs no treatment.	Results: mean symptom score no-tablet 8.0; placebo 15.4; statin 16.5; $p<0.001$ vs no-tablet for statin and placebo, but no difference statin vs placebo ($P=0.388$). Nocebo ratio= 0.90, 70% resumed statins at 6 months. Conclusion: most of the symptom burden was explained by the nocebo effect, temporal pattern does not distinguish drug from placebo.

Table 1. Key scientific evidence supporting the impact of nocebo and drucebo effects (i.e., adverse symptoms driven by expectations and misattribution) in patients treated with statins

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STATIN ASSOCIATED AUTOIMMUNE MYOPATHY: A CASE REPORT

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Since the publication of the 2019 ESC/EAS Guidelines and their last update in 2025 (1) for the management of dyslipidemias, there is a progressive widespread use of statins because of their impact in reducing the incidence of cardiovascular disease. Statins are generally safe and tolerable. A mild myalgia is the more frequent symptom complained by patients (2) but only in rare cases (3) statins cause serious muscle damage, with weakness and elevated levels of creatine kinase (CK). In the majority of such cases, the patients recover spontaneously after the statin treatment discontinuation (4,5).

We describe a case of a 63 years old woman with a mild hypercholesterolemia (total cholesterol 204 mg/dl, LDL 121 mg/dl) who started a treatment with statin (atorvastatin 20 mg OD) since 2018 for a high atherosclerotic risk due to a familiar hypercholesterolemia, high blood pressure and aortic arch's atherosclerosis. On June 2022 the patient (pt) complain a worsening of muscle fatigue, myalgia with increased value of CK (3237 IU/l), never checked before. Symptoms improved after interruption of the statin and CK reduced (574 IU/l).

Statin was substituted with Evolocumab and Ezetimibe. During follow–up the pt was asymptomatic but CK progressively increased (1369–1734–2237 IU/l). Ezetimibe was stopped. A clinical investigation excluded a thyroid disease or a neuromuscolar disease. All laboratory autoimmune assays were within normal range but high level of autoantibodies against 3–hydroxy–3–methylglutaryl coenzyme A (HMG–CoA) reductase was detected (141 A/mL; cutoff 0–20) . In the hypothesis of an autoimmune myopathy induced by statin, an electromyography that documented a mild muscle sufferance was performed.**Conclusion:** Autoimmune myopathy induced by statins is rare but it has to be considered in presence of myalgia and elevated values of CK (› 10x normal value), persistently also after interruption of the statin (6). In this case immunosuppressive treatment is a challenge because of lack of randomized treatment study but at the same time it has to be considered in case of progression of the muscle disease and symptoms.

Abstract citation ID: suag058.547

ACHIEVEMENT OF LDL CHOLESTEROL TARGETS IN HIV–POSITIVE PATIENTS

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Background and objectives: People living with HIV (PLWH) face an increased cardiovascular (CV) risk due to the interaction of traditional risk factors, chronic inflammation and cumulative antiretroviral therapy (ART) adverse metabolic effects. However, standard risk models often underestimate this burden, limiting effective prevention. This study evaluates LDL cholesterol target achivement in PLWH, based on European Society of Cardiology guidelines, and explores its association with clinical, immunological, and therapeutic HIV–related variables.
Methods: A retrospective analysis was conducted on 246 HIV–positive patients, aged ≥40, on ART at our hospital. Clinical, laboratory, and therapeutic data were extracted from the hospital's electronic registries, while ten–year CV risk was assessed using SCORE2 from which each patient's LDL cholesterol target was defined.
Results: Only 27.2% of the analyzed cohort achieved the recommended LDL cholesterol targets; a significantly higher prevalence of uncontrolled profiles was observed among patients belonging to the "high" or "very high" SCORE2 risk categories (29.3 and 14.6% of the population, respectively). 35.4% of the patients take statins, 12.2% ezetimibe while only the l'11.4% take their association. Univariate analysis showed that lower value of total cholesterol ($r=-0.490$, $p<0.0001$), triglycerides ($r=-0.188$, $p=0.003$), systolic blood pressure ($r=-0.190$, $p=0.003$), and SCORE2 risk class ($r=0.270$, $p<0.0001$) were significantly associated with an increased likelihood of achieving the LDL cholesterol target, whereas no significant relation was found with HIV–specific variables.
Conclusions: LDL cholesterol target achievement in PLWH remains suboptimal. A refined predictive model integrating HIV–specific variables, could be useful to enhance individualized risk stratification and to optimize therapeutic strategies tailored to PLWH.

Abstract citation ID: suag058.548

CAROTID PLAQUES TREATED WITH BEMBEDOIC ACID: A 7% OF REDUCTION IN 6 MONTHS

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Bempedoic acid were indicated to be able to reduce the hypercholesterolemia add on to statin and ezetimibe therapy. We investigated the effect of the same treatment in carotid atherosclerosis after a follow up of 6 months.**Methods:** A

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continuous series of 22 patients were enrolled in a prospective analysis. All patients started a therapy with bempedoic acid for hypercholesterolemia add on to rosuvastatin or atorvastatin plus ezetimibe therapy for an insufficient reduction of cholesterol. The mean of LDL dosage was 101 mg/dl. All patients were high or very high–risk patient. In all patients the bempedoic acid was added to optimal medical therapy without new symptoms in ambulatory. The recruitment period was long 1 month. After the recruitment the patient was follow for other 6 months. At the start and at the end of the follow–up we evaluated. The atherosclerosis was evaluated in an ultrasound doppler of carotids The data was collect in excel and analysed by the Q–R–Calc program.

Results: The mean age of patients was 68 age, 44% female. 33% was diabetic patients. Hypertension was present in 73%, hypercholesterolemia in 100%. 11% was smokers. 94% were Caucasian patients. The mean of Weight was 75 kg at the first control. The mean height 174 cm. All patients performed a cardiological control in which the medical doctor prescribed bempedoic acid. 100% of patients assumed a statin, 100% ezetimibe. After 6 months the mean LDL was 78 mg/dl. The doppler showed plaques in 89% of patients. The mean plaques occluded the lumen for 37% before the bempedoic acid and 30% after with a reduction of 7% (p:0,03%) In 50% of patients, we revel a reduction of atherosclerosis (in this subgroup the reduction was 11%)

Conclusion: The bempedoic acid add on to statin therapy reduced the carotid. atherosclerosis for 7% in a continuous series of 23 patients (Figure 1).

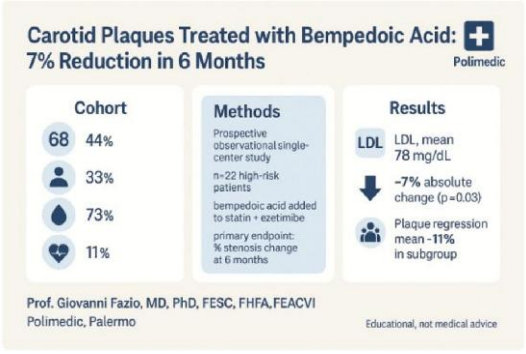

Figure 1

Abstract citation ID: suag058.549

LDL CHOLESTEROL IN PATIENTS UNDERGOING STAGED CORONARY REVASCULARIZATION

I. Radano, F. Delnevo, S. Muccioli, L. Zappia, R. D'Aniello, S. Civera, S. Bongioanni, M. Casula, A. Riba, and G. Musumeci
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Background and aims: Despite LDL cholesterol (LDL–C) is a well–established modifiable risk factor in patients in secondary cardiovascular prevention, only 30% of them reach the LDL target ‹55 mg/dl. In our hospital, a protocol of intensive lipid–lowering therapy (LLT) is applied in patients with coronary artery disease (CAD).

The aim of our analysis is to evaluate the efficacy of this approach in patients re–admitted for staged revascularization.

Methods: We evaluated 208 patients (162 male and 46 female) admitted to our ward between October 2021 and November 2025, diagnosed with CAD (acute coronary syndrome and chronic coronary heart disease), undergoing staged revascularization (within 2–6 months of the index event). Demographic features, LDL values and LLT (at admission and during previous index event) were collected.

Results: Patients mean age was 69 years old. At the index event, 96 patients of 208 (46%) were receiving LLT: 2 patients statins+ ezetimibe+ PCSK9i, 54 patients stantins + ezetimibe, 34 patients only statins, 5 patients only ezetimibe, 1 patient only PCSK9i. LDL average was 90 mg/dl. At discharge 203 patients (97%) were on statin therapy. Of the remaining 5 patients, 2 were on ezetimibe alone, 1 on pcsk9i and 2 on ezetimibe + bempedoic acid. Triple LLT (statins+ ezetimibe+ PCSK9i) was prescribed in 36 patients (18%). Statin therapy was boosted in 32 patients.

Of note, at admission for staged revascularization, LDL average was 45 mg/dl and LDL target had been reached by 154 patients (74%). LDL average of patients on target and not was 31 mg/dl e 82 mg/dl, respectively. Therapy has been further enhanced: bempedoic acid was added on therapy in 9 patients and PCSK9i in 7 patients.

Conclusion: These data highlight the need of optimizing LLT intensively already during hospitalization in CAD patients, in order to increase the number of

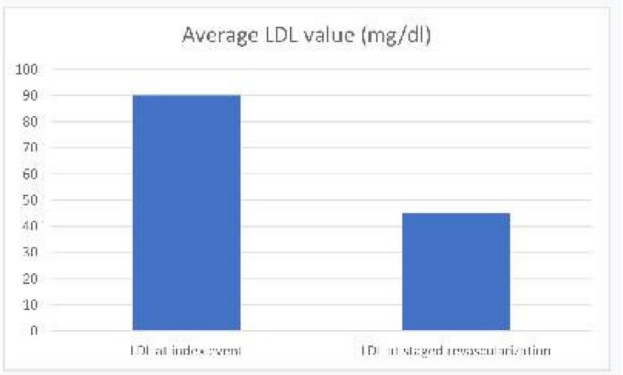

Figure 1

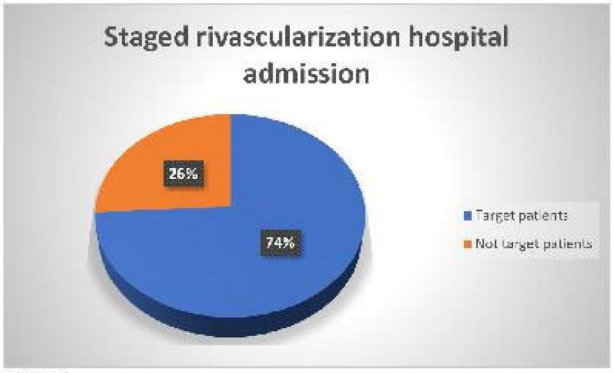

Figure 2

Abstract citation ID: suag058.550

REAL WORLD ANALYSIS OF LIPID MANAGEMENT AFTER ACUTE CORONARY SYNDROME: STRIKE STRONG AT DISCHARGE OR AT 1–MONTH?

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Arcispedale Sant'anna

Background: Numerous scientific evidence demonstrates that the rapid achievement of optimal LDL cholesterol levels after an acute coronary syndrome is associated with improved outcomes. The aim of this retrospective analysis is to describe the use of lipid–lowering therapy in this clinical setting and the results obtained. In particular, we analyzed the trajectory of LDL cholesterol levels in patients with elevated baseline LDL.

Methods: During the period from 1 September 2024 to 30 August 2025, we collected the following data for all patients with acute coronary syndrome who underwent a 1–month follow–up visit at our center: in–hospital LDL cholesterol levels, lipid–lowering therapy prescribed at discharge, and LDL cholesterol levels measured after at least 4 weeks. Baseline LDL cholesterol was considered elevated when greater than 140 mg/dL.

Results: . We consecutively collected data from 135 patients. The baseline LDL cholesterol level was 101 mg/dL, and 18 (13%) patients had values ›140 mg/dL. During hospitalization, 118 patients (87%) received high–intensity statin therapy, 14 (10%) received moderate–intensity statins, and 114 (84%) were treated with ezetimibe. At the 1–month follow–up visit, 78 patients (58%) had achieved target LDL cholesterol levels. Among patients not at target, 26 (19%) met the eligibility criteria for PCSK9 inhibitor therapy. Of the 18 patients with elevated baseline LDL cholesterol, 9 (50%) achieved target levels (mean LDL 35 mg/dL), and 5 (28%) met the eligibility criteria for PCSK9 inhibitor therapy.

Conclusion: Appropriate use of statins and ezetimibe allows many patients to achieve target LDL cholesterol levels, even when baseline LDL cholesterol is elevated. The 1–month follow–up visit after acute coronary syndrome represents a crucial time point for therapy optimization in patients who do not reach target levels with first–line treatment.

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Abstract citation ID: suag058.551

EFFECTIVENESS OF LIPID–LOWERING STRATEGIES IN REAL WORLD: MISSED GOALS AND DISCREPANCIES

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Asst Fatebenefratelli Sacco; Ospedale Luigi Sacco; I.R.C.S.S. Ospedale San Raffaele; Ospedale Fatebenefratelli E Oftalmico

Background: Acute coronary syndromes (ACS) are characterized by partial or total occlusion of one or more coronary vessels caused by atherosclerosis. Dyslipidemia plays a major role in atheroma formation.
Objectives: We collected three–month follow–up data to assess the outcomes of the therapy prescribed at hospital discharge. We studied the lipid profile of patients hospitalized for ACS and any ongoing lipid lowering therapy.
Methods: We collected data on the lipid profile of patients hospitalized for ACS at L. Sacco Hospital in Milan from January 2024 to May 2025, noting risk factors, ongoing therapies, LDL levels at admission. At three months, we repeated a lipid profile to evaluate the efficacy of the prescribed lipid lowering therapy in terms of guideline–directed targets. We also noted any adverse event related to lipid–lowering therapy and the incidence of MACEs.
Results: In our population, only 48% reported dyslipidemia, whereas 68% were confermed by laboratory tests. Moreover, 38% had history of at least one ACS event. At admission, LDL was off target in 78.1% of those at extremely high risk, 92% in those at very high risk, 68.8% in those at high risk, 62.5% in those at moderate risk, and 39.1% in those at low risk. Mean LDL level at hospital admission was 100,85 ± 43,36 mg/dL. Also, 49% were already on lipid–lowering therapy but only 37% of these had LDL levels at target. Therapy prescribed at discharge included statins (49%) or statins plus ezetimibe (37%). Only 6% received other lipid–lowering agents. At three months, 63.5% of patients were not at target (mean LDL 61,66 ± 27,25 mg/dL) and 4.5% reported therapy–related side effects. Failure to reach the LDL target was due in 59.5% of cases to inadequate therapy at discharge, but lower than predicted potency of properly prescribed drugs was accounted in the remaing 40.5% with a mean deviation from the target value of 13.46 mg/dL and a maximum deviation of 65 mg/dL.
Conclusions: Dyslipidemia is often underestimated and undertreated in patients presenting with ACS. Suboptimal LDL values at hospitalization (primary prevention) and at follow–up (secondary prevention) may be attributable to inadequacy of screening, lack of use of new non–statin drugs, therapeutic inertia, or the short follow–up. Our data differ from the literature in terms of discrepancy between the predicted and actual LDL values obtained through lipid–lowering therapy, a finding which requires further investigations.

Heart Valve Disease 1

Abstract citation ID: suag058.552

A RARE CASE OF ASPERGILLUS ENDOCARDITIS ON AN AORTIC VALVE PROSTHESIS

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Infective endocarditis (IE) is an infection of the endocardium caused by bacteria or, less frequently, fungi, with an incidence of 3–10 cases per 100,000 people/year. Prosthetic valve endocarditis accounts for 20–30% of cases. Fungal IE is rare (2–4%) but severe, with mortality exceeding 50%. Candida species are most common, followed by Aspergillus, which represents 20–25% of fungal cases. Aspergillus endocarditis is characterized by an insidious course, frequent negative blood cultures, and a high risk of embolic complications, often delaying diagnosis.**Clinical Case:** A 72–year–old man with a history of aortic valve replacement using an Inspiris Resilia Edwards 25 bioprosthesis one year earlier was admitted for persistent fever and gastrointestinal symptoms. Due to ongoing fever and visual impairment, he was transferred to our hospital. Transesophageal echocardiography (TEE) revealed a mobile, pedunculated mass (2 × 1.5 cm) on the posterior aortic side of the prosthetic cusps and additional hypoechoic areas at the sinotubular junction. Moderate prosthetic stenosis (Vmax 3.2 m/s, mean gradient 34 mmHg) with mild central regurgitation was observed.

A repeat TEE showed large, irregular, mobile vegetations up to 3.5 × 2 cm, thickening of the posterior prosthetic ring and mitro–aortic junction consistent with a prosthetic abscess, and increased prosthetic mobility. Microbiological investigations confirmed Aspergillus sepsis, and antifungal therapy was initiated. Brain CT performed for neurological symptoms revealed a right rolandic cisternal hemorrhage compatible with septic embolization.

Given persistent sepsis, large vegetations, and embolic risk, the patient underwent surgical replacement of the aortic valve with a bioprosthesis.

Conclusions: Multimodal imaging is crucial for diagnosing IE and detecting complications. In patients with valve prostheses, TEE remains fundamental for both diagnosis and therapeutic decision–making.

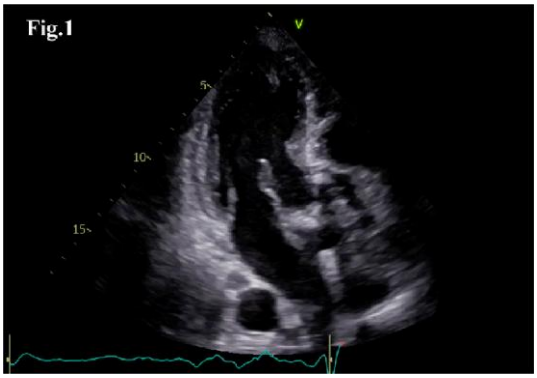

Fig. 2

Abstract citation ID: suag058.553

DIFFERENTIAL DIAGNOSIS OF MECHANICAL MITRAL PROSTHESIS DYSFUNCTION: THE KEY ROLE OF MULTIMODALITY IMAGING AND HEART TEAM DECISION–MAKING

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Introduction: Mechanical valve (MV) dysfunction may result from thrombosis, pannus ingrowth, structural degeneration or infective endocarditis. Accurate identification of the underlying etiology is essential, as management differs substantially between thrombotic and non–thrombotic causes. The 2025 ESC guidelines on valvular heart disease emphasize multimodality imaging and Heart Team discussion for optimal decision–making in prosthetic valve dysfunction.
Case Report: A 60–year–old man with atrial fibrillation and combined mitro–tricuspid valve disease underwent mechanical mitral valve replacement with a Sorin Bicarbon 29–mm prosthesis, tricuspid annuloplasty and surgical AF ablation after progression from severe regurgitation to mitral stenosis. He presented with progressive exertional dyspnea and mild peripheral edema. Transthoracic echocardiography showed restricted prosthetic leaflet motion, elevated mean transprosthetic gradient (21 mmHg) (Figure 1), and moderate–to–severe tricuspid regurgitation, raising suspicion of prosthetic valve dysfunction. Transesophageal echocardiography demonstrated reduced mobility of the antero–septal leaflet with a hyperechogenic structure consistent with obstruction (Figure 2). Contrast–enhanced chest computed tomography

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excluded prosthetic valve thrombosis. Given persistent symptoms and imaging findings, the case was discussed by the Heart Team. Surgical exploration revealed fibrous pannus and annular calcification limiting leaflet mobility (Figure 3). The mechanical prosthesis was replaced with a 29–mm Medtronic Hancock bioprosthesis, and tricuspid repair was revised. Postoperative recovery was uneventful, with normalization of transprosthetic gradients and improvement in functional status.

Discussion: Differentiating thrombus from pannus is crucial, as thrombotic obstruction may respond to anticoagulation or thrombolysis, whereas pannus requires surgical treatment. Chronic symptom progression, adequate anticoagulation, hyperechogenic and immobile lesions, and absence of thrombus on CT support the diagnosis of pannus. Current guidelines recommend multimodality imaging and Heart Team evaluation to guide personalized therapy.

Conclusion: This case illustrates the challenges in diagnosing mechanical prosthetic valve dysfunction. Accurate etiological differentiation through imaging and multidisciplinary discussion is essential to optimize patient management and outcomes.

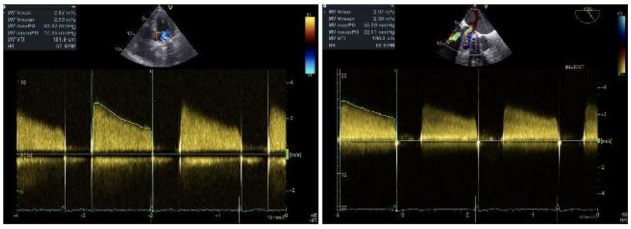

Figure 1

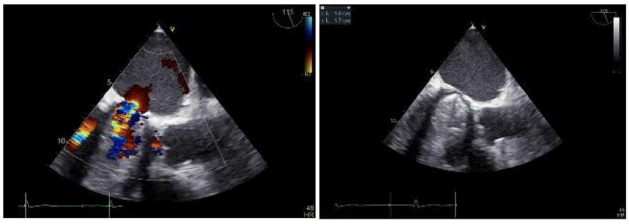

Figure 2

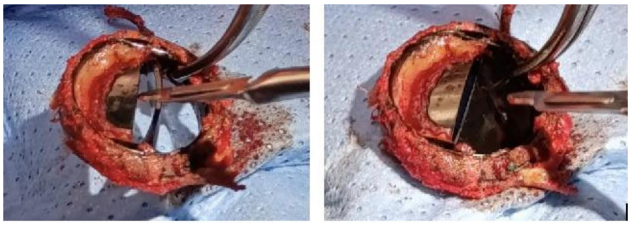

Figure 3

Abstract citation ID: suag058.554

MULTIPARAMETRIC PREDICTORS OF ADVERSE OUTCOMES AFTER SAVR: A 2–YEAR COHORT STUDY

A. Grasso Granchietti, L. Cosco, L. Iozzelli, D. Mancini, G. Grandi, L. Biagiotti, F. Vanni, S. Vigiani, S. Del Pace, E. Cecchi, B. Tomberli, C. Di Mario, M. Pieroni, and S. Caciolli
Azienda Ospedaliera Universitaria Careggi

Background: Patients undergoing surgical aortic valve replacement (SAVR) for severe aortic stenosis (AS) remain at considerable long–term risk for adverse cardiovascular events. Traditional surgical risk scores often fail to capture functional and subclinical predictors of late complications.

Methods: We retrospectively analysed 101 consecutive patients who underwent isolated SAVR for severe AS from 2021 and 2023. Baseline demographic, clinical, laboratory, and echocardiographic data were collected. NACE was defined as a composite of all–cause mortality, stroke, myocardial infarction, or major bleeding during a 2–year follow–up.

Results: Seventeen patients (16.8%) experienced a NACE. Compared to patients without events, those with NACE were older ($p<0.001$), had higher EuroSCORE II ($p<0.001$), worse renal function ($p<0.001$), and impaired LV systolic function as assessed by global longitudinal strain (p=0.01). Systolic pulmonary artery pressure (sPAP) was also significantly higher (p=0.004). At multivariate logistic regression, four variables independently predicted NACE: Age (95% CI 1.04–1.25, OR: 1.12, p=0.003); LV–GLS (95% CI 0.8–0.97, OR: 0.88, p=0.02); post operative serum creatinine (95% CI 1.2–1.76, OR: 1.45, p=0.001); sPAP (95% CI 1.01–1.22, OR: 1.08, p=0.03). GLS ≤14.5% identified patients at risk of NACE with an overall diagnostic accuracy of 72%.

Conclusions: Impaired LV myocardial strain, postoperative renal dysfunction, older age, and elevated pulmonary pressures are independently associated with long–term adverse events after SAVR. These parameters may improve individual risk stratification beyond conventional scores and inform tailored postoperative surveillance.

Abstract citation ID: suag058.555

COUNTERCLOCKWISE MITRAL VALVE: DYSPLASTIC MITRAL VALVE IN A TNNI3 MUTATION CARRIER

C. Gatti, I. Capodaglio, F. Patani, M. Benedetti, C. Mattei, R. Manfredi, M. Shkoza, M. Nazziconi, K. Maurizi, A. Massari, G. Furlani, B. Anselmi, T. Gaudenzi, S. Luciani, F. Pietrucci, A. Scavuzzo, A. Dello Russo, F. Vagnarelli, C. Lofiego, and M. Marini
Lancisi Cardiovascular Center

A 58–year–old man was diagnosed in his 30s with mitral valve prolapse due to myxomatous degeneration. His family history was notable for ischemic heart disease (his father died suddenly from myocardial infarction) and hypertrophic cardiomyopathy (HCM). The patient is heterozygous for a likely pathogenic variant in the troponin I gene (TNNI3), c.592C>G p.(Leu198Val), also expressed by his brother and nephews, all affected by HCM. He had no significant comorbidities.

ECG showed non–significant Q waves in the inferior leads and V6, mild LV strain pattern in the lateral leads with negative T waves in aVL (Fig.1). CMR didn't reveal any abnormalities (normal thickness, no LGE), and no arrhythmias were documented during the years.

Patient underwent periodic follow–up showing abnormal features of the mitral valve apparatus: marked anterior displacement of the anterolateral commissure and posterior displacement of the posteromedial one, resulting in a 'right–to–left' rather than anteroposterior leaflet orientation (Fig.2b). Both papillary muscles appeared hypoplastic and were displaced apically and anteriorly (Fig.2d). There was pronounced elongation of the chordae tendineae and of the anterior mitral valve leaflet (AMVL), which was also thickened (Fig.2c). Additional findings included myxomatous degeneration of the leaflets, annular dilation with fibrosis of the posterior part and mild posterior annular curling, without significant mitral annular disjunction (Fig.2a).

At most recent assessment, TTE revealed moderate–to–severe mitral regurgitation, a normal–sized left ventricle with normal wall thickness and preserved systolic function, increased filling pressure, reduced lateral e' 4 cm/sec and medial e' 5 cm/sec, severe left atrial enlargement, right ventricle normal in size and systolic function and normal systolic pulmonary artery pressure at rest. TEE confirmed severe mitral regurgitation with an eccentric jet (Fig.3d), originating at the A2M2/P2M2–A3/P3 segments (Fig.3c) and directed toward the posterolateral wall of the left atrium, secondary to prolapse of the AMVL (Fig.3a–b). The patient was deemed suitable and then scheduled for surgery.

The ECG and echocardiographic findings are not consistent with hypertrophic cardiomyopathy. Abnormalities of the mitral valve apparatus, although showing anterior displacement of the papillary muscles and increased AMVL length, are not fully representative of ancillary manifestations of HCM.

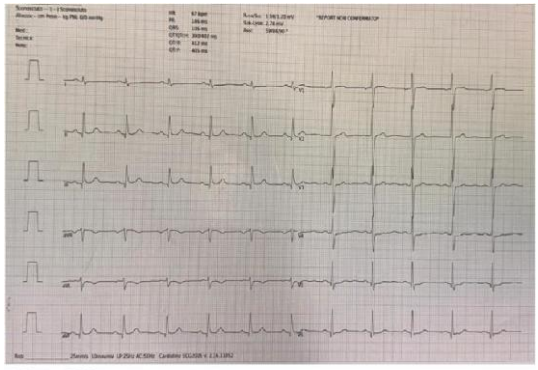

Fig.1 – ECG

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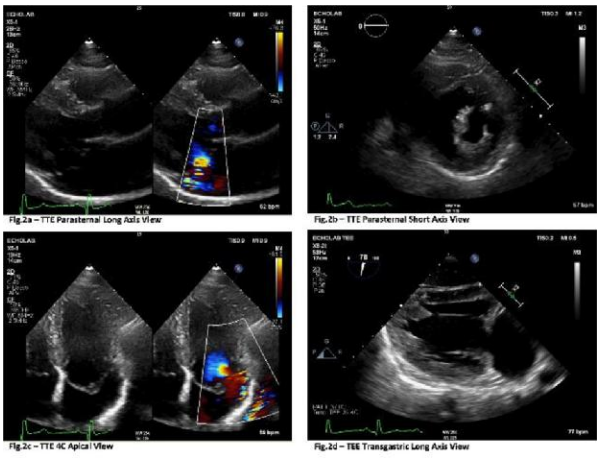

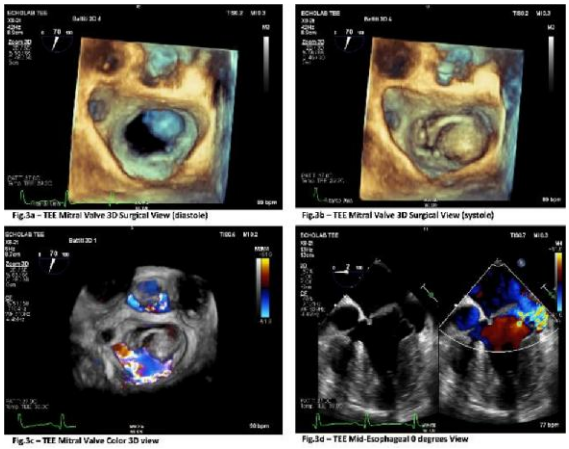

Abstract citation ID: suag058.556

IMPACT OF CHEST WALL CONFORMATION ON THE OUTCOME OF PRIMARY MITRAL REGURGITATION DUE TO MITRAL VALVE PROLAPSE

A. Sonaglioni, G. Nicolosi, M. Lombardo, and M. Baravelli
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Background: The possible influence of chest wall conformation on cardiovascular (CV) outcome of patients with mitral regurgitation (MR) due to mitral valve prolapse (MVP) has never been previously investigated.
Methods: This retrospective study included all consecutive symptomatic patients with MVP and moderate MR who underwent exercise stress echocardiography at our institution between February 2014 and February 2021. Modified Haller Index (MHI; chest transverse diameter over the distance between sternum and spine) was noninvasively assessed. During the follow-up, we evaluated the occurrence of any of the following: (1) CV hospitalization, (2) mitral valve (MV) surgery, and (3) cardiac death or sudden death.
Results: Four hundred and twenty-four consecutive patients (66.8 ± 11.5 years, 48.3% men) were retrospectively analyzed. Overall, MVP patients had concave-shaped chest wall (MHI = 2.55 ± 0.34) and were found with small cardiac chamber dimensions. During a mean follow-up time of 3.2 ± 1.7 years, no patients died, 55 patients were hospitalized due to CV events, and 20 patients underwent MV surgery. On multivariate Cox analysis, age (heart rate [HR] 1.05, 95% confidence interval [CI] 1.03–1.06), diabetes mellitus (HR 3.26, 95% CI 2.04–5.20), peak exercise-E/e' ratio (HR 1.07, 95%CI 1.05–1.09), and peak exercise-effective regurgitant orifice area (HR 2.53, 95% CI 1.83–3.51) were directly associated to outcome, whereas MHI (HR 0.15, 95%CI 0.07-0.33) and beta-blocker therapy (HR 0.26, 95% CI 0.19–0.36) showed strong inverse correlation. An MHI ≥2.7 showed 80% sensitivity and 100% specificity for predicting event-free survival (area under the curve = 0.98).
Conclusions: Symptomatic patients with moderate MR due to MVP and MHI ≥2.7 have an excellent prognosis over a medium-term follow-up. Noninvasive chest wall shape assessment should be encouraged in clinical practice.

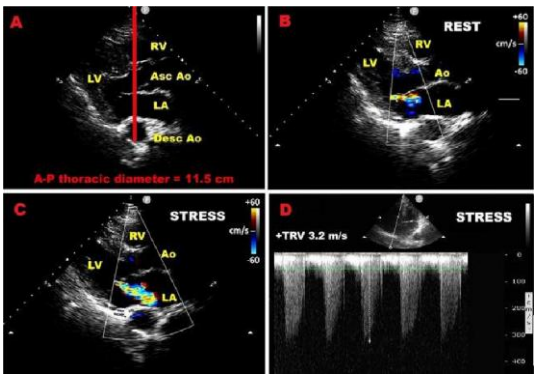

Figure 1: Dynamic MR assessment using ESE in symptomatic MVP individuals with concave–shaped chest wall and resting mild–to–moderate MR

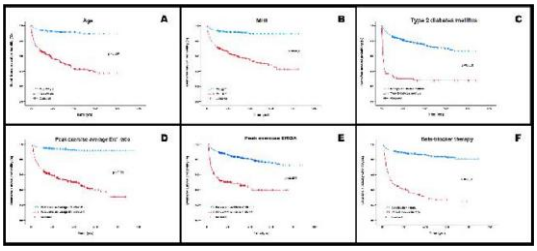

Figure 2: The Kaplan–Meier event-free survival curves, obtained for the six variables with the strongest independent correlation with adverse CV events. (a) age, (b) MHI, (c) type 2 diabetes mellitus, (d) peak exercise average E/e' ratio, (e) peak exercise EROA, (f) beta–blocker therapy.

Heart Valve Disease 2

Abstract citation ID: suag058.557

GLP1–RA SEMAGLUTIDE AND SLOWING PROGRESSION OF AORTIC VALVE STENOSIS IN NON DIABETIC PATIENTS

G. Marchetti, C. Stefanio, G. Santese, M. Boiani, and G. Trisolino
Clinica Privata Accreditata Villa Laura; Villa Torri; Villa Mediprò

We investigated predictors of aortic stenosis (AS) progression in 20 consecutive patients (pts) every 6 months for 24 months with clinical controls, echocardiograms and biochemical variables. The changes evuated were: every 6 months clinical status and mean gradient [MG], peak velocity [PV], peak gradient [PG], or aortic valve area [AVA]); at baseline and after 24 months: calcium score [AVC] at computed tomography. Pts with obesity (BMI ≥30.0 kg/m²) and/or hip circumference /height ratio ›0.5 were treated with Glucagon–Like Peptide–1 Receptor Agonist semaglutide (GLP1–RA) subcutaneously once weekly. During the first 16 weeks, the dose of semaglutide was gradually escalated from 0.25 mg once weekly until the target dose. Pts with diabetes mellitus were excluded from the study. Pts with LDL levels › 110 mg were treated with rosuvastatin 20 mg + ezetimibe 10 mg.**Resuts:** The pooled annualized progression of MG was +4.80 mm Hg (95% CI: 2.80–5.41 mm Hg), AVA –0.10 cm2 (95% CI: 0.06–0.12 cm2), PV +0.20 m/s (95% CI: 0.13–0.24 m/s), PG +8.8 mm Hg (95% CI: 5 –10.75 mm Hg), and AVC +160 AU (95% CI: 50–265 AU).The reduction in AVA per year was significantly related to initial AVA (r=0.42, P‹0.0001), mean aortic valve gradient (r=0.28, P=0.04), left ventricular (LV) outflow tract velocity (r=0.28, P=0.001), LV end–diastolic diameter (r=0.24, P=0.04) and to serum creatinine level (r=0.15, P=0.08).Pts with a faster rate of reduction in AVA had higher serum creatinine (P=0.04) and calcium (P=0.08) levels.Those with a serum LDL ›110 mg/dL had a rate of AVA reduction twice that of those with a lower cholesterol level (P=0.04). Initial AVA, current smoking, and serum calcium level were independent predictors of amount of AVA reduction per year. During a mean follow–up of 24 months, the changes in body weight, BMI, waist–to–hip ratio, and NYHA functional class correlated well with a slowing of the stenotic AVA progression in treated pts with semaglutide + rosuvastatin and ezetimibe (–0.10 ± 0.09 cm² /year).
Conclusion: Absolute and percentage AVA progression per year is greater in those with milder degrees of stenosis, higher body mass index, hip

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circumference / height ratio›0.5. Aortic stenosis progression is accelerated in the presence of smoking, hypercholesterolemia, lower BMI, and elevated serum creatinine and calcium levels. The use of GLP1–RA semaglutide plus rosuvastatin and ezetimibe seems to be a possible strategy to retard this process.

