MANAGEMENT OF SHOULDER INSTABILITY IN A MILITARY POPULATION

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Abstract

Objectives: Recurrent instability is common after shoulder dislocation in the young, particularly those engaged in physical jobs or sport. The management of recurrent traumatic shoulder instability is predominantly operative. However, the best method of surgery i.e. open or arthroscopic is still a matter of debate. We have developed an algorithm to decide on the choice of surgery and the aim of this study is to report this and compare the two different groups of military patients.

Methods: A retrospective review of all shoulder stabilisations performed on military personnel, by a single surgeon, between August 2004 and August 2005 at a district general hospital serving both military and civilian population was undertaken. The presentation, clinical and operative findings were noted and compared in the groups treated by arthroscopic or open stabilisation.

Results: Using our protocol 39 shoulder stabilisations were performed in military personnel. Of the shoulders, 25 (64%) underwent arthroscopic and 14 (36%) underwent open stabilisation. The indication for surgery was more than 2 episodes of shoulder dislocation. Open surgery was found to be more common in those who had their first dislocation at a younger age. Bilateral shoulder laxity was the most common indication to choose the open method. Both open and arthroscopic stabilisation gave good results in the high demand military population. Only one patient had recurrent instability after arthroscopic