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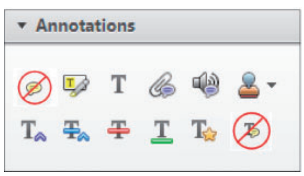

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S CASE REPORT

Shoulder & Elbow

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Surgical treatment of a concurrent type 5 acromioclavicular joint dislocation and a failed anterior glenohumeral joint stabilization

Abbas Rashid, Christopher Lawrence and Graham Tytherleigh-Strong

Abstract

Traumatic anterior glenohumeral joint (GHJ) dislocations and acromioclavicular joint (ACJ) subluxations occur in the same group of patients, namely active young males. The use of the coracoid process, either as a transfer in recurrent anterior GHJ instability or for suspensory reconstruction of the coraco-clavicular ligaments for ACJ dislocations, has become increasingly popular. This may require careful consideration if the patient has concomitant GHJ and ACJ pathology, with both warranting surgery using the coracoid. We describe the surgical management of a patient with recurrent anterior GHJ instability following a failed soft-tissue stabilization and a concomitant symptomatic type 5 ACJ dislocation [AQ2].

Keywords

acromioclavicular instability, Bristow, Laterjet, LockDown, recurrent glenohumeral instability, Surgilig

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Introduction

Traumatic anterior glenohumeral joint (GHJ) dislocations and acromioclavicular joint (ACJ) subluxations occur in the same group of patients, namely active young males.

The use of the coracoid process, either as a transfer in recurrent anterior GHJ instability or for suspensory reconstruction of the coraco-clavicular ligaments for ACJ dislocations, has become increasingly popular. This may require careful consideration if the patient has concomitant GHJ and ACJ pathology, with both warranting surgery using the coracoid.

We describe the surgical management of a patient with recurrent anterior GHJ instability following a failed soft-tissue stabilization and a concomitant symptomatic type 5 ACJ dislocation.

Case report

A 23-year-old right-handed male labourer sustained his first GHJ dislocation 6 years previously during a motorcycle accident. The instability became recurrent and he was treated elsewhere with an arthroscopic Bankart repair using bio-absorbable suture anchors. After surgery, his shoulder was stable for 2 years until he sustained a further traumatic anterior GHJ dislocation during a fistfight. Again, this had become recurrent, dislocating with relative ease. Examination revealed positive apprehension and relocation tests. Indirect magnetic resonance imaging arthrography demonstrated a re-tear of the anterior inferior capsule and modest anterior inferior glenoid bone loss, along with a moderate Hill–Sachs lesion (Figures 1 and 2).

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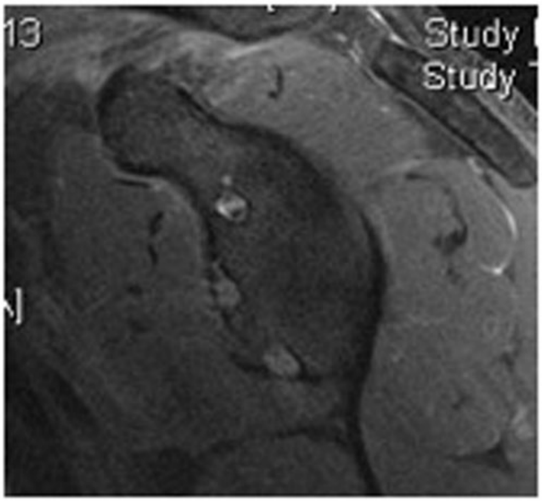

Figure 1. T2-weighted sagittal magnetic resonance imaging sequence of the glenoid showing evidence of three anchors from a previous anterior stabilization and re-tear of the anterior inferior glenohumeral capsule.