Abstract citation ID: suag058.558

TRICUSPID VALVE–IN–VALVE IN EBSTEIN'S ANOMALY: A FEASIBLE CHALLENGE

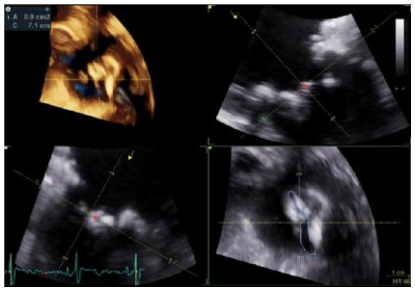
L. Tulli, G. Lattanzi, E. Colucci, M. Ricci, C. Bernetti, R. Sclafani, G. Bardelli, and E. Carluccio
Azienda Ospedaliera Santa Maria Della Misericordia; Azienda Ospedaliera Di Perugia – Ospedale Santa Maria Della Misericordia, Perugia, Italy

Degeneration of tricuspid bioprostheses represents a relevant clinical issue in patients with complex congenital heart disease, such as Ebstein's anomaly, in whom redo cardiac surgery is associated with high morbidity and mortality. We report the case of a 75–year–old woman with Ebstein's anomaly who had previously undergone double surgical tricuspid valve replacement with bioprostheses (1997 and 2011), referred to our center for progressive dyspnea and asthenia.

Transthoracic echocardiography revealed severe stenosis of the tricuspid bioprosthesis, with a mean inspiratory gradient of 12 mmHg and moderate regurgitation, associated with right ventricular dysfunction. Three–dimensional transesophageal echocardiography confirmed thickened, partially fused and calcified leaflets, with reduced valve opening (planimetric area 0.9 cm²) (Figure 1). Given the high surgical risk (STS score: 6.01% mortality, 18.9% morbidity; EuroSCORE II: 10.56%) and a favorable oncological prognosis (›12 months), the case was discussed by the Heart Team, which opted for a transcatheter tricuspid valve–in–valve (TVIV) procedure, after informed consent for off–label use.

Pre–procedural planning with cardiac computed tomography and 3D reconstructions allowed accurate assessment of the prosthetic annulus (Figure 2). The procedure was successfully performed via transfemoral access using a 29–mm Edwards SAPIEN 3 Ultra RESILIA valve, implanted in reverse orientation under fluoroscopic guidance. Positioning of a stiff guidewire in the pulmonary artery proved crucial to ensure adequate system support in the presence of a small right ventricular cavity, typical of Ebstein's anomaly (Figure 3). No procedural complications occurred. Post–implant echocardiography showed a mean tricuspid gradient of 1.7 mmHg, with no residual regurgitation or paravalvular leak. The patient experienced rapid clinical improvement, achieving NYHA functional class I, which was maintained at three–month follow–up with a normally functioning prosthesis.

This case supports the feasibility, safety, and effectiveness of tricuspid valve–in–valve implantation in selected patients with complex anatomy due to Ebstein's anomaly, highlighting the key role of multimodality imaging and procedural expertise.



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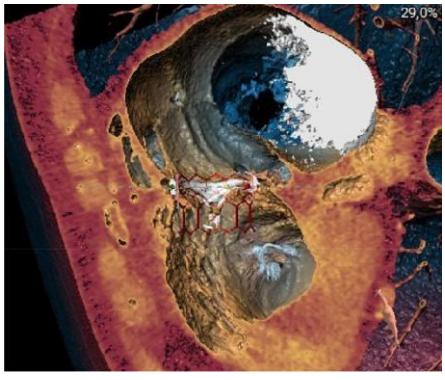

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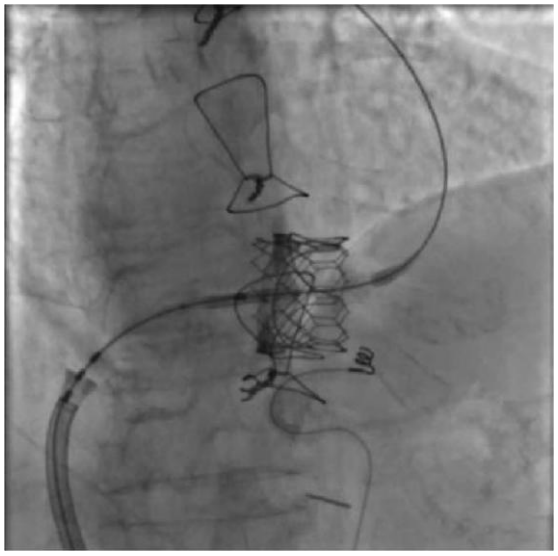

Figure 3

Abstract citation ID: suag058.559

INTEGRATED ECHOCARDIOGRAPHIC ASSESSMENT OF SEVERE TRICUSPID REGURGITATION AND OUTCOMES AFTER TRANSCATHETER THERAPY

N. Bruno, M. Russo, A. Cammardella, I. Chirichilli, F. Sbaraglia, A. Pergolini, and G. Luzi
Ospedale San Giovanni Evangelista; San Camillo Forlanini

The management of severe tricuspid regurgitation (TR) remains a major clinical challenge, particularly in elderly patients at high surgical risk. Two– and three–dimensional transthoracic (TTE) and transesophageal echocardiography (TEE) play a pivotal role in the anatomical and functional assessment of the tricuspid valve, patient selection and post–procedural follow–up.**Methods:** Fifty consecutive patients with severe TR underwent comprehensive 2D/3D TTE and TEE evaluation. In a subgroup of patients (n = 16), echocardiographic parameters were compared with invasive hemodynamic measurements obtained by right heart catheterization. 20 patients were treated with transcatheter tricuspid valve interventions (TTVI). Clinical and echocardiographic outcomes were assessed up to 2 years, and the predictive value of baseline echocardiographic parameters was analysed.
Results: The study population was predominantly elderly (77 ± 7 years), at high surgical risk, and severely symptomatic (86% NYHA class III–IV). TR etiology was mainly functional (84%). A high degree of agreement was observed between TTE and TEE in the assessment of tricuspid valve anatomy, right ventricular dimensions, and function. Significant differences emerged only in the quantification of EROA and RVol with TTE showing greater sensitivity in grading TR severity. Echocardiographic estimates of PAPs correlated well with invasive measurements. Right ventricular functional parameters (TAPSE, FAC, RV strain) and the ventriculo–arterial coupling index (TAPSE/PAPs) showed significant correlations with pulmonary pressures, vascular resistance, and cardiac output. Among patients undergoing TTVI, a significant and sustained improvement in NYHA functional class, TR severity and regurgitant volume, right ventricular systolic function, and pulmonary pressures was observed. Predictive analyses demonstrated that higher baseline TAPSE, FAC, and TAPSE/PAPs values were consistently associated with better clinical outcomes and lower diuretic requirements throughout follow–up, up to 2 years.
Conclusions: Comprehensive 2D/3D TTE and TEE provide a reliable and integrated assessment of severe TR and RV function, with good agreement with invasive hemodynamic data. TTVI are effective in improving symptoms, RV performance, and TR severity. Baseline RV functional and ventriculo–arterial coupling parameters represent valuable prognostic tools for patient selection and mid– to long–term risk stratification

Abstract citation ID: suag058.560

PARAVALVULAR LEAK AND HAEMOLYTIC ANAEMIA, WHEN THE SIZE MATTERS

B. Pozzato, D. Calderone, C. Munforti, R. Brambilla, D. Sala, G. Verolino, P. Ghiso Basile, R. Latini, F. Casilli, and M. Medda
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Background: Paravalvular leak (PVL) is a complication of valve replacement with 1% to 3% of patients developing symptoms including heart failure or haemolysis. The correlation between the size of the leak and the severity of haemolysis is unclear. Small leaks can cause severe haemolysis, whereas significant leaks may cause no haemolysis.
Methods: We report the case of an 85–year–old woman who underwent a mitral valve replacement thirty years ago with a mechanical Sorin 27 valve prosthesis. The patient presented at our hospital with chest pain, dyspnoea, cutaneous jaundice and dark–coloured urine. Laboratory tests revealed severe haemolytic anaemia (haemoglobin 76 g/L), markedly elevated LDH (3789 U/L), indirect hyperbilirubinaemia (4.76 mg/dL) and undetectable haptoglobin; transoesophageal echocardiography described a mild–to–moderate anterolateral paravalvular leak (vena contracta 0.2 cm²) at 11 o'clock position, with normal functioning of the bioprosthesis. Extensive diagnostic workup was performed to exclude alternative aetiologies, including abdominal CT and abdominal ultrasound, cytofluorimetry (to exclude paroxysmal nocturnal haemoglobinuria) and haematologic consultation to exclude autoimmune and infectious diseases. Leak correction was performed through percutaneous implantation of two Amplatzer Valvular Plug III devices, resulting in clinical improvement and haemodynamic stabilization.
Results: The postoperative course was characterized by marked improvement in symptoms, physical findings (resolution of jaundice and urine colour), and laboratory parameters. Haemoglobin stabilized around 90–92 g/L, LDH decreased to 785 U/L, total bilirubin was 1.25 mg/dL. At the one–month follow–up, haemoglobin had increased to 116 g/L, while LDH further decreased to 257 U/L and total bilirubin to 0.62 mg/dL.
Conclusion: Mild residual PVL can be related to severe haemolytic anaemia that is correctable via percutaneous closure of the leak, after careful exclusion of possible alternative diagnoses.

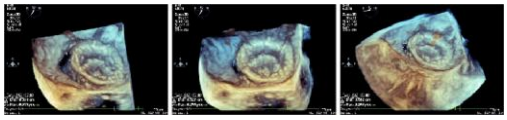

Figure 1. Pre–procedural three–dimensional transoesophageal colour Doppler echocardiography.

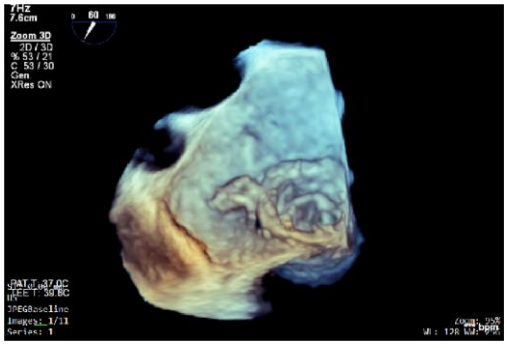

Figure 2. Post–procedural three–dimensional transoesophageal echocardiographic view after percutaneous closure of the mitral paravalvular leak

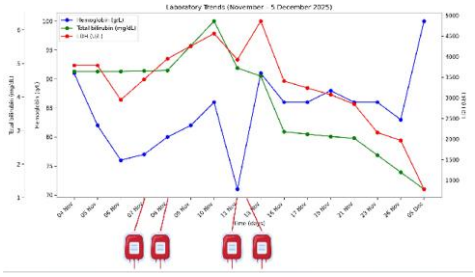

Figure 3. Temporal trends of haemoglobin, lactate dehydrogenase (LDH), and total bilirubin levels, with red blood cell transfusions administered during the pre–procedural phase

Abstract citation ID: suag058.561

AN UNUSUAL CASE OF TRICUSPID REGURGITATION

G. Lattanzi, M. Mascelloni, G. Bardelli, R. Lauciello, C. Zuchi, A. Mengoni, S. D'addario, G. Spinucci, F. Fortuni, and E. Carluccio
Azienda Ospedaliera Santa Maria Della Misericordia

Backgroung: Significant tricuspid regurgitation affects 3–6% of the general population and is associated with reduced quality of life, increased hospitalizations and mortality. Echocardiography is the first–line imaging modality for assessing etiology, mechanism, and severity.
Clinical Case: We describe a 58–year–old woman with hypertension and active smoking, without significant prior cardiac history, who presented with progressive lower–extremity edema and exertional dyspnea. Transthoracic and transesophageal echocardiography showed a normal left ventricle with preserved systolic function and a diastolic D–shaped septum. The tricuspid valve exhibited leaflet fibrosis, retraction, and reduced mobility (area 3D 2,7 cmq) (Figure 1), resulting in severe regurgitation (EROA 3D 2,3 cmq) with right atrial and caval dilation. Right–heart catheterization confirmed severe tricuspid regurgitation with markedly elevated central venous pressure, normal pulmonary pressures, and no increase in pulmonary vascular resistance. Contrast–enhanced CT revealed a hepatic mass, diagnosed as a neuroendocrine tumor on biopsy. The characteristic valvular abnormalities raised suspicion for carcinoid heart disease. Ga–68 PET/CT demonstrated pathological tracer uptake in the hepatic lesion, while the primary tumor site remains unidentified. Therapy with a somatostatin analogue was initiated after multidisciplinary evaluation. The patient recently underwent tricuspid and pulonomary valve replacement with a biological prosthesis (respectively Magna 25 and Inspiris resilia 19); the procedure was complicated by advanced atrioventricular block, which required implantation of a Medtronic Micra DR leadless PMK. During the follow–up, although brief, the patient maintained good hemodynamic control with clinical and laboratory improvement. The echocardiogram showed a well–functioning tricuspid and pulmonary bioprosthesis with normal antegrade gradients (max 10 mmHg and mean 4 mmHg) with no valvular regurgitation.
Discussion: Carcinoid tumors are uncommon neuroendocrine neoplasms producing vasoactive substances that induce fibrotic plaque deposition on right–sided cardiac valves, leading to regurgitation or stenosis. Patients typically present with dyspnea, fatigue, and signs of right–sided volume overload.
Conclusions: Tricuspid regurgitation may arise from various mechanisms; carcinoid heart disease represents a rare (but pathognomonic) etiology with distinctive echocardiographic hallmarks.

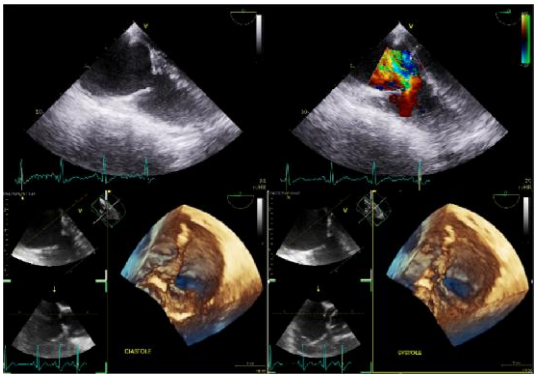

Figure 1

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Position paper ANMCO in collaboration with Italian Alliance for Cardiovascular Rehabilitation and Prevention (ITACARE-P): 'the management of hospital discharge'

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KEYWORDS
Hospital discharge; Continuity of care; Doctor–patient communication; Multidisciplinary activity

Hospital discharge is a pivotal stage in the continuum of care, marking the transition from the acute clinical episode to subsequent therapeutic management. Rather than being a purely administrative procedure, discharge is a multifaceted process that requires structured planning, clear communication, and the coordinated participation of all healthcare stakeholders, with the patient playing a central role. Inadequate discharge processes may adversely affect clinical outcomes and increase hospital readmission rates, resulting in sub-optimal utilization of healthcare resources. This issue is particularly relevant in the context of an ageing and increasingly frail population, characterized by a high burden of comorbidities and complex clinical needs. In this setting, discharge planning should be treated as an integral component of the care pathway, embedded within a comprehensive, coordinated model of care. This document proposes an updated, practical framework for hospital discharge management, grounded in current scientific evidence and multidisciplinary expertise. Its primary objective is to enhance continuity of care, support individualized treatment strategies, and ultimately improve patient outcomes. Specifically, this paper aims to provide clinical cardiologists with a structured reference tool for discharge management, including actionable recommendations to strengthen physician–patient communication, optimize therapeutic regimens, and promote better health outcomes.

Introduction

Hospital discharge represents a crucial component within the continuum of care and a fundamental element of the hospital–community pathway. An appropriately structured discharge process enables patients to receive the information necessary to return home, gain awareness and reassurance, and allows primary care physicians to manage ongoing care safely and effectively. This contributes to improved therapeutic appropriateness and adherence, more rational use of healthcare resources, avoidance of unnecessary testing, and the implementation of pharmacological and non-pharmacological strategies consistent with the patient's individual risk profile and recommended clinical targets.

Discharge should not be regarded as a single moment limited to the delivery of the discharge letter. Rather, it is a process that develops throughout hospitalization and relies on effective communication. Information should be provided in a language, with timing and depth of explanation tailored to each patient's characteristics, needs, and level of understanding.

The discharge letter is the primary document through which information is conveyed regarding the clinical course, the potential consequences of the acute event on daily life, and the therapeutic plan. This includes the initiation and long-term continuation of pharmacological treatment—some of which may be lifelong—together with clear recommendations on lifestyle modification.

At present, no specific guidelines strictly regulate the structure of discharge letters; available recommendations mainly outline the essential elements to include. In the development of this document, consideration was also given to the areas of competence of other healthcare professionals—such as nurses, physiotherapists, psychologists, and dietitians—who, depending on the organization and resources of individual centres, contribute to the care pathway. This broader perspective allows physicians receiving the discharge letter to obtain a comprehensive, multidimensional overview, reinforcing its role as a continuity-of-care tool and a bridge between the acute phase and long-term management. Building on previous evidence,[1] an update was considered appropriate in relation to the recent data concerning

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pharmacological therapies and post-discharge management strategies. To improve practical adoption and use, the document incorporates flowcharts and checklists. Particular attention is paid to communication strategies and the expectations and needs of both patients and general practitioners, which are key elements in constructing an effective and clinically appropriate discharge pathway.

Communication strategies for ameliorating outcomes

An inaccurate discharge should be regarded as a communication failure. However, this failure cannot be limited to the final moment of discharge, as it usually results from the accumulation of unresolved communication gaps throughout the hospital stay.

Discharge may be viewed as a narrowing point in the care pathway: both the amount and the quality of information that successfully passes through must be carefully managed, so that what ultimately reaches the patient—and leaves with them—is sufficient, relevant, and meaningful.[2] Many of these pieces of information must subsequently be translated into actions by the patient and therefore need to be practically applicable and enabling.

During hospitalization, communication exchanges should be approached with a forward-looking perspective, as a sequence of interdependent steps. This allows progressive adjustment to the patient's communicative abilities, which is essential for identifying and sharing priorities and for reaching discharge with a concise set of key messages and clear instructions on symptom management, medication use, risk factors, and strategies for their control (*Figure 1*).

Today, more than in the past, physician–patient communication can be challenging, and a stable, effective connection is not always achieved or maintained. Shorter hospital stays reduce the time available for dialogue, increasing the likelihood of information gaps and misunderstandings. These, in turn, may amplify organizational barriers to an effective discharge, such as the absence of standardized procedures and insufficient coordination among healthcare professionals.

There are no specific categories of 'critical' patients; actually, there are recurrent situations which, if not adequately addressed from a communication standpoint, may weaken the physician–patient relationship and consequently affect the quality not only of discharge but of the entire care pathway (*Table 1*).

Effective communication requires an appropriate setting. When a dedicated space is unavailable, the environment should be managed to minimize interference. If discharge communication occurs in a crowded corridor, the physician's posture and positioning remain relevant: standing with the back to the wall and facing the patient helps convey availability and attention rather than haste. Eye contact should be established and maintained, particularly in contexts where multiple healthcare professionals are present and engaged in parallel activities.

The internal structure of verbal messages is also important. Key information should be presented at the beginning of the sentence, reiterated at the end, and reinforced through consistent non-verbal cues, including tone of voice and gestures, to enhance clarity and retention.

The ability to deliver bad news is a core communication competence. Clinicians must identify what constitutes bad news from the patient's perspective and use an appropriate approach to avoid communication that appears abrupt, detached, or uncomfortable. Information becomes bad news when it negatively alters an individual's expectations regarding present or future life conditions.[3] For patients, the perceived loss of opportunities and the discrepancy between expectations and reality often weigh more than objective clinical severity in defining the information as distressing.[4]

There is no universal formula for communicating bad news, given the number of variables involved. However, specific communication strategies can increase effectiveness and reduce common errors, which are frequently associated with distraction, time pressure, and inadequate exploration of patient expectations (*Table 2*).

Assessment of informational needs should take into account both age and gender. Young individuals without a prior history of disease may leave the hospital without fully understanding their diagnosis or the importance of preventive strategies, while frail, elderly adults may risk being discharged with therapeutic plans that are difficult to sustain, complex, or challenging to remember and implement.[5]

Women should receive information on gender-specific cardiovascular risk factors, which vary across different age groups, as well as on psychosocial stressors related to gender roles. The need for clarifications is often greater in women than in men. Young women frequently lack caregiver support and may be required to manage multiple roles simultaneously,[6] whereas elderly women are often less autonomous. In both situations, specific lifestyle recommendations are necessary, and pharmacological treatment planning should consider the higher likelihood of sub-optimal adherence observed in women, which may require targeted motivational support.

Consistency in communication among all healthcare professionals involved in the care pathway should be ensured. Nurses should be actively involved in discharge preparation, as their closer and more frequent contact with patients and family members may provide valuable insights, including an assessment of whether the patient and caregiver feel ready for discharge.

Hospital discharge as a process: a systematic approach

Discharge planning during hospitalization

Effective hospital discharge management requires that discharge planning be initiated at the time of admission. Early assessment of the clinical complexity underlying hospitalization, together with evaluation of the patient's overall condition and degree of frailty, allows the development of an individualized plan that supports appropriate length of stay and suitable post-discharge pathways.

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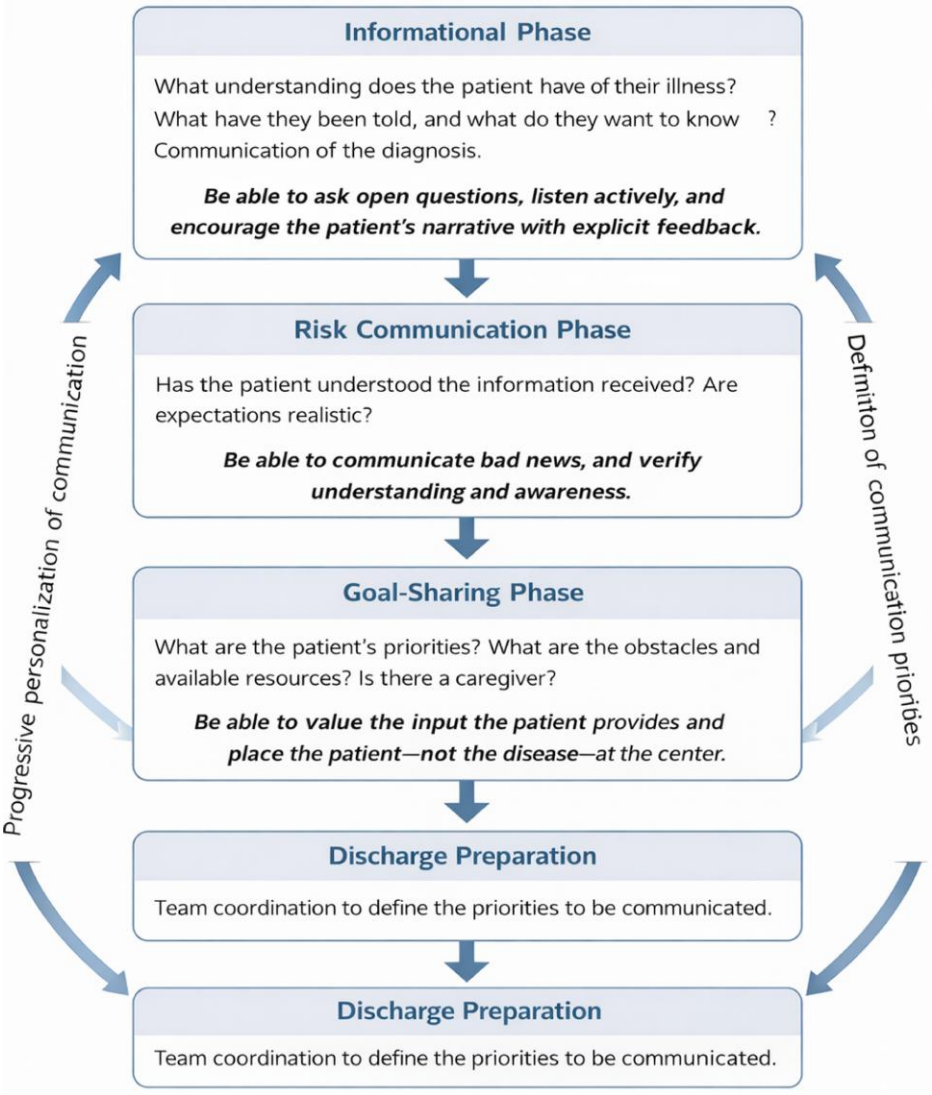

Figure 1 The phases of communication from the beginning of hospitalization to discharge. The sequence is determined by the progressive relevance of the objectives to be achieved, with a gradual narrowing of the focus on the patient and with a selection of information that takes into account the patient's priorities and not only the disease. For each phase, the main objective and the operational sub-objectives are indicated; in addition, the communication skills that the physician must possess in order to achieve them are reported. Achieving the objectives of one phase is a pre-requisite for moving on to the subsequent phase and thus for arriving at good communication at discharge.

Discharge should therefore be regarded as a process that begins at admission and involves the patient and, when appropriate, the caregiver. When adequately informed about the clinical situation, patients and caregivers can actively contribute to defining the different management steps, up to the transition from hospital to home or to another healthcare or social-care facility.

International guideline recommendations[7] support the use of structured discharge approaches, as these are associated with reduced 1-year mortality. These documents outline key steps for discharge after an acute event, specifying objectives, responsible professionals, and operational tools.[8,9]

Conversely, when discharge is managed in a non-standardized manner and considered secondary to in-hospital treatment, the benefits achieved during the acute phase may be rapidly lost, with an increased risk of early hospital readmission.

A proper discharge process requires an integrated, multidisciplinary team (MDT) approach. Physicians and nurses play a central role and are responsible for overseeing all phases, including the key transitions that connect the patient, caregivers, primary care physicians, and any intermediate services potentially involved after discharge, such as inpatient or outpatient cardiac rehabilitation (CR), cardiology clinics for secondary prevention, and services dedicated to continuity of care.

Discharge planning is based on an appropriate assessment phase, which should be performed at admission and repeated during hospitalization as clinical conditions evolve. The definition of post-hospital care pathways should be completed before the planned discharge date. Only coordinated involvement of all stakeholders—sharing objectives, tools, implementation strategies, and roles—ensures an effective process (*Table 3*).

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Table 1 The most frequent communication barriers: what to do to overcome them without compromising the relationship with the patient

Common Communication Barriers with Patients

Barriers and Practical Strategies to Overcome Them

BARRIER	PRACTICAL APPROACH
Lack of Illness Awareness	• Reconstruct the diagnostic pathway using a clear, step-by-step narrative. • Use diagrams, visual aids, or drawings to make clinical information concrete and understandable.
Unrealistic Expectations	• Rapidly explore the patient's expectations. • Acknowledge them and incorporate them into the discussion. • Allow space for the patient to express concerns, beliefs, and priorities.
Low Motivation to Adhere	• Investigate potential barriers (*previous experiences, fears, misconceptions, negative outcomes*). • Set small, achievable goals. • Involve caregivers whenever appropriate.
Misinformation	• Identify inaccurate or misleading beliefs. • Correct them using clear, evidence-based explanations. • Avoid confrontation — focus on clarification rather than contradication.
Socio-Cultural Vulnerability	• Deliver information one concept at a time. • Check understanding frequently. • Use simple language, practical examples, and images related to daily life.

Multidimensional assessment of patient's needs and individualized discharge planning

The epidemiological transition has led to a substantial increase in the number of elderly patients with chronic cardiovascular disease, frequently characterized by multi-morbidity and frailty. These conditions are associated with a higher risk of complications related both to the underlying disease and to diagnostic and therapeutic interventions—as well as increased mortality, rehospitalization, disability (defined as limitations in performing basic or instrumental activities of daily living), reduced quality of life, and greater healthcare resource utilization.[10]

Frailty is a multifactorial syndrome characterized by progressive biological decline, particularly affecting cognitive function, muscle strength, gait speed, endurance, asthenia, and unintentional weight loss, resulting in increased vulnerability to stressors.[11] Although age is not included in formal definitions of frailty, advancing age is strongly associated with a higher likelihood of this condition.

Consequently, cardiologists are frequently faced with hospitalized elderly patients who present multi-morbidity, disability, and frailty, representing a population that differs substantially from those enrolled in clinical trials. This scenario requires integrated and holistic approaches at discharge, shifting the focus from the single disease to the overall complexity of the individual. One possible response, both at the individual clinician level and within healthcare systems, is the adoption of multidimensional assessment (MDA) processes aimed at systematically defining the patient's clinical and care profile.

Multidimensional assessment can be defined as an inter-disciplinary diagnostic process that complements routine clinical evaluation, with the objective of quantifying medical, psychosocial, and functional problems. Its purpose is to develop a comprehensive

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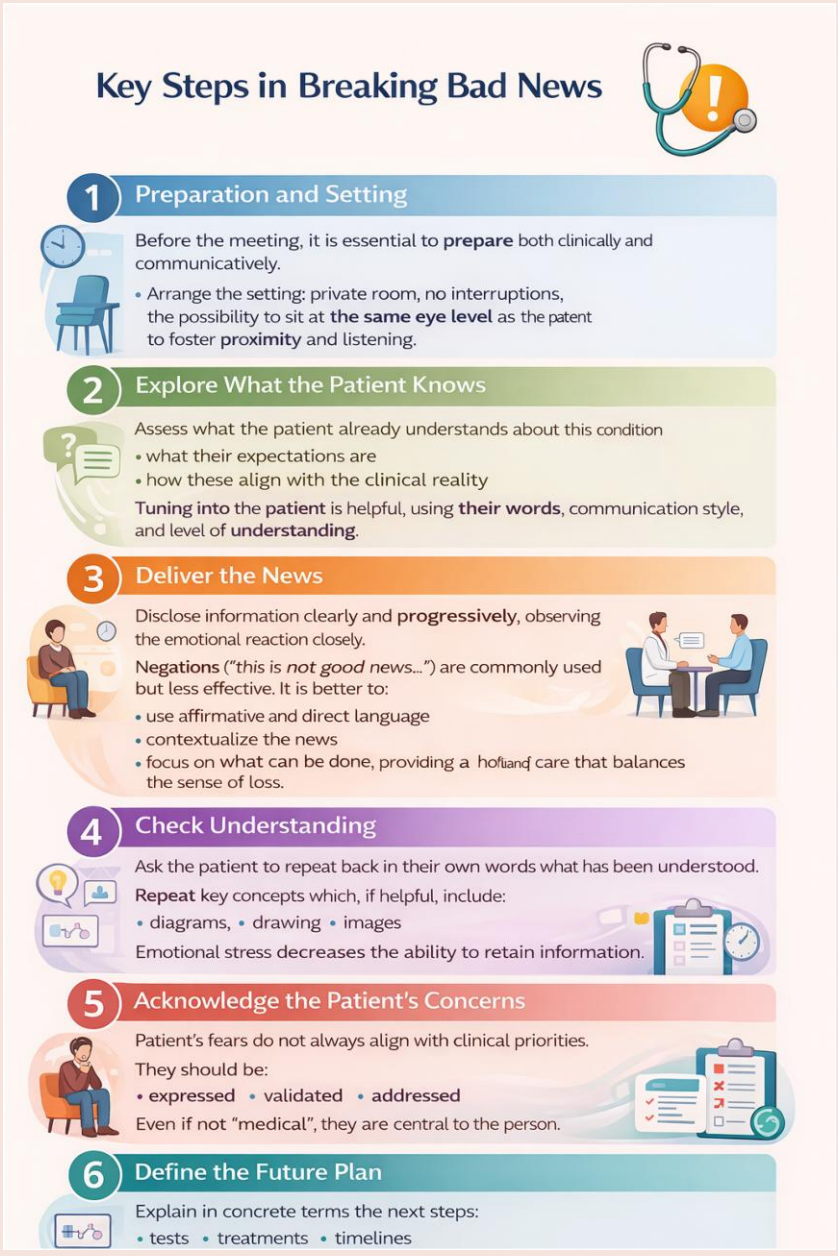
Table 2 Key points for communicating bad news



plan for treatment, care, and short- and long-term follow-up, while also supporting safe and appropriate discharge planning.[12]

Multidimensional assessment enables an integrated and objective evaluation by using validated scales and tools exploring multiple health domains, including physical and functional status, psychological well-being, cognitive performance, and socio-economic factors (*Table 4*).

Implementation of MDA requires a dedicated team, often referred to as an assessment unit, whose composition may vary. It typically includes a physician—preferably with geriatric expertise—a nurse, an occupational therapist, a physiotherapist, and a social worker.[13] However, not all hospital settings have the staffing and resources needed to fully implement such an organizational model. For this reason, cardiologists should be familiar with at least the essential tools required for basic multidimensional evaluation.

