N. 32

1184

PROPOSAL OF A STANDARDIZED TRAINING MODEL FOR ULTRASOUND GUIDED INSERTION OF CENTRAL VENOUS CATHETERS

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INTRODUCTION. Ultrasound (US) guided insertion of central venous catheters (CVC) is widely accepted, but cannulation techniques and training issues are still controversial. We propose a training model based on a close standardization of the technique and of the teaching protocol.

METHODS.

1. Insertion protocol:
   (a) US evaluation of internal jugular vein (IJV) (ideally: depth <2 cm, diameter >5 mm, not collapsible during breaths, not medial to carotid artery) and subsequent choice between right vs. left IJV or between IJV vs. other veins.
   (b) Standardized technique of US guided venipuncture (see Table 1).
   (c) Intracavitary EKG guidance for intraoperative control and standard chest X-Ray for documentation of tip position.
2. Teaching protocol: 4 h of theory + 4 h of training on home-made simulators + 4 clinical procedures observed + 4 procedures performed under supervision + tutored learning curve with late audit.

RESULTS. The first 13 trainees have been enrolled in December 2008 and completed the training program in January 2009. Success rate at first attempt was 95% and complication rate was 0%. Failed attempts were mostly due to inability to visualize the needle during the procedure. All the trainees completed each procedure within the second attempt.

COMMENTS. US-guided CVC insertion is easy to learn when a standardized training is provided. This training program will be validated by an Italian panel of experts so to provide National training guidelines.

TABLE 1 STANDARDIZED TECHNIQUES OF US GUIDED VENIPUNCTURE

First choice:
Internal jugular (Low lateral approach)—Short axis—In plane
Other choices:
Brachiocephalic (Supraclavicular)—Long axis—In plane
Subclavian (Supraclavicular)—Long axis—In plane
Axillary (Infraclavicular)—Short axis—Out of plane
Axillary (Infraclavicular)—Long axis—In plane
Internal jugular (Axial approach)—Short axis—Out of plane
Short vs. long axis: US scan of the vein
In plane vs. out of plane: scan of the needle under US beam

1185

INCIDENCE OF THROMBOEMBOLIC EVENTS FOLLOWING CENTRAL VENOUS CATHETER INSERTION IN A TERTIARY CARDIOTHORACIC ADULT INTENSIVE CARE UNIT

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INTRODUCTION. There are around 200,000 insertions of CVC per year in the UK (JICS 9(3):228–231, 2008). Central Venous Catheters (CVCs) are widely used in critical patients for sampling, monitoring, pharmacotherapy and parenteral nutrition in critically ill patients. Thrombosis and sepsis are well recognised complications of CVC's. Less well recognised are the potentially more fatal sequelae of these clots which include pulmonary embolism (PE) and right heart thromboembolism (RHTE). Following the introduction of NICE guidelines recommending ultrasound guided CVC insertion diagnosis of CVC associated clots will inevitably increase potentially leading to changes in practice. Currently little information exists to guide clinicians in diagnosis and management of CVC-related thromboembolic complications.

OBJECTIVES. To measure the incidence of and ascertain the pre-disposing risk factors for CVC related thromboses. The primary endpoint is the CVC related thrombosis on discharge from AICU. Secondary endpoint is the prevalence of clinically manifest PE among the patients with CVC-related thrombosis, and whether any particular strategy reduced or prevented it.

METHODS. All patients admitted to a cardiothoracic tertiary referral centre Adult Intensive Care Unit (AICU) over a six month period will be included. USS of bilateral internal jugular and femoral veins is performed by trained medical staff on admission, each line change, line removal and on discharge. The presence and extent of clot are recorded along with patient demographics, pro-thrombotic risk factors, anticoagulation use and the number, type and use of lines in situ. Patients who develop a thrombosis will be followed up at 6 months to establish the development of any clinical or radiological evidence of a PE.

RESULTS. To date 60 patients have been included, 65% females 35% males with a mean age 59 years (range 40–80 years). Mean length of AICU stay 7 days (range 4–11). 91% of the cohort were admitted to the AICU post cardiothoracic surgery, and 8% were admitted for medical management. 8 patients (13%) have been identified with CVC-related thrombosis at present, of these patients 2 (25%) had risk factors for clot formation.

CONCLUSION. It is too early in this audit to draw any firm conclusions. CVC-related thrombosis remains a common feature of critical patient care and best practice needs to be standardised to provide optimum patient care and reduce complications from over or under treatment of this complication.