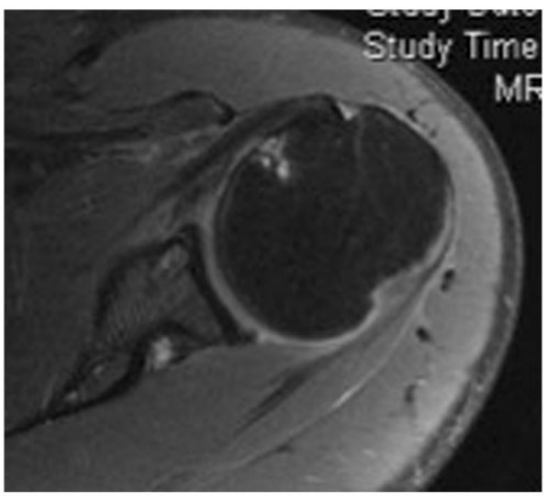

Figure 2. T2-weighted coronal magnetic resonance imaging sequence of the glenohumeral joint showing a moderate sized Hill–Sachs lesion.

Given his age, functional demand and failure of the previous surgery, a revision stabilization was indicated. Although his bone loss was moderate, we recommended an arthroscopic Latarjet procedure because, in addition to increasing the bony arc of the glenoid, the dynamic sling effect of the conjoint tendon would augment the weakened anterior capsule. Unfortunately, the patient did not attend his surgery.

He re-presented in the outpatient clinic 18 months later. During this time, he continued to suffer with recurrent anterior GHJ instability but had also sustained an ACJ dislocation during a road traffic accident

Figure 3. Anteroposterior radiograph of left shoulder demonstrating type V acromioclavicular joint dislocation.

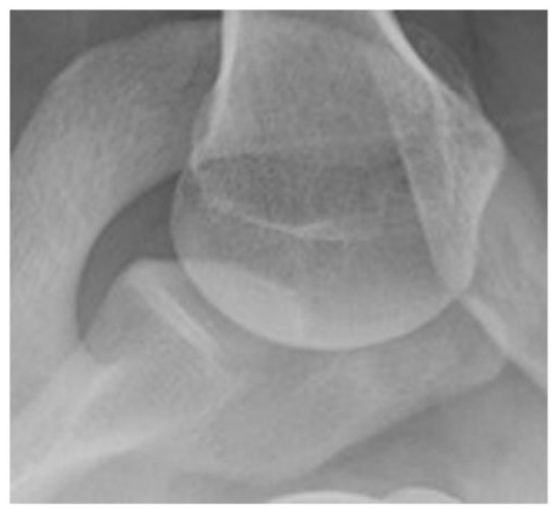

Figure 4. Lateral radiograph of left shoulder demonstrating glenoid bone loss.

6 months previously. As a consequence, he was unable to perform overhead activities or carry heavy scaffolding, which was necessary for his job. On examination, he had an obvious ACJ subluxation associated with painful clicking and a secondary scapular dyskinesia. Plain radiographs showed a type 5 ACJ subluxation (Figures 3 and 4). His Oxford Shoulder Instability Score was 15.[1]

We elected to treat both injuries surgically and, given his lack of reliability, we planned to perform them at the same sitting. We undertake a soft tissue stabilization of the glenoid, although we proceed to a coracoid transfer if the Hill–Sachs defect engages the glenoid. However, to also stabilize the ACJ using a LockDown (LockDown, Redditch, UK) suspensory sling around the base of the coracoid, we modified our surgical plan to undertake an arthroscopic Bristow procedure using only the tip of the coracoid, leaving a sufficient coracoid stump under which we could pass the sling.