MDA allows the following:

- evaluation of the risk and degree of loss of autonomy, to determine the need for ongoing assistance;
- formulation of an individualized care plan (ICP), based on the need for rehabilitation, monitoring and/or nursing support, assistive devices for daily living,

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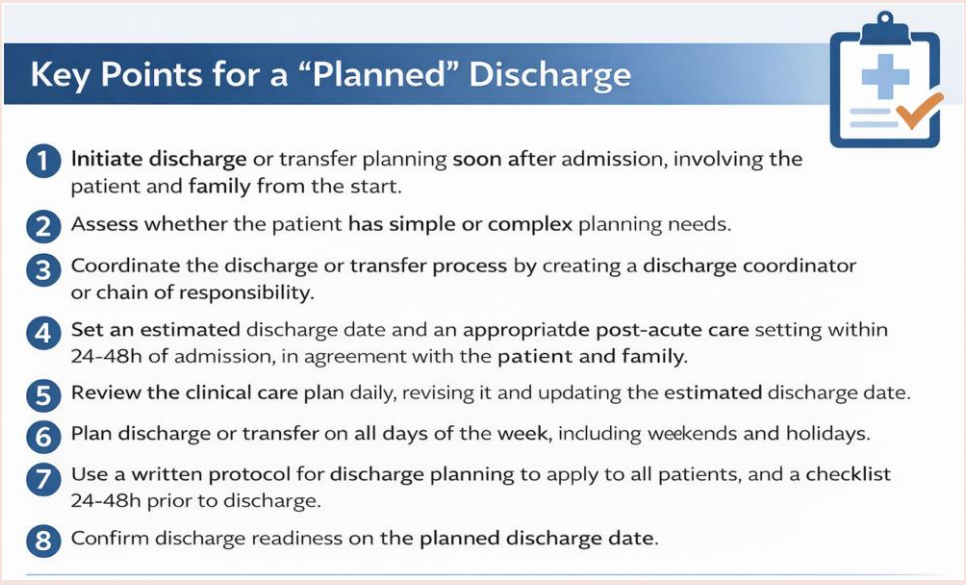
Table 3 Key points for a planned hospital discharge



presence of architectural barriers, availability of informal support, and social contacts. While clinical care pathways aim to standardize care for defined patient categories, the ICP is designed to personalize the care pathway for the individual patient; and
- identification of the most appropriate setting for care delivery, such as long-term care facilities, community health centres, or integrated home care services.[14]

Several studies have shown that MDA is associated with improved survival, better functional and psychological outcomes, and reduced rehospitalization.

Recent national legislation has formally recognized the importance of MDA as a tool to facilitate access to services for elderly and frail individuals, and its role has been further emphasized within community-based access models.

The multidisciplinary and inter-professional team in discharge planning

Discharge planning is one of the most common activities in hospital settings, where the inter-professional team plays a central role in supporting the transition to home or to another care facility.[15] The proportion of patients readmitted to hospital within the first year after an episode of heart failure has been estimated at ~60.9%.[16] For this reason, the development of a structured and individualized discharge plan aimed at addressing both healthcare and social needs is strongly recommended to reduce avoidable readmissions.

The Institute of Medicine identifies planned, timely, efficient, and safe hospital discharge as an indicator of high-quality care.[17] Length of hospital stay is also considered a key performance indicator and a target of healthcare planning. However, hospitals frequently encounter difficulties in consistently meeting discharge targets and organizational benchmarks.[18]

Unstructured collaboration and communication among members of multidisciplinary and multi-professional teams are recognized sources of information duplication, role overlap, and fragmentation of responsibilities, potentially leading to inter-professional conflict.[19] Multidisciplinary teams operate across both hospital and community settings; nevertheless, in highly fragmented organizational contexts, communication at discharge may be ineffective, creating barriers to continuity of care and compromising appropriate handover to other professionals.[20]

Effective discharge planning has positive implications not only for patients and their families or caregivers but also for healthcare organizations. It is associated with reduced hospital readmission rates, shorter hospital stays, increased patient satisfaction, and improved overall management of hospitalization.[21]

To ensure effective discharge planning within a MDT, coordination among professionals must be structured, collaboration among team members must be active, and each professional's roles and responsibilities must be clearly defined and understood by the entire team (*Figure 2*).

Among the actors involved in the discharge process, the patient must be considered an active participant in care decisions.[22] Evidence indicates that active patient engagement during hospitalization and at discharge improves understanding of the clinical condition and reduces hospital readmissions.[23]

Across acute, rehabilitative, and community or home-care settings, effective inter-professional care models are required to support patients and families. These models should include strategies to strengthen coordination and collaboration within and between MDTs. Several studies show that MDT interventions

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Table 4 Core tools for multidimensional geriatric assessment

Domain	Primary recommended tools	Alternative tools/notes
Functional status	ADL (Katz) + IADL (Lawton & Brody)	Barthel Index (preferred in rehabilitation)
Cognitive function	MoCA	MMSE + Clock Drawing Test; AMT (if patient cannot write)
Mood	CES-D	Geriatric Depression Scale (15 or 30 items)
Sarcopenia	SARC-F + Handgrip Strength	If positive → Bioimpedance analysis
Physical performance/falls	SPPB; Tinetti Scale	400-m Walk Test; TUG; Gait Speed; Handgrip Strength
Nutritional status	MNA	Bioimpedance analysis; DEXA
Comorbidities	CIRS-G	Charlson Comorbidity Index
Polypharmacy	Number of Medications	STOPP/START Criteria
Socio-economic situation	Living arrangement; caregiver presence; social/recreational participation; housing conditions; financial resources	—
Quality of life	EuroQol-5D	SF-36
Frailty	Frailty Index (Rockwood)	Frailty Phenotype (Fried)

ADL, activities of daily living; AMT, abbreviated mental test; CES-D, center for epidemiological studies depression scale; CIRS-G, cumulative illness rating scale for geriatrics; DEXA, dual-energy X-ray absorptiometry; IADL, instrumental activities of daily living; MMSE, mini mental state examination; MNA, mini nutritional assessment; SARC-FSPPB, strength, assistance in walking, rise from a chair, climb stairs, falls – falls, short physical performance battery; SF-36, short form 36 health survey; START, screening tool to alert doctors to right treatment; STOPP, screening tool of older persons' prescription; TUG, timed up and go test.

improve clinical outcomes and patient satisfaction; however, evidence specifically addressing the effectiveness of teamwork during the discharge process remains limited.[24]

Useful information for the nurse

Hospital discharge is a key stage in the care pathway, as it represents the transition from a monitored clinical setting to an environment in which the patient is required to manage treatment and follow-up independently or with caregiver support. A structured discharge process is therefore necessary to ensure continuity of care and to limit complications and unplanned readmissions. In this context, nurses have a central role because of their continuous contact with patients and families.[1,25]

During the initial assessment, nurses evaluate clinical stability, the patient's ability to self-manage, and existing care needs.[26] This phase includes a review of medication therapy and an assessment of available social and family resources, enabling early identification of support requirements.[27] Discharge planning is then carried out in collaboration with the MDT—such as cardiologists, physiotherapists, nutrition specialists, or other professionals according to clinical needs—allowing the definition of realistic goals and the organization of follow-up visits or home care services.

Education of patients and caregivers is a core component of the process. Nurses provide clear, tailored information on therapies, diet, physical activity, and recognizing warning signs of clinical instability. Verification of understanding is essential and can be supported through teach-back strategies, written materials, or practical demonstrations.[1,26] Programmes that combine discharge planning with post-discharge support are associated with better outcomes.[28] Nurses also facilitate access to community nursing services, specialist consultations, and social or volunteer networks, helping to maintain support after discharge.[28]

The final step involves planning appropriate post-discharge follow-up. When required, nurses may arrange early telephone contacts or short-term visits to assess adherence and clinical stability and to detect early signs of deterioration.[29] These measures contribute to reducing rehospitalizations and improving patients' sense of security. Overall, hospital discharge requires coordinated management in which nurses, through organizational and relational competencies, support a safe transition and promote the achievement of health objectives and patient well-being.[30]

Useful Information for the dietitian

Dietary habits are among the major determinants of health and of the global burden of disease, and most countries worldwide face one or more forms of malnutrition, whether due to deficiency or excess.

Unhealthy dietary patterns:

(1) influence major cardiovascular risk factors, including dyslipidaemia, hypertension, body weight, and diabetes, thereby contributing to overall cardiovascular risk[31] and
(2) account for approximately half of deaths and disabilities related to cardiovascular diseases and are associated with a substantial economic impact in the European Union, with estimated costs of €102 billion annually.[32]

Healthy nutrition represents the most relevant behavioural factor in the prevention of premature cardiovascular mortality and disability, exceeding the impact of smoking cessation and adequate physical activity.[33] In 2022, Dai et al.[34] reported that more than

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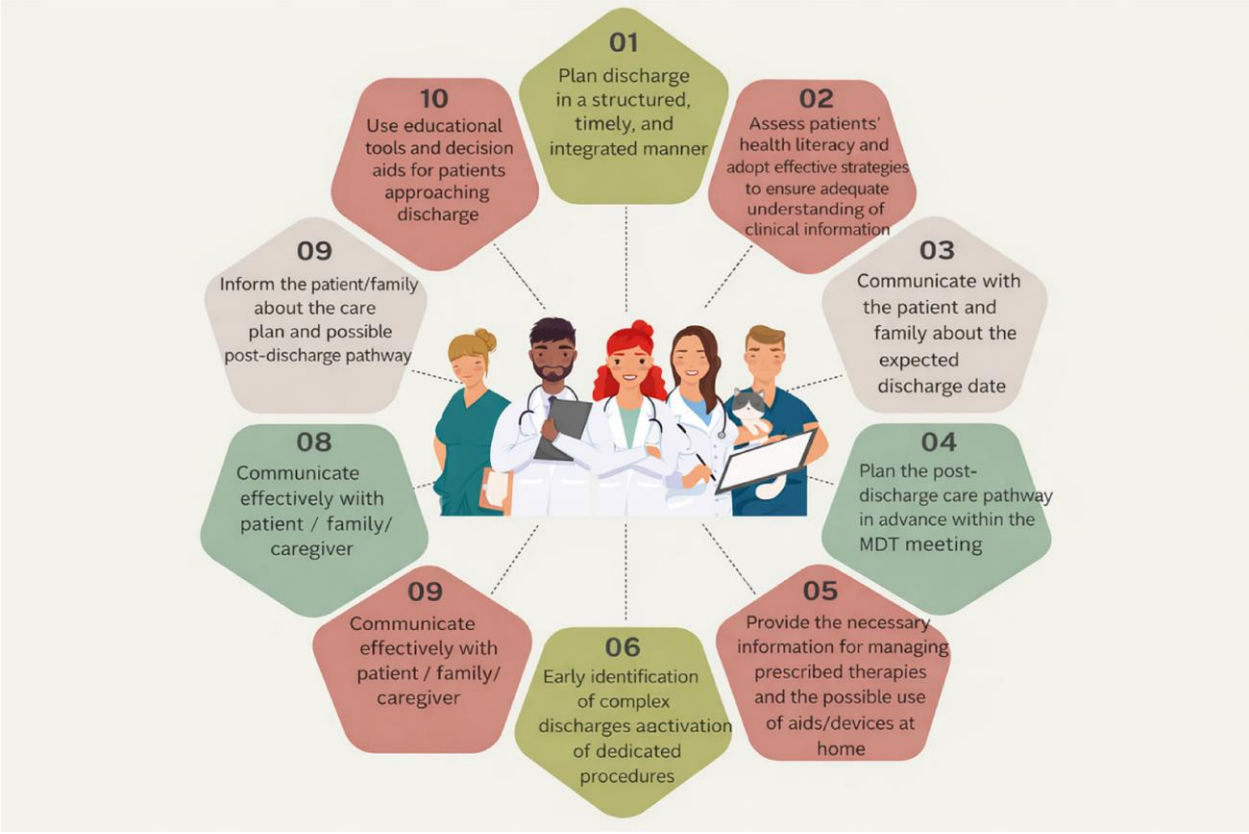

Figure 2 Management of the discharge process by the multidisciplinary assessment team.

two-thirds of cardiovascular deaths worldwide could be prevented through healthy dietary patterns.

In this context, adopting appropriate dietary choices as an integral component of cardiovascular care is essential and consistent with current guideline recommendations. In particular, the recent European Society of Cardiology Guidelines advocate a Mediterranean-style dietary pattern to reduce cardiovascular risk in all individuals (*Table 5*).[31]

The World Health Organization recognizes nutritional literacy as a central element in the prevention and control of non-communicable diseases.[35] The acquisition of basic nutritional knowledge is fundamental for empowering patients and enabling informed dietary decisions.[33,36-41] Moreover, multi-morbidity—with or without age-related frailty—is frequently associated with nutritional issues that may coexist with metabolic disturbances. This may necessitate the use of energy-dense foods, texture-modified diets and fluids, or, in selected cases, artificial nutrition. Early identification of nutritional risk is therefore crucial, and clinical guidelines recommend routine screening in elderly adults.[36]

Treatment goals are established based on the nutritional diagnosis,[37] a process that identifies and describes nutrition-related problems that can be resolved or improved through dietetic intervention. Close collaboration among members of the cardiology care team is essential to achieve nutritional targets and optimize patient outcomes (*Table 2*).

Physiotherapy contributions to discharge planning

Resumption of physical activity after hospital discharge in cardiology patients must be individualized according to clinical status, in-hospital course, length of stay, and additional factors such as comorbidities, severity of the acute event, and age.[42] Careful evaluation of functional status is required, as patients may range from physically fit individuals to those with severe functional limitations. This assessment is essential for defining a safe and effective rehabilitation pathway.

The main objectives of post-discharge physical activity include improving cardiac function and quality of life, preventing recurrence, and promoting patient autonomy. Appropriate determination of exercise intensity is a key element in cardiovascular rehabilitation, directly affecting both effectiveness and safety.[43]

During the first weeks after discharge, high-intensity physical activity should be avoided. Exercise intensity can be guided by target heart rate (typically 50–85% of age-predicted maximum heart rate), perceived exertion on the Borg scale, and the Talk Test, which indicates the patient should be able to speak without difficulty during activity. Exercise modalities should be adapted to the patient profile: sedentary individuals may begin with short walks and stretching; patients with better baseline fitness may perform light aerobic exercise; and elderly

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Table 5 Key dietary components and nutritional recommendations in cardiovascular prevention

Key component	Main characteristics	Clinical considerations
Mediterranean diet	Primarily based on extra-virgin olive oil, whole grains, legumes, fresh and dried fruit, vegetables; moderate amounts of fish, dairy products, and meat	Dietary pattern associated with reduced cardiovascular mortality. Food portions should be individualized with a dietitian according to patient clinical status and food availability.
Whole grains	One or two servings per meal (bread, pasta, rice, or other cereals), preferably whole grain	Promote high-fibre foods due to beneficial effects on glucose and lipid metabolism.
Fruit and vegetables	At least five servings per day	Variety in colour and texture provides a broad spectrum of antioxidants and protective bioactive compounds.
Extra-virgin olive oil	Main source of dietary fat due to high nutritional quality	Long-term adherence to an extra-virgin olive oil-rich Mediterranean diet is associated with slower progression of atherosclerosis. Suitable for cooking and seasoning due to stability at high temperatures.
Saturated fatty acids	<10% of total energy intake	Reduce saturated fats by replacing them with mono- and polyunsaturated fats; encourage fish consumption at least twice weekly. Prefer lean meat and cheeses with ≤25% fat content.
Trans fatty acids	<1% of total energy intake	Intake should be minimized, preferably avoiding processed foods.
Alcohol	Maximum safety threshold ≈100 g ethanol per week	Alcohol consumption is not necessary. The American Heart Association does not recommend initiating alcohol intake for cardiovascular benefit.
Salt (sodium chloride)	≤5 g/day; <1.5 g/day in selected conditions	Patients should be educated on the health impact of excessive salt intake.
Water/fluids	1.5–2.5 L/day under normal conditions; <1.5 L in selected situations	In heart failure patients, fluid intake is generally guided by thirst. Requirements may increase in hot/humid environments or with excessive sweating.
Energy intake	Adequate caloric intake to achieve and maintain healthy body weight	Educate patients on the relationship between energy intake, body weight, and waist circumference. In patients with reduced intake or dysphagia, increase meal energy density, modify food texture, and consider oral nutritional supplements or enteral nutrition if needed. Higher protein intake may be considered in older adults to preserve muscle mass. Provide educational materials.

individuals should perform exercises to improve balance and muscle strength.

Continuous monitoring of the cardiovascular response during physical activity is necessary, and symptoms should be reported promptly. Guidelines recommend low-impact aerobic activities that enhance cardiovascular endurance, such as cycling on a low-resistance stationary bicycle with a gradual progression to higher workloads or outdoor cycling. Resistance training with light weights and low loads is also recommended, favouring sessions with more repetitions. Circuit training, combining resistance and aerobic components, may improve overall physical condition. Functional activities such as brisk walking and stair climbing should be integrated into recovery programmes.

When patients are referred to structured CR programmes, individualized pathways including supervised exercise, psychological support, and nutritional counselling are associated with reduced complication risk and improved functional capacity.

At discharge, the cardiologist should provide clear guidance on gradually increasing physical activity. Patients should be encouraged to walk, even at a slow pace, both indoors and outdoors, use stairs when possible, and participate in group activities that promote social engagement, such as low-intensity exercise classes or walking groups, while appropriately monitoring exercise intensity. The long-term goal is to achieve 30–60 min of moderate-intensity aerobic physical activity on at least 5 days per week.[44] Even lower levels of activity provide clinically relevant benefits, including improved mobility, autonomy, mood, and social participation, particularly in elderly adults (*Table 6*).[45]

Management of pharmacological and non-pharmacological therapy

Lifestyle recommendations

Lifestyle exerts a substantial influence on prognosis after hospitalization for an acute event. Hence the importance of intervening on all those lifestyle habits that, if modified, allow improvement in the outcome after discharge. Smoking cessation is a major priority

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Table 6 Type, effects, and recommendations for daily physical activities

Physical activity	Benefits	Details and recommendations
Walking (slow or moderate pace)	Improves mobility and independence, promotes social interaction	Walking daily, even at low intensity, helps maintain muscle activity and improves circulation.
Climbing stairs	Increases endurance, supports cardiac function, strengthens muscle tone	Start gradually to avoid excessive exertion. Stair climbing is an excellent cardiovascular exercise that requires no equipment.
Participating in walking groups	Social engagement, mutual support, increased motivation	Group activities encourage socialization and make exercise more enjoyable and sustainable.
Light gymnastics	Improves flexibility and strength, reduces stress	Low-intensity exercises help enhance overall well-being and reduce muscular tension.
Goal (30–60 min of moderate aerobic activity)	Improves prognosis in ischaemic heart disease, supports heart health	Regular aerobic activity reduces the risk of cardiac complications and improves mood. Exercise intensity should always be monitored.

among lifestyle interventions. Patients should be informed about the risks associated with tobacco use and strongly encouraged to achieve permanent abstinence. Strategies to support smoking cessation include structured counselling, psychological support, and, when indicated, pharmacological therapy.

Other important components of lifestyle management after hospitalization include physical activity and nutrition, which are discussed in dedicated sections of this document.

Recommendations to improve treatment adherence

Adherence to prescribed therapies is a key determinant of clinical outcomes; therefore, all feasible measures to support medication adherence should be implemented.[46] One effective strategy is to initiate treatment during hospitalization or within a structured CR programme, where patients can receive clear explanations about the purpose of each therapy, possible adverse effects, and practical guidance on their management.

The use of fixed-dose combination therapies has been shown to enhance adherence, contribute to improved prognosis,[47] and offer advantages in terms of cost-effectiveness.[48]

Medication reconciliation

At discharge, it is essential to implement medication reconciliation by reviewing the patient's previous therapy and, for each drug, providing clear instructions on continuation, possible dosage adjustments, or discontinuation. Careful attention to this process helps reduce errors due to incomplete information. Medication reconciliation may also represent an opportunity for deprescribing drugs that no longer provide benefit in a clinical context modified after the acute event, with a favourable impact on treatment adherence as well.[46]

Release of therapeutic plan cards

The prescription and reimbursement of several medications require the compilation of therapeutic plan cards. In authorized centres, physicians at the time of discharge are required to complete therapeutic plans and/or monitoring forms for all medications under their responsibility (*Table 7*), in order to overcome one of the barriers to treatment continuation and adherence.

Medication supply at discharge

At discharge, in addition to detailed therapeutic prescriptions specifying administration route, dosage, and timing, it is advisable to provide the patient with all prescribed medications in quantities sufficient to cover the period between hospital discharge, reassessment by the general practitioner (GP) with issuance of prescriptions covered by the National Health Service (when applicable), and drug procurement from community pharmacies. This practice aims to ensure continuity of therapy and is particularly important when a patient is prescribed new medications.

Post-acute pathway and secondary prevention

Cardiac rehabilitation pathway

At discharge after an acute cardiovascular event, direct referral to a CR programme represents the most cost-effective strategy to achieve multiple care objectives, including further clinical stabilization, reduction of disability related to the underlying heart disease, favourable lifestyle modification (smoking cessation, diet, and physical activity), and the provision of appropriate psychosocial support.[42] For a detailed description of the components and professional figures involved in the rehabilitation pathway, refer to the dedicated documents.[49]

Virtually, every major cardiovascular event is appropriate for referral to CR; however, in the current national context, patients with coronary disease or heart failure represent the main target population, not only due to their epidemiological relevance but also because of the stronger evidence supporting the effectiveness of rehabilitation interventions, particularly in terms of event reduction and lowering of residual risk.[50,51]

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Table 7 Cardiological drugs for which the completion of therapeutic plans or monitoring forms is required for reimbursement by the National Health Service

Therapeutic class	Drugs	Indications
DOACs	Apixaban, dabigatran, edoxaban, rivaroxaban	Atrial fibrillation; Pulmonary embolism; Prevention/treatment of deep vein thrombosis; [a]peripheral artery disease
P2Y12 receptor inhibitors (anti-platelets)	Prasugrel, ticagrelor	Acute coronary syndrome
ATP-citrate lyase inhibitor (lipid-lowering)	Bempedoic acid	Hypercholesterolaemia; primary and secondary cardiovascular prevention
PCSK9 inhibitor monoclonal antibodies	Alirocumab, evolocumab	Familial hypercholesterolaemia; secondary cardiovascular prevention
PCSK9 siRNA therapy	Inclisiran	Familial hypercholesterolaemia; secondary cardiovascular prevention
ARNI	Sacubitril/valsartan	Heart failure with reduced ejection fraction
Soluble guanylate cyclase stimulator	Vericiguat	Heart failure with reduced ejection fraction
Anti-anginal agent	Ranolazine	Refractory angina
SGLT2 inhibitors	Dapagliflozin, empagliflozin	Heart failure; Type 2 diabetes mellitus
GLP-1 receptor agonist	Semaglutide	Type 2 diabetes mellitus

ARNI, angiotensin receptor–neprilysin inhibitor; DOACs: direct oral anticoagulants; GLP-1 RA, glucagon-like peptide-1 receptor agonists; PCSK9, pro-protein convertase subtilisin/kexin type 9; SGLT2-i, sodium–glucose co-transporter 2-inhibitor.

Cardiac rehabilitation programmes are delivered after discharge in either inpatient or outpatient settings, depending on patient characteristics and local availability. Inpatient rehabilitation is provided in structured hospital units, recently surveyed as 116 nationwide, with a total of 2075 beds,[52] and is mostly classified under the ministerial code 56, which identifies intensive rehabilitation. Inpatient facilities may be located within the same hospital as the acute cardiology ward, in separate facilities, or within different healthcare institutions.

Inpatient CR activities have recently undergone regulatory revision (Ministerial Decree of 5 August 2021, 'Criteria for appropriateness of access to hospital rehabilitation admissions,' and further updates), which established appropriateness criteria based on combined evaluation of the hospital discharge report from both the acute and rehabilitation units, timing of patient transfer, and levels of intervention complexity. Outpatient pathways may be delivered in day-hospital, day-service, or complex outpatient settings, provided that an adequate quantitative and qualitative level of rehabilitation intervention is ensured to achieve the predefined clinical and prognostic goals. The system scenario described above, together with the well-known shortage of rehabilitation facilities relative to potential demand, significantly affects the referral process to CR at discharge.

The current CR referral rate reported by Agenzia Nazionale per i Servizi Sanitari Regionali, below 10% after acute coronary syndrome at a national level,[53] highlights a marked misalignment with recommendations from major international guidelines, which almost unanimously assign a Class I, Level A recommendation to CR interventions. This situation—given its potential implications in terms of physicians' professional responsibility—unmet obligations of care by hospital institutions, and, above all, population health loss cannot be simplistically accepted as being due to inevitable reasons.

Consequently, the discharge process from an acute hospital ward should systematically include the following actions by the responsible physician:

(1) Consideration of a subsequent rehabilitation phase with appropriate individualized goals.
(2) Identification of clinical conditions in which transfer to rehabilitation is not only appropriate but also a priority, differentiating between inpatient and outpatient settings (*Table 8*).[54-57]
(3) In cases where referral to the CR is not possible, the condition preventing referral must be formally documented in the medical record and the 'best possible alternative' must be organized to structure the subsequent care pathway (*Figure 3*) with specific adjustments for geriatric patients available in dedicated documents.[54]

Post-discharge outpatient pathway

The post-discharge outpatient pathway for cardiac patients following an acute event plays a fundamental role in continuity of care, enabling ongoing clinical monitoring, optimization of pharmacological therapy, and promotion of appropriate secondary prevention measures. The care pathway must be timely and structured to significantly contribute to the reduction of rehospitalizations, with benefits in terms of clinical outcomes and quality of life (*Table 9*).

The hospital discharge phase marks the start of this pathway. The patient is provided with a detailed discharge report that specifies the date and modalities of the first outpatient reassessment, ideally scheduled within 7–14 days after hospital discharge (and in any case within 30 days).

This timing is crucial for the early identification of possible signs of clinical instability and for verifying

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Table 8 Priority criteria for referral to cardiac rehabilitation after discharge from an acute care ward

Qualifying diagnosis for referral to cardiac rehabilitation	Priority criteria
Sequelae of acute coronary syndrome and/or percutaneous coronary intervention	Priority referral to inpatient rehabilitation in the presence of high clinical risk of heart failure or adverse left ventricular remodelling: • myocardial infarction (MI) with heart failure (even mild) in the acute phase; • LVEF <40%; • LVEF 40–45% with at least one predictor of remodelling (mitral regurgitation >1+, restrictive diastolic filling, high wall motion score index, non-dilated ventricle); and • MI with prolonged acute hospitalization, complications, or comorbidities. Priority referral to a rehabilitation cycle, preferably outpatient, in patients with high thrombotic (residual ischaemic) risk: • High residual cardiovascular risk, diabetes mellitus, renal failure, peripheral artery disease, history of angina or prior MI, multi-vessel disease or complex lesions, incomplete revascularization, failed revascularization/reperfusion, prior restenosis or stent thrombosis.
Heart failure	• Priority referral to inpatient rehabilitation in the presence of a medium–high risk profile: • NYHA class III–IV at discharge; • electrical instability; • need for optimization of pharmacological therapy; • clinical instability and/or after prolonged or complicated hospitalization; and • Under evaluation for heart transplantation or VAD. Also priority referral to inpatient rehabilitation for: • possible candidates for device implantation after recent ACS with pump dysfunction, to assess potential recovery of LV function after revascularization and/or guideline-directed medical therapy and • patients with recent device implantation and clinical/electrical instability or surgical complications.
Chronic coronary syndrome	Priority referral to inpatient rehabilitation in patients with severe disability related to heart disease (low-threshold angina), high risk of heart failure, high thrombotic risk, or high arrhythmic risk with logistical barriers to outpatient treatment.
Sequelae of coronary, valvular, or major vascular cardiac surgery	Priority referral to inpatient rehabilitation in the presence of: • surgery following a coronary event; • advanced age; • high risk of heart failure; and • prolonged or complicated acute hospital stay.
Sequelae of percutaneous valve procedures (TAVI, MitraClip, TriClip) and elective cardiac device implantation (PM, ICD, CRT)	Priority referral to inpatient rehabilitation in the presence of: • procedure following a coronary event; • advanced age; • high risk of heart failure; • prolonged or complicated acute stay; and • need for device reassessment during physical training.
Pulmonary embolism	Priority referral to rehabilitation (inpatient or outpatient) in the presence of haemodynamic instability during the acute event and/or thrombolysis/thrombectomy procedures.
Lower limb PAD	Priority referral to inpatient rehabilitation in patients: • after surgical or percutaneous revascularization, at high risk of MACE and MALE; • with trophic lesions or complex wounds; • with haemodynamic or cardiac rhythm instability. In patients with PAD and intermittent claudication, an outpatient rehabilitation programme is considered a priority for supervised exercise training aimed at restoring walking autonomy, achieving therapeutic targets rapidly, and promoting healthy lifestyle habits.

ACS, acute coronary syndrome; CRT, cardiac resynchronization therapy; ICD, implantable cardioverter-defibrillator; LV, left ventricle; LVEF, left ventricular ejection fraction; MACE, major adverse cardiovascular event; MALE, major adverse limb event; NYHA, New York Heart Association; PAD, peripheral arterial disease; PM, pacemaker; TAVI, transcatheter aortic valve implantation; VAD, ventricular assist device. Adapted from.[50-52]

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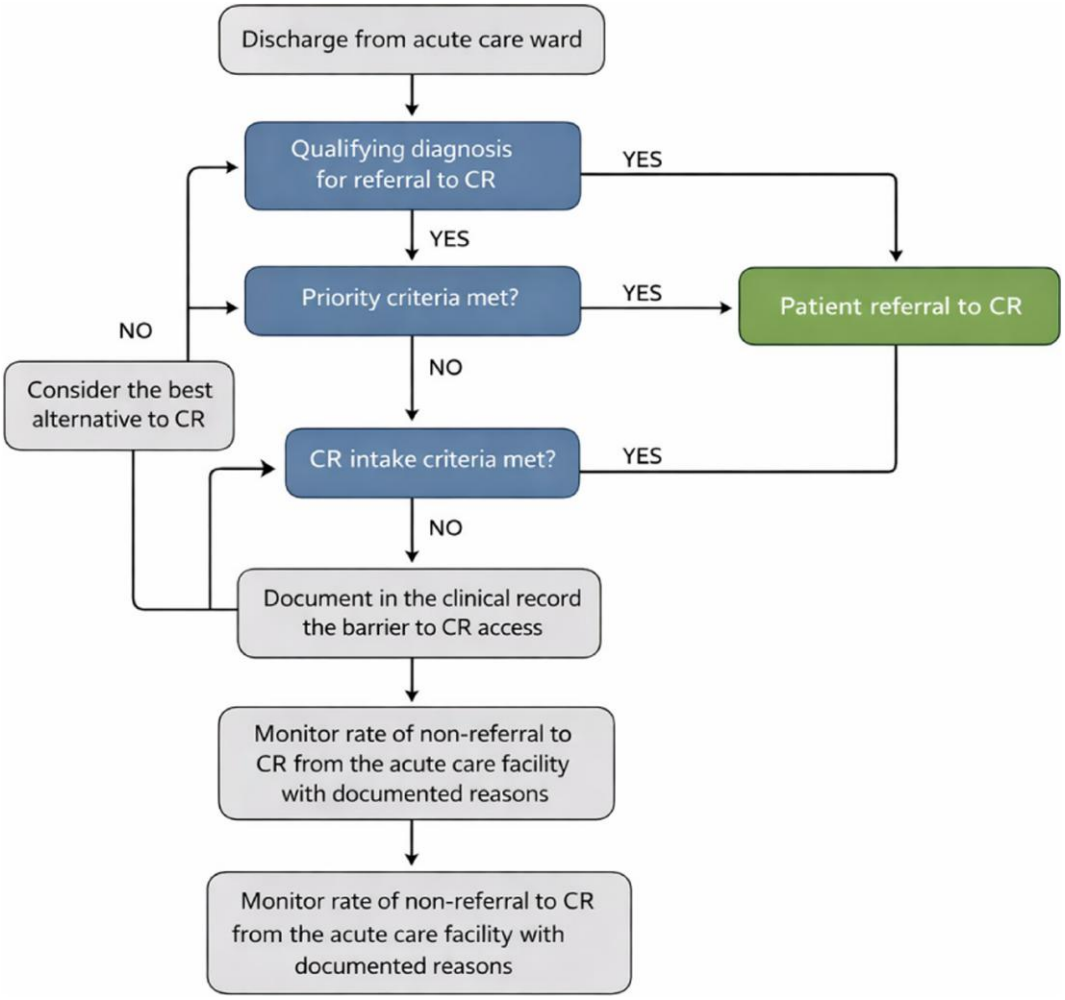

Figure 3 Operational flow chart for the management of 'referral' and 'no referral' to cardiac rehabilitation at discharge from an acute care ward. Criteria for taking charge of the patient are as follows: availability of a territorially compatible cardiac rehabilitation centre, availability of an appropriate care setting (inpatient or non-inpatient), time to taking charge, and consistency between the acute hospital discharge summary and the rehabilitative hospital discharge summary, ensured in accordance with the 2021 Ministerial Decree. Best possible alternative are as follows: oriented towards the main objectives of maintaining clinical stability, reducing residual risk, reducing disability, lifestyle modification, and psychosocial support (e.g. structured outpatient follow-up, a shared care pathway with the GP, integrated rehabilitative home care, activation of the family and community nurse, referral to health gyms with a structured physical exercise programme, referral to smoking cessation centres, and counselling services with educational and psychological activities). In case there is a need to continue hospitalization in facilities with a lower intensity of care, appropriate instructions should be drafted in the discharge letter.

and implementing secondary prevention programmes, which include the following:

(1) optimization of pharmacological therapy (beta-blockers, Renin-Angiotensin System inhibitors, diuretics, anticoagulants, lipid-lowering agents, antiplatelet drugs, etc.) and verification of treatment adherence;
(2) adoption of healthy lifestyles (smoking cessation, regular physical activity, healthy diet or according to specific indications);
(3) psychological support and health education, aimed at improving adherence to therapy and disease awareness; and
(4) possible referral to structured CR programmes.

Within the individualized follow-up programme, the frequency of subsequent visits—typically at 3–6 months and 12 months after the acute event—is modulated according to the individual risk and the underlying disease (myocardial infarction, heart failure, valvular disease, comorbidities, etc.). Thereafter, once the patient is stabilized and therapy optimized, visits may be spaced further apart, becoming annual and subsequently biennial.

