

Case Report

Biceps tendon subluxation associated with isolated greater tuberosity fracture and bony Bankart lesion without a Hill-Sachs lesion: A case report and review of the literature

Joseph Maalouly, Dany Aouad*, Antonios Tawk, Jad El Bitar, Mohammad Darwish, Georges El Rassi

Department of Orthopedic Surgery and Traumatology, Saint Georges University Medical Center, Balamand University, P.O. Box 166378, Achrafieh, Beirut 1100 2807, Lebanon

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ABSTRACT

Combined injuries of the glenohumeral joint that involve biceps tendon subluxation associated with isolated greater tuberosity fracture and bony Bankart lesion are extremely rare. As per our knowledge, this is the first case report that includes such combined injuries that were treated arthroscopically. We present the case of a 48-year-old male patient who sustained shoulder trauma after being thrown against the rocks by a wave, was found to have biceps tendon subluxation associated with isolated greater tuberosity fracture and bony Bankart lesion.

The operative management resulted in complete restoration of the range of motion of the shoulder, and uneventful healing of the fracture. The patient recovered normal activity including his surfing.

Introduction

Anterior dislocation of the glenohumeral joint induces bicep tendon subluxation that usually occurs with a rotator cuff injury [1]. This has been classified, by Walch et al., into three types based on the direction of subluxation [2–4]. This is treated medically using NSAIDs, unless it is a young healthy patient for which surgical management is warranted to achieve a better function and a higher level of activity of the joint [5]. In addition to that, anterior dislocation of the glenohumeral joint was found to be associated with a greater tuberosity humerus fracture in one third of the cases; this generally occurs in comminuted proximal humerus fractures especially in elderly osteopenic individuals, as per Pantazis et al. [6]. Nevertheless, an isolated greater tuberosity humerus fracture along with the bicep tendon subluxation resulting from an anterior dislocation of the glenohumeral joint can still be seen in healthy young patients, making surgical management much more complex [7–9]. In addition to a bicep tendon subluxation and a greater tuberosity fracture, whether isolated or occurring with a comminuted proximal humerus fractures, a Bankart lesion can also be reported, and this is the result of the detachment of the antero-inferior glenoid labrum [10].

Herein, we present the case of a patient presenting with biceps tendon subluxation associated with isolated greater tuberosity fracture and a concomitant bony Bankart lesion post-traumatic anterior shoulder dislocation. As per our knowledge, this is the first case report of a combination of such lesions treated arthroscopically.

* Corresponding author at: St Georges University Medical Center, Achrafieh, St Georges Street, Beirut, Lebanon.

E-mail address: Dany_aouad@hotmail.com (D. Aouad).

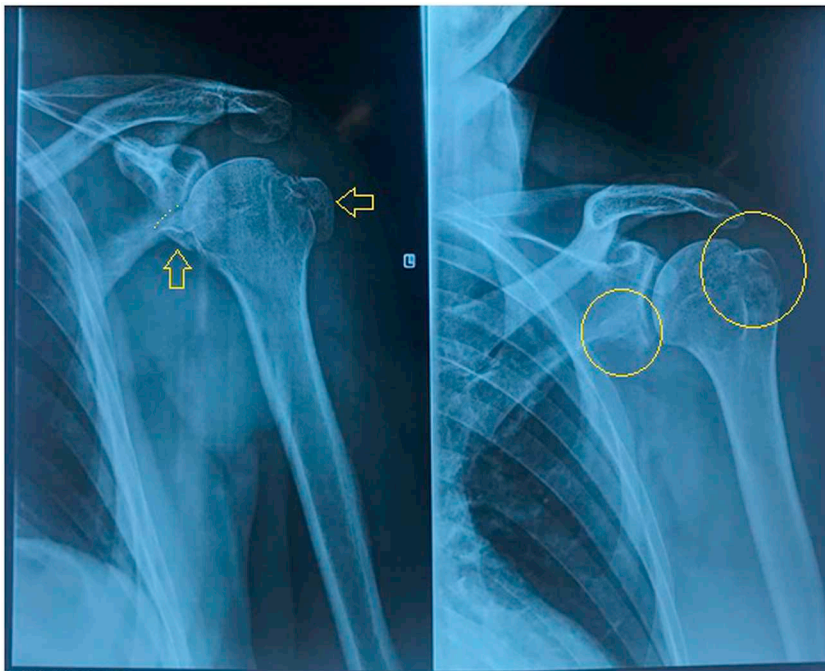


Fig. 1. Left shoulder X-ray AP view showing a greater tuberosity displaced fracture with associated bony Bankart lesion.