The procedure was performed under general anaesthetic and interscalene block with the patient in the beach chair position. A diagnostic arthroscopy confirmed the presence of a Hill–Sachs defect that engaged the glenoid within normal physiological range of motion resulting in dislocation. We therefore decided to proceed to a coracoid transfer to restore GHJ stability. The arthroscopic Bristow procedure was performed using the Bristow Latarjet Instability Shoulder System from DuPey Mitek (Raynham, MA, USA). A modification of the arthroscopic Latarjet technique was undertaken using a single-barrelled guide.[2–4] The sutures from the previous repair were removed, the anterior surface of the glenoid prepared, the anterior compartment opened up and the conjoint tendon mobilized. Viewing from an anterior lateral portal, a subscapularis split was made and the coracoid skeletonized, including a complete release of the coraco-acromial ligament and the pectoralis minor tendon (Figure 5). A guidewire was passed into the tip of the coracoid, which was overdrilled to a depth of 12 mm, allowing insertion of a 'top-hat' (Figure 6). An osteotomy was made 12 mm from the tip of the coracoid, leaving a 10-mm coracoid stump. The single-barrelled guide was then attached to the coracoid graft, which was then manipulated through the subscapularis split and fixed onto the inferior part of the anterior glenoid using a 34-mm partially threaded screw (Figure 7). The capsule was repaired to the anterior glenoid with a single suture anchor to make the graft extracapsular. Attention was then turned to the ACJ. A 2-cm sabre incision was made over the lateral end of the clavicle, the delto-trapezial fascia split and the ACJ exposed. Remnants of the superior ACJ capsule and disc were excised to allow for reduction of the clavicle. The length-gauge was then passed arthroscopically around the coracoid stump and over the posterior edge of the clavicle that had been reduced. The measured length was 10 cm. The definitive LockDown ligament was shuttled under the coracoid under arthroscopic vision (Figure 8), the clavicle reduced and the implant secured to the clavicle using a screw and washer. The delto-trapezial fascia was then imbricated and the wounds closed in layers. The patients arm was immobilized for 4 weeks, after which he commenced a standard instability rehabilitation programme.

At 12-month follow-up, the patient was pain free, had not experienced any further instability of the GHJ or ACJ, and demonstrated a near full range of movement. His Oxford Shoulder Instability Score had improved to 41 and his plain X-rays were acceptable, with a slight superior migration of the lateral end of the clavicle (Figs 9 and 10).

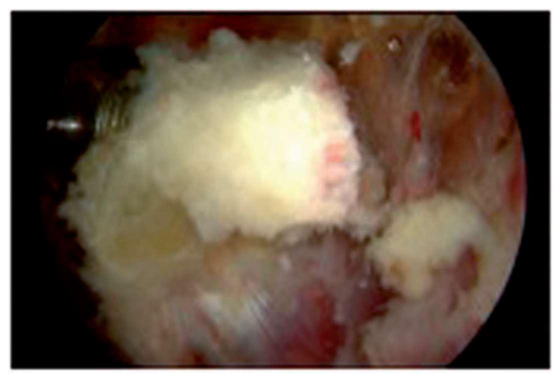

Figure 6. The top-hat has been inserted into the tip of the coracoid.

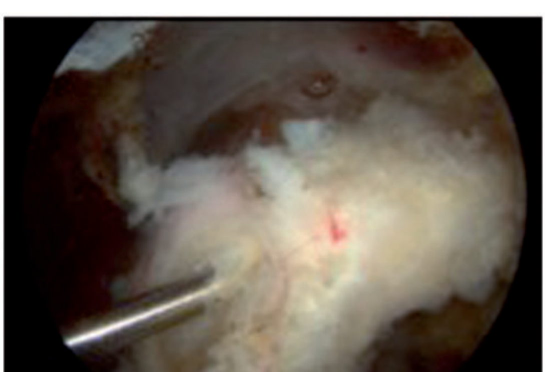

Figure 5. The skeletonized coracoid with a guidewire drilled through it.