In this context, the outpatient cardiologist (whether hospital-based or working in community care facilities) serves as the specialist reference point, managing drug titration, scheduling follow-up investigations [echocardiography, exercise testing, and Holter electrocardiogram (ECG) monitoring], and indicating invasive or rehabilitation procedures when appropriate. A fundamental pre-requisite for community cardiology is the presence of an organizational structure (structural or functional, included within accredited private facilities) based on integrated specialist teams, ideally multidisciplinary (including diabetologists,

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Table 9 Outpatient pathway of the patient discharged from hospital after an acute event

Patient characteristics	Care pathways	Responsible professionals
1. Patients with a recent cardiovascular event (acute coronary syndrome, coronary revascularization, cardiac surgery, acute heart failure). 2. Indication for cardiology follow-up. 3. Enrolment in a cardiovascular rehabilitation programme. 4. Possible presence of social or care needs.	Outpatient cardiology follow-up (ideally within 7–14 days and in any case within 30 days). Subsequent visits at 3, 6, and 12 months. Nurse-led care management: multidimensional assessment of healthcare and social needs, educational intervention, monitoring during therapy titration, evaluation of adherence to shared care plans with the patient and family, and assessment of support needs for patients and caregivers. Specialist teleconsultation (diabetology, nephrology, pulmonology, etc.), when indicated. Data entry into the patient electronic record (PER). When appropriate, PER teleconsultation for activation of community care pathways. At each medical or nursing visit, a clinical report is issued for the GP. Ongoing community-based specialist follow-up, with timing and modalities individualized according to patient complexity. Early reassessment requested by the GP through specialist teleconsultation within the continuity-of-care pathway.	Cardiologist Other specialists Nurses GP PER and community healthcare services

GP, general practitioner.

nephrologists, pulmonologists, etc.), multi-professional, and equipped with the necessary diagnostic tools for at least first-level non-invasive patient assessment.[59]

Within this organization, the nursing outpatient clinic represents a crucial node for close clinical monitoring, MDA, and delivery of personalized health education interventions aimed at self-care and self-monitoring.[26] The GP collaborates with the cardiologist to monitor the patient's clinical course and manage associated conditions.

Finally, protected hospital discharge represents an opportunity to promote multidisciplinary and multi-professional integration processes and tools, as well as territorial organizational-care models, in order to harmonize healthcare and social-care responses to the person's health needs along the hospital–community continuity of care axis. Integration should be implemented at the level of the territorial operations centre, where available, which performs a coordinating function in patient care management and in linking services and professionals involved across different care settings.[59]

Telemedicine pathway

Heart failure represents a clinical condition in which telemedicine has particularly relevant and paradigmatic applications, given the complexity of its management and the high burden of hospital utilization. The challenges associated with heart failure are well recognized and relate to the large number of affected patients and the high rate of hospital admissions.

Although the literature consistently shows that structured post-discharge follow-up after hospitalization for heart failure is essential to reduce mortality and rehospitalization, only a limited proportion of patients are enrolled in dedicated outpatient follow-up programmes at discharge. The 2023 ESC Heart Failure Guidelines recommend the use of four foundational pharmacological classes—angiotensin receptor–neprilysin inhibitors (ARNI), beta-blockers, mineralocorticoid receptor antagonists, and sodium–glucose co-transporter 2 (SGLT2) inhibitors—which have been shown to reduce mortality and heart failure hospitalizations by ~20%.[60] The benefit of these therapies depends not only on initiation but also on early implementation and achievement of target dosages. The STRONG-HF trial demonstrated that an intensive post-discharge follow-up programme led by physicians and nurses significantly reduced mortality and rehospitalization at 180 days; however, such intensive models are difficult to implement in routine clinical practice.[60]

The post-discharge period (transitional care) following an acute event or heart failure exacerbation is associated with a high risk of mortality and rehospitalization.[61] International guidelines, including ESC recommendations, support integrated home-based care pathways aimed at improving patient self-management, enhancing treatment adherence, enabling early detection of clinical instability, and reducing rehospitalizations (*Figure 4*).[60]

Telemedicine services provide a potential solution by enabling patient follow-up within an integrated,

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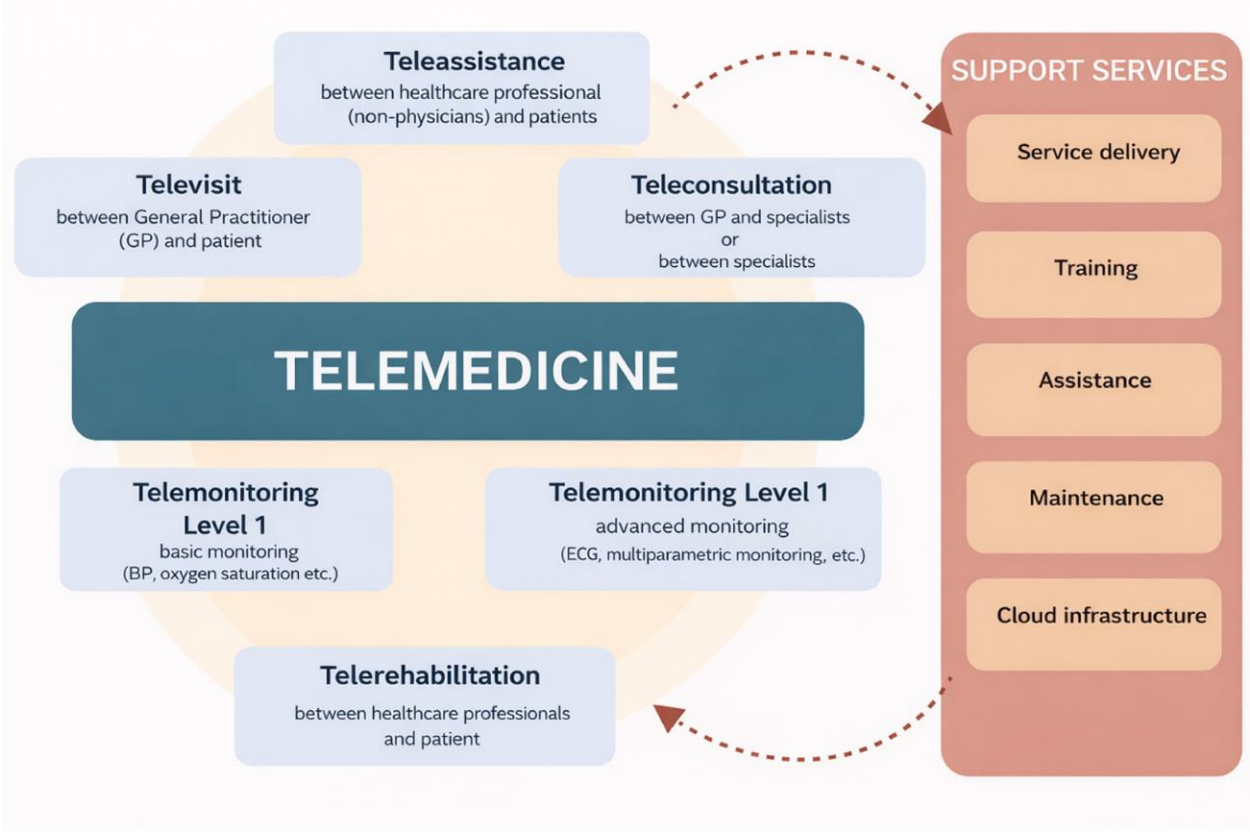

Figure 4 Management of a clinical pathway dedicated to telemedicine. GP, general practitioner; BP, blood pressure.

Table 10 Selection of the patients

Tele-assistance and tele-monitoring eligibility
(1) Patients with implantable devices without heart failure
(2) Patients with chronic heart failure:
a. Without implantable devices
b. With implantable devices
(3) GUCH patients
(4) Patients with chronic artery disease at higher risk
Tele-rehabilitation
(1) After cardiac surgery
(2) In chronic heart failure
(3) In chronic artery disease at higher risk
(4) After recent interventional procedures (PCI and TAVI)

GUCH, grown-up congenital heart disease; PCI, percutaneous coronary intervention; TAVI, transcatheter aortic valve implantation.

Table 11 Requirements for the hospital facility

- Use of institutional electronic systems for prescribing, booking, admission, and reporting
- Electronic agendas for specific services
- Use of institutional reporting systems and digital signature
- Platform for receiving sensor-derived signals
- Full information disclosure and consent collection
- Technical verification and prior staff training
- Prior availability of patient documentation
- Video call with recording integrated into the clinical record
- Clinical report available online

multi-professional care pathway. Tele-assistance and tele-monitoring have demonstrated benefit in this setting, with meta-analyses reporting reductions in mortality and rehospitalization.[62] Given the recognized role of CR as a key component of optimal heart failure management, tele-rehabilitation also represents an important strategy, both as an alternative setting to increase referral rates and as an option for long-term maintenance programmes (*Figure 4*).[63]

Risk-stratified tele-monitoring strategies may further support multidisciplinary management, reduce the need for in-person outpatient visits, and facilitate optimization and titration of guideline-directed medical therapy. Shared cloud-based data platforms can enhance communication among healthcare providers. Remote monitoring of clinical parameters (heart rate, blood pressure, body weight), instrumental data (oxygen saturation, ECG), and laboratory values (sodium, potassium, urinary albumin-to-creatinine ratio, creatinine, N-terminal pro-brain natriuretic

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Table 12 Requirements for the patient or caregiver

- Availability of internet/data connection
- Computer/device/phone with camera and microphone
- Valid e-mail address
- Valid phone number

Patients should be able to access the telemedicine system. The skills of the patient for using the telemedicine prescriptions should be assessed for each patient in relation to:

- the patient's or caregiver's ability to access technological systems that meet at least the minimum technical requirements for the correct and safe delivery of the service;
- the minimum competencies and skills that the patient must possess in order to appropriately use technological platforms;
- the patient's adherence to the activation of the telemedicine service;
- the suitability and training of the patient or caregiver;
- the adequacy of the social aspects of the family context; and
- the structural suitability of the home and clinical setting, also in relation to the use of equipment.

Table 13 In-hospital phase pathway

- Patient referral and evaluation of social/family context, in-hospital clinical pathway, and ongoing therapy
- Assignment to a nurse case manager
- Definition of shared goals (patient–nurse–specialist)
- Allocation of tele-monitoring devices and education on their use
- Personalized alert settings and, for wearable devices, definition of monitoring duration and control frequency
- Identification of dedicated time slots for staff reviewing transmitted data
- Data sharing may include the patient's GP depending on the pathology monitored
- Evaluation of the need for other specialists and non-medical professionals
- Notification to community care coordination centres (COT) of patient enrolment
- Scheduling of the first televisit (heart failure) or remote device control and in-person visits

Table 14 Extra-hospital phase pathway

Tele-assistance

- May be managed by nursing staff
- Supports early symptom recognition and device/app management, identifies barriers to adherence (e.g. drug side effects)
- Verifies adequacy of physical therapy intensity
- Facilitates communication with physiotherapists, GPs, specialists, pharmacists
- Enables family involvement in the patient educational plan

Tele-monitoring Level 1 (wearable devices)

- Transmission of clinical parameters (body weight, heart rate, blood pressure, etc.)
- In relation to wearable devices, parameter measurement may be performed independently by the patient or may involve home-based monitoring carried out by nurses equipped with tele-monitoring kits, with particular attention to the patients' general condition, the presence of symptoms, adherence to therapy, and trends in the variation of the monitored parameters.

Tele-monitoring Level 2 (implantable devices: PM, ICD, loop recorder, CardioMEMS)

- Identification of dedicated staff and time slots for reviewing transmissions
- Definition of alerts requiring physician notification
- Assignment of dedicated DRG
- Streamlined administrative procedures for reporting monitoring activities

DRG, diagnosis-related groups; GP, general practitioner; ICD, implantable cardioverter-defibrillator; PM, pacemaker.

peptide, and complete blood count) allows early identification of clinical deterioration and supports therapy adjustment. Criteria for patient selection are reported in *Table 10*; requirements for healthcare facilities and for patients or caregivers are detailed in *Tables 11* and *12*. Care pathways across different care settings and according to monitoring modality are described in *Tables 13* and *14*.

Occasional contact may be requested by the patient according to agreed modalities. It must never be used for emergencies, where calling 112 is mandatory. It is important for early symptom recognition or management of drug-related issues.

Sharing among all professionals involved in the pathway is essential for achieving common goals and monitoring adherence (e.g. sharing electrophysiology reports for patients with implantable devices).

Reassessment of the goals: Goals defined during the hospital phase may be achieved and require redefinition.

What the recipient would like to read

The GP perspective

Some preambles are needed:

(1) Within the integrated inter-disciplinary management of the patients, a good communication and sharing of news and data between specialists and general practitioners is the cornerstone in the self-care process and management of the hospital-territory care continuity; in the context of hospital discharge, a clear and exhaustive paper or electronic discharge letter is essential for the comprehension, sharing, and security.

(2) Achievement, functioning, and the daily use of electronic health record might solve many criticisms in the transmission of data, thus making the discharge letter an adjunctive tool, which is useful

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Table 15 Frail patient and/or patients with multiple morbidities

Phenotype	Clinical description
Very fit	Robust, active individuals, full of energy and motivated. They exercise regularly and are among the most active for their age.
Fit	No active disease or symptoms, but less fit than the previous category. They are physically active occasionally, often depending on the season.
Managing well	Do not engage in regular physical activity apart from walking for daily activities. Medical problems are well controlled.
Vulnerable	Not dependent on others, but symptoms limit daily life. They feel tired and slowed down during the day. Illness is often not well controlled.
Mildly frail	Need help with more demanding daily activities (transportation, heavy housework, managing finances, and medication management).
Moderately frail	Totally dependent for more complex daily activities and also require help with basic activities (personal hygiene, dressing, and climbing stairs).
Severely frail	Completely dependent in all activities of daily living. Clinically stable and not at high risk of death within the next 6 months.
Very severely frail	Completely dependent on others. End of life is approaching. Recovery is not possible even from minor illness.

Description of the frail patient phenotype. In moderately and severely frail individuals, cognitive decline and/or depression are frequently associated conditions.

Table 16 Components of care for patients with cognitive impairment or dementia

(1) Diagnosis
(2) Ongoing assessment and reassessment
(3) Care planning
(4) Medical management
(5) Information provision, education, and informed and supported decision-making
(6) Recognition and emotional support for the person with dementia
(7) Care for the person with dementia, including assessment of impairment in basic activities of daily living
(8) Involvement, emotional support, and assistance for family members/caregivers
(9) Prevention and management of behavioural and psychological symptoms of dementia
(10) Safety for the person with dementia, including evaluation of physical and social environmental modifications
(11) Care transitions from hospital to home or residential facilities, considering the needs of the patient and family/caregivers

for the engagement of the patients in the care plans. As per the health electronic record (HER), similar to a shared clinical database in which data are included in real time by physicians who are involved in the care of the patient, we can overcome the problem of data transfer and the need for updating therapeutic advice and follow-up indication in the general management software of general practitioners.

The discharge letter should include the following:

- The discharge diagnosis or diagnoses with explicit specification of the International Classification of Diseases-9.
- The patient's clinical status at discharge and body weight at admission and at discharge is also useful (especially for patients with heart failure).
- Diagnostic tests and treatments performed during hospitalization.
- The pharmacological and non-pharmacological therapies proposed for any newly diagnosed conditions and any changes, with the corresponding rationale.
- Follow-up instructions including the parameters to be monitored, the evaluations to be performed, and the proposed frequency.
- Indications regarding warning signs or the presence of a clinical condition that may require prompt intervention and management of complications.
- Any new care needs (incontinence aids, walking aids, etc., with the relevant prescriptions or the need for complex care settings); identification of frail patients or those at high risk of rehospitalization and indication to initiate home care, highlighting which interventions are a priority; this type of activation often presents difficulties or delays, as well as the frequent need for the involvement, in addition to the GP, of nurses and physiotherapists; it is therefore important that hospital wards are familiar with local services and organizational structures in order to avoid proposing care pathways and requests that cannot be fulfilled.
- Identification of patients requiring palliative care, specifying the level of assistance required, in order to assess at the time of protected discharge, which needs the community is able to take on or whether there are conditions indicating transfer to a hospice or a long-term care facility.
- Contact details of the ward physicians who followed the patient, for any requests for information from the GP, with the possibility of direct communication channels for clarification, without having to go through the patient or family members.

Furthermore, it would be useful if the discharge card contained specific information about the clinical follow-up pathways that the patients should follow, above all in case of individuals who were discharged after acute coronary syndrome, heart failure, atrial fibrillation, or other cardiovascular diseases.

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Table 17 Essential elements that must always be included in the discharge letter

Item	Content
1	Identification of the hospital facility, discharging unit, and its staff
2	Place and date of document preparation
3	Patient identification
4	Date of admission and date of discharge
5	Discharge diagnosis
6	Reason for admission
7	Diagnostic, interventional, or surgical procedures performed, with brief description
8	Hospital course, including clinical evolution, diagnostic–therapeutic pathway, rehabilitation or care pathway; post-operative course in case of surgery
9	Patient's clinical condition at discharge
10	Functional status at discharge and care needs
11	Pharmacological prescriptions: drug type, dosage, and duration of treatment
12	Non-pharmacological prescriptions: diet, physical activity, home self-monitoring
13	Follow-up instructions
14	Date and modality of access for the first post-discharge visit
15	Cardiac rehabilitation pathway, with indications
16	Name and signature of the responsible physician and collaborating non-medical professionals

The discharge letter is still the main tool that guarantees the continuity in the care of patients. We believe that the early widespread of the HER would be the cornerstone for the correct management of information about clinical status of the patients by assuring immediate access, standardized data, and the best integration between hospital and territory. To invest resources in the digitalization of the national health system would certainly improve communication among physicians and further offer patients the most efficacious, shared, personalized, and safest care pathway.

The patient's perspective

That being a physician is a job, is not in question. A job like any other one with a routine and a thousand habits, with hectic moments and others of calm, phases of difficulty, and moments of tranquility. During the day, it may happen that colleagues exchange a few jokes, that there is gaiety, or friction, perhaps an argument. That being a physician is a job with its everyday different features and aspects. To be carried out with conscientiousness and professionalism, but one in which thoughts and concerns from personal life inevitably intrude, just as thoughts and concerns from the working day end up going home. A job, in short.

And yet this job has particular characteristics that make it somewhat different from all the others. Because it has to do with people's lives, who, when they come into contact with these professionals, find themselves at a moment of immense difficulty and enormous importance. In many cases, at a true crossroad.

The people who are the object of this profession are often facing a radical change in their existence. Nothing will ever be the same again, in any case.

This is why, at the time of discharge, when one is about to leave behind this terrible phase of life, a patient must in no way feel like part of a routine. There is no comfort in being pigeonholed into an ordinary case history; a shared misfortune is no consolation at all, not even halfway.

It is at the moment of discharge that a person needs their doctor. On that particular occasion, fear is greater. One is no longer monitored, no longer observed in the course of the illness, no longer the object of professionals' attention. One will not be able to rely on immediate, reassuring urgent interventions; there is no bell to call for help, at night there will be no attentive nurses ready to support any need. One is left alone, and the main difficulty will be to observe oneself and understand how one actually feels. The fear is not understanding the signals of one's own body—whether they are the usual ones, the ordinary ones that were there before, or whether they are alarm bells, warnings from the body of a new crisis, perhaps lethal, perhaps unmanageable. One finds oneself facing a new, unknown fragility. With the awareness that it will not be as before and that one must therefore come to terms with a new condition.

The boundary between reassurance and minimization, we realize, is very thin. On one hand one would like to return to a normal life and that is what one is often told, but one also knows that it was precisely the previous life, often excessive ways and wrong behaviours, that brought them where they are; therefore no, one cannot be exactly as one was, one must change, but without feeling disabled, without carrying fears and indecision along.

An explanation of the therapies will certainly be useful; medications are a new fact, the patient trusts them and they are a protective factor; knowing what they are for, what function they have, helps a great deal. And behavioural instructions—what must be paid attention to and to which signals—will be an important comfort, a constant reference.

More than anything else, however, the smile will matter. There is no other moment in which one has more need of friendship, of closeness, even of affection. Nothing fake, nothing imposed. More than professionalism, more than competence will be necessary to feel that the doctor who puts you back into the world is on your side. Even if they remain in that place of suffering and yet reassuring, that smile will be the element patients carry home and remember when they find themselves alone, facing the visible and invisible wounds.

A smile. That's all.

Models of discharge letters with follow-up timing according to disease

The proposed documents are concise templates that include the main recommendations for continuation of care and secondary prevention measures, based on the contribution of multiple healthcare professionals involved in patient management, care, and treatment.

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The Panel considered it appropriate to focus on the cardiovascular diseases of greatest relevance in terms of prevalence, mortality, and hospitalization rates: ischaemic heart disease and heart failure, as well as hospital admissions related to cardiac pacing and electrophysiological procedures.

The principal clinical characteristics, the determinants influencing recurrences/exacerbations and rehospitalizations, and the therapeutic targets are briefly described, with the aim of optimizing follow-up, improving continuity-of-care pathways, and positively influencing prognosis.

Acute coronary syndrome

Predictors of new coronary events[64-66] have been identified in multi-vessel coronary artery disease, female gender, diabetes mellitus, heart failure, advanced age, and obstructive sleep apnoea syndrome. Achieving therapeutic targets represents the main objective to reduce 'residual cardiovascular risk'.[65]

Residual risk and main therapeutic targets

Arterial hypertension

Hypertension induces endothelial dysfunction, dysregulation of the autonomic nervous system, and impaired vasoreactivity.[67] European guidelines recommend, in secondary prevention, blood pressure values <130/80 mmHg.

Dyslipidaemia

LDL levels <55 mg/dL are recommended in patients with ischaemic heart disease (<40 mg/dL in very-high-risk categories and in case of recurrent ischaemic events), with initiation of high-intensity lipid-lowering therapy already during hospitalization, followed by the addition of non-statin lipid-lowering agents (ezetimibe, bempedoic acid, or PCSK9 inhibitors) if the target is not achieved.[68] Cases of hypertriglyceridaemia should be reported, with possible indication for treatment.

Diabetes mellitus

Diabetic patients often present multi-vessel disease and multiple coronary lesions, a higher prevalence of unstable atherosclerotic plaques, and altered microvascular reactivity.[69] The therapeutic goal is to maintain glycated haemoglobin <7%, with adjustments according to patient age.

Smoking

Smoking cessation reduces the risk of recurrent myocardial infarction or cardiovascular death by 30–50% over the subsequent 3–7 years.[70]

Chronic kidney disease

These patients have a higher burden of comorbidities, endothelial dysfunction, inflammatory and pro-thrombotic states, and anaemia,[71] as well as incomplete revascularization and sub-optimal therapeutic optimization.[72]

Main recommendations for the discharge letter

Include the main pre-existing risk factors (including unfavourable psychosocial conditions and/or stress), those not at target, and 'residual' risk factors (in-hospital complications, residual coronary stenosis, reduced ejection fraction, and prescription contraindications), as well as corrective interventions proposed by the MDT.

Pharmacological therapy should be clearly and comprehensibly described. It is suggested to list medications in chronological order of intake (including the active ingredient name) to improve adherence and reduce medication errors.

Patients should be referred to follow-up programmes and CR when indicated (Supplementary figure 1).

Patient with heart failure

Several factors contribute to the high mortality, hospitalization, and 30-day rehospitalization rates characterizing heart failure.[73-75]

Demographic and socio-economic characteristics

Heart failure with reduced ejection fraction is more prevalent in men, whereas heart failure with preserved ejection fraction is more frequent in women.[76] Low socio-economic status is associated with reduced quality of care, limited access to community services, and consequently lower treatment adherence and medication titration.[77]

Comorbidities

Diabetes mellitus is present in ~40% of patients and is an independent predictor of new hospitalizations.[78,79]

Chronic obstructive pulmonary disease,[80] present in about 30% of heart failure patients, contributes to right ventricular overload and dysfunction.

Renal failure promotes oxidative stress, endothelial dysfunction, volume overload, electrolyte imbalance, release of uraemic toxins, and anaemia.[81,82]

Anaemia increases hospitalization risk,[83,84] and treatment—particularly of iron deficiency anaemia—improves functional capacity.[84]

Main recommendations for the discharge letter

Highlight precipitating factors and risk factors that may predispose to clinical destabilization; assign the patient to a nurse case manager where available; enrol in structured follow-up programmes specifying the optimal timing for the first control visit; and refer to CR pathways when indicated.

Provide a clear list of prescribed medications, preferably in chronological order of intake, and schedule —or indicate—titration in terms of timing, dosage, and need for clinical reassessment (Supplementary figure 2).

Patient undergoing electrostimulation/electrophysiology procedures

Provide the patient, the GP, and other specialists with a description of the procedures performed and their indications regarding the underlying disease, the clinical course, and any complications. The models of implanted devices and the related electronic parameters should be specified.

Clearly state the therapeutic indications and recommendations the patient must follow for recovery,

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follow-up, and ongoing care, including pre-arranged appointments and visits (Supplementary figure 3).

Specific conditions

Cognitive decline, dementia, frailty, and multi-morbidity represent negative prognostic determinants, influencing therapeutic adherence, continuity of care, regularity of follow-up, and the burden on family members/caregivers.

Caregiver involvement is essential and should be identified early. Key recommendations for caregivers include the following:

(1) Involvement in the care team.
(2) Provision of clear and accurate information about the disease.
(3) Connection with the support service network before discharge.
(4) Information about the follow-up programme.[85]

The discharge letter should report episodes of disorientation, aggression, or delirium occurring during hospitalization, the specific treatments administered, and the planning of specialist follow-up to be conducted remotely (telephone or virtual) for less complex cases, reserving direct in-person care for more complex situations.

The increasing proportion of elderly patients is associated with frailty, multi-morbidity, cognitive impairment, polypharmacy, and disability; therefore, a multidisciplinary intervention is necessary and more effective.[86]

Frailty[87] complicates disease progression, with higher rates of delirium, prolonged hospitalization, post-operative complications, and need for institutionalization after discharge. Routine assessment of frailty and comorbidity burden is essential (*Table 15*). The contribution of all dedicated healthcare professionals and the involvement of family members/caregivers are necessary for medication management and verification, planning of clinical and instrumental follow-up, and the use of remote visits (telemedicine). In selected cases, the patient may be eligible for CR pathways.[88]

The approach to patients with cognitive impairment and dementia should be structured and multidisciplinary (*Table 16*).

Conclusions

An updated discharge model characterized by practical operational references, grounded in the most recent scientific evidence and supported by the multidisciplinary expertise that works alongside the clinical cardiologist, is essential to ensure that discharge represents a central element in improving the care pathway. This pathway begins at the time of hospital admission and is therefore an integral part of the patient's care process.

The discharge letter must include all essential information for the GP in a clear and accessible format, so as to be useful not only to the physician but also to the patient and family members or caregivers. It thus becomes a fundamental tool for the transmission of information concerning the entire hospitalization. *Table 17* summarizes the essential contents of the discharge letter.

Supplementary material

Supplementary material is available at *European Heart Journal Supplements* online.

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Data availability

No data available as this is not an original article.

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ANMCO position paper: ANMCO general assembly 2024—the role of the cardiologist in the management of cardiovascular chronicity

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KEYWORDS
Cardiovascular chronicity;

Cardiovascular diseases remain the leading cause of mortality globally and in Italy, with a growing burden exacerbated by ageing populations and underdeveloped strategies for managing chronic cardiovascular conditions. This position paper,

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Management;
Secondary prevention

resulting from the 2024 ANMCO General Assembly, addresses the current state of cardiovascular chronicity management in Italy, highlighting critical gaps and proposing sustainable, integrative solutions. Despite improvements in acute cardiovascular care, the lack of structured post-acute management, insufficient adoption of secondary prevention protocols, limited access to innovative therapies, and a slow digital transition continue to hinder effective chronic care. The document stresses the pivotal role of cardiologists, not only in acute intervention but also in long-term care and secondary prevention, emphasising the need for a multidisciplinary, multichannel healthcare model. The paper explores the potential of e-Health and artificial intelligence to revolutionize chronic disease management. It advocates for the widespread implementation of integrated care pathways, digital tools like electronic health records and telemedicine platforms, which together could enhance early detection, patient monitoring, and therapeutic adherence while reducing unnecessary hospitalisations. It also underscores the necessity of updating national and regional pharmaceutical policies to improve equitable access to disease-modifying therapies. Furthermore, the integration of palliative care in end-stage cardiovascular disease and the enhancement of post-acute care networks are deemed essential. Ultimately, the document advocates for a comprehensive systemic and cultural transformation spearheaded by scientific societies such as ANMCO, where technological innovation, organisational reform, and patient-centred care align to ensure a sustainable and universally accessible healthcare system. This vision is consistent with the objectives of the PNRR, the 2030 Agenda, and, most importantly, the foundational principles of the Italian Constitution.

Introduction

Cardiovascular diseases (CVDs) remain the leading cause of death worldwide, including in Italy, with an increasing trend observed between 2020 and 2022[1] Delays in care delivery, inadequate implementation of secondary prevention management protocols, and the progressive marginalisation of chronic cardiovascular disease management are contributing to a reversal of the previously improving survival trends among patients with CVD.

Given the well-established association between cardiovascular diseases and modifiable risk factors, it is evident that the prevention of cardiovascular events and their recurrences or complications must be grounded in a comprehensive, multidisciplinary model of patient care involving multiple healthcare stakeholders, including general practitioners, pharmacists, hospital-based and outpatient specialists. Among these, cardiologists play a pivotal role. In light of the epidemiological burden and the substantial socio-economic costs associated with cardiovascular diseases, cardiologists are increasingly called upon to assume a leading role in the long-term management of cardiovascular chronicity. Their responsibility extends beyond the acute phase of disease to encompass continuity of care, secondary prevention, and chronic disease management.

However, data from both international and national registries temper optimism,[2,3] as they consistently demonstrate suboptimal implementation of evidence-based therapies in routine clinical practice. The reasons underlying the inadequate management of patients with chronic cardiovascular diseases and the failure to optimize pharmacological and non-pharmacological therapies in accordance with international guideline recommendations are multifactorial. These include therapeutic inertia, barriers to access innovative pharmacological and technological treatments within reimbursement frameworks, poor patient adherence, insufficient counselling, limited availability of cardiac rehabilitation services across the national territory, logistical and technical challenges in implementing integrated hospital–community care pathways, and delays in the digital transformation of healthcare systems.[4]

The purpose of this document, stemming from the debate held during the session '*The cardiologist must also be a key player in chronic care*' at the 2024 General Assembly of the Italian Association of Hospital Cardiologists (ANMCO), is to critically appraise the current Italian landscape, identify barriers to the effective management of patients with chronic cardiovascular diseases, and propose actionable solutions to improve existing standards of care. In particular, this paper aims to define strategies and care pathways that enable appropriate patient-centred management, leveraging the opportunities offered by e-Health solutions and advanced clinical research to overcome the shortcomings of current chronic cardiovascular disease management.

Chronicity in cardiology: state of the art

According to the most recent data from the Global Burden of Disease study, the four major groups of chronic diseases (cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes) collectively account for 63% of all

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non-communicable diseases worldwide.[5] These major chronic disease groups are also responsible for substantial impairments in quality of life; in 2019, they accounted for 80.5% of total years lived with disability globally. The growing relevance of chronic diseases is closely linked to ongoing demographic transitions, and projections indicate that they will account for up to 86% of all deaths by 2048.

Chronic diseases impose a substantial socio-economic burden, with an even greater impact on the Italian National Health Service, as they frequently coexist, thereby increasing the complexity of patient management. According to data from the Italian National Institute of Statistics (ISTAT), 40.4% of the Italian population lives with at least one chronic condition, with prevalence increasing markedly with age. This translates into approximately 527,000 potentially avoidable hospitalisations per year, with an average cost per admission of around €5000.

Cardiovascular diseases, affecting nearly 10 million individuals in Italy, represent not only the leading cause of mortality but also the primary cause of hospital admission. Recent estimates (TEHA Group, 2024) indicate that the economic burden of cardiovascular diseases exceeds 3 million disability-adjusted life years, reflecting the sum of years of life lost due to premature mortality and years lived with disability, amounting to approximately €42 billion when productivity losses are also taken into account.

Beyond underscoring the economic and financial relevance of the problem, which is expected to intensify as the Italian population becomes older, frailer, and increasingly multimorbid, these data should inform decisions related to resource allocation and investment planning. Strategic investments in chronic disease management may, in the long term, prove cost-effective by improving the quality of healthcare delivery through more rational use of resources and enhanced efficiency of the healthcare system as a whole.

The economic and social impact of cardiovascular diseases is such that the issue has now been recognized as a priority within the agenda of both the rotating Presidency of the Council of the European Union and the European Commission for the 2024–2029 period. In Italy, the most recent National Prevention Plan (PNP) 2020–2025 identifies the 'reduction of preventable and avoidable morbidity, mortality, and disability due to non-communicable diseases' as a key priority, also in alignment with the objectives of the 2030 Agenda for Sustainable Development. Furthermore, the Social Affairs Committee of the Italian Chamber of Deputies has approved three resolutions committing the Italian Government to the development of a National Plan for Cardio- and Cerebrovascular Diseases, in continuity with both the National Prevention Plan and the National Chronicity Plan (PNC).

Across all these strategic documents, there is a clear recognition that effective action against cardiovascular and other chronic diseases requires a multisectoral, multi-stakeholder perspective and a 'Health in All Policies' approach, with the full engagement of all levels of care from community-based and primary care services to community pharmacies, which serve as frontline access points for citizens, and hospital-based facilities.

Management models

The management of cardiovascular chronic disease requires the adoption of standardized protocols for patient stratification, assessment, and long-term follow-up, with the aim of improving quality of life, reducing hospitalisations and mortality, and optimising the use of healthcare resources.

As a complex and long-term challenge, cardiovascular chronicity involves not only physicians but also institutions and society at large, given its substantial clinical, economic, and social costs. In this perspective, the Essential Levels of Care have sought to redefine the healthcare services guaranteed by the Italian National Health Service.[6] Over recent decades, several models have been developed to address chronic diseases, particularly cardiovascular conditions (*Figure 1*). Since 2005, the National Prevention Plans (PNP) have promoted programs aimed at improving health literacy and strengthening the active role of citizens in maintaining their own health in synergy with the Italian National Health Service. This approach has the potential to foster a renewed physician–patient alliance, capable not only of improving clinical outcomes but also of positively influencing health policy decisions and reducing medico-legal disputes. Achieving this goal requires close collaboration among specialists, general practitioners, and paediatricians, promoting preventive strategies from the earliest stages of life and ensuring continuity of care throughout the entire life course.[7]

Conversely, the PNP 2020–2025 proposes a model based on integration across schools, workplaces, communities, healthcare services, and local authorities, aiming at comprehensive patient management and at reducing social and territorial inequalities (context-based approach).[7] Such integration would enable more effective management of chronic patients while mitigating social and geographic disparities within the national healthcare system.

