

Calcific tendonitis of the shoulder: reflections upon diagnostic reliability of ultrasound examination in a group of volleyball players

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Abstract

Calcific Tendonitis has a dynamic pathogenesis, which can be associated with the overuse of the limb. It is usually diagnosed by ultrasound examination, but it is also known to be related to the ultrasound operator's method and non-univocal interpretation criteria, which may result in misidentification of calcific deposits. Taking a sample of a overhead athletes' (Volleyball players) diagnostic results, obtained by two different operators, will be compared and commented.

Keywords: shoulder, calcification, tendinopathy, reliability.

Introduction

Calcific Tendonitis, known in the past as calcific peri-arthritis or Duplay's disease (it takes the name after the French surgeon Simmon-Emmanuel Duplay, who first described scapulohumeral peri-arthritis in 1872) and also known as "Traffic Cop's" disease, is characterized by formations of deposits in the anatomic-functional structure of rotator cuffs¹.

Using conventional radiology, Bosworth² identified the calcific pathology of the shoulder with a percentage of 2.7% in general population; Uthoff³ identifies a 7.5% percentage.

On the other hand, Speed⁴ reports a range between 7.5% and 20%.

Reporting Bosworth's work, Ark et al.⁵ claim that 35% of shoulder deposits are symptomatic, causing pain and functional limitation during its phase of spontaneous reabsorption, whereas it is asymptomatic in 30-40% of the cases.

According to Galletti⁶, the supraspinatus is the most affected tendon (80%) and females aged between 40-50 are mostly affected. In 20% of the cases it is possible to

Riassunto

La tendinopatia calcifica di spalla ha una patogenesi dinamica che si può associare a sovraccarico funzionale. La diagnosi è in genere ecografica ma la nota operatore dipendenza insita nella metodica e non univoci criteri interpretativi possono comportare difformità nella individuazione di depositi calcifici. In un gruppo di atleti overhead (pallavolisti) si confrontano e si commentano i risultati diagnostici di due differenti operatori.

Parole chiave: Spalla, calcificazione, tendinopatia, affidabilità.

notice that both shoulders are affected. The etiology of Calcific Tendonitis is still subject to many hypotheses and nowadays it is mostly unknown.

There are studies^{7,8,9} that hypothesize a multifactorial etiopathogenesis that shows inflammation and overuse as *primus movens* as far as the causes of Calcific Tendonitis is concerned. Under unfavorable biomechanic situations, recurring movements would cause inflammation and repeating such activities would start a vicious cycle putting tendons under stress. The inflammation would then be structured as calcium crystals.

According to Hartig et al.¹⁰ the ultrasound examination is the tool that is 100% reliable in identifying calcific deposits as opposed to the 90% reliability of x-rays.

In literature, the ultrasound examination criteria have been described by Farin¹¹, Patte et al.¹² According to these authors, Calcific Tendonitis is a dynamic-pathogenetic process and that is why its ultrasound characteristics change over time.

The factors mentioned above, as well as a less rigid application of criteria, could lead to interpretative differences of Calcific Tendonitis ultrasound images which

can create doubts about the definition of the disease itself.

The purpose of this study is to verify the reliability of the diagnosis by ultrasound examination in the definition of shoulder calcific pathology in a group of professional volleyball players. This study also highlights possible interpretative differences between two expert ultrasound operators.

Materials and Method

A sample of 24 volleyball players was chosen (15 females, 9 males) whose average age was 22.6 (\pm 4.9) and all right-handed.

Esaote MyLab 25 imager was used to perform a bilateral examination of the shoulder. In every case the examination was performed twice on each subject by two different operators. Each operator had 10-year experience. Results were kept hidden from the operators. The operators throughout the day performed random evaluations. For each evaluation, operators have made their own diagnoses.

Results and Statistical Analysis

Operator 1 (9 calcific deposits all on the right-dominant limb)

Operator 2 (8 calcific deposits all on the right-dominant limb + 1 thickening)

K Cohen 0.96

All alterations have been verified by both technicians and only in one case were there diagnostic differences between the two.

Discussion

The study's results raise reflections on the disease's etiopathogenesis and diagnosis.

The presence of calcific deposits was found by both operators only in the dominant limb, which is subject to more repetitive efforts during sporting activities.

Therefore, the hypothesis that considers calcific deposits as a result of a chronic inflammatory process could be credible. One more interesting aspect is the study of the correspondence between the two operators' results. In fact, the ultrasound examination is widely known to be dependent on the operators' techniques. Sometimes it is not sufficiently considered for a definitive diagnosis as far as the musculoskeletal system is concerned.

The study of the correspondence between two different operators' was also made to highlight possible interpretative and performing differences of the images.

In this study the correspondence is almost total ($k=0.96$) except for one case where one of the technicians diagnosed a tendon thickening and not calcific tendonitis.

According to Uthoff et al.¹³, calcific tendonitis is characterized by a first formative phase, a second resting phase, which can last many years, followed by a resorptive phase. The occurrence of algic symptoms with functional impediment would be associated with the formative and resorptive phases of calcific deposits. During the resting phase the subject would stay asymptomatic in the majority of cases.

Patte et al. have described two forms of calcific tendonitis: localized and diffuse.

The first form is the proper calcific tendonitis, with a "classic" ultrasound imaging, mostly localized 1-2 cm from the tendon insertion. On the other hand, the diffuse form, also known as dystrophic or enthesopathic, appears as a form of tendon thickening at the level of entheses, associated or not with erosion.

Still from an imaging perspective, Farin created a diagnostic system, which compares the different forms of ultrasound presentations of calcific deposits with the cycle described by Uthoff et al. In fact, Farin distinguished two further groups: with rear shadow cone and without rear shadow cone. The process of the cycle is characterized by a resting phase of calcifications to which corresponds an ultrasound image with the typical rear acoustic shadowing and a hyper-reflective surface.

During the resorption phase, instead, calcifications lose the rear shadow cone, presenting themselves distinctly echogenic, irregular and with irregular light margins with the tendency to move to the subdeltoid bursa.