Case presentation

A 48-year-old male patient, right hand-dominant, with a positive medical history for hypertension and hyperuricemia, presenting for left shoulder trauma secondary to a beach accident during which the patient was pushed by a wave against a rock. Upon physical examination, the patient had decreased range of motion of the left shoulder associated with shoulder pain. However, the neurovascular exam was intact. Radiographs of the left shoulder showed proximal humeral fracture of the greater tuberosity with bony Bankart fracture (Figs. 1, 2, 3).

Under loco-regional and general anesthesia, the patient was put in the beach chair position with the head rest. The patient was secured and strapped. The left shoulder was prepped and draped in a standard sterile fashion. The glenohumeral joint was arthroscopically evaluated through a posterolateral portal. The anterior working portal was established in the rotator interval from outside in using spinal needle for localization. Examination of the biceps tendon showed active lateral subluxation (Fig. 4). Inspection of the rotator cuff with the rotator interval capsule, the anterior glenohumeral ligaments, anteroinferior and posteroinferior capsular recesses, peripheral capsule and synovial tissue was performed. Inspection revealed an inferior glenoid fracture (bony Bankart lesion).

Five portals were positioned through the lateral and anterolateral portals which a standard 45° angled suture hook passing in the posterior portal. The bony Bankart lesion was identified. Arthroscopic tissue liberator (Arthrex) is used to free up and elevate the

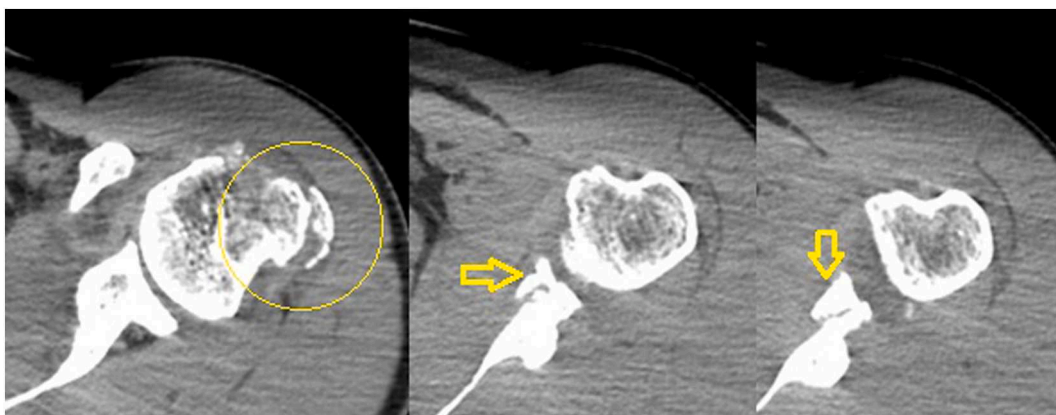


Fig. 2. MRI of the Left shoulder axial cuts showing greater tuberosity fracture with associated bony Bankart lesion.

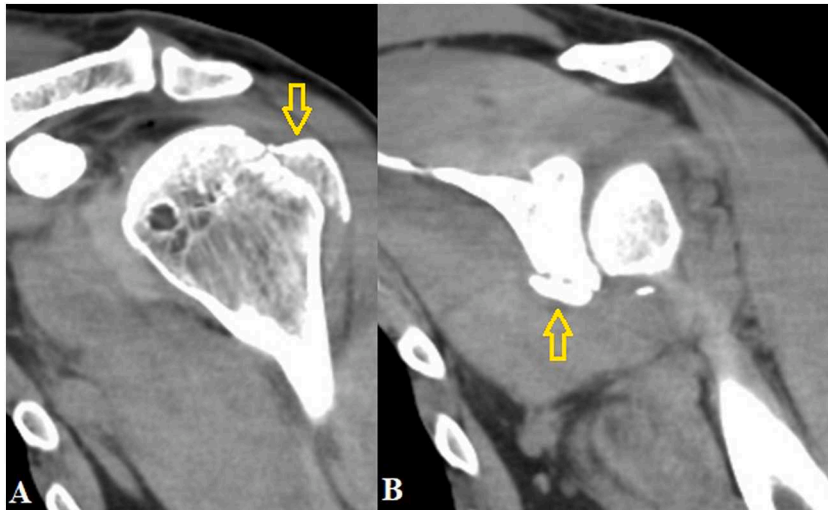


Fig. 3. MRI of the Left shoulder coronal cuts showing greater tuberosity fracture with associated bony Bankart lesion.