Additional support is provided by the National Chronicity Plan (PNC), first issued in 2016 and updated in 2024,[8,9] which advocates for continuous, integrated, and personalized care through the implementation of structured diagnostic–therapeutic care pathways and the strengthening of telemedicine and healthcare digitalisation. The overarching objective is to ensure high-quality care, reduce hospital admissions, and enhance the active role of patients and caregivers in the management of chronic disease.

Nevertheless, several critical issues remain unresolved. Despite the growing demand for chronic care management models, there is a persistent shortage of healthcare professionals capable of planning and implementing the necessary interventions. The 8th Census of Cardiology Units in Italy conducted by ANMCO in 2022 highlighted an increase in staffing levels within Italian cardiology departments, accompanied by a reduction in hospital beds and a largely unchanged or, in some cases reduced number of outpatient cardiology clinics dedicated to chronic disease management.[10] At the same time, despite the ambitious financial intentions of the National Recovery and Resilience Plan (PNRR),

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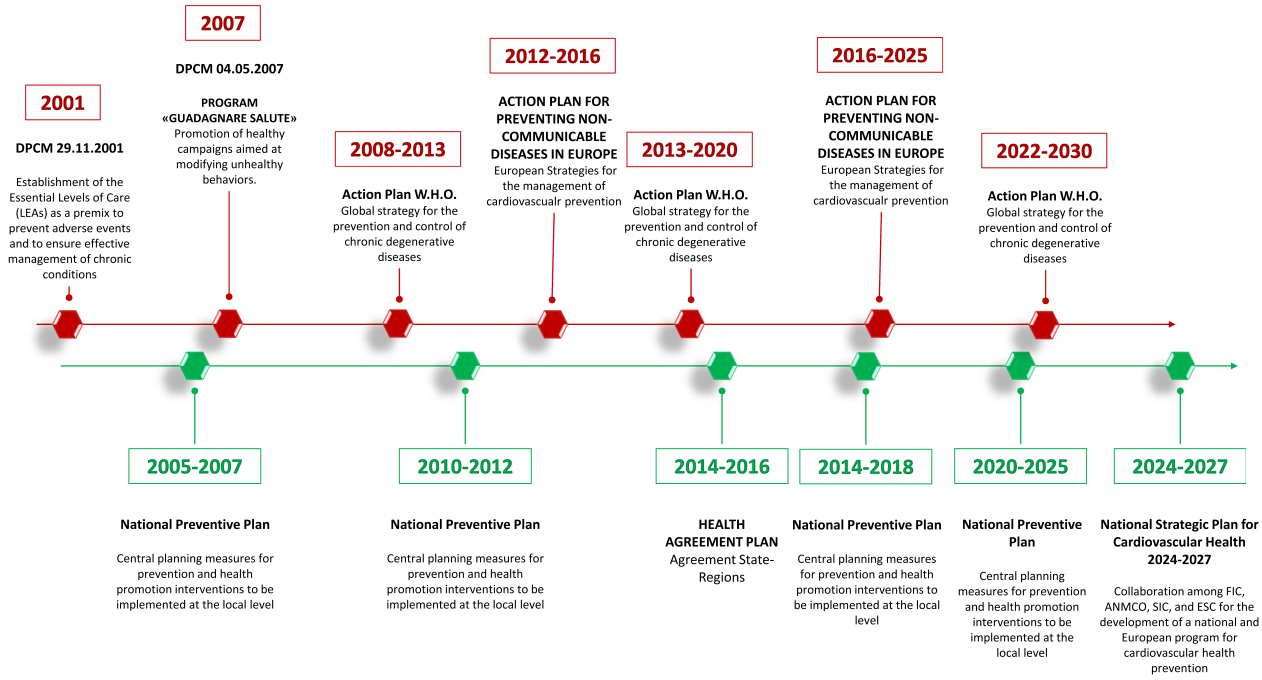

Figure 1 Timeline of documents addressing cardiovascular chronicity. LEA, Essential Levels of Care; WHO, World Health Organisation.

adequate funding for chronic care management remains lacking. Indeed, the 2024 update of the PNC appears to propose an expansion of chronic care largely under conditions of unchanged or severely constrained resources.[9]

Moreover, healthcare digitalisation remains an unmet goal. In addition to the current limitations of telemedicine in terms of applicability and reimbursement, unresolved medico-legal issues related to clinical decision-making in digital care settings continue to fuel debate.[11]

The implementation of structured diagnostic–therapeutic care pathways would enable a more rational, coordinated, and goal-oriented management of patients with chronic cardiovascular disease. In the Apulia region, the diagnostic–therapeutic care for heart failure and post-revascularisation pathways implemented within the PONTE-SCA project have yielded significant clinical benefits, supported by an organized model of continuity of care that ensures patient management from hospital discharge through community and home-based care.[12] From this perspective, optimising chronic care pathways should not be viewed solely through the lens of patient and disease management.

The longstanding Hub-and-Spoke organisational model adopted in Italian cardiology for the management of acute ischemic events has inadvertently contributed to the migration of young physicians away from 'peripheral' cardiology units, leading to overcrowding in Hub centres.[13] The development of dedicated care pathways, the establishment of highly specialized and disease-focused cardiology outpatient clinics, and the implementation of multispecialty collaboration for the management of patients with multiple comorbidities could enable Spoke centers to emerge as centres of excellence, albeit in non-acute settings. Enhancing the value of long-term clinical follow-up and scientific innovation may increase the attractiveness of these settings for younger professionals, helping to counteract healthcare workforce desertification and to promote a more equitable and efficient model of community-based healthcare.

e-Health, electronic health record 2.0, and cardiovascular chronicity

The term *e-Health* refers to the broad set of network-based digital resources, solutions, and information technologies applied to health and healthcare delivery. In recent years, e-Health has assumed a crucial and strategic role within modern healthcare systems, particularly following the SARS-CoV-2 pandemic, which markedly accelerated the adoption of digital technologies in clinical practice.

The potential of digital health driven by Artificial Intelligence (AI) and telemedicine goes beyond the mere digitisation of prescriptions and records. While early efforts successfully addressed the storage and accessibility constraints of paper-based systems, the current imperative is a fundamental paradigm shift in care models to radically transform healthcare delivery and patient management. The primary domain of application of this paradigm shift, particularly in the context of chronic disease management, should be care pathways that are currently characterized by fragmented diagnostic and therapeutic actions carried out by multiple healthcare stakeholders in a non–patient-oriented manner, lacking synergy and a holistic vision, essentially replicating traditional workflows with a paper-to-digital transition (*Figure 2*).[14]

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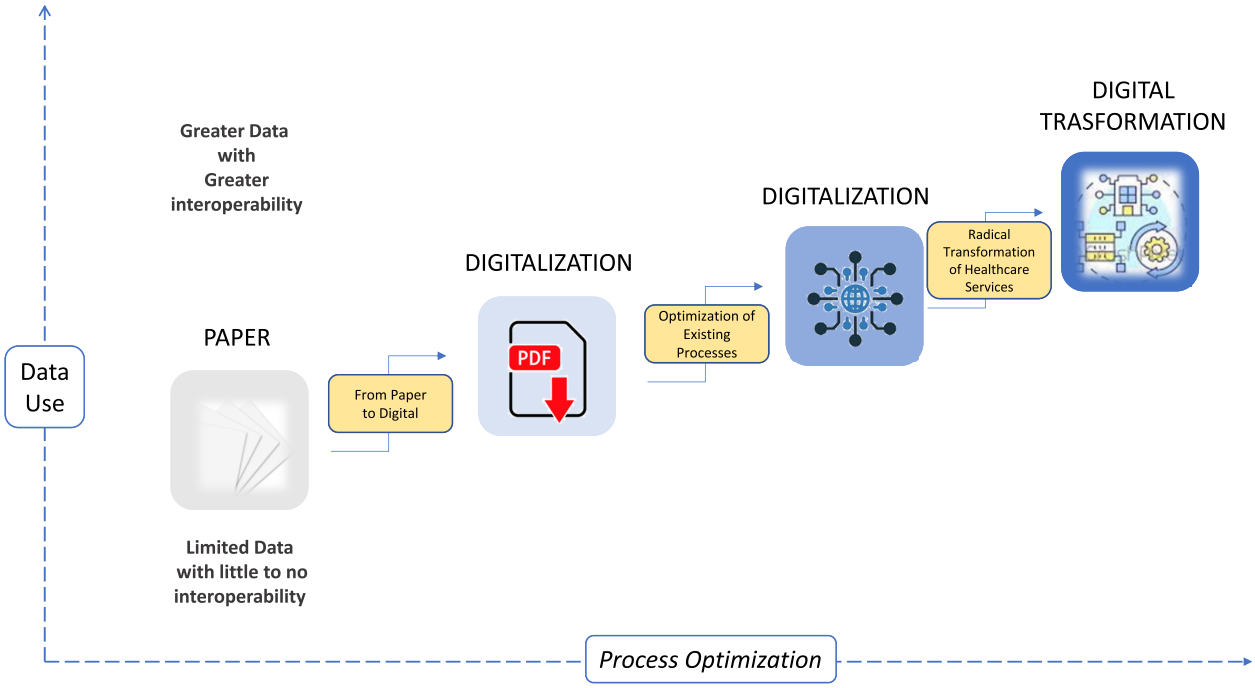

Figure 2 Digital transformation for a more effective, efficient, and sustainable healthcare system. Adapted from the World Health Organisation[15].

Conversely, truly integrated diagnostic–therapeutic care pathways could be developed, starting from the patient's care demand—detectable also remotely through wearable devices and remote monitoring tools—and redesigning shared management across general practitioners and specialists, primary care and community health centres, specialists and community pharmacists, as well as between hospital-based and territorial specialists. This transformation, achievable only through digital technologies and the development of AI, will profoundly change not only the way diseases are diagnosed and treated but also how healthcare systems are organized. With specific regard to chronic diseases and particularly cardiovascular conditions, this change should be grounded in the development of shared protocols enabling early identification of patients' healthcare needs, appropriate specialist referral (triage), and prioritisation, while also incorporating fast-track pathways, where applicable, to accelerate patient access and initiation of appropriate therapy.

Such a transformation would result in a substantial reduction in the number of outpatient visits and, consequently, waiting lists; a decrease in the inappropriate use of diagnostic procedures, which are often redundant and sometimes potentially harmful; and a more effective gatekeeping role for primary and community care, whose professional value would be enhanced through these new operational frameworks. Furthermore, unnecessary hospitalisations would be reduced, alleviating the economic and social burden on hospitals, which could then reallocate human, technological, and pharmacological resources to the management of acute patients. Digital integration would also facilitate simpler and more effective multidisciplinary and multichannel management of patients with comorbidities and multimorbidity, ultimately improving both the quality of care delivered and patient-perceived quality of care.

The most advanced expression of this transformation is represented by the development of so-called *virtual hospitals*, capable of delivering hospital-level care at home, thereby improving chronic disease management, enhancing access to care, and reducing avoidable hospital admissions. Existing models, such as those implemented at Mercy Hospital in the United States and the 'virtual wards' adopted in the United Kingdom, demonstrate how multispecialty telemedicine and home-based management of mild acute conditions can provide timely, personalized care. The advantages of these innovative solutions lie in the delivery of truly patient-centred care by multidisciplinary healthcare teams capable of early identification and treatment of disease exacerbations, thereby facilitating proactive interventions within the framework of so-called *anticipatory* or *initiative-based* medicine. This approach also simplifies administrative procedures, improves operational efficiency, and reduces overall healthcare costs.[15]

Despite these promising perspectives, Italy remains significantly behind in the digital transformation of healthcare. According to the 2023 Digital Economy and Society Index (DESI), Italy ranks only 18th among European countries in terms of technological innovation, highlighting an urgent need for further investment and development in the healthcare sector and beyond.[16]

Advantages of e-HEALTH

Accessibility to healthcare services

One of the main advantages of telemedicine is improved access to healthcare services. Patients living in remote

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or rural areas, where healthcare facilities may be geographically distant, can receive medical support without the need to travel. Moreover, for individuals with mobility limitations due to disability or chronic illness, telemedicine represents a major opportunity, enabling access to care from the comfort of their own homes.

Reduction in waiting times

Telemedicine can contribute to reducing waiting times for medical consultations. As many visits can be conducted more rapidly and flexibly, the burden on healthcare facilities may be alleviated, allowing for more efficient resource allocation and improved system performance.

Continuous monitoring of health conditions

Through wearable devices and dedicated applications, continuous monitoring of vital signs and health parameters is now feasible. This approach allows real-time detection of abnormalities, facilitating early intervention and improving the management of chronic diseases. In this context, it is essential to distinguish between patient-managed digital medical devices and digital therapeutics (DTx).[17] The latter—depending on their medical purpose—can be categorized into four groups: therapeutic DTx, remote patient monitoring, digital diagnostics, and digital prevention. For several of these applications, reimbursement pathways are already available in the United States and in some European countries, although not yet in Italy. These technologies, which could potentially benefit millions of individuals in Italy, fall within the scope of the National Health Technology Assessment (HTA) Program covering all non-pharmacological interventions and of the European HTA Regulation (EU) 2021/2282, which mandates the evaluation of clinical effectiveness and safety.[18]

Education and prevention

Telemedicine also enhances patient education and empowerment by providing access to information and resources through online platforms and dedicated devices. This facilitates the promotion of healthy lifestyles and supports the prevention of disease onset, progression, and recurrence.

Economic benefits

Digital health implementation may generate substantial cost savings for the Italian National Health Service. Remote management of selected conditions can reduce the number of outpatient visits and hospital admissions, alleviating pressure on hospital infrastructures and optimising resource utilisation. Moreover, digital solutions allow physicians to manage a larger number of patients within a shorter timeframe, improving care delivery, reducing healthcare workforce burden, and enhancing overall system efficiency.

Limitations and critical issues of e-HEALTH in healthcare

Despite digital transformation offering significant advantages, its realisation entails critical challenges that necessitate coordinated, evidence-based governance across all healthcare stakeholders.

Technological challenges

The reliability of e-Health technologies is a crucial issue. Not all patients have access to adequate technological devices or stable internet connectivity on a continuous basis. This may exclude specific population groups, such as older adults or individuals with limited access to digital tools.

Diagnostic limitations

Certain physical examinations and diagnostic tests require in-person assessment. Consequently, some health conditions still necessitate face-to-face clinical evaluation.

Data privacy and security

Health data are extremely sensitive, and their management entails risks related to unauthorized access and privacy breaches. Robust security measures, including advanced authentication systems and encryption protocols, are essential to ensure data protection and maintain public trust in healthcare systems.

Physician–patient relationship

The use of telemedicine and digital therapeutics may influence the quality of the physician–patient relationship. The lack of physical interaction can make it more challenging to establish trust and ensure effective communication.

Equity of access

Although e-Health promises improved accessibility, it also carries the risk of exacerbating existing inequalities. Therefore, strategies to promote digital literacy among patients and caregivers are essential to ensure equitable access to telemedicine services.[19]

ELECTRONIC HEALTH RECORD (EHR) 2.0

The Electronic Health Record (EHR) 2.0 represents a cornerstone in the digital transformation of the National Health Service, offering a unique opportunity to enhance efficiency, quality of care, and health information management. This digital platform enables the collection and sharing of clinical and administrative data among healthcare professionals, ensuring rapid and comprehensive access to information necessary for optimal patient care. Despite its advantages, the adoption of EHR 2.0 remains heterogeneous across Italian regions.

One of the major benefits of EHR 2.0 is the optimisation of care pathways. Immediate availability of clinical information allows physicians to make timely, well-informed decisions, reducing diagnostic and therapeutic errors, which is especially critical aspect for patients with chronic diseases requiring continuous monitoring and integrated care. EHR 2.0 also promotes continuity of care: when patients change physicians or relocate to another region, their

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clinical information remains accessible, minimising treatment interruptions and ensuring therapeutic consistency. This improves both clinical effectiveness and patient experience, reducing bureaucratic burden and frustration.

Additionally, EHR 2.0 can reduce medical errors related to incomplete diagnoses or outdated therapies and prevent unnecessary duplication of diagnostic tests, thereby lowering costs and patient inconvenience. Importantly, it also offers the potential to improve therapeutic adherence.

However, significant limitations remain.[20] Data security and privacy are central concerns. Recently, the Italian Data Protection Authority approved the regulatory framework for the implementation of the Health Data Ecosystem (Ecosistema dei Dati Sanitari, EDS),[21] designed to provide authorized stakeholders subject to explicit patient consent with timely access to updated health data for care, prevention, public health surveillance, research, and governance purposes (with mandatory pseudonymisation for the latter). One of the most relevant and debated aspects of the current decree is the prohibition of automated data processing and the use of artificial intelligence systems on EHR 2.0 data, which had been envisaged in earlier drafts.

Interoperability between regions and healthcare providers remains another unresolved issue. Despite being a national initiative, differences among regional health information systems hinder seamless data exchange, limiting uniform data management. Moreover, not all patients, particularly elderly individuals or those with limited digital literacy, are able to use the system effectively, potentially increasing inequalities in access to care and remote monitoring.

Equally important is healthcare professionals' adherence to the system and its integration with community-based care. The effectiveness of EHR 2.0 depends on widespread adoption by healthcare workers, yet digital competencies and willingness to use new technologies vary considerably, potentially slowing large-scale implementation. Furthermore, real-time updating of EHR data is not always guaranteed, as delays in uploading diagnostic results or therapeutic changes may compromise care quality.

Beyond individual patient management, EHR 2.0 also offers opportunities for improved epidemiological surveillance. Centralized data collection enables timely monitoring of population health, identification of trends and outbreaks, and planning of targeted public health interventions. Active patient participation—through access to and updating of personal health data—fosters autonomy, awareness, and prevention, reinforcing a proactive approach to health.[20]

ANMCO proposals

PNRR, electronic health record 2.0, and AI

In addressing the challenges posed by chronic disease management, cardiologists are called upon to rethink care models. In this context, ANMCO, as the leading Italian cardiology scientific society, has a responsibility to critically assess the current landscape and to propose strategies capable of transforming these challenges into opportunities.

A key asset is ANMCO's extensive experience in clinical research. Data derived from recent observational studies, such as BRING-UP 3 Heart Failure and BRING-UP Prevention, as well as ongoing projects, allow identification of therapeutic targets that are adequately achieved and those that are not, as well as barriers to the implementation of guideline-recommended therapies with a direct impact on prognosis in patients with heart failure and chronic ischemic heart disease. Moreover, ANMCO serves as the Italian reference point for the international EuroHeart project, promoted by the European Society of Cardiology, which provides the foundation for post-marketing surveillance registries of drugs and devices and represents an invaluable source of data for improving chronic disease management.

Within this framework, data collection and sharing for quality assessment and outcome research should be facilitated through simplified ethical review processes and harmonisation of data using the tools provided by EHR 2.0. Achieving this goal requires interoperability among regional EHR systems, attainable through adoption of the Clinical Document Architecture version 2 (CDA-2) standard, which enables structured clinical data exchange while remaining human-readable, similar to a traditional PDF document without compromising citizens' privacy rights.[21]

Artificial intelligence may also be integrated with telemedicine services. Telemedicine generates large volumes of data, whose analysis represents both a valuable opportunity and a potential burden if managed exclusively by human operators. Robust evidence already supports telemedicine effectiveness: a recent meta-analysis in heart failure demonstrated a 15% reduction in heart failure hospitalisations and a 16% reduction in all-cause mortality.[22] Importantly, telemedicine is a key component of the National Recovery and Resilience Plan (PNRR), Mission 6 (Health), which aims to support chronic patients through the implementation of at least one telemedicine platform per region and autonomous province and to assist at least 300 000 individuals by 2025.[23] These investments represent a major opportunity to strengthen secondary prevention and chronic disease management by preventing exacerbations and enabling early detection and treatment.

Artificial intelligence also holds substantial promise in chronic cardiovascular care. By integrating clinical data, laboratory results, imaging, and sensor-derived information, AI can generate predictive algorithms of individual disease trajectories, enabling a shift from reactive to proactive, predictive, preventive, and personalized—medicine, while also supporting patient self-management.[24] Importantly, AI can analyse unstructured data such as electrocardiograms, chest radiographs, and echocardiograms.[25] The most robust applications to date involve ischemic heart disease (atherosclerosis detection and ischemia prediction), heart failure (prognostic stratification), and arrhythmias (atrial fibrillation detection and event prediction in patients with implantable devices).[26]

In this perspective, safeguarding individual privacy rights should not conflict with the right to health, which may be more effectively protected through the

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appropriate and ethically governed use of AI to support healthcare professionals.

Quality indicators

Effective management of cardiovascular chronicity requires systematic evaluation and monitoring of clinical performance. In networks dedicated to ST-segment elevation myocardial infarction, time-dependent indicators enable clear identification of system failures. In contrast, in the chronic care setting, the ability to assess the effectiveness of healthcare interventions is partially lost.

Although the National Outcomes Program (Piano Nazionale Esiti, PNE) provides an overview of process and management quality indicators, most of the currently available metrics focus on acute care and invasive cardiovascular treatments (*Table 1*), underscoring the need for dedicated indicators tailored to chronic cardiovascular disease management.

Quality assessment in cardiovascular chronic care

Consequently, the National Outcomes Programme (Programma Nazionale Esiti, PNE) provides limited support for clinical evaluation in the setting of chronic cardiovascular disease. This limitation largely stems from its reliance on a predominantly administrative data-collection framework, which is not systematically grounded in clinical variables or longitudinal patient history. As such, the PNE does not adequately capture the complexity of chronic care pathways, highlighting the need for additional, clinically meaningful quality indicators.

A recent document issued by the European Society of Cardiology (ESC) has outlined a comprehensive set of quality indicators for cardiovascular prevention. Within its core framework, the proposed indicators encompass the full spectrum of preventive care, including: (a) structural and organisational aspects, (b) cardiovascular risk assessment, (c) management of individuals at risk of atherosclerotic cardiovascular disease, (d) care of patients with established disease, (e) patient education and empowerment, and (f) clinical outcomes.[27]

Table 2 summarizes the key quality indicators applicable to the management of patients with chronic cardiovascular disease, revised in accordance with European recommendations.

In the context of chronic care, these indicators may serve as a practical and conceptual reference for clinicians, supporting appropriate, guideline-concordant management. However, their effective implementation requires a uniform, interoperable data-collection system across the national territory. At present, the fragmentation of digital informational flows significantly hampers both the measurement and reporting of these indicators. The implementation of Electronic Health Record (EHR) 2.0 has the potential to overcome current heterogeneity and enable the routine application of quality indicators, thereby supporting clinicians in optimising patient management while simultaneously assessing adherence to international guideline standards.

Post-acute care networks: moving beyond STEMI systems

One of the major structural gaps within the Italian National Health Service is the absence of a standardized and comprehensive post-acute care model, that is, the phase following hospitalisation for acute cardiovascular events such as myocardial infarction, acute heart failure, cardiogenic shock, or malignant arrhythmias. While regional and national STEMI networks have substantially improved outcomes after acute myocardial infarction, comparable organisational models for other cardiovascular conditions in the post-discharge phase remain largely underdeveloped.

An organized and proactive approach to the management of clinical destabilisation in patients with chronic cardiovascular disease through dedicated post-acute pathways is essential to improve prognosis, reduce rehospitalisations, and enhance quality of life.[28]

Heart failure exemplifies this unmet need. Episodes of worsening heart failure are frequent, even among patients receiving optimal guideline-directed medical therapy. Timely intervention during these vulnerable phases of acute decompensation is critical to mitigating morbidity and mortality. However, the lack of a structured Hub-and-Spoke network analogous to STEMI care pathways represents a major organisational failure, exposing patients to avoidable risk, increasing healthcare costs, and exerting a negative impact on broader socio-economic welfare.

The key challenge lies in the early identification of clinical instability and its correction before overt deterioration occurs. This would allow healthcare networks to allocate resources more efficiently and to refer appropriate patients to specialised centres in a timely manner. In this context, AI, particularly when integrated with EHR 2.0 and existing electronic medical record systems, may represent a transformative tool. By synthesising large volumes of heterogeneous data, AI-driven decision-support algorithms could facilitate early risk stratification and clinical decision-making.[29] Although concerns regarding algorithmic bias, such as missed diagnoses, misclassification, inaccurate risk prediction, or inappropriate therapeutic recommendations, are legitimate, continued technological refinement combined with human clinical oversight may allow AI to serve as a valuable adjunct rather than a replacement for clinical judgment.

Prescribing barriers to innovative pharmacological therapies

Access to innovative, disease-modifying pharmacological therapies is a cornerstone of effective chronic cardiovascular disease management. These therapies are essential for achieving guideline-recommended treatment targets and for reducing residual cardiovascular risk—that is, the likelihood of major cardiovascular events despite optimal standard-of-care treatment.[30,31]

In recent years, multiple pharmacological classes have demonstrated robust efficacy in reducing recurrent cardiovascular events, hospitalisations, and cardiovascular mortality in both chronic coronary

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Table 1 National outcomes plan indicators—cardiovascular area

Condition	Indicator	Area of examination	Type
Left appendage occlusion, patent foramen ovale, intra-atrial defect	Hospital admission for Left appendage occlusion, patent foramen ovale, and intra-atrial defect	Hospital	Hospital admission
AMI	AMI: 30-day mortality	Hospital	Mortality
AMI	AMI: 1-yr mortality anno	Territorial	Mortality
AMI	AMI: 1-yr MACCE	Territorial	Process/ Outcome
AMI	AMI: 1-yr MACCE with all-cause mortality	Trial	Mortality
AMI	1-yr mortality in those who survived 30 days after AMI with acute heart failure	Territorial	Mortality
AMI	1-yr MACCE in those who survived 30 days after AMI with acute heart failure	Territorial	Process/ Outcome
AMI	AMI STE: 30-day mortality	Hospital	Mortality
AMI	AMI STE: n. of admissions	Hospital	Activity volume
AMI	AMI NSTE: n. of admissions	Hospital	Activity volume
AMI	AMI a sede non specificata: n. of admissions	Hospital	Activity volume
AMI	AMI: n. of admissions	Hospital	Activity volume
AMI	AMI: n. of admissions con trombolisi	Hospital	Activity volume
AMI	N. of admissions per AMI complicato da scompenso cardiaco	Hospital	Activity volume
AMI	AMI: 30-day mortality (main diagnosis)	Hospital	Mortality
AMI	AMI: 30-day mortality—new variables	Hospital	Mortality
AMI	30-day mortality for AMI NSTE	Hospital	Mortality
AMI	AMI STE: mortalità a 1 anno	Trial	Mortality
AMI	AMI NSTE: mortalità a 1 anno	Trial	Mortality
PTCA	N. of PTCA in conditions other than AMI	Hospital	Activity volume
PTCA	n. of PTCA in AMI STE over total PTCA	Hospital	Process/ Outcome
PTCA	PTCA: n. of admissions with at least one angioplasty	Hospital	Activity volume
PTCA	PTCA in AMI STE: n. of admissions	Hospital	Activity volume
PTCA	PTCA in AMI NSTE: n. of admissions	Hospital	Activity volume
PTCA	Hospitalisation for PTCA	Hospital	Hospital admission
PTCA	AMI STE: n. of PTCA-treated patients within 90 min from admission to the ward/service	Hospital	Process/ Outcome
PTCA	AMI STE: rate of PTCA performed within 90 min as related to the overall PTCA performed within 12 h from hospital/ service admission	Hospital	Process/ Outcome
Isolated CABG	Isolated CABG: 30-day mortality	Hospital	Mortality
Isolated CABG	CABG: burden of interventions	Hospital	Activity volume
Isolated CABG	Isolated CABG: 30-day mortality—with new variables	Hospital	Mortality
Isolated CABG	Total CABG: n. of admissions	Hospital	Activity volume
Heart Failure	Congestive heart failure: 30-day mortality	Hospital	Mortality
Heart Failure	Hospitalisation for heart failure	Territorial	Hospital admission
Heart Failure	Congestive heart failure: n. of admissions	Hospital	Activity volume
Heart Failure	Heart failure: n. of admissions	Hospital	Activity volume

Continued

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Table 1 Continued

Condition	Indicator	Area of examination	Type
Heart Failure	Congestive heart failure: 30-day hospital readmission	Hospital	Process/ Outcome
Arterial Hypertension	Hospitalisation for systemic arterial hypertension	Territorial	Hospital admission
Valvuloplasty	Valvuloplasty or cardiac valve repair: 30-day mortality	Hospital	Mortality
Valvuloplasty	Valvuloplasty or cardiac valve repair: n. of admissions	Hospital	Activity volume
Abdominal Aortic Aneurysm Repair	Repair of abdominal aorta not-ruptured aneurysm: 30-day mortality	Hospital	Mortality
Abdominal Aortic Aneurysm Repair	Repair of abdominal aorta not-ruptured aneurysm: n. of admissions	Hospital	Activity volume
Abdominal Aortic Aneurysm Repair	Repair of abdominal aorta ruptured aneurysm: n. of admissions	Hospital	Activity volume
Carotid revascularisation	Carotid revascularisation: stenting and angioplasty	Hospital	Activity volume
Carotid revascularisation	Carotid revascularisation: endoaterectomy	Hospital	Activity volume
Carotid revascularisation	Carotid revascularisation: n. of admissions	Hospital	Activity volume
Lower limb PAD	Lower limb revascularisation: n. of admissions	Hospital	Activity volume
Lower limb PAD	Lower limb PAD (stage II—IV): burden of admissions	Hospital	Classi di Volume
Lower limb PAD	Lower limb PAD (stage III—IV): lower limb amputation within 6 months of admission	Hospital	Process/ Outcome
Lower limb PAD	Lower limb PAD (stage III—IV): lower limb revascularisation within 6 months of admission	Hospital	Process/ Outcome
Lower limb PAD	Lower limb PAD (stage III—IV): mortality within 6 months of admission	Hospital	Mortality
Thrombosis, Embolism	Deep vein thrombosis: n. of admissions	Hospital	Activity volume
Thrombosis, Embolism	Pulmonary embolism: n. of admissions	Hospital	Activity volume
Thrombosis, Embolism	Pulmonary embolism: re-hospitalisation within 30 days of admission	Hospital	Process/ Outcome
Pulmonary Embolism	Hospitalisation for pulmonary embolism	Hospital	Hospital admission
Pulmonary Embolism	Pulmonary embolism: 30-day mortality	Hospital	Mortality
Angiology	Hospitalisation for PAD stage II	Hospital	Hospital admission
Vein Stripping	Hospitalisation for vein stripping	Hospital	Hospital admission
Vein Stripping	Surgical intervention for ligation and vein stripping: n. of admissions	Hospital	Activity volume

Abbreviations: AMI: acute myocardial infarction; **CABG:** coronary artery bypass graft; **MACCE:** Major Adverse Cardiovascular and Cerebrovascular Events; **NSTE:** non-ST elevation; **PAD:** peripheral artery disease; **PTCA:** Percutaneous Transluminal Coronary Angioplasty; **STE:** ST-elevation.

syndromes and heart failure. Moreover, several of these agents have shown benefit in comorbid conditions such as diabetes, obesity, and chronic kidney disease, which substantially amplify cardiovascular risk.