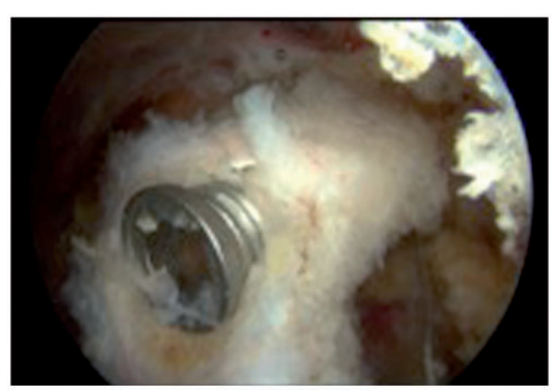

Figure 7. A view from the side a coracoid osteotomy is shown. The tip of the coracoid with the conjoint tendon has been attached to the plastic guide, as seen on the left side of the image.

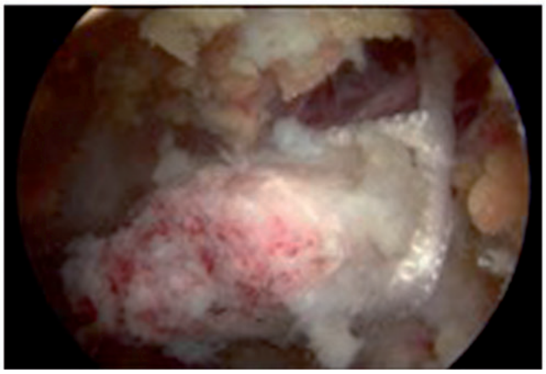

Figure 8. Intraoperative image showing the definitive LockDown graft secured around the residual coracoid stump.

Figure 9. Anteroposterior radiograph of left shoulder at 1 year postoperatively after a Bristow procedure and LockDown stabilization of the acromioclavicular joint.

Figure 10. Axial radiograph of left shoulder after a Bristow procedure and LockDown stabilization of the acromioclavicular joint.

Discussion

Although the mechanism of injury of GHJ dislocation and ACJ injuries may differ, they tend to occur in young males who are involved in contact and high-velocity sports (equestrianism, snow sports and motorcross). In a series of 77 patients undergoing surgery for acute ACJ dislocations (ranging from type III to V), concurrent labral injuries were identified in 14 of 77 patients at diagnostic arthroscopy.[5] However, apart than this, there appears to be no other reports of concurrent ACJ injuries and GHJ instability in the literature.

There is a general consensus that type V ACJ dislocations require surgical stabilization. Multiple techniques have been described with the most successful being based on various ways of reconstructing the coraco-clavicular ligaments.[6] The Weaver–Dunn procedure with its multiple modifications is based on transferring the coraco-acromial ligament from the anterior edge of the acromion into the lateral end of the clavicle. Newer techniques try to re-create the action of the coraco-clavicular ligaments by re-suspending the clavicle onto the coracoid.[5] Techniques using synthetic devices, tendon autograft or allograft and a 'tight-rope' either passed around or through the coracoid process have all been described.[6] However, regardless of the actual procedure, they are all dependant on the coracoid process being present, either in total or in part. Our patient had a symptomatic chronic type V ACJ subluxation and a concurrent failed soft-tissue anterior shoulder stabilization, both of which required surgical stabilization. Although treating the ACJ injury with a hook plate would have allowed us to undertake an arthroscopic Laterjet procedure for the recurrent GHJ instability, we had several concerns. There are multiple reports of complications with the use of hook plates such as postoperative pain, acromial erosion, fracture of the acromion or medial end of the clavicle and subacromial impingement warranting plate removal.[7–14] Furthermore, in chronic cases, the hook plate has to be augmented with a soft tissue reconstruction of the coraco-clavicular ligaments or, on removal of the implant, the ACJ will usually re-sublux. Our procedure of choice is therefore coracoid suspension using a LockDown implant.

