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OSSIFIED CORACO ACROMIAL LIGAMENT: A RARE ANOMALY WITH CLINICAL SIGNIFICANCE

Susmita Saha Assistant Professor, Department of Anatomy, Faculty of Medicine & Health Sciences, SGT University, Budhera, Gurgaon – 122505, India - Corresponding Author

Neelam Vasudeva Director Professor & Head, Department of Anatomy, Maulana Azad Medical College, New Delhi – 110002, India

ABSTRACT The Coracoacromial Ligament (CAL) is a strong triangular band, extending from the coracoid process to the acromion process. This ligament, together with the coracoid process & the acromion, form a vault for the protection of the head of the humerus. It is also one of the major components of Coraco acromial arch. Impingement of the tendinous cuff beneath this arch is an established cause of chronic shoulder disability mainly in rotator cuff impingement pathology. Anatomical texts allude to many variations in the morphology of the acromion process as well as coracoid process of the scapula but ossified CAL in dry bony specimen has not been mentioned very routinely because in the dry bone normally this ligament is not found. In the present study, we report a completely ossified CAL extending from the tip of the coracoid process to the undersurface of the acromial process in a single dry bony specimen in the osteology museum department of Anatomy, MAMC, New Delhi. Studies have been undertaken to define various morphologic pattern of this particular ligament in the cadavers but little anatomic information exists about the status of this ligament in dry bones. Moreover, most of the studies were based on western population; little attention has been paid to this anatomic issue in the Indian population. Though this type of anatomic information is thought to be one of the most important factors in the pathogenesis of impingement syndrome as it can press upon the supraspinatus tendon, so knowledge and awareness of such variations is extremely helpful to the orthopaedic surgeons for the diagnosis and management of impingement of shoulder joint.

KEYWORDS : Coracoacromial ligament; ossified; morphology; impingement syndrome

Introduction

Impingement of the tendinous cuff beneath the coracoacromial acrh is an established cause of chronic shoulder disability [1, 2]. The antero – inferior edge of the acromion, the CAL and occasionally the under surface of the acromion are known sites of impingement2. Irregularity in the shape of the coracoids and the acromion was first reported time by Goldthwaite[3] in 1909, but more recently interest has been directed to the morphologic appearance of coracoid as well as acromion in relation to the impingement syndrome. Although it is attached to both the structures, surprisingly little attention has been given to the variability of the coracoacromial ligament as it is not usually seen in dry bones but an accepted contributor to impingement[4, 5]. Subacromial impingement refers to a condition in which, the supraspinatus tendon and the bursa are entrapped between the humeral head inferiorly or coracoacromial ligament superiorly[2]. The diagnosis of this syndrome is mainly done both clinically as well as radio logically. Neer in 1972, first introduced anterior acromioplasty in which beveling of antero inferior part of acromion with resection of coracoacromial ligament is done, which has become standard operative procedure for the patients of such diseases[2, 4]. Though minimally invasive surgery is increasing now days and with it an expanded knowledge of such anatomic variant is required for the clinicians, surgeons and also for academicians in day to day practice.

Case report

During routine demonstration of undergraduate teaching program in Department of Anatomy, Maulana Azad Medical College, New Delhi, we detected one scapula showing an ossified coracoacromial ligament. The anomalous bony specimen was studied in great detail and the specimen was photographed.

Observations

The configuration and architecture of the scapula of the scapula confirmed to adult morphology. The left sided scapula showed complete ossification of the ccoracoacroial ligament as showing in Fig 1. The length of the ossified ligament was 37 mm, average thickness was 3 mm. It was extending from the undersurface of acromion to the tip of the coracoid process. An extension of the ligament was also projecting away from the tip of the coracoids process but the root of the coracoid process was rounded. It was showing a curved acromion process with the facet for the articulation with clavicle. It has been noticed that along with this ossified coracoacromial ligament, there was a complete ossification of the superior transverse scapular ligament which was converting the suprascapular notch into suprascapular foramen as showing in Fig 2. The length of the ligament was 10 mm; vertical length of suprascapular foramen was 9 mm and its maximum transverse diameter was 7 mm. No other deformities were noted in the bone specimen.

Fig 1. Antero-lateral view of left scapula showing a ossified coracoacr omial ligament

Fig 2. Same scapula displaying ossified superior transverse scapular ligament with suprascapular foramen

Discussion

The concept of shoulder Subacromial impingement syndrome (SAIS) was introduced by Neer in 1972 and stated that impingement is mainly due to mechanical compression of the rotator cuff, subacromial bursa, and biceps tendon against the undersurface of the acromion and CAL, especially during elevation of the arm4. Inferior aspect of acromion process, coracoid process & CAL all together forms a protective arch over the shoulder joint k/a

coracoacromial arch through which supraspinatus tendon passes. CAL which is a strong triangular band between coracoid process and acromion which is attached apically to the acromion anterior to its clavicular articular surface and by its base along the whole lateral border of the coracoid [6]. It is thought that thickening of this ligament can be a significant causative factor of impingement as well [6,7]. The fibers of the coracoacromial ligament fan out along the undersurface of the acromion and are extremely firm and unyielding7. Thus, because of its anatomic position and its physical rigidity, the coracoacromial ligament becomes a prime suspect as an etiologic factor in chronic impingement described by many investigators [2,7,8]. McLaughlin and Asherman in 1994, described a condition as snapping shoulder in which bursa thickens and snaps back and forth under the leading edge of the CAL on the undersurface of acromion & concluded as a offending structure in painful shoulder [9]. Neer in 1972 also included resection of the ligament as an integral part of the anterior acromioplasty which is one of the most popular surgical interventions in the treatment of impingement syndrome 2. Soslowsky et al in 1996, found statistically significant changes in the geometric dimensions of the lateral band of this ligament, which is the region most likely to impinge on the rotator cuff 10. Uhthoff et al. in 1988 reported histological studies of specimens of coracoacromial ligament from patients who had impingement syndrome revealed only degenerative changes without thickening[7]. Martin et al in 1995, identified three main types of coracoacromial ligament: quadran gular, Y- shaped, broad band with a multiple banded ligament for the first time [11]. Previous literature reveals that there were a few reports in relation to the morphology of this ligament but that were mainly based on cadaveric dissection. There is a paucity of literature as far as morphology of this ligament concern in dry bony specimen. Apart from the ossified Coraco acromial ligament, in this present bony specimen we have also demonstrated a complete ossification of superior transverse scapular ligament (STSL) which converted the notch into suprascapular foramen. This foramen serves as a passage for suprascapular nerve occouring entrapment neuropathy of suprascapular nerve [12]. Not only entrapment of nerve but also, this ossified STSL is one of the potential risk factor at surgical exploration of suprascapular nerve decompression [12]. Though the prevalence of ossified STSL have been reported in other population group like Brazillian 13 & Italian 14 including Indian population 15 but along with ossified coracoacromial ligament in the same bony specimen is rarely observed.

In the present bony specimen, we noted a complete ossification of coracoacromial ligament making one of the component of coracoacromial arch among 200 adult scapulae. The incidence of such ossified ligament have not yet been reported and also to the best of our knowledge this type of variant has not been reported in the past study. It is thus evident that the extreme rarity of complete ossification of coracoacromial ligament as seen in this case, may be clinically and academically relevant. So, the presence of such variant on plain radiograph or in the MRI scan has been emphasized as an important indicator of rotator cuff impingement syndrome. The clinician needs to be well versed with the appearance of such variant in the dry bones, so that they can interpret the data in the radiograph. This will assist them in the diagnosis as well as to decide the modality of treatment for such diseases.

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