Lipid-lowering therapy has expanded beyond statins and ezetimibe to include novel agents such as bempedoic acid, monoclonal antibodies targeting proprotein convertase subtilisin/kexin type 9 (PCSK9), and small interfering RNA (siRNA)–based therapies, enabling more effective achievement of guideline-recommended lipid targets.[32] In the setting of heart failure, several disease-modifying therapies, including angiotensin receptor–neprilysin inhibitors, sodium–glucose cotransporter-2 inhibitors (SGLT2i), mineralocorticoid receptor antagonists, and vericiguat, have demonstrated substantial prognostic benefit.[33] More recently, robust evidence has also emerged supporting the cardiovascular and renal protective effects of SGLT2 inhibitors and glucagon-like peptide-1 receptor agonists in patients with diabetes.[34]

Despite strong and consistent evidence, access to these therapies in Italy remains highly variable across regions, reflecting heterogeneity in healthcare governance. This variability conflicts with the principle of universal access to

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Table 2 Potential quality indicators for the management of patients with chronic cardiovascular disease

Structural organisation

- Availability of multidisciplinary teams for the management of lifestyle modifications and counselling to support therapeutic adherence
- Availability of first- and second-level instrumental investigations for the early diagnosis of cardiovascular diseases or their progression (ECG, echocardiography, coronary CT, etc.)
- Participation in and development of dedicated registries for the collection of key anthropometric, clinical, and instrumental data of chronic patients

Clinical Risk Evaluation

- Proportion of patients at high cardiovascular risk assessed at least once for renal function (eGFR and albuminuria)
- Proportion of patients at high cardiovascular risk assessed for lipid profile
- Proportion of patients at high cardiovascular risk screened for diabetes (fasting plasma glucose and glycated haemoglobin)
- Proportion of patients at high cardiovascular risk assessed for blood pressure profile
- Proportion of patients at high cardiovascular risk reassessed annually for risk profile adjustment

Caring for patients at ASCVD risk

- Proportion of very high cardiovascular risk patients aged 40–70 years with baseline LDL-C > 55 mg/dL receiving lipid-lowering therapy
- Proportion of very high cardiovascular risk patients aged 40–70 years with baseline LDL-C > 55 mg/dL who are intolerant to, refuse, or have contraindications to lipid-lowering therapy
- Proportion of patients with diabetes or chronic kidney disease prescribed RAAS inhibitors
- Proportion of patients with diabetes or chronic kidney disease who are intolerant to, refuse, or have contraindications to RAAS inhibitors
- Proportion of patients with diabetes or chronic kidney disease prescribed SGLT2 inhibitors
- Proportion of patients with diabetes or chronic kidney disease who are intolerant to, refuse, or have contraindications to SGLT2 inhibitor therapy

Care of individuals with established atherosclerotic disease

- Proportion of patients with established ASCVD and type 2 diabetes treated with SGLT2 inhibitors and/or GLP-1 receptor agonists
- Proportion of patients with established ASCVD and type 2 diabetes who are intolerant to, refuse, or have contraindications to SGLT2 inhibitors and/or GLP-1 receptor agonists
- Proportion of patients with symptomatic peripheral arterial disease receiving antiplatelet therapy
- Proportion of patients with symptomatic peripheral arterial disease who are intolerant to, refuse, or have contraindications to antiplatelet therapy
- Proportion of patients with established ASCVD and blood pressure >140/90 mmHg receiving antihypertensive therapy
- Proportion of patients with established ASCVD and blood

Continued

Table 2 Continued

Structural organisation

pressure >140/90 mmHg who are intolerant to, refuse, or have contraindications to antihypertensive therapy

- Proportion of patients with established ASCVD referred to a cardiovascular rehabilitation program after an acute event or elective revascularisation
- Proportion of patients with established ASCVD who refused or could not be referred to a cardiovascular rehabilitation program after an acute event or elective revascularisation
- Proportion of patients with ASCVD on antiplatelet therapy and at high bleeding risk prescribed proton pump inhibitors
- Proportion of patients with ASCVD on antiplatelet therapy and at high bleeding risk who are intolerant to, refuse, or have contraindications to proton pump inhibitors

Education of patients

- Proportion of patients with established ASCVD or at very high cardiovascular risk who underwent multidisciplinary discussion of their health status and therapeutic targets
- Proportion of patients with established ASCVD or at very high cardiovascular risk satisfied with the control of their risk factors

Outcomes

a. Treatment outcomes

- Proportion of very high-risk patients or patients with established ASCVD who achieved recommended LDL-C levels
- Proportion of patients with established ASCVD and diabetes with HbA1c < 7.0% (53 mmol/mol)
- Proportion of very high-risk patients or patients with established ASCVD who quit smoking
- Proportion of very high-risk patients or patients with established ASCVD with well-controlled blood pressure

b. Clinical outcomes

- Annual all-cause mortality rate
- Annual cardiovascular mortality rate
- Annual rate of hospitalisation for cardiovascular causes
- Annual rate of non-fatal myocardial infarction
- Annual rate of bleeding events requiring emergency department access or hospitalisation

care guaranteed by the Italian National Health Service and enshrined in Article 32 of the Constitution. Importantly, unequal access has direct clinical consequences: data from the PNE and other national assessments suggest a clear regional association between failure to achieve secondary prevention targets and the underutilisation of effective therapies capable of improving patient prognosis.[35]

The governance of pharmaceutical access remains a subject of ongoing debate. While pricing, reimbursement status, and prescribing criteria are negotiated centrally, regional authorities are responsible for budget management and cost-containment strategies, including drug distribution policies and procurement. Regional implementation of national guidance through prescribing restrictions, therapeutic sequencing, and centralized

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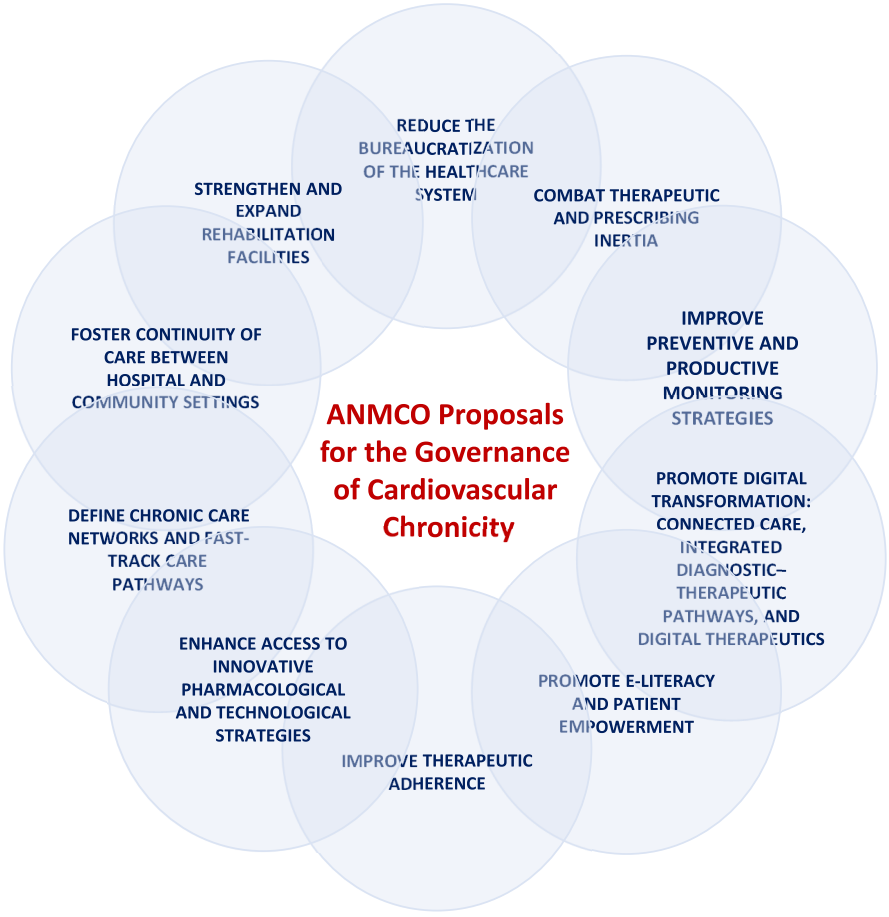

Figure 3 ANMCO proposals to address the challenge of cardiovascular chronicity. EHR, Electronic Health Record; SSN, Italian National Health Service.

purchasing may inadvertently contribute to disparities in access.[36]

To improve outcomes for patients with chronic cardiovascular disease, several actions are warranted: alignment of Italian Medicines Agency (AIFA) prescribing and reimbursement criteria with contemporary international guidelines; reform of State–Region pharmaceutical governance, including reconsideration of Regional Therapeutic Formularies; enhanced efficiency of Regional Therapeutic Committees; and strengthened coordination between national and regional authorities. Such measures would promote equity, sustainability, and value-based healthcare.

Cardiovascular chronicity, palliative care, and end-of-life management

Comprehensive management of cardiovascular chronicity must also address end-of-life care. Diseases such as coronary artery disease and heart failure typically follow a prolonged, progressive course, with gradual deterioration in functional capacity and quality of life. In advanced stages, symptom-directed therapy becomes central to improving daily well-being.

Palliative care plays a crucial role in this phase, aiming to alleviate physical, psychological, and emotional suffering, while supporting both patients and their families, often through home-based care and multidisciplinary teams.[37,38] Continuous clinical monitoring and dynamic adaptation of treatment plans are essential, guided by open communication and shared decision-making that respects patient preferences and goals of care.

Recent amendments regarding the allocation of PNRR funds for healthcare personnel may provide a practical roadmap to reassess and strengthen financial resources devoted to healthcare teams. Nonetheless, it remains essential that administrative and bureaucratic processes proceed rapidly to implement end-of-life care programmes that are integrated with, rather than separated from, other preventive and therapeutic interventions for cardiovascular disease.

In the direction of meaningful change, aimed at addressing the burden of cardiovascular diseases effectively, appropriately, and sustainably, with the involvement of all stakeholders, the recent 2024–2027 Strategic Plan of the Italian Federation of Cardiology deserves particular attention. Developed jointly by the two Italian cardiology societies (Società Italiana di Cardiologia, SIC, and ANMCO), with ESC endorsement, the plan aims to return Italy to the group of European countries at low cardiovascular risk through reorganisation, implementation, and technological development of cardiovascular chronic care models.

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Figure 3 summarizes ANMCO's proposals to address the challenge of cardiovascular chronic care governance.

Conclusions

The management of cardiovascular chronic disease represents one of the most formidable challenges facing modern healthcare systems, owing to its epidemiological magnitude and its profound social and economic implications. Advances in acute cardiovascular care have significantly improved survival but have simultaneously increased the prevalence and complexity of chronic disease, particularly in ageing populations.

Addressing this challenge requires an integrated, multidisciplinary, and collaborative approach in which the cardiologist plays a central role, while working in close coordination with all healthcare stakeholders involved in chronic care delivery. Digital health solutions and AI, when appropriately governed and integrated, offer unprecedented opportunities to redesign care models, enhance quality, improve efficiency, and ensure long-term sustainability.

This position paper critically examines the current Italian landscape, identifying gaps and opportunities while proposing innovative, sustainable models for chronic cardiovascular care. Ultimately, rethinking and redesigning chronic care governance in the light of new organisational and technological tools is not optional, but essential to ensure sustainability not only economic, but also ethical and societal, while safeguarding the universal right to health.

Scientific societies such as ANMCO have a responsibility to lead this transformation, which is not merely technological but fundamentally cultural.

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Data availability

Data sharing is not applicable to this article as no new data were created or analysed.

Disclaimer

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ANMCO position paper E-health integration in cardiology clinical care framework

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KEYWORDS
Telemedicine (TM);
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telecontrol;
Teleconsultation;
Telerehabilitation;
Teleassistance;
Continuity of care;
Heart failure (HF);
Atrial fibrillation (AF);
Hospital-community integration;
Mobile health (m-Health);
Elderly patient;
Cardiac implantable electronic devices (CIEDs)

The ongoing digital transformation is reshaping organisational and care delivery models in cardiology, positioning telemedicine as a pivotal tool to address increasing clinical and demographic complexity. This manuscript presents a comprehensive and critical overview of telemedicine applications in cardiovascular care, with a focus on its role in strengthening hospital-community integration, its deployment within hospital-based healthcare systems, and the associated regulatory and operational frameworks. The analysis encompasses the management of chronic cardiovascular conditions, such as heart failure and atrial fibrillation, through telemonitoring, telecontrol, televisit, and teleconsultation. Additionally, it explores the use of digital technologies in post-myocardial infarction follow-up, oral anticoagulation management, preoperative assessment, and care for elderly patients. The review also highlights the challenges and opportunities linked to digital infrastructure, interoperability, data protection, and healthcare professional training.

Introduction

The ongoing digital transformation has profoundly reshaped healthcare systems, influencing both organisational models and care delivery pathways. In this evolving landscape, telemedicine (TM) has emerged as a key tool to address the growing clinical and demographic complexity of contemporary healthcare, particularly in cardiovascular diseases (CVD).[1,2] The management of patients with chronic CVD requires continuity of care, proactive surveillance, and timely clinical intervention, needs that TM is uniquely positioned to fulfil, while simultaneously alleviating pressure on hospital-based services.[2]

TM is especially relevant in-patient care, as it promotes more equitable access to healthcare services and improves overall quality of care.[3] One of its most significant advantages lies in strengthening the integration between hospital-based and community care. By enabling effective home-based management, TM facilitates safer, more structured discharge processes than traditional models. Additional benefits include fewer hospital admissions, particularly among elderly patients, and reduced patient travel, which is especially relevant for frail and geriatric populations.[3]

When implemented effectively, TM enables the structured and secure sharing of clinical information among specialists, general practitioners, and community healthcare professionals. This fosters a multidisciplinary, patient-centred approach, helping to overcome fragmentation of care pathways, improve coordination of therapies, and enhance long-term disease management. Such an approach is particularly valuable for patients with heart failure (HF), atrial fibrillation (AF), arterial hypertension (AH), and for individuals carrying Cardiac Implantable Electronic Devices (CIEDs).[4] Within hospital systems, the progressive integration of TM is also being pursued as a strategy to improve economic sustainability while responding to emerging healthcare needs and maintaining high standards of organisational innovation.[4]

Through tools such as virtual visits, teleconsultations, telemonitoring, and telecontrol of clinical parameters (see Glossary; *Table 1*), continuous and regular patient management is now feasible. This enables early detection of clinical deterioration or complications, improves continuity of care, and reduces inappropriate emergency department visits. Moreover, the incorporation of digital technologies into administrative processes offers an additional opportunity to enhance system efficiency and promote equitable access to care.

Given the expanding role of TM in chronic disease management, major international scientific societies, including the American Heart Association (AHA),[5] the American College of Cardiology (ACC),[6,7] and the European Society of Cardiology (ESC), have progressively incorporated TM into their recommendations, defining its role as complementary to conventional clinical practice.[2,8,9] European guidelines recognize that telemonitoring strategies may contribute to reduced rehospitalisation rates and improved therapeutic adherence, particularly when embedded within adequately structured programs supported by trained personnel.[2,3]

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Table 1 Essential telemedicine glossary

Term	Definition
Access Control	System that regulates access to sensitive digital resources, allowing their use only by authorised subjects. Essential for protecting clinical data and ensuring regulatory compliance.
Access Point	Device enabling wireless connection to a local network is essential to ensure continuity of access to telehealth services in healthcare settings.
European Digital Agenda	European Union strategy aimed at promoting digital transition, with objectives of equity, security, sustainability, and inclusion, including in healthcare.
Aggregated Data	Sets of statistically reprocessed anonymized data describing population-level phenomena are used for epidemiological studies and healthcare performance analyses.
Android	Mobile operating system widely used in digital health to support health-related apps and clinical communication tools.
Anonymisation	Technique that removes any direct link between data and the individual's identity, reducing re-identification risk in secondary-use contexts.
Anonymized Data	Information from which all direct identifiers have been removed, enabling research and health statistics under secure conditions.
App (Mobile Application)	Software installable on mobile devices, useful for monitoring, health education, and clinician–patient communication.
GIS Applications	Systems managing georeferenced data, applied in public health for territorial epidemiological analyses and service planning.
API (Application Programming Interface)	Interfaces enabling structured data exchange between software systems are essential for interoperability across healthcare platforms.
ASP (Application Service Provider)	Model where software is provided remotely, enabling scalable delivery of clinical IT services in telemedicine.
Software Architecture	Technical structure of an IT system designed to ensure efficiency, security, and scalability of healthcare applications.
Assumed Consent	Form of consent based on lack of objection, applicable only in justified circumstances and only after having adequately informed the patients.
Virtual Classroom	Online environment for distance learning that reproduces the educational dynamics of a traditional classroom.
Patient Empowerment	Process that promotes patient autonomy in managing health through informational and digital tools.
Strong Authentication	Identity verification method based on at least two distinct factors is indispensable for secure access to healthcare platforms.
Authentication	Procedure confirming the user's identity before authorising access to a system.
Authorisation	Verification of access rights to specific resources for authenticated users.
Telemedicine	Delivery of healthcare services at a distance supported by digital technologies, aiming to improve accessibility, continuity, and quality of care.
Televisit	Remote clinician-patient interaction for diagnostic and therapeutic purposes, documented and traceable like an in-person visit. During a televisit, biological parameters may be collected when clinically appropriate; remote monitoring and clinical surveillance can be performed. Televisit is generally intended for follow-up of patients with an established diagnosis and can be delivered when physical examination is not required and when the service is consistent with an Individualized Care Plan (ICP) or PDTA. The physician determines whether and how the televisit can be used, including whether TM may be applied to collect and monitor biological parameters remotely and to ensure clinical surveillance. Within TM services, physicians may also issue medical certificates after verifying the reliability and correctness of collected data. Data and information exchange between the physician and the patient must be ensured. Activation of TM requires the patient's prior agreement (or that of an authorized family member) to confirm, among other aspects, the availability of telematic contact for document/information interaction with the specialist. During a televisit, a healthcare professional may support the physician. Informed consent must be collected in advance, in compliance with privacy and security requirements. The televisit must guarantee real-time interaction and may be facilitated by a caregiver to support communication. It may be applied in several community-care settings, including outpatient specialist care, counselling services, and mental health centres. Direct clinician–patient interaction via videoconference is essential. The technological complexity used (e.g. phone call, video call, transmission of clinical images such as skin lesions/wounds) must be appropriate to the specific case and determined by the responsible physician.

Continued

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Table 1 Continued

Term	Definition
Teleconsultation	Remote structured collaboration between healthcare professionals that does not require the patient's direct presence. It involves sharing clinical data and specialist evaluations to improve diagnostic accuracy or define the most appropriate therapeutic approach in complex cases. This modality allows clinicians to draw on the expertize of colleagues within the same speciality or across different disciplines, facilitating comprehensive case assessment. When clinical conditions allow, teleconsultation may also be performed asynchronously without compromising patient safety.
Telemonitoring	Remote acquisition and transmission of clinical parameters through connected digital devices represents a key tool in the active management of chronic diseases. Vital parameters are continuously collected via biomedical sensors (with or without direct patient contact) and transmitted to a dedicated platform. Home-based technology is selected based on clinical indications and must ensure continuous connection with the central system, which processes and integrates data and makes them available to healthcare professionals according to defined operational procedures. It is also essential that the collected data are stored locally at the patient's site to maximize security and availability when needed.
Medical Tele-check/Telecontrol	Structured activity based on periodic contacts between patient and physician aimed at monitoring clinical evolution. It uses video calls integrated with transmission of home-acquired clinical data, both prior to and during real-time interaction. This approach supports continuous evaluation of health status and enables remote therapeutic monitoring.
Medical–Healthcare Tele-advice (Teleconsultancy)	Remote clinical-care activity involving two or more healthcare professionals from different disciplines or with different roles related to the case. It is not limited to physicians but includes all legally recognized healthcare professions. It is an on-demand, scheduled intervention designed to provide qualified support for specific clinical situations. Teleconsultancy is delivered through a video call in which the consulted professional provides operational/decision-making support to the requesting clinician to ensure appropriate patient management. The virtual meeting may occur with the patient present or at a subsequent time, provided all relevant clinical information is available, including reports, health data, and imaging documentation. Direct structured interaction between professionals is central, while asynchronous integration of additional information may be allowed when needed. Importantly, teleconsultancy cannot replace emergency or first-aid services; rather, it supports routine clinical practice by promoting knowledge-sharing and continuity of care.
Telerehabilitation	Remote delivery of personalized rehabilitation programs, digitally monitored and integrated within the therapeutic pathway.
Teleassistance	Teleassistance is a professional activity that falls within the specific competences of different healthcare professions and is carried out through remote interaction between the health-worker and the patient or his/her caregiver, for supporting the management of the health condition, promoting well-being and ensuring continuity of care at home or other living environment. It is mainly addressed to people with chronic conditions, with frailty or vulnerability. Teleassistance is generally scheduled and repeatable, in line with individualized care plans. Interaction mainly takes place via videocall between the professional and the patient/caregiver, with the possibility of sharing clinical data, reports, images or other digital content. The professional can also use dedicated applications to administer questionnaires, provide educational materials or share video tutorials to support the performance of specific activities. Teleassistance can also be provided in collaboration with social workers, with a view to integrated and multi-professional care. In this context, teleassistance may involve various qualified healthcare professionals (e.g. nurses, psychologists, nutritionists, physiotherapists, speech therapists, etc.), in response to the specific needs of the person being cared for.
Telemedicine Platform	IT system that securely and integrally manages TM activities, ensuring traceability, interoperability, and data protection.

In cardiology, the effectiveness of digital consultations and collaborative care models depends critically on the availability of interoperable systems integrated with electronic health records (EHRs), ensuring secure, continuous, and accessible information flow among all professionals involved. The adoption of standardized data transmission protocols may enhance uniformity in service delivery. However, such standardisation must preserve sufficient flexibility to tailor medical and care interventions to the individual patient,

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particularly in situations of increased clinical or social complexity.

The expansion of digital health services also requires addressing several unresolved challenges, including disparities in access to technology, limited digital literacy, and a lack of robust long-term cost-effectiveness evidence comparing TM with traditional care models. Further harmonisation of technical requirements for commercially available digital devices is needed to achieve a fully integrated system, building on national interoperability frameworks such as the recently launched National Telemedicine Infrastructure. Greater regulatory clarity is also required regarding professional liability and legal responsibilities in remote care settings.

Consequently, the sustainable expansion of TM requires an integrated strategy that encompasses technological development, workforce training, regulatory adaptation, and active patient engagement (*Table 1*). Digital technologies enable continuous, tailored, and multidisciplinary interactions between clinicians and patients, supporting proactive and integrated management of chronic diseases,[2] with positive effects on therapeutic adherence, timeliness of intervention, and patient awareness and empowerment, particularly among frail individuals with multiple comorbidities.[10,11]

TM is fundamentally based on transparency and data sharing, aiming to actively involve patients as partners in clinical decision-making through an ethical and regulated framework that ensures data protection and effective communication.[11,12] Importantly, TM should not be viewed as a replacement for traditional physician–patient interactions, but rather as a complementary modality that enhances effectiveness, efficiency, and appropriateness of care. All rights and duties inherent to conventional healthcare services fully apply to TM.[3]

Beyond informed consent for the healthcare intervention itself, explicit consent for data management is required, clearly specifying how data will be handled, who will have access, and the roles and responsibilities of the institutions and professionals involved. One of the objectives of TM is also to enhance disease awareness and self-management by patients and caregivers, reinforcing their central role in chronic disease management through active engagement and improved understanding of the condition.[12]

Digital medicine (DM)

Digital medicine (DM) represents the evolution, currently in its early stages, of TM from a means of providing remote services to a harmonized set of medical and care activities based on digital technologies, regardless of the distance from which they are delivered. This evolution requires advanced technological infrastructure and specific methodological development.

In this context, understanding the scope and domains of DM is essential to evaluate the effectiveness and sustainability of TM-based models within cardiology pathways. Also, the concept of DM began to consolidate after 2010, with a progression that, until approximately 2019, largely paralleled the widespread adoption of smartphones and was mainly centred on the diagnostic opportunities offered by emerging mobile technologies. Subsequently, DM evolved into a methodological framework for generating evidence supporting the clinical use of selected digital technologies, particularly app-based solutions underpinning Digital Therapeutics (DTx). This shift introduced novel development streams in digital healthcare, including digital biomarkers (voice biomarkers to monitor tremor changes in Parkinson's disease), electronic clinical outcome assessments (e.g. electronic patient-reported outcome questionnaires, ePROs), and tools designed to measure adherence and safety (wearable fall-detection sensors and smart home monitoring systems enabling passive surveillance). This progressive evolution has contributed to the definition currently accepted by the international scientific community. DM may be described as an integrated body of scientific–technological knowledge and clinical competencies that focuses on the appropriate use of digital and robotic technologies in medical practice to innovate care through new modalities of parametric measurement, differential diagnosis, and treatment/intervention, ultimately improving both treatment and prevention. Accordingly, DM has evolved from TM and surgical/assistive robotics, relying on the integrated clinical use of high-quality hardware and software systems. These are increasingly supported by Artificial Intelligence (AI) to analyse large volumes of data and enable predictive modelling of human pathophysiological dynamics, as well as by advances in robotics that aim to optimize care processes. DM employs technological tools, software and hardware capable of producing measurements and/or delivering interventions to treat and/or prevent disease, supported by clinical evidence of efficacy and by approval processes based on scientific validation throughout all development phases[13,14] DM is a component of Digital Health (DH), which is defined more broadly as the set of digital technologies applied to health and does not always require evidence of clinical effectiveness or regulatory approval.[14] DM products may be categorized into three main groups:

(1) Measurement products, namely systems designed to collect information about patients in their real-life context through direct patient input or automatically via sensors, are intended for diagnosis or disease monitoring (e.g. digital biomarkers, systems that monitor pharmacological adherence, digital inhalers, digital pills).
(2) Intervention products, used autonomously or together with drugs, devices, or other therapies to optimize care and improve health outcomes (digital drug support tools, CIEDs connected to monitoring systems, digital self-management systems). DTx belong to this category as a subset of DM; they are therapies in which the active ingredient is a software component or algorithm delivered through digital technologies (apps, software, sensors) and classified as medical devices with proven therapeutic efficacy derived from confirmatory randomized controlled clinical trials[15-17] (subcutaneous insulin and glucagon pumps, reminder systems for therapy intake, applications

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delivering structured health education, serious games). A parliamentary intergroup dedicated to DTx has recently been established to accelerate the diffusion of these technologies and promptly identify an effective regulatory pathway enabling reimbursement,[16,18] as already occurs in other European Union countries.[19]

(3) Combination products, capable of measuring digital biomarkers and delivering therapy based on measured values (e.g. artificial pancreas systems).

The implementation of DM can naturally develop within chronic care management through the revision of PDTA (Diagnostic, Therapeutic and Care Pathways), adopting the home setting as a key environment to enhance collaboration with the patient while optimising socio-healthcare interventions via digital technologies. These tools can be integrated alongside traditional strategies across all PDTA phases, from needs assessment and diagnosis to monitoring, rehabilitation, and therapy, supporting continuity of care and enabling digital models for territorial healthcare delivery. Adoption of this model requires disseminating information and providing training for all stakeholders, developing research and clinical experimentation programs, and approving regulations to accelerate DM implementation.

Within this context, telemonitoring represents one of the most promising DM tools, allowing clinical observation to shift from hospital to home settings, in accordance with principles of proximity and continuity of care, though it remains one of the most complex approaches to organize (*Table 1*). Telemonitoring uses audio, video, and other telecommunication technologies to remotely monitor patients, relying on home devices to measure vital signs, CIEDs, and wearables (smartwatches). The collected data should be stored in cloud platforms that can detect threshold exceedances and trigger appropriate healthcare countermeasures, including urgent responses when required.

In cardiology, telecontrol is also relevant, referring to structured remote clinical follow-up through scheduled video calls supported by systematic collection of specific clinical data. Televisits are real-time remote medical consultations made possible by an internet connection, enabling video interaction and the secure sharing of patient data through dedicated, certified platforms.[20] Teleconsultation refers to remote collaboration among physicians, allowing one clinician to seek advice from one or more colleagues on a specific patient and to share diagnostic and therapeutic decisions collegially (*Table 1*). Teleconsultation can be defined as a medical act carried out at a distance between healthcare professionals to manage a specific clinical issue and may occur through two main operational modalities[21-23] (*Figure 1*):

(1) Asynchronous (store-and-forward): communication does not occur in real time. The referring clinician transmits clinical patient data (history, tests, imaging, reports) through a protected digital system; the specialist reviews the information later and provides a deferred clinical response.

(2) Synchronous (real-time)**:** interaction occurs in real time, for instance, through videoconferencing platforms or dedicated systems, allowing immediate discussion of diagnosis, therapy, and care pathway.

In both modalities, an essential requirement is that teleconsultation is conducted through secure electronic systems that ensure traceability of the entire process (request and response), with documentation recorded in the official medical record. Although various tools exist for clinical information exchange, systems integrated into institutional electronic health records are generally the most reliable in terms of efficiency, security, and data governance for outpatient remote care delivery. A structured clinical-to-clinical teleconsultation program may improve access to care and potentially influence outcomes. Finally, telerehabilitation refers to the delivery of rehabilitation services at a distance.[15] Each of these strategies has distinct objectives, challenges, and limitations[24-27] (*Table 1*).

Regulatory references for digital medicine

The regulatory framework in this field is still evolving. Although early Italian developments in DM were documented as early as the 1970s through remote electrocardiogram transmission, comprehensive legislative definitions remain limited. Initial regulatory attempts date back to 2007, when the Ministry of Health established the National Observatory for the evaluation and monitoring of eCare applications (Osservatorio eCare), developed in close collaboration with the Emilia-Romagna Region. This initiative was supported by the European Commission Communication COM (2008)689 of 04/11/2008, which aimed to provide legal clarity and promote the implementation of TM across Member States.

On 20 February 2014, the State Regions Conference formalized the agreement on the National Guidelines for TM, proposing early models, processes, and modalities for integrating TM into clinical practice. At the European level, this digitalisation process was strengthened by Regulation (EU) 2017/745 on medical devices, one of the first legal instruments to operationally define software applied in medicine.

A major acceleration in the development of a national public TM system occurred during the COVID-19 pandemic, driven by operational guidance issued by the National Centre for Telemedicine and New Assistive Technologies at the Italian National Institute of Health. This led to the State–Regions and Autonomous Provinces Agreement Rep. Atti 215/CSR of 17/12/2020, entitled ‘National indications for the delivery of TM services’, and the Agreement Rep. Atti 231/CSR, entitled ‘National indications for the delivery of telerehabilitation services by health professions’. These documents defined core TM services, clarified healthcare responsibilities, and indicated essential organisational and administrative requirements.

In Italy, the State–Regions Agreements of 17/12/2020 and 18/11/2021, together with the decree of 29/04/2022 (Official Gazette No.150 of 24-05-2022), defined the organisational model for implementing home care

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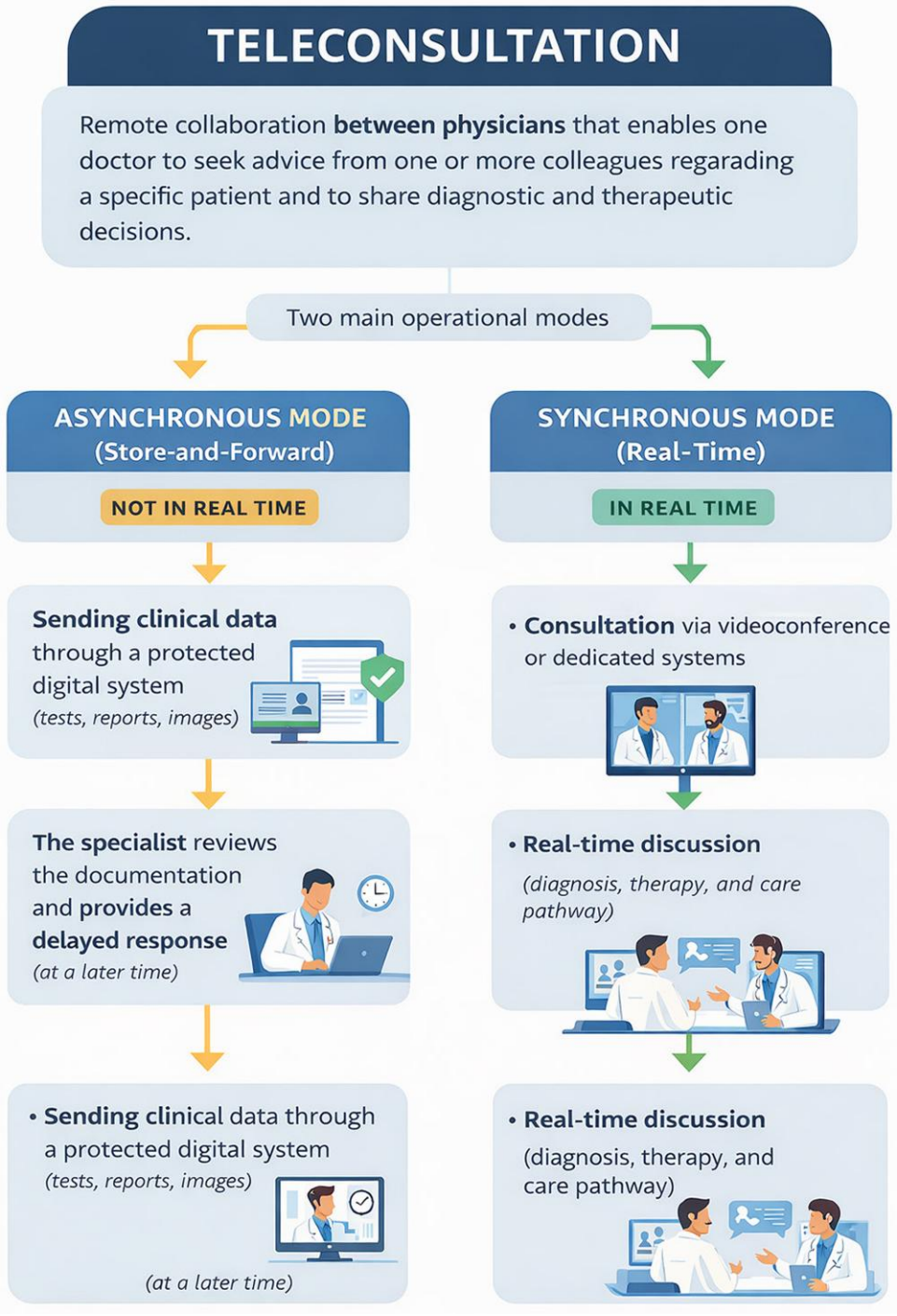

Figure 1 Teleconsultation. Overview of teleconsultation, showing asynchronous (store-and-forward) and synchronous (real-time) modes for remote physician collaboration and clinical decision support.

using TM systems. In parallel, the decree of 21/09/2022 (Official Gazette No. 256 of 02-11-2022) and the subsequent decree of 30/09/2022 (Official Gazette No. 298 of 22-12-2022) established the key principles for developing the national TM cloud infrastructure, designed to coordinate TM activities nationwide. These provisions defined minimum functional software requirements underlying regional cloud infrastructures, national interoperability requirements for TM services, and competencies and training needed to ensure DM development and effectiveness within regional healthcare contexts for both professionals and users.

Three aspects require further discussion from a regulatory perspective:

(1) Professional liability;

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(2) Privacy and protection of sensitive data;
(3) Economic reimbursement mechanisms for TM-delivered healthcare services.

The State Regions Agreement of 17/12/2020 specifies that healthcare professionals delivering DM services assume full professional responsibility for their actions while acknowledging distance-related limitations. Therefore, clinicians must responsibly decide the most appropriate operational approach. Medico-legal liability remains essentially comparable to conventional in-person clinical activities.

Regarding reimbursement criteria, uniform guidance is still lacking. The State–Regions Agreement of 17/12/2020 reiterates that remote healthcare services should be remunerated in accordance with national/regional regulations governing LEA, using the same tariff/remuneration system as for the same services delivered through traditional models. In 2016, the Autonomous Province of Trento was the first to formally quantify reimbursement for TM services. Notably, TM does not include triage or phone-based advice performed solely to identify diagnostic/therapeutic pathways and schedule visits. Access regulations for televisits overlap with those established nationally and regionally for equivalent in-person services, including tariff and remuneration, which follow the same rules as traditional delivery. For each TM service, an official clinical report must be produced.

Artificial intelligence in cardiology

The evolution of TM is now closely intertwined with the development of digital technologies, particularly AI. While early TM services primarily focused on the remote transmission of clinical data and distance-based decision support, the integration of AI has opened new opportunities for advanced analytics, personalisation, and prediction, thereby improving the efficiency and accuracy of diagnostic and therapeutic pathways. In this setting, AI does not merely optimize existing systems; it introduces a paradigm shift in both healthcare delivery models and the generation of medical knowledge.

Synthetic AI (sAI), which generates realistic clinical data using generative models such as Generative Adversarial Networks (GANs), represents a novel and promising frontier for overcoming the main limitations of real-world clinical datasets, including scarcity, heterogeneity, and ethical and privacy constraints.[28]

In cardiology, sAI is particularly attractive due to the availability of large amounts of structured data, imaging, and complex data-driven information. Nonetheless, these tools are still frequently viewed with scepticism, largely due to concerns regarding limited reliability.[29] This perception is further reinforced by prior experiences in which some models were developed without meaningful clinician involvement, resulting in solutions that, despite considerable engineering sophistication, proved difficult to use and insufficiently applicable to real-world clinical practice.[30]

Importantly, the perceived reliability of synthetic data strongly depends on the active integration of clinicians throughout the generative process. In the absence of clinical supervision, models may generate incoherent or clinically unrepresentative data, thereby undermining practical utility and eroding clinical trust.[31] Confidence among healthcare professionals in sAI requires transparent, clinically supervised, and verifiable frameworks, components that remain too often lacking in current implementations.[31] The perceived reliability of synthetic data largely depends on physicians' involvement in the generative process. Without active clinical oversight, models may produce data that are inconsistent or insufficiently representative of real clinical scenarios, reducing their practical value and weakening clinical confidence.[32] Trust in artificial intelligence systems (AIS) among healthcare professionals requires transparent, clinically supervised, and verifiable frameworks, which are still lacking in many current implementations.[32] A structured example of this approach is the TIMA (Team-Implementation Multidisciplinary Approach) method, which conceptualizes synthetic data generation as an iterative process. Within this framework, clinicians define the relevant clinical constraints, assess the coherence of relationships among variables, and evaluate the plausibility of the generated cases.[31,32] As shown in *Figure 2*, the workflow explicitly incorporates supervision and feedback between the clinical team and developers, thereby increasing confidence in the reliability of the resulting dataset.