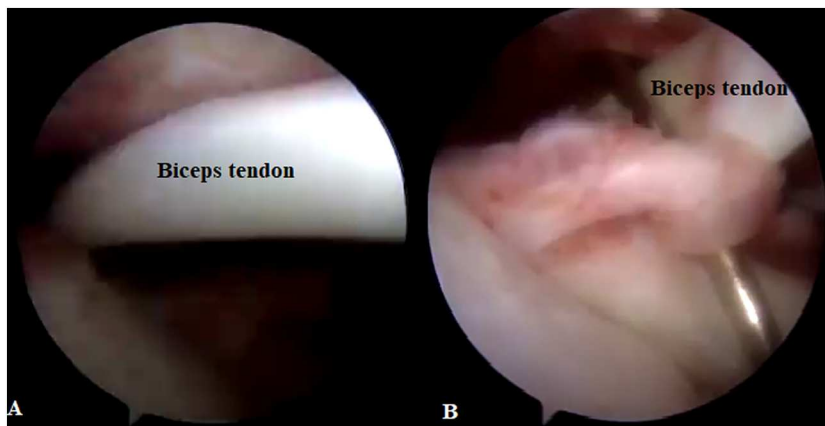


Fig. 4. Arthroscopic evaluation of the biceps tendon (A) showing active subluxation using the probe (B).

labrum from the anterior glenoid. This step is important as incomplete mobilization of the anterior labrum from the glenoid can result in a nonanatomic, less functional repair. A 4.5-mm burr is used to create a bleeding bed of bone along the glenoid. While viewing from the posterior portal, the drill guide for the suture anchor is introduced through the inferior cannula and is placed onto the face of the glenoid. Then, a drill is used to make a pilot hole, and the anchor is then tapped into the glenoid. A curved suture passer loaded with a polydioxanone (PDS) suture is employed to penetrate the capsule and is advanced under the capsule and labrum in one pass. The passer is removed, and the PDS is tied to the suture limb and pulled out of the cannula. The anchors are placed subsequently in a similar fashion.

The bony fragment of the glenoid was tightly secured by placing three anchors. The exploration of the subacromial space revealed an inflamed bursa, and subacromial bursectomy was then performed. After adequate debridement of the long head of the biceps tendon and proximal tenotomy, tenodesis was performed with one anchor after drilling was done.

Lateral incision over the left shoulder was performed with subsequent dissection until reaching the fractured greater tuberosity. The fracture was reduced under fluoroscopic guidance using two guide wires, all while taking care of the tendons. Fixation of the fracture was achieved by using two cannulated screws.

The wounds were closed in layers, and a sterile dressing with a shoulder immobilizer was applied and the patient was recovered from his anesthetic and taken to the recovery room in good condition. Post-operative radiographs showed satisfactory alignment (Fig. 5).

Discussion

The glenohumeral joint is a hypermobile joint with increased range of motion, which explains in part the anatomical predisposition of the shoulder joint for instability [1]. Stability of the glenohumeral joint is maintained via the synchronous activity of the

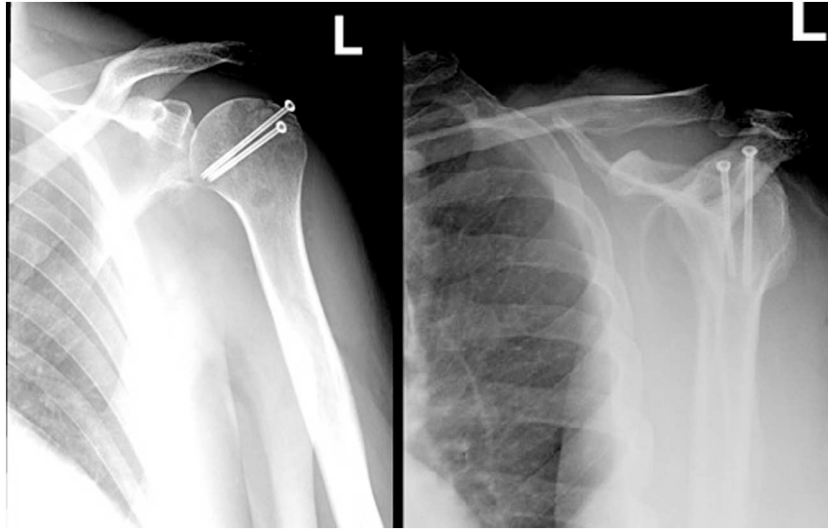


Fig. 5. Post-operative X-ray of the Left shoulder showing two screws fixing the greater tuberosity fracture with satisfactory reduction, along with reduced bony Bankart lesion after anchor placement.