An arthroscopic soft tissue Bankart repair is now established as the treatment choice for routine recurrent anterior dislocators with minimal bone loss.[13] However, studies have demonstrated a substantially higher failure rate following a soft-tissue stabilization in patients with more than 20% anterior inferior glenoid bone loss (the so-called 'inverted pear' glenoid), particularly in the context of an engaging Hill–Sachs defect.[8] On diagnostic arthroscopy [AQ3], if the Hill–Sachs defect engaged the glenoid within the physiological range of motion, we will abandon the soft tissue repair and proceed to re-create the glenoid arc. This can be achieved either by using a bone block or a coracoid transfer. Bone block procedures involve the use of autograft (iliac crest) or allograft (cortical tibial allograft, calcaneal allograft, fresh-frozen glenoid) to augment large glenoid defects. Originally described by Eden in 1918 and redefined by Hybinette in 1932, this procedure initially involved harvesting tibial autograft to fill in glenoid defects.[9,10] In its more common incarnation, a corticocancellous bone autograft is harvested from the iliac crest and secured to the anterior glenoid defect with screws. Despite reports of positive outcomes, this procedure is less popular as a result of complications such as lack of external rotation, donor site morbidity, osteoarthritis and recurrent instability in as many as 30% of cases.[5,15] Although bone block proponents argue that coracoid transfers distort the surgical field making further surgery high risk, they circumvent the problem of recurrent stability by incorporating the 'dynamic sling' effect of the conjoint tendon. As the patient's arm moves into abduction and external rotation, the conjoint tendon tightens over the front of the shoulder, helping to contain and stabilize the humeral head. This is of potential benefit when treating patients with associated ligamentous laxity, in contact athletes without significant bone loss, and after failure of a soft tissue stabilization regardless of bone loss.[8] There are two popular variations of the coracoid transfer. In the modified Bristow procedure, the terminal 1 cm of the coracoid process and the conjoint tendon are transferred through the subscapularis and fixed, end on, with a screw onto the glenoid below its equator.[11] The Latarjet procedure involves osteotomizing the coracoid process at its base, transferring it through the subscapularis and fixing it on its decorticated undersurface to the glenoid with two screws.[2,3] More recently, the Latarjet has found favour as its side on fixation is thought to better conform to the curvature of the glenoid.[12] In the context of recurrent GHJ instability secondary to a failed soft-tissue stabilization, we favour a coracoid transfer using a Latarjet. However, because we wanted to retain a sufficient length of coracoid stump to perform a suspensory ACJ reconstruction, we decided to undertake a Bristow procedure.

The Bristow Latarjet instability shoulder system can be used for all open coracoid transfers but an arthroscopic procedure has only been described for the Laterjet. We undertook a Bristow procedure arthroscopically, essentially using the technique describe for the Latarjet, apart from a few modified steps. We inserted the guidewire, overdrilled and screwed the top-hat washers into the tip of the coracoid through the J portal. Having undertaken the osteotomy, we then attached the single barrelled guide onto the coracoid tip to manipulate it through the subscapularis. We were able to maintain rotational stability of the graft on the end of the guide with an arthroscopic manipulator before securing it into position with a screw. We then passed the guidewire and the LockDown implant around the base of the coracoid stump under arthroscopic control.

Given the similarity in patient demographics and activities leading to ACJ and GHJ injuries, it is surprising that there are not more cases of patients who have sustained concurrent or synchronous injuries. Although most grade 3 ACJ injuries do not require surgery and grade 5 injuries are relatively rare, when operative intervention is required, the majority of procedures currently undertaken involve the use of the coracoid process.

Conclusions

Coracoid transfer procedures are commonly used in the management of GHJ instability associated with bone loss and poor soft tissues, as well as for revision stabilizations. The Latarjet procedure has recently been popularized over the Bristow procedure but involves transferring the whole of the coracoid process. However, this does not leave a sufficient coracoid stump to undertake an ACJ stabilization. Although this may not be a primary consideration when undertaking a coracoid transfer for GHJ instability, it may limit future surgical options should an associated or subsequent ACJ dislocation require surgical fixation.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical review and patient consent

Institutional sanctioned patient consent was obtained.

Level of evidence

Level V.

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