Accordingly, the responsible and safe adoption of sAI entails a cultural and methodological transformation in which clinicians serve as key drivers rather than passive end-users.

Televisit

Current regulations define a televisit as 'a medical act in which the healthcare professional interacts remotely, in real time, with the patient, also with the support of a caregiver'. The physician is responsible for deciding in which situations and to what extent TM may be used to benefit the patient, and for employing TM tools to measure or remotely monitor biological parameters and for clinical surveillance.[33] Televisits may be prescribed exclusively for follow-up activities in patients whose diagnosis has already been established during an in-person consultation.

Accordingly, services delivered through televisits aim to:

(1) follow up a known condition (the first visit must always be conducted in the traditional in-person setting and not as a televisit);
(2) monitor, confirm, adjust, or modify ongoing therapy;
(3) Perform an anamnestic evaluation to prescribe diagnostic tests or staging investigations for a known or suspected condition;
(4) allow the physician to review the results of completed investigations, which may be followed by the prescription of further diagnostic assessments and/or therapy.

Cardiology is among the specialities in which televisits are most widely implemented, as an integration of standard in-person visits.[34-37] For example, cardiology

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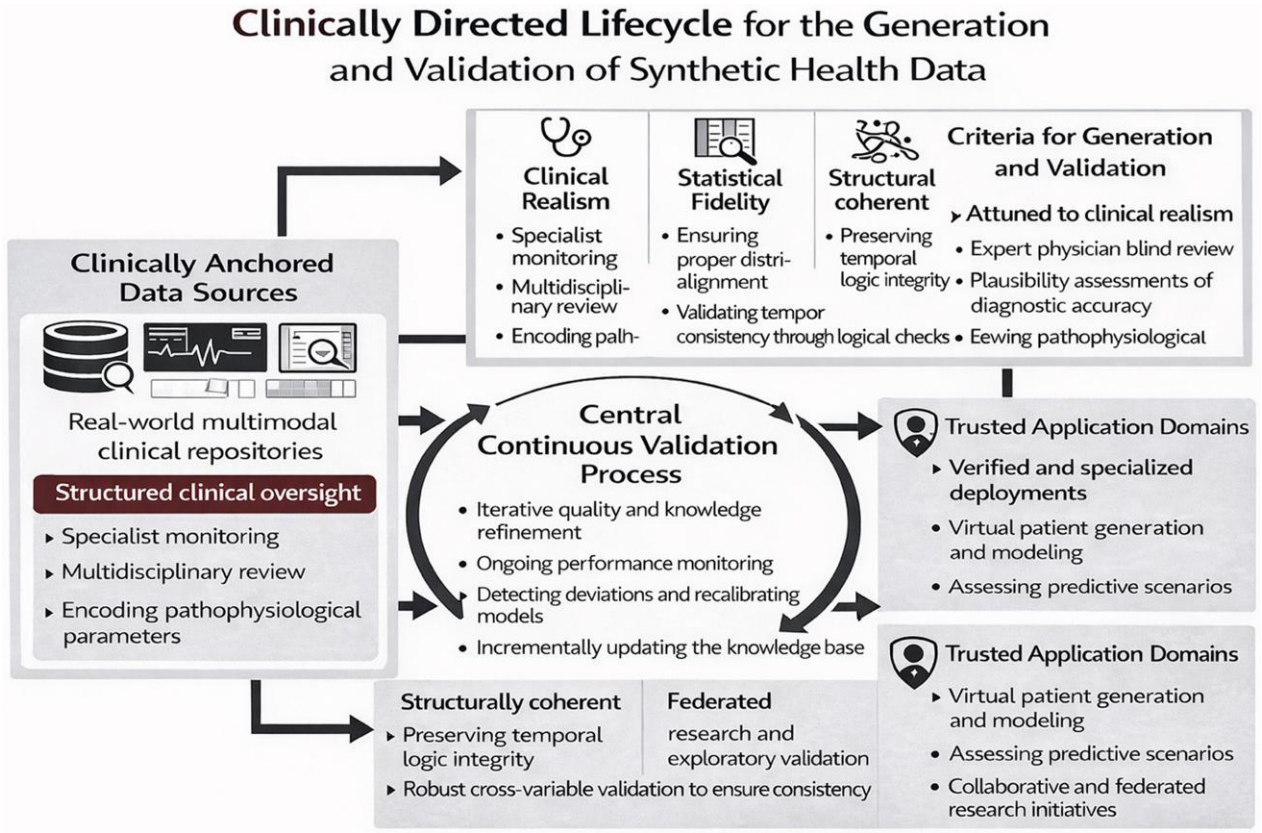

Figure 2 Multidimensional framework for the generation, validation, and clinical use of synthetic health data. The figure depicts an operational workflow that begins with a multidisciplinary team defining clinical and methodological constraints and continues through ongoing interaction between clinical expertise and computational development. Subsequent stages involve creating and assessing synthetic datasets, including analysis of internal consistency, practical usability, and alignment with clinical standards. This approach embeds medical reasoning within generative algorithms, ensuring that synthetic data are not only statistically reliable but also clinically credible.

televisits may be used in patients with chronic CVD (HF, ischaemic cardiomyopathy) for scheduled follow-up assessments, therapy prescriptions or adjustments, particularly for treatments requiring AIFA monitoring, and for the prescription and/or review of instrumental tests.[38]

Essential components of televisit delivery include careful patient selection and the patient's (or legal guardian's) informed consent, to confirm the availability and accessibility of a synchronous audio–video communication system that enables the secure exchange of data, images, and clinical documents.[39]

The efficiency of IT systems, prior training of citizens in DH tools, and continuous support provided to patients and/or caregivers during technology use positively influence satisfaction with the service, including among older age groups.[33]

Importantly, the televisit process does not end with the activation of a video call; rather, the service follows the full life cycle of the prescription (prescription, booking, delivery, reporting, and administrative accounting), in accordance with the regulatory framework governing outpatient specialist care and specific regional regulations.[40] The entire pathway—from patient consent to service accounting is designed to avoid any physical access to healthcare facilities by the patient or caregiver (*Figure 3*).

The implementation of this new model of care requires organisational restructuring, the development of new competencies among healthcare professionals, and the emergence of additional professional profiles to be integrated within healthcare organisations (e.g. management engineer and/or biomedical engineer).

While the recent pandemic facilitated the expansion of TM,[41] particularly televisits, the current challenge is to develop new healthcare models that leverage technological tools to redesign socio-clinical care pathways.[42]

Clinical governance models in cardiovascular telemedicine

The effectiveness and safety of telemedicine in cardiology depend strongly on a clearly defined clinical governance framework that establishes roles, responsibilities, and decision-making processes throughout the care pathway. TM should not be regarded as a purely technological or administrative service; rather, it must be embedded within structured clinical organisational models aligned with established diagnostic, therapeutic care pathways and the professional responsibilities of conventional clinical practice.

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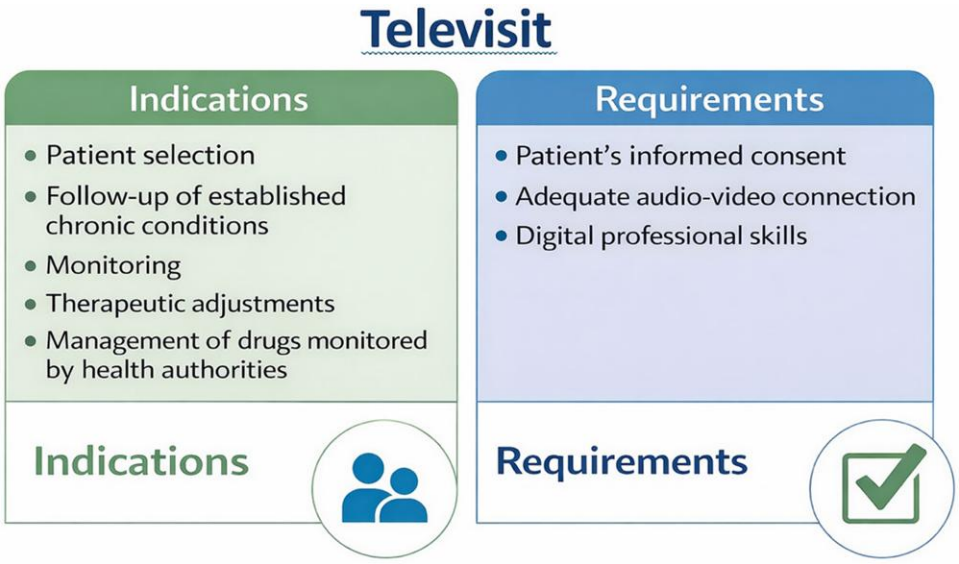

Figure 3 Televisit. Key indications and essential requirements for conducting a televisit in routine clinical practice.

The general principles, organisational structure, and decision-making processes that characterize clinical governance in cardiovascular telemedicine are illustrated in *Figure 4*. In addition, clinical governance in TM must ensure effective integration between hospital and community care, while maintaining a clear allocation of clinical responsibilities (*Figure 4*). Within this organisational framework, each telemedicine program in cardiology should operate under a formalized clinical governance model characterized by explicit specialist leadership, multiprofessional integration, and a clearly defined distribution of clinical accountability.

Only with a structured governance framework can TM ensure appropriateness, safety, sustainability, and genuine clinical value within CV care pathways. Clinical governance models are therefore essential prerequisites for the appropriate implementation of telemedicine in cardiology. On this basis, its application can be examined across the most relevant clinical settings. Consistent with these principles, TM in cardiology may be implemented through different organisational models that translate clinical governance into concrete operational structures across diverse care contexts (*Figure 5*).

Applications of digital medicine in cardiology

HF is a growing challenge for healthcare systems, primarily due to frequent clinical decompensations and prolonged rehospitalisations, with a substantial impact on patients' quality of life and healthcare expenditure[43,44] Alongside population ageing and continuous advances in cardiovascular (CV) therapies, identifying treatments that are not only effective but also applicable across heterogeneous patient profiles[20] has become increasingly complex. Therefore, collaborative efforts are required to refine HF management strategies and improve long-term outcomes.

The COVID-19 pandemic led to a profound organisational reshaping of hospitals and served as a major catalyst for implementing TM,[45-47] particularly in conditions such as HF. In this setting, TM may support therapeutic decisions, reduce the risk of hospitalisation, and ensure continuity of care by enabling early recognition of new-onset or worsening signs and symptoms, while reducing avoidable face-to-face visits. Several TM strategies have been described for patients with HF,[20] including telemonitoring, teleconsultation, televisits, and telerehabilitation. The use of TM in HF has been associated with reductions in both all-cause mortality and hospitalisations.[26,27]

Among the available approaches, telemonitoring has gained particular relevance, as dedicated algorithms for early detection of HF deterioration may help identify individuals at higher risk of acute decompensation.[48] In the PARTNERS HF study,[49] which included approximately 700 patients with implantable cardioverter-defibrillators (ICDs), a multiparametric analysis identified patients with a 5.5-fold higher risk of HF-related hospitalisation within 30 days. Additional studies have supported a role for telemonitoring in lowering rehospitalisation rates.[50,51] Importantly, the burden of HF extends beyond the number of admissions, as prolonged length of stay has major socio-healthcare implications. In this regard, telemonitoring has also been associated with shorter hospitalisations: the CONNECT trial[52] demonstrated a significant reduction in hospital length of stay among patients managed with telemonitoring compared with standard in-office follow-up (P & 0.002).

A clinically relevant survival benefit associated with telemonitoring was reported in the randomized IN-TIME trial[53] (Influence of Home Monitoring on the Clinical Status of Heart Failure Patients With an Impaired Left Ventricular Function), which enrolled 664 patients with mild-to-moderate HF implanted with cardiac resynchronisation therapy pacemakers (CRT-P) and cardiac resynchronisation therapy defibrillators (CRT-D).

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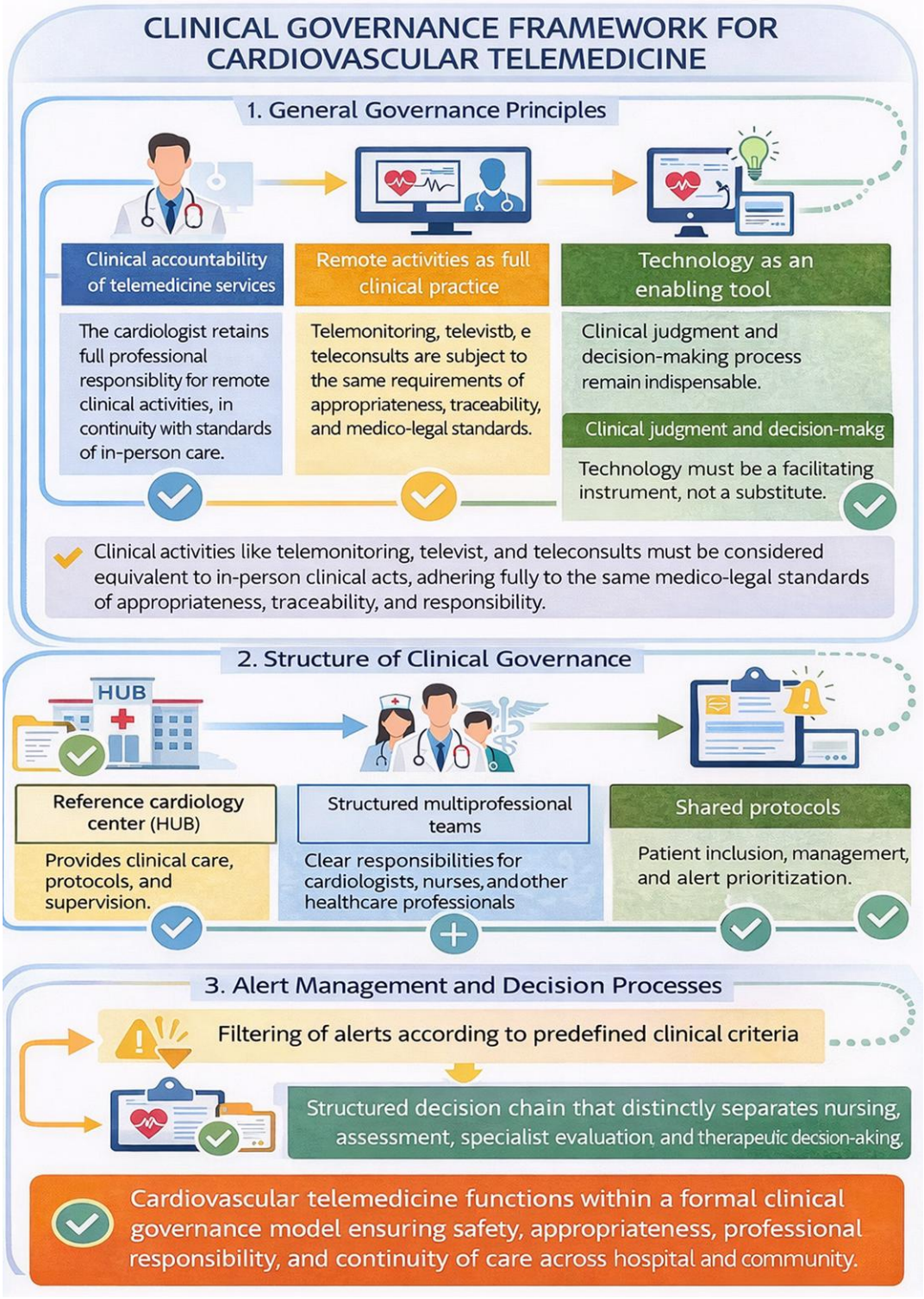

Figure 4 Clinical governance framework, organisational structure, and decision processes in cardiovascular telemedicine. Clinical responsibility for telemedicine services remains with the cardiology specialist, in continuity with in-person care. Telemonitoring, televisits, and teleconsultations are fully recognized clinical acts and must meet the same standards of appropriateness, traceability, reporting, and medico-legal accountability. Technology functions as an enabling tool within the care process but does not replace clinical judgment or medical decision-making. The organisational model includes a reference cardiology centre (HUB or equivalent) responsible for clinical oversight, protocol definition, and activity supervision, supported by structured multiprofessional teams with clearly defined roles and shared protocols for patient enrollment, alert management and prioritisation, and escalation to in-person reassessment or higher levels of care when needed. Alerts generated by telemonitoring systems are filtered according to predefined clinical criteria and integrated into a structured decision pathway distinguishing nursing assessment, specialist evaluation, and therapeutic decision-making, with all actions documented in the patient's official medical record to ensure appropriateness, continuity of care, and clinical accountability.

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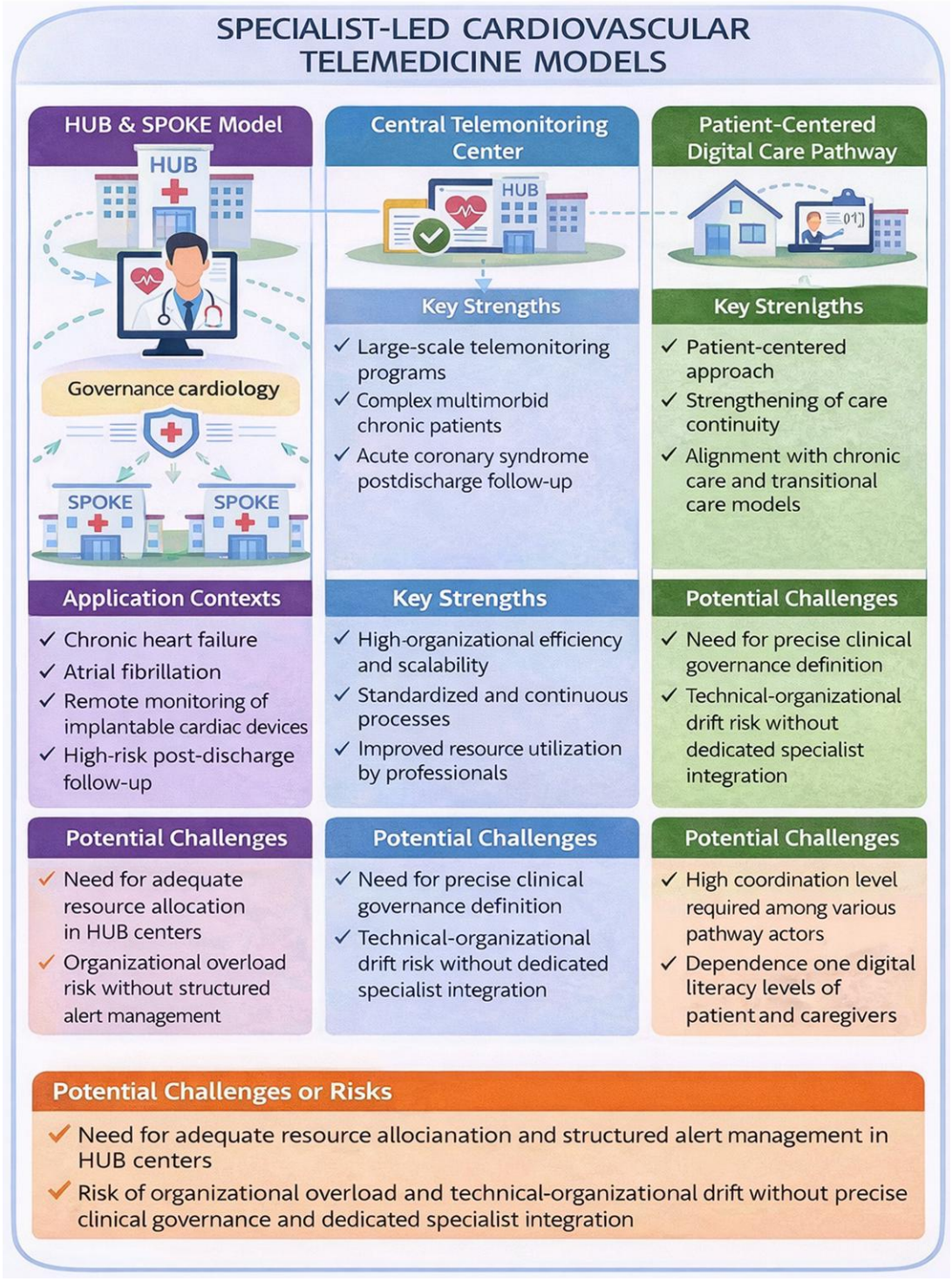

Figure 5 Hospital–community telemedicine network and HUB & SPOKE model with specialist cardiology governance. Clinical governance in telemedicine should promote effective integration between hospital and community care while maintaining a clear allocation of responsibilities: the cardiology specialist remains the primary clinical reference, whereas community care providers (general practitioners and community nursing services) operate within a functionally integrated, protocol-driven framework. Information flows must be bidirectional, secure, and interoperable. Within this context, structured clinical governance models are essential for the appropriate implementation of telemedicine in cardiovascular care pathways. The HUB & SPOKE model with specialist cardiology governance represents a recommended organisational approach, in which effectiveness depends not only on technological availability but also on alignment with established diagnostic–therapeutic care pathways and clearly defined governance structures. This model is particularly applicable to chronic heart failure, atrial fibrillation, remote monitoring of implantable cardiac devices, and high-risk post-discharge follow-up. Its main strengths include clear attribution of clinical responsibility to the cardiology specialist, consistency with international scientific society recommendations, mitigation of medico-legal risk, and ease of integration into existing care pathways. Potential challenges include the need for adequate resource allocation in HUB centres and the risk of organisational overload in the absence of structured alert management systems.

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Worsening of the composite clinical score (all-cause death, HF hospitalisation, NYHA class, and patient global self-assessment) occurred in 63/333 patients (18.9%) in the remote arm compared with 90/331 (27.2%) in the standard-care arm ($P = 0.013$; OR 0.63; 95% CI 0.43–0.90). This translated into a significantly lower 12-month mortality (3.0% vs. 8.2%; HR 0.36; 95% CI 0.17–0.74; $P = 0.004$). Real-world evidence from large databases involving more than 200 000 patients (ALTITUDE[54] and MERLIN[55]) further confirmed a major impact of telemonitoring on survival, with a 50–75% reduction in mortality risk among patients managed remotely compared with those receiving standard follow-up.

In contrast, evidence is less consistent in patients with advanced HF undergoing CRT-D implantation. Available data in this subgroup largely derive from the MORE-CARE study,[56] which enrolled patients candidates for CRT-D only. A comparison between the two randomized trials (IN-TIME[53] and MORE-CARE[56]) highlights differences not only in baseline population profiles but also in the operational organisation of telemonitoring. In MORE-CARE, actions triggered by telemonitoring alerts were left to routine centre-based clinical practice, whereas in IN-TIME, alerts were managed through a central monitoring unit acting as a supervisor. Moreover, MORE-CARE[56] relied on a limited set of active alerts (AF and intrathoracic impedance), whereas IN-TIME implemented a broader multiparametric model that included supraventricular and ventricular arrhythmias, low pacing percentage, burden of premature ventricular contractions, and reduced patient activity. These observations suggest that a structured daily multiparametric approach—consistent with the IN-TIME organisational model, may be more likely to have a favourable impact on outcomes.

Based on the available evidence, the IN-TIME strategy has been incorporated within European guideline frameworks among the main organisational models proposed by clinical studies (MONIC, HUB&SPOKE model[57]; HOMEGUIDE, Primary Nursing model; IN-TIME model). Current European Society of Cardiology (ESC) guidelines assign remote telemonitoring a Class IIb recommendation for HF, given its potential to reduce rehospitalisation and mortality (Class IIb, Level of Evidence B).[9,58,59] In addition, pulmonary artery pressure monitoring in selected symptomatic patients has shown potential to improve clinical outcomes.[60] Although HF is a setting where the generalisability of intervention efficacy may be challenging, telemonitoring offers meaningful advantages that are most likely to translate into clinical benefit when supported by multiparametric integration, appropriate adherence, and incorporation into multidisciplinary care models. Identifying predictive parameters and/or multiparametric risk scores and integrating telemonitoring systems optimally into multidisciplinary pathways remain key goals for future development.

TM may also strengthen adherence to guideline-directed medical therapy in HF through regular and structured communication between the patient and the care team. Nevertheless, practical barriers continue to limit routine implementation,[20] including the need for adequate hardware (computer, smartphone, tablet) and reliable internet access. Some patients may struggle to use the required devices or participate in TM sessions without assistance due to older age, hearing impairment, or cognitive dysfunction. Furthermore, some individuals may prefer in-person visits to virtual assessments.[61,62] Despite these limitations, it is clear that digital solutions are increasingly needed to address persistent gaps in HF care,[63] including difficulties with titration and optimisation of therapies in patients with reduced ejection fraction. It is therefore plausible that TM will play an expanding role in the future.[64]

TM is also a key component of the integrated management of AF, both for early detection of subclinical episodes in high-risk individuals and for structured follow-up of patients with established AF, with potential benefits for therapeutic adherence, rhythm monitoring, and prevention of complications.[61,62] The Heart Rhythm Society (HRS) consensus document recommends telemonitoring (Class I, Level of Evidence A) to quantify arrhythmic burden and enable early identification of AF. Telemonitoring sensitivity for early AF detection is approximately 95%,[20] and nearly 90% of AF episodes triggering alerts are asymptomatic.[63] Compared with standard in-office follow-up, telemonitoring enables arrhythmia detection 1–5 months earlier, supporting dynamic patient management and timely therapeutic adjustments, including initiation of anticoagulation when indicated, rhythm control evaluation, device reprogramming, optimisation of biventricular pacing, and reduction of inappropriate shocks.[65,66]

A relevant impact of early arrhythmia detection through telemonitoring on hospitalisation rates was reported in the COMPAS study,[67] where hospitalisations for atrial arrhythmias were markedly reduced among patients managed with telemonitoring (7.3% in the control group vs. 2.4% in the telemonitoring group). Although not specifically designed for this endpoint, COMPAS also recorded a reduction in cerebral ischaemic events (3.3% vs. 0.8%). In the TRUST study, AF episodes were identified 34.5 days earlier in telemonitoring-managed patients compared with controls (5.5 vs. 40 days). This may have important implications for the management of silent AF, particularly regarding timely anticoagulation initiation and prevention of embolic events. Further dedicated studies are needed to clarify the magnitude of benefit of telemonitoring in this setting. Additional evidence, including the EMBRACE substudy[68] and ASSERT findings,[69] confirmed that early detection of subclinical AF through telemonitoring is associated with increased use of preventive strategies, especially among patients at high embolic risk[68,69] Moreover, integrated digital platforms enable continuous follow-up for patients with known AF, improving adherence and facilitating timely action in case of recurrence, with potential benefits on quality of life and clinical outcomes.[70]

TM has also gained importance in post-acute coronary syndrome (ACS) care. The period following an ACS represents a particularly vulnerable phase and a cornerstone of secondary prevention, which begins at discharge and continues throughout follow-up. In this context, telemonitoring after hospital discharge

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has been shown to improve clinical outcomes.[71] In the UK TELE-ACS trial,[72] 337 patients discharged after ACS were randomized to standard follow-up or standard follow-up plus TM, including a wearable ECG system, an automated blood pressure monitor, and a pulse oximeter. When symptoms were reported, a cardiology televisit was performed to determine whether the patient should be directed to the emergency department, the general practitioner, or other services. Telemonitored patients showed lower six-month rehospitalisation rates, fewer emergency department accesses, fewer unplanned coronary revascularisations, and reduced symptom burden.[72]

In a study enrolling 1064 patients with ACS, digital health interventions (DHIs), including smartphone applications, a smartwatch, and home blood pressure monitoring during hospitalisation and for up to 30 days after discharge, were associated with fewer 30-day rehospitalisations than usual care.[73] Overall, TM in the post-infarction setting has been shown to improve adherence, optimize risk factor control, and reduce rehospitalisation.[74] By combining telemonitoring, virtual assessments, and mobile applications for remote follow-up, early recognition of symptoms and clinical destabilisation becomes feasible, allowing rapid intervention, particularly during the first 30 days after discharge, which represents the most delicate period and may influence CV outcomes.[75] TM also promotes multidisciplinary management through teleconsultation. Long-term benefits of telemonitoring systems have also been reported for quality of life and survival.[76]

In the field of thrombosis and haemostasis, TM-based follow-up for patients receiving oral anticoagulation, including both vitamin K antagonists (VKAs) and direct oral anticoagulants (DOACs), has been associated with improved adherence and treatment quality, as well as reduced bleeding complications and thrombotic recurrences[75-80] Home monitoring of haematochemical parameters allows smoother management, especially in elderly or frail individuals,[81] enhancing safety and continuity of care, an aspect that became particularly evident during the COVID-19 pandemic.[79]

Finally, in the context of atherosclerotic CVD, appropriate management of dyslipidaemia is essential to significantly reduce CV risk in both primary and secondary prevention[82,83] DM can support several components of dyslipidaemia management, from diagnostic assessment to treatment and monitoring.[84] From an epidemiological perspective, analysing data extracted from digital systems using International Classification of Diseases (ICD) coding, typically adopted for administrative purposes, provides accurate insights for conditions such as ACS and HF, but appears less reliable for identifying dyslipidaemia,[85] even when ICD coding is combined with lipid-lowering prescriptions and laboratory results.

At the individual level, wireless devices and applications on smartphones and tablets can increase awareness of the CV impact of dyslipidaemia and provide rapid access to information on CV risk[86,87] Such tools may also facilitate lifestyle modification. In a randomized clinical trial, regular text messages containing behavioural suggestions and motivational reminders related to CV health were associated with a greater reduction in low-density lipoprotein cholesterol (LDL-C) compared with the control arm.[88] In a large cohort study, remote titration of antihypertensive and lipid-lowering therapies using digital applications, with the support of pharmacists and digital navigators (dedicated personnel assisting patients in app use), was associated with better control of both blood pressure and LDL-C levels compared with the control group managed through educational interventions in addition to standard in-person follow-up.[89] From the clinician's perspective, CV risk calculators available online or as downloadable applications are valuable tools for quickly and accurately defining an individual patient's risk profile and tailoring LDL-C targets accordingly.

Role of telemedicine in preoperative cardiology consultation

The purpose of preoperative CV assessment in non-cardiac surgery is to prevent perioperative CV morbidity and mortality and to minimize bleeding complications.[90] The application of TM to this specific cardiology setting gained major momentum during the COVID-19 pandemic, largely because elective surgical procedures needed to be prioritized and, when appropriate, postponed to support strict hygiene measures and social distancing policies.[91] Outside the pandemic context, however, TM use in Italy has been described as largely 'episodic and artisanal'; therefore, in the absence of consolidated local experience and dedicated evidence, its contribution to preoperative risk stratification remains essentially unexplored.

Most Italian TM and telemonitoring initiatives have been implemented within chronic CV care,[92] particularly in patients with HF93–95. In such scenarios, the patient is typically well known to the care team, and TM enables structured home follow-up by detecting new signs and/or symptoms and documenting disease progression, thus supporting treatment optimisation. In contrast, assigning TM a central role in previously unknown patients—where physical examination and rapid clinical decision-making are pivotal, as in emergency/urgent surgery and, in part, in time-sensitive procedures, appears premature at present and would require seamless hospital, community integration together with robust organisational and technological support. Conversely, a more realistic and immediately applicable role for DH may be envisioned in elective surgery, where both teleconsultation and televisits could be incorporated into the preoperative workflow.

In line with the 2022 ESC Guidelines,[90] TM, despite the inherent limitation of excluding direct physical examination, allows the acquisition, remote transmission, and interpretation of key cardiocirculatory parameters (blood pressure, heart rate, ECG, biomarkers), facilitates collection of relevant pre-admission information (presence/absence of CV risk factors and known CVD), and may therefore contribute to preoperative CV evaluation. A televisit can also support the assessment of newly developed or previously unrecognized symptoms such as dyspnoea, oedema, and chest pain;

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allow a structured appraisal of patient-reported functional capacity; and optimize therapy through clear instructions on perioperative medication management. Overall, this approach may enable at least partial CV risk stratification and support the indication for additional face-to-face cardiology work-up, potentially complemented by targeted diagnostic testing.

In patients with CIEDs, TM may be particularly valuable for identifying electrical instability (non-sustained ventricular tachycardia or asymptomatic ventricular tachycardia) and early signals of haemodynamic deterioration suggestive of impending HF decompensation (impedance changes).[93] Telemonitoring can help detect patients at risk of electrical or haemodynamic instability, support optimisation of medical therapy, and potentially reduce the risk of perioperative CV events, including major arrhythmias and acute HF.[94-99]

Nevertheless, digital tools are unlikely to replace a model of care in which direct physician–patient interaction remains essential. Rather, they may serve as complementary components of the traditional preoperative approach. At a time when healthcare systems face increasing pressure to reallocate and rationalize available resources, remote consultation has the potential to redesign the organisation and scheduling of preoperative cardiology assessments.[100] Adequate technological infrastructure, effective hospital, community integration, appropriate training, and a transparent and equitable governance framework for health data will form the foundations for the safe and appropriate implementation of televisits and teleconsultation in preoperative CV evaluation.

Conclusions

TM has become a core component of contemporary cardiology, providing innovative solutions to support integrated, continuous, and personalized management of patients with chronic CV conditions. The use of digital tools, such as telemonitoring, televisits, and teleconsultation, has been associated with improved clinical outcomes, particularly through reductions in rehospitalisation rates, enhanced therapeutic adherence, and optimisation of care pathways, most notably in HF and AF. However, its application extends beyond these settings to include post-ACS follow-up, preoperative CV assessment, and management of elderly patients.

Nevertheless, the full integration of TM into routine clinical practice requires overcoming persistent technological and regulatory barriers. This transition presupposes the development of essential prerequisites, including digital training for healthcare professionals and improved digital literacy among patients. Targeted actions in this direction are indispensable, and scientific societies are expected to play a decisive role in promoting the structured incorporation of DM into regional and national healthcare systems.

In a context where healthcare demand continues to rise and health system sustainability is increasingly challenged, TM should be viewed not merely as an opportunity, but as a necessity. To fully realize its potential, a multidisciplinary, patient-centred approach is required, grounded in scientific evidence, responsible innovation, and a system-level vision.