REFERENCES. 1. Randolph AG et al (1998) Benefit of heparin in central venous and PA catheters. A Meta-analysis of RCTs Chest 113:165–171

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1186

SUBCLAVIAN VEIN CANNULATION WITH THE PATIENT IN A SITTING POSITION: SAFETY AND INDICATIONS

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INTRODUCTION. Cannulation of the subclavian vein (SVC) is carried out routinely in ICU, normally in the supine position (SUPO). There are clinical settings in which lying the patient down could prove counterproductive.

OBJECTIVE. To assess the safety of SVC on patients in a sitting position.

METHODS. Clinical study conducted in two hospitals selecting at random whether the patient were to have the SVC carried out in the supine position (SUPO) or in a sitting position at 60 degrees (SIPO); all patients in a spontaneous ventilation and requiring a central line to be put in place were included in the study. Criteria for exclusion: general contraindications for SVC (coagulopathy, etc.), anticipated immediate need for invasive mechanical ventilation. The following clinical data was evaluated as variables before and after cannulation: arterial blood pressure (BP), respiratory rate (RR), heart rate (HR), PaO_2/FiO_2 (PF ratio), gasometry; any complications were recorded.

RESULTS. Of the 43 patients, SVC in SUPO was randomly selected for 15 patients and in SIPO for 28 patients. 14 doctors participated in the SVC. Only 3 times was it necessary to change doctor. Profile of the patients: 32.6% had chronic respiratory pathology (85.7% COPD); 53.5% presented with acute respiratory failure at the time of the SVC; 41.9% were on non-invasive ventilation (NIV). There were 3 pneumothorax (7%), and in 93% of the cases the subclavian artery was not punctured. In 93% the radiological position of the distal tip was correct. The respiratory condition of the patients in SUPO (vs. SIPO) was better: acute respiratory failure: 33.3% (vs. 64.3%); use of NIV: 33.3% (vs. 46.3%); RR pre-insertion: 20 ± 6 vs. 26 ± 6 ($P < 0.01$); RR post-insertion: 20 ± 6 vs. 25 ± 6 ($P < 0.05$); PF ratio post-insertion: 301 ± 98 vs. 214 ± 125 ($P < 0.05$); FiO_2: 33 ± 8 vs. 54 ± 28 ($P < 0.001$). There was no difference in the time taken to insert the central line. There was 1 pneumothorax in SUPO and 2 in SIPO.

CONCLUSIONS. SVC is usually carried out in SUPO, but in situations of respiratory failure, particularly with NIV, performing the procedure in SIPO can help to prevent a worsening of the patient's condition. SVC with the patient in a sitting position is a safe technique.

REFERENCE. 1. Suclavian central venous catheter placement, sitting position.

1187

PERCUTANEOUS DILATIONAL TRACHEOSTOMY, DO WE NEED BRONCHOSCOPIC ASSISTANCE?

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INTRODUCTION. Tracheostomy, as a means of airway access, is one of the oldest surgical procedures documented, dating back approximately 4000 years. Percutaneous tracheostomy (PCT) has become increasingly popular and has gained widespread acceptance in many ICU and trauma centers as a viable alternative approach. In some institutions, PCT has become the procedure of choice [1].

OBJECTIVES. To compare between the blind technique and the bronchoscopic assisted one regarding patients' safety.

METHODS. Prospective randomized observational study comparing the bronchoscopic assisted and the blindly inserted percutaneous dilational tracheostomy (PDT) using single dilator techniques. The study was conducted on 100 patients, 64 males and 34 female with mean age of 46 years. Patients with anticipated difficulty were excluded from the study. Bronchoscope was used in the blind group as a rescue method when tracheal cannulation could not be achieved after 2 trials. We used the single dilator Tracho set by 2 skilled physicians and 3rd physician on the airway to pull the tube out before tracheal puncture.

RESULTS. Among 50 patients underwent blind technique, 35 (70%) patients had a successful tracheal cannulation from 1st puncture, 15 (30%) from 2nd puncture, bronchoscope was not required in this group. No major complications (major blood loss that required blood transfusion, vascular injury, pneumothorax, pneumomediastinum) were reported among both groups. The mean procedure time starting from tube mobilization was 5 min in the blind group and 12 min in the bronchoscope group. Twelve out of 50 patients in the bronchoscope group had arterial oxygen desaturation that was responsive to increased FiO_2, no hypoxic events reported in the blind group during the procedure. Due to unavailability of the scope, bronchoscope group patients had a mean delay time of 1 day.

CONCLUSIONS. Blind PCT is at least as safe as bronchoscopic assisted one, no benefits offered from the later technique in our study. Furthermore, waiting for scope availability may delay the procedure and the scope may unnecessarily interfere with the patients' oxygenation.

REFERENCE. 1. Ciaglia P, Firsching R, Syniec C (1985) Elective percutaneous dilatational tracheostomy. A new simple bedside procedure; preliminary report. Chest 87(6):715–719

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