static and the dynamic stabilizers such as the glenoid labrum, ligaments, glenoid concavity (static stabilizers) and proprioceptive sensations and periarticular musculature (dynamic stabilizers) [11,12]. However, the glenohumeral joint remain the most susceptible joint in the body for dislocation with anterior dislocations being the most frequent [11,13]. A conservative approach via closed reduction is the management of choice for most cases of shoulder dislocations [11]. One of the complications associated with shoulder dislocation is subluxation of the long head of the biceps tendon. In older patients, subluxation of the long head of the biceps tendon is associated with rotator cuff tears of degenerative etiology. In younger patients however, subluxation of the long head of the biceps tendon is mainly seen in athletes participating in throwing sports or as a result of a traumatic event. These patients may present with anterior shoulder pain located at the bicipital groove and limited external rotation of the glenohumeral joint [2–4]. Walch defined long head of the biceps tendon subluxation as the partial loss of contact between the biceps tendon and the intertubercular groove of the humerus. Walch divided biceps tendon subluxation into 3 types. Type I is superior subluxation of the biceps tendon secondary to the tearing of the superior glenohumeral and the coracohumeral ligaments. However, the subscapularis tendon remains intact which prevents the long head of the biceps tendon to be dislocated (complete loss with the bicipital sulcus). Type II biceps subluxation is subluxation in the intertubercular groove where the tendon slips over the rim of the groove medially so it becomes over the border of the lesser tuberosity of the humerus. Subluxation in the groove occurs as the outermost tendinous part of the subscapularis muscle are torn which constitutes the major criterion for Type II. Type III biceps tendon subluxation is the slipping of the tendon in and out of the sulcus due to mal- or nonunion of a dislocated fracture sustained to the lesser tuberosity of the proximal humerus [14–16]. In the presented case, the patient had Type II biceps tendon subluxation. The mechanism of subluxation of the long head of the biceps tendon can be due to several factors among which rotator cuff tears, Bankart lesion, recurrent shoulder dislocations, subscapularis tendon tear, degenerative changes of the pulley, and traumatic injuries [17]. In the presented case, subluxation of the long head of the biceps may be caused by the bony Bankart lesion and/or by the traumatic injury sustained to the shoulder with the latter being a more probable explanation for biceps tendon subluxation in the presented patient. Isolated subluxation of the long head biceps tendon is initially is non-surgically managed with nonsteroidal anti-inflammatory drugs (NSAIDs) along with rest and activity modification. However, and especially in the younger patient or when the subluxation is significant, an operative management (tenotomy vs tenodesis) is the preferred and necessary treatment modality [5]. Fracture of the greater tuberosity of the humerus is an additional pathology seen with shoulder dislocations as around 30% of such fractures are associated with anterior dislocation of the glenohumeral joint [6]. After a comprehensive review of the literature, Pantazis et al. reported that interposition of the long head of the biceps tendon with or without concomitant fracture of the greater tuberosity was the most common cause of mechanical obstacles to reduce an anteriorly dislocated glenohumeral joint [11]. Greater tuberosity fractures are frequently observed in comminuted proximal humerus fractures. However, isolated greater tuberosity fractures are less common and mainly seen in association with anterior dislocation of the glenohumeral joint; or it may be secondary to an impaction insult [7]. In contrast to greater tuberosity fractures with concomitant proximal humerus fracture which are seen in osteopenic patients with several comorbidities, isolated greater tuberosity fractures mainly occur in the healthy, young adults. The latter type of fracture remains to impose a challenging operative management since the literature contains limited number of studies guiding management decisions [7–9]. Bankart lesion is detachment of the anteroinferior glenoid labrum and it is usually accompanied by a Hill-Sachs lesion. The Bankart lesion has long been associated with anterior dislocation of the shoulder joint [10]. Arthroscopic repair of the Bankart lesion is the preferred surgical technique for the management of glenohumeral instability [18].

As per Pujol et al., they presented the first case report of a patient with a greater tuberosity fracture with a concomitant Bankart lesion, treated arthroscopically [19].

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Joseph Maalouly: Writing - Review & Editing.

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George El Rassi: Resources, Supervision, writing, surgical technique.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tcr.2020.100310>.

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