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Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Disclaimer

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Occupational Hazards in Cardiac Catheterization Laboratories: Radiation and Beyond-ANMCO Position Paper Update 2026

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KEYWORDS
Cancer; Cardiovascular disease; Protection; Radiation; Risk; Safety

Interventional cardiology has profoundly transformed the management of cardiovascular disease; however, working within the cardiac catheterization laboratory exposes healthcare professionals to substantial occupational hazards. Four principal risks can be identified: (i) malignancy and non-malignant sequelae related to chronic exposure to ionizing radiation; (ii) musculoskeletal injury associated with prolonged use of heavy radioprotective equipment; (iii) exposure

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to blood-borne pathogens and other infectious agents; and (iv) work-related psychological strain. Among these, cumulative radiation exposure remains the most consequential and historically under-recognized threat. Although the radiation dose which operators receive during a single procedure is markedly lower than that delivered to patients, healthcare professionals are subjected to repeated, lifelong exposure. For a high-volume interventional cardiologist, the annual effective dose may substantially exceed that of other radiation-exposed professionals, including nuclear industry workers and diagnostic radiologists. Importantly, unlike radiologists, many cardiologists receive limited formal training in radiation physics and radiobiology, which may lead to limited awareness of dose-optimization strategies and stochastic risk. Contemporary epidemiological evidence has refined our understanding of the biological effects of chronic low-dose and low-dose-rate radiation. Risk estimates for malignancy have progressively increased as follow-up durations have lengthened and methodological approaches have improved. Moreover, emerging data suggest that sustained low-dose exposure may confer an elevated risk of cardiovascular disease, thereby extending concern beyond oncological endpoints. Occupational exposure varies greatly depending on the location: doses to the head can be several times higher than doses to the chest, with a predominance on the left side attributable to the position of the operator in relation to the X-ray source. In addition to the well-established association with posterior subcapsular cataracts, observational studies have reported potential links between long-term occupational exposure and neurodegenerative disorders, including Alzheimer's and Parkinson's diseases, although causality remains to be definitively established. Mitigation of these risks necessitates a paradigm shift towards a rigorous culture of radiation safety. Institutional commitment is essential, encompassing advanced shielding systems, ceiling-suspended protection, real-time dosimetry with immediate feedback, and systematic optimization of imaging protocols. Ultimately, the future of the field may depend on the progressive adoption of radiation-sparing and radiation-free technologies, including intracardiac and intracoronary ultrasound, electro anatomical mapping systems, and non-fluoroscopic navigation platforms. In parallel, robot-assisted procedures enable remote manipulation of the catheter promise to reduce the operator's direct exposure. The pursuit of a zero-radiation environment in the workplace should not be considered an ambitious ideal but a strategic priority to safeguard the next generation of interventional cardiologists.

Introduction

The increasing volume and complexity of diagnostic and interventional cardiovascular (CV) procedures have led to a progressive rise in exposure to ionizing radiation (IR) in cardiac catheterization laboratories (Cath Labs).[1,2] This trend has relevant implications not only for patients, who may accumulate low-dose exposure across multiple, technically demanding procedures, but also for healthcare professionals, who are repeatedly exposed over the course of their careers.[3,4] Radiation protection has therefore become an integral component of contemporary cardiovascular care.[5,6]

This document builds on the 2023 ANMCO Position Paper[7] focused on radiological protection in interventional cardiology and provides an updated, broader perspective on occupational risk in Cath Labs. While the previous document[7] primarily addressed radiation safety issues, this paper adopts a broader perspective on occupational risk in the Cath Labs, including updated evidence and additional dimensions of professional exposure.

Since 2023, developments in radiation biology, molecular epidemiology, and large-scale cohort analysis have substantially improved our understanding of the biological effects of chronic low-dose radiation exposure. These developments have expanded the focus beyond oncological risk, drawing attention to potential cardiovascular, neurodegenerative, and even reproductive sequelae that may emerge with prolonged exposure (*Figure 1*).[2,4,8–10]

At the same time, there is a growing awareness of occupational risks unrelated to radiation, including musculoskeletal disorders associated with prolonged use of radiation protection equipment,[11] exposure to blood-borne pathogens such as hepatitis B and C viruses and human immunodeficiency virus,[12–15] and finally, the psychological stress inherent to high-intensity procedures have highlighted the intrinsically multidimensional risk profile of the cardiac Cath Lab environment.

Advances in technology further justify this broader perspective. Modern Cath Labs now have access to advanced shielding systems, structured dose-optimization strategies, and imaging innovations that

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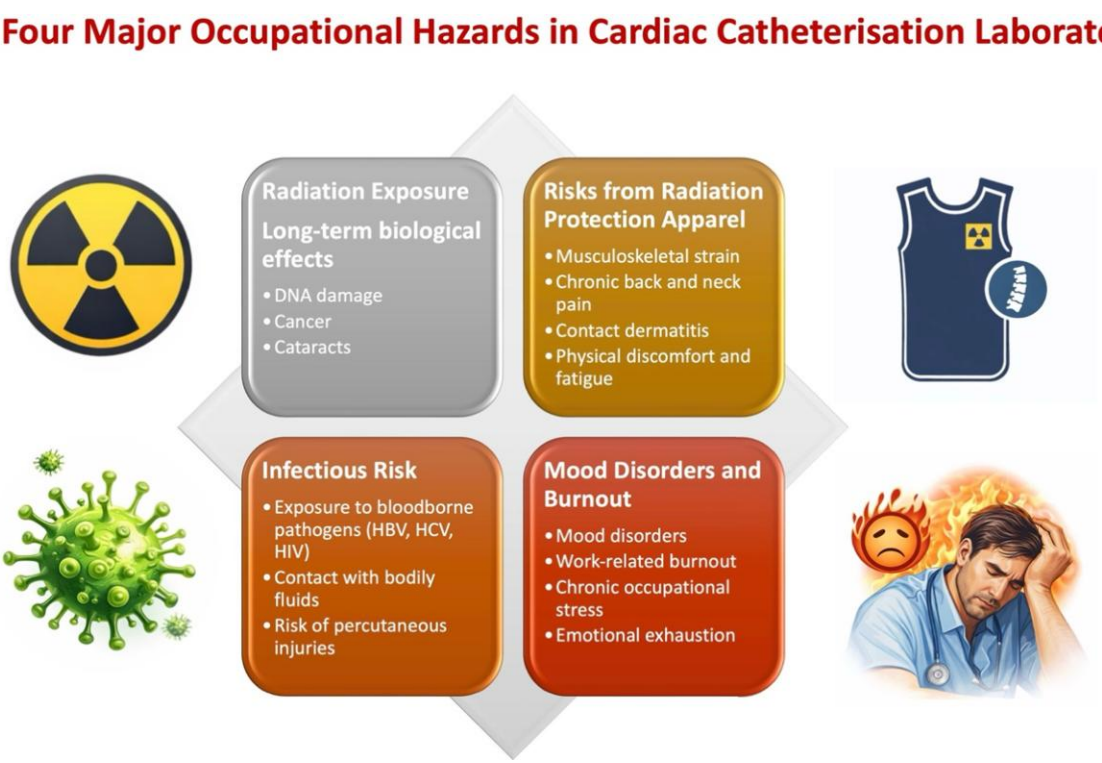

Figure 1 Overview of the four principal occupational hazards affecting healthcare professionals working in cardiac catheterization laboratories. These include: (1) chronic exposure to ionizing radiation with long-term biological consequences such as DNA damage, malignancy, and cataracts; (2) musculoskeletal and dermatologic complications related to prolonged use of radiation protection apparel; (3) infectious risk due to exposure to blood-borne pathogens and bodily fluids; and (4) psychological burden, including mood disorders and work-related burnout associated with sustained high-stress procedural environments.

substantially reduce exposure. Moreover, the increasing adoption of non-fluoroscopic approaches in cardiac electrophysiology (EP) and selected interventional procedures, including electro-anatomical mapping systems and ultrasound-guided techniques, supports a gradual transition towards radiation-sparing and, in selected settings, potentially radiation-free workflows.

For these reasons, the present document should not be interpreted as simply an update to the 2023 ANMCO Position Paper. Rather, it represents a broader and more articulated framework, developed in response to evolving evidence and aimed at extending both the scientific depth and the conceptual reach of the original document. The aim of this document is to provide a comprehensive, evidence-informed appraisal of occupational hazards in the cardiac Cath Labs, integrating data through 2026 and encouraging a renewed, more accountable culture of safety within interventional cardiology. By bringing together scientific evidence, technological progress, structured education, and principles of clinical governance, it seeks to reinforce protection standards while safeguarding the long-term sustainability of contemporary interventional CV practice.

Occupational hazards in the cardiac catheterization laboratory

Working in the cardiac Cath Labs exposes healthcare professionals to a range of occupational hazards that may be broadly grouped into four principal domains: IR exposure; musculoskeletal strain associated with prolonged use of protective equipment; occupational exposure to blood and other body fluids; and psychological stress related to sustained procedural intensity and workload (*Table 1*).

Radiation exposure in patients and staff

Radiation exposure remains a major concern in cardiac cath labs, affecting not only patients but also the healthcare professionals involved in procedural care. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) defines the low-dose and low-dose rate for radiation protection as <100 milliSievert (mSv) and < 6 mSv/h, respectively.[16] The main difference between interventional cardiologists and patients exposed to radiation from fluoroscopy procedures is not primarily determined by the total dose received (100–200 mSv), but the dose rate, typically 100–1000 mSv/h for patients and 100–1000 microSievert/h (low-dose rate) for medical workers. Patient exposure, typically expressed as effective dose, varies substantially according to procedural complexity, ranging from fractions of an mSv to several hundred mSv. To facilitate clinical interpretation, radiation doses are often compared with standard postero-anterior chest X-rays (CXRs). For example, simple procedures (e.g. pacemaker implantation): ~0.5 mSv (equivalent to 25 CXRs); common procedures

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Table 1 Occupational hazards for interventional cardiologists and cath lab staff

Hazards	Radiation exposure	Radiation protection	Blood-borne pathogens	Work-related distress
Cancer	V			
Cardiovascular disease	V			
Alzheimer's disease	V			
Cataracts	v			
Reproductive risks	v			
Orthopaedic injury		v		
Neurologic disease		v		
HBV/HCV/HIV infection			v	
Burnout				V

HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus.

Table 2 Annual and lifetime radiation doses in exposed workers

Workers	<3 mSv/ year	3–6 mSv/ year	6–10 mSv/ year	10–20 mSv/ year	<600 mSv/ career
Nuclear power plant workers	v				
Medium volume interventional cardiologist		v			
High-volume interventional radiologist			v		
High-volume unprotected interventional cardiologist				v	
NASA Astronauts					V

NASA, National Aeronautics and Space Administration.

(e.g. percutaneous coronary intervention): 15 mSv (750 CXRs), but up to 100 mSv (5000 CXRs) for dilation of chronic total occlusion; complex interventions (e.g. thoracic aortic repair): up to 200 mSv (~10 000 CXRs) (2,3); advanced structural heart procedures (e.g. transcatheter valve interventions): in some institutions, 29% of cases exceed 2 Sv (100 000 CXRs).[17–19] An interventional cardiologist performing 1000 procedures as the primary operator accumulates a dose comparable to a single-patient exposure.[20] Annual occupational exposure ranges from 3 to 15 mSv/year, with lifetime totals often exceeding 200 mSv (whole body) and 1–2 Sv (head dose), akin to therapeutic radiotherapy levels.[21,22] High-volume operators receive 3× the annual dose of nuclear plant workers and 5× that of diagnostic radiologists.[23] Unlike radiologists, whose residency training includes structured education in radiation physics and protection, many interventional cardiologists, particularly in the early phases of their careers, may receive limited formal instruction in radiation safety. This disparity highlights the need for more consistent educational pathways and the systematic integration of radiation-protection principles into interventional training programmes. Such a gap highlights the need for enhanced safety protocols and education. The One Million Person Study[23] evaluates low-dose radiation effects across occupations, including medical workers (interventional cardiologists, radiologists); nuclear industry staff; military personnel (e.g. atomic veterans); and astronauts. Despite variability in procedural settings and operator workload, cumulative radiation exposure over time ultimately determines biological risk (***Table 2***).

Notably, high-volume interventional cardiologists face doses comparable to astronauts on Mars missions, where cosmic radiation raises concerns about cancer and degenerative diseases.[24] National Aeronautics and Space Administration's career dose limit (600 mSv) reflects a 3% excess risk of radiation-induced death (6% risk of non-fatal and fatal cancer) for 35-year-old females above the non-exposed baseline mean.[25]

Health risks associated with occupational radiation exposure

Cancer risk

Radiation-induced cancer represents the primary stochastic risk for Cath Labs' staff, with a probability that increases proportionally with the cumulative dose. A cumulative dose of 100 mSv (equivalent to 5000 CXRs) corresponds to an excess cancer risk of 1.0–1.3% (fatal and non-fatal combined), with evidence matured in the last 20 years increasing the previous risk estimates of Biological Effects of Ionising Radiation Committee VII Committee, 2006, for the same dose

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exposure, up to 30%.[25,26] The head and neck are particularly vulnerable anatomical regions, with left-sided cranial exposure approximately two-fold higher than right-sided exposure, largely reflecting operator positioning relative to the X-ray source. This asymmetric pattern has been linked in observational reports to a higher incidence of left-sided brain tumours, including glioblastoma, meningioma, and neurinoma, although causality remains a matter of ongoing investigation[27]; skin, with unprotected areas (especially left-sided) showing elevated rates of basal cell carcinoma[28]; lung and haematological cancers, with excess risks observed for lung cancer, leukaemia (except chronic lymphocytic leukaemia), and lymphoma.[29]

Findings from traditional epidemiological approaches can be meaningfully complemented by molecular epidemiology, which integrates intermediate biomarkers of biological effects and early predictors of long-term cancer risk. From a conceptual standpoint, this strategy resembles using carotid plaque assessment by vascular ultrasound to identify subclinical disease and improve the prediction of subsequent cardiovascular events in asymptomatic populations. In the oncological setting, relevant biomarkers include chromosomal aberrations, such as dicentrics and micronuclei in lymphocytes, which reflect genomic instability and are associated with an elevated long-term cancer risk. This effect is further amplified by factors such as smoking, a well-established mutagen, or polymorphisms in DNA repair genes that impair their function.[30–32]

Cardiovascular disease

Recent evidence suggests that low-dose IR may accelerate atherosclerosis, with cardiovascular risks potentially comparable to those of cancer, thereby challenging the traditional cancer-centred focus of radiation protection.[33] Meta-analysis data from a study of 400 000 workers demonstrated dose-dependent increases in ischaemic heart disease, stroke, and overall cardiovascular disease (CVD) mortality.[34] A cumulative dose of 100 mSv (equivalent to 5000 CXRs) corresponds to an excess risk of CVD around 1.0% (fatal and non-fatal events combined).[25,26] In the context of atherosclerosis, epidemiological observations have been supported by molecular epidemiological findings showing that interventional cardiologists have shorter leukocyte telomere length, a recognized marker of accelerated vascular ageing.[35] The fundamental mechanism underlying the induction of atherosclerotic CVD is low-grade inflammation that triggers DNA damage and endothelial dysfunction.[36,21] Individuals with clonal haematopoiesis of indeterminate potential face disproportionately elevated risks.[37]

Neurodegenerative disease

Recent evidence has raised concern regarding a potential association between IR exposure and neurodegenerative disorders. In particular, findings from the Million Person Study indicate a 17% increase in the excess relative risk of Parkinson's disease for every 100 mSv of cumulative absorbed dose to the brain.[38,39] Subclinical alterations have also been reported among interventional cardiologists, including reduced olfactory sensitivity, considered an early marker of neurodegenerative processes, and diminished performance in selected left-hemispheric cognitive domains, particularly verbal fluency and long-term memory.[40] Applying a molecular epidemiology framework, chronically radiation-exposed operators show significant alterations in the expression of brain-enriched microRNAs, a pattern consistent with early molecular signatures of neurodegenerative pathology.[41] Several biological pathways have been proposed to explain the impact of IR on cerebrovascular integrity, including enhanced oxidative stress, activation of neuroinflammatory cascades, endothelial dysfunction, increased arterial stiffness, accelerated atherosclerotic remodelling, and the development of cerebral amyloid angiopathy.[22]

Reproductive health

In males, doses as low as 150 mSv reduce sperm counts; 300 mSv causes transient azoospermia.[42] Exposed workers exhibit poor motility, DNA fragmentation, hypermethylation, and overall reduced sperm quality.[43] The molecular epidemiology approach shows a greater Y chromosome instability.[44,45] An increased copy number variation within the azoospermia factor c (AZFc) region of the Y chromosome has been recognized as a genomic marker associated with impaired spermatogenesis and male infertility.[44] In men, the most vulnerable period for radiation-related reproductive effects is the approximately 90 days preceding conception, corresponding to the full spermatogenic cycle. During this interval, germ cells progress from relatively radio-resistant spermatogonia to highly radiosensitive mature spermatozoa, which lack cytoplasm and intrinsic cellular defence mechanisms against radiation-induced damage.[45] Concerns about foetal irradiation and its potential health effects remain a major issue for women pursuing careers in invasive cardiology.[46,47] The lack of robust data in this field is further evidenced by disparate safety standards for foetal protection in pregnant workers. In contrast, most European countries prioritize the safety of the unborn child, enforcing a stricter limit of <1 mSv and requiring pregnant women to leave the cardiac Cath Labs once pregnancy is confirmed. Although quantifying exact risks remains challenging, IR exposure is associated with an increased likelihood of miscarriage, small-for-gestational-age newborns, childhood leukaemia, and congenital malformations.[48,49]

Paternal exposure to IR during the 3 months preceding conception has been associated with more than a three-fold increase in the risk of sporadic bilateral retinoblastoma, a condition typically arising from a *de novo* germline mutation of the RB1 (retinoblastoma-1) gene.[50] Changes in DNA methylation, histone modifications, and non-coding RNAs are viable mechanistic candidates for the non-genetic transfer of paternal environmental information from maturing germ cells to zygotes.[51] Although the issue of the transgenerational effects of low-dose radiation exposure remains unsettled, it is now established that not only mothers but also fathers occupationally exposed to high levels of carcinogenic substances may endanger not only themselves but also their children.

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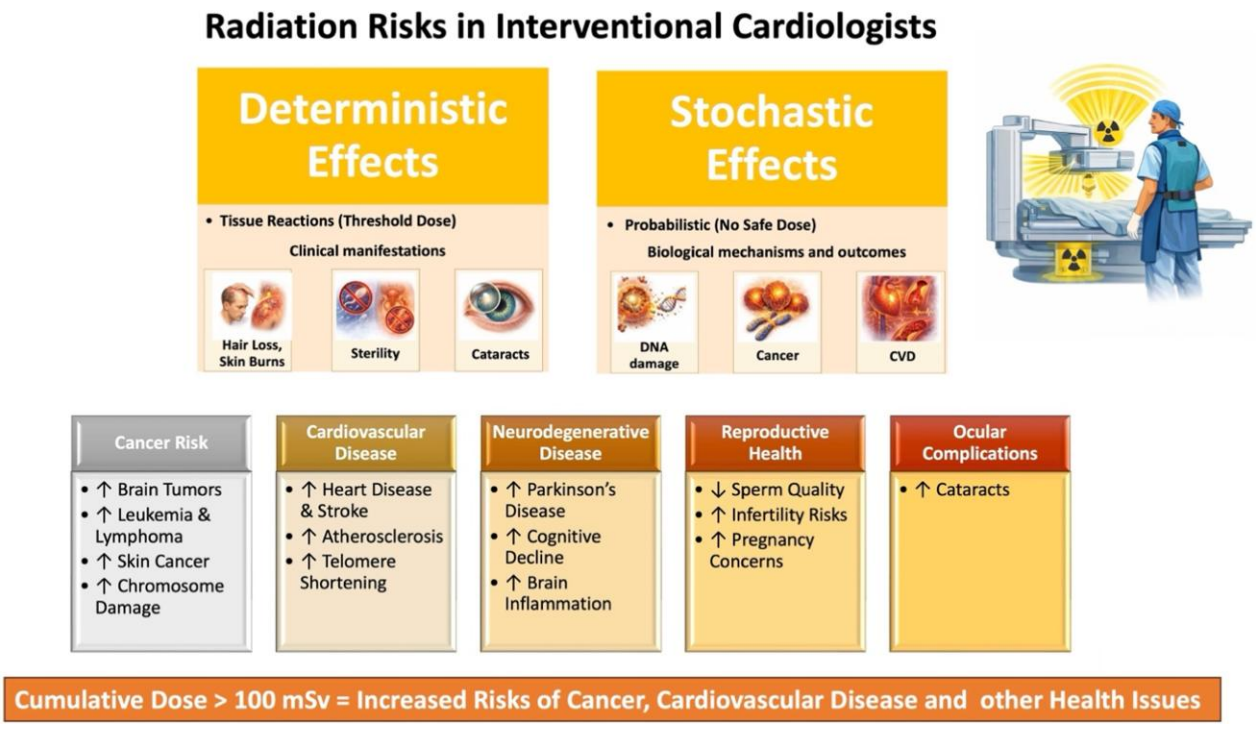

Figure 2 Occupational radiation risks in interventional cardiologists. Ionizing radiation exposure in cardiac catheterization laboratories is associated with both deterministic effects (threshold-dependent tissue reactions such as skin injury, sterility, and cataracts) and stochastic effects (probabilistic outcomes without a safe dose threshold, including DNA damage, cancer, and cardiovascular disease). Emerging evidence also suggests associations with neurodegenerative disorders, reproductive health impairment, and ocular complications. Cumulative lifetime exposure, particularly beyond 100 mSv, has been linked to an increased risk of malignancies, cardiovascular disease, and other long-term health consequences.

Ocular complications

Approximately one in two interventional cardiologists develop posterior subcapsular cataracts, largely attributable to chronic, insufficiently shielded ocular exposure. This elevated prevalence can be explained by several factors. First, the operator's eyes are directly exposed to scattered X-rays generated during fluoroscopic procedures. In the absence of appropriate leaded eye protection, the crystalline lens may receive an entrance dose of several hundred microSieverts per coronary angiography session, with cumulative exposure over time reaching clinically relevant thresholds.[52] A second, and largely preventable, factor is the inconsistent use of appropriate leaded eyewear among operators. Third, historical occupational dose limits for the lens were set at levels now considered insufficiently protective, potentially allowing cumulative exposures that could induce lens damage before the adequate awareness of risk was established. On 21 April 2011, the International Commission on Radiological Protection (ICRP) revised its recommendations for occupational exposure to the eye lens, lowering the annual dose limit from 150 mSv to 20 mSv, averaged over a 5-year period, with the additional constraint that no single year should exceed 50 mSv. Current evidence suggests that a clear threshold dose for radiation-induced cataract cannot be reliably defined. Although lens opacities have traditionally been regarded as a prototypical tissue reaction (formerly termed deterministic or non-stochastic) with an assumed threshold above 0.5 Sv, more recent data indicate that lens damage may occur at substantially lower doses (*Figure 2*). Moreover, the risk per unit dose appears to be proportionally greater at low cumulative doses and low dose rates, challenging earlier radiobiological assumptions.[53] The likely mechanism of radiation-induced cataract is that the lens epithelium, especially in the posterior pole, is very sensitive to IR. Unlike other tissues, the lens has no cell turnover: once lens epithelial cells are damaged, the effect accumulates. Radiation damages DNA and proteins, leading to abnormal migration and differentiation of the lens epithelial cells beneath the capsule, where they migrate and clump abnormally.

Radiation-independent risks: orthopaedic hazards from protective gear

Although radiation shielding remains indispensable for exposure control, the prolonged use of conventional lead aprons introduces distinct occupational hazards. These predominantly orthopaedic and, in some cases, neurological disorders are not radiation-related but arise from the chronic mechanical load imposed by heavy protective garments. The risk is further amplified by sustained static postures, repetitive movements, and suboptimal ergonomics that characterize daily practice in the Cath Labs. Standard lead aprons (0.25–0.50 mm Pb-equivalent) weigh 5–10 kg, placing sustained stress on the spine and joints.[54] Due to

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weight and strain, 50% of interventional cardiologists report cervical/lumbar pain, hip/knee degeneration, or spinal damage.[55–57] Severe cases progress to spinal cord compression, paralysis, or career-ending disability.

In addition, protective gear has a documented risk of surface toxicity. Thyroid collars show 80% contamination with lead dust (vs. 40% in aprons) due to frequent folding and sweat exposure[56,58,59]

Biomonitoring analyses indicate that personnel working in Cath Labs have hair lead concentrations approximately three-fold higher than those of non-exposed healthcare workers, suggesting chronic environmental and occupational exposure in interventional settings.[60] No safe threshold exists for lead exposure, raising concerns about chronic toxicity.

Traditional lead shielding is life-saving, but its weight, toxicity, and recycling challenges make it a double-edged sword, potentially overcome by innovative, effective shielding materials such as lead-free multilayered polymer composites and non-lead nanocomposite shields. Using several high-density, high-atomic-number elements, such as bismuth, barium, gadolinium, and tungsten, significantly enhances the shielding ability of composites.[61]

Infectious hazards in the cath lab: blood-borne pathogens and prevention strategies

Interventional cardiology personnel are at measurable risk of exposure to blood-borne pathogens, with percutaneous injuries posing a significant occupational hazard. Needlestick events have been reported in approximately 0.6% of vascular procedures, while glove perforation rates approach 1% per intervention. Over the course of their professional careers, nearly 80% of interventional cardiologists report at least one percutaneous injury, and more than one-third report having sustained a sharp-related injury within the previous year.[62]

The three most concerning bloodborne pathogens and their transmission rates following percutaneous exposure are hepatitis B virus, with a 30% transmission risk and the highest infectivity, but vaccine-preventable; hepatitis C virus, with 1.9% transmission risk and no vaccine available; and human immunodeficiency virus, with the lowest (0.3%) transmission risk but the most feared consequence.[63]

Psychological distress and burnout in interventional cardiology

Interventional cardiology offers unique professional satisfactions, with high reward: life-saving interventions with immediate patient impact; rapid technological evolution (e.g. robotic interventions); team-based achievements with specialized staff; financial compensation, since the average U.S. interventional cardiologist earns $700 K/year,[64] 50% higher than non-invasive cardiologists. Yet, these rewards come at a high psychological cost, with 70% of practitioners experiencing burnout and a gender disparity; 65% of female interventionalists report burnout vs. 48% of males.[65]

Several structural and organizational factors contribute to this risk profile, including sustained workload intensity, often averaging approximately 63 working hours per week, continuous 24/7 on-call responsibilities, and cumulative decision fatigue associated with managing complex, time-critical procedures.[65] Additional environmental and occupational stressors may further compound this burden. These include persistent radiation-related concerns, together with the potential neurobiological effects of chronic low-dose exposure that may increase susceptibility to mood disturbances, physical strain from prolonged standing and the use of heavy lead aprons, and the emotional impact of adverse clinical outcomes. Notably, up to 42% of operators report features consistent with ‘compassion fatigue’, and 58% describe a sense of social isolation despite maintaining personal relationships.[65]

After leaving the cardiac Cath Labs, professional pressures persist. Interventional cardiologists remain subject to productivity-driven performance audits, encounter a malpractice litigation risk estimated to be about twice that of colleagues in general cardiology, and face a considerable administrative workload, with nearly 33% of their time devoted to documentation and related non-clinical tasks. These sustained pressures have tangible consequences on physical and psychological well-being, as well as on personal and social relationships. Reported divorce rates are approximately twice those observed in the general population, the risk of depression is up to four-fold higher, and sleep disorders affect nearly 61% of practitioners. Available data also indicate that younger, unmarried women cardiologists may be particularly susceptible to burnout.[66]

Countermeasures: the race to zero radiation and lead-free protection

Although the ethical commitment to patient care remains paramount, it should not come at the expense of operator safety. A culture in which excessive radiation exposure is tacitly accepted still persists in some settings. This is driven in part by limited formal training in radiation biology among cardiologists, the insidious and delayed nature of chronic exposure effects, which reduces the perception of immediate risk, and financial constraints that may hinder the timely adoption of safer technologies and protective systems.[67]

There are now clear cultural, technological, and organizational conditions that make it possible to substantially reduce occupational risk within the cardiac Cath Labs.

With robotic-assisted interventions, operators achieve a 97% dose reduction in percutaneous coronary intervention,[68] with precision enhancement and sub-millimetre catheter control. Advanced, non-fluoroscopic imaging modalities reduce radiation exposure by 85% to 95% with intracardiac echocardiography or magnetic navigation, achieving near-zero fluoroscopy in electrophysiology studies.[2] New Food and Drug Administration-cleared protection systems allow a > 90%

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Table 3 Annual and lifetime radiation doses in exposed workers

	What we have	What we need
Reduce inappropriateness	Pay volume	Pay value
Optimize dose	Reference dose class	Delivered organ dose
Near-zero PCI	Fluoroscopy	ICE
Near-zero EP	Fluoroscopy	Magnetic navigation
Dosimetry	Offline	Online
Technology	Subpar	Leading edge
Risk estimate	Only cancer	Cancer and non-cancer effects
Protection	Lead-based	Leadless ergonomic
Tools	Apron, glasses, collar, other	Eggnest, cabin, robotic, other
Research	High dose, high-dose rate	Low dose, low-dose rate

EP, electrophysiology; ICE, intracardiac echography; PCI, percutaneous coronary intervention.

Figure 3 Multilayer operational framework for reducing occupational exposure to ionizing radiation in cardiac catheterization laboratories. The model integrates procedural, spatial-technical, and system-level strategies centred on the ALARA principle.

dose reduction with a setup time of 3 to 6 min. New nanoparticle-based shields are lead-free and 40% lighter while providing the same level of protection.[69]

All these changes have a cost in terms of investment and in the institution's and the operators' expertise. Nevertheless, the net gain is extraordinary when balanced against the reduced long-term risk of operators and patients. In addition, a 90% reduction in radiation exposure can be achieved without any investment, simply by providing dedicated radioprotection courses for operators, who are made aware of the risks of radiation exposure and how to minimize the damage.[70,71] It is important to optimize the fluoroscopy time, and even more important to minimize the cine-time, since during the actual recording ('cine') sequences, the patient and the operator are exposed to a 10 times higher rate of radiation than during standard fluoroscopy. 'Live' Fluoroscopy is like using a handheld camcorder to film behind-the-scenes footage all day. The camera is on for a long time, but it is in a low-quality, efficient mode.[4] 'Cine' Acquisition is like rolling the expensive, Hollywood-quality IMAX (Image Maximum) high-resolution camera for the crucial scenes. This camera uses blindingly bright lights and consumes massive amounts of energy, but you only use it for short, critical takes. The total dose is a product of both the high-dose-rate recordings and the long cumulative time of low-dose-rate fluoroscopy. This is why complex interventions like percutaneous coronary interventions are among the highest-dose procedures in radiology.

New evidence, especially in the low-dose, low-dose-rate range of the greatest medical interest for patients and occupationally exposed workers, is needed.[72,73] The main cultural, technological, regulatory, and scientific needs for an effective change are shown in *Table 3*, *Figure 3*.

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Conclusion: from complacency to vigilance—a new era of radiation safety

The message from the data is clear: chronic occupational radiation exposure in interventional cardiology is associated with meaningful long-term risks, affecting not only individuals but potentially entire generations of operators.

This calls for a change in attitude. Exposure should no longer be passively accepted as part of the job but addressed with the same rigour applied to patient outcomes and procedural quality. Professional responsibility includes protecting those who deliver care. In this context, Ted Diethrich stands as a relevant example. A pioneer of hybrid revascularization techniques, he was also among the early voices emphasizing the importance of radiation safety and occupational awareness in the cardiac catheterization laboratory, reminding the community that innovation and protection must progress together. For a long time, many operators worked under the quiet assumption that serious harm would not happen to them. The effects of chronic exposure were distant, abstract, and easy to underestimate. With the passing of years, however, the clinical consequences became harder to ignore.

Ted Diethrich later developed bilateral cataracts and significant carotid atherosclerotic disease, and in 2012, he was diagnosed with a brain oligodendroglioma. He spoke publicly about his condition, linking it to decades of occupational radiation exposure and urging colleagues to take protection seriously.[74] Towards the end of his life, having suffered from what he thought was radiation-induced illness, he issued a powerful warning to his colleagues: '*When we started doing these procedures, nobody questioned what we did. The last thing I was thinking about was how much radiation I am exposed to. Being a doctor, my whole motive was to help the patient get well. I didn't think about the hazardous conditions*'. In the film, Dr. Diethrich describes himself as '*a living example of excessive radiation and what it can do to tissue.*' He added, '*I think I felt this radiation could not hurt me. I felt indestructible. Obviously, I didn't know what I was talking about*'.

Concrete change does not require complex reforms; it can begin with deliberate, everyday choices. Consistent use of personal dosimetry, rigorous application of available shielding, and strict adherence to clinical appropriateness are fundamental. Radiation output should be kept as low as reasonably achievable by limiting fluoroscopy and cine acquisition to what is truly necessary. At the institutional level, commitment to investing in advanced dose-reduction systems and more ergonomic protective technologies is essential. In parallel, the progressive integration of non-ionizing imaging modalities offers a realistic path towards reducing cumulative exposure.

Ultimately, safeguarding operator health is not secondary to patient care, it is part of it. A mature safety culture recognizes that excellence in interventional cardiology encompasses both procedural success and long-term professional sustainability. Protecting ourselves and our teams ensures we can continue to provide high-quality care throughout our careers.

Let this serve as a clear call to action—no more preventable harm. Each time we step into the cardiac catheterization laboratory, we should recall the experience of Ted Diethrich, a pioneer and leading figure in modern cardiology, and allow that memory to guide our conduct and our commitment to safety. Several practical steps can be implemented without delay in routine practice. First, personal dosimeters should be worn consistently, and exposure levels should be periodically reviewed. Second, all available shielding devices and protective equipment should be used appropriately and systematically. Third, examinations lacking clear clinical indication should be avoided. Fourth, radiation delivery must be optimized by limiting fluoroscopy time and, in particular, reducing cine acquisition to what is strictly necessary. Fifth, institutions should be encouraged to invest in advanced dose-reduction platforms and improved personal protective technologies. Finally, whenever clinically appropriate, non-ionizing imaging modalities should be considered as alternatives to conventional radiation-based techniques.

The best way to protect your patients is to first protect yourself and your team. This proactive approach will ensure a longer, healthier personal and professional life while upholding the highest standard of patient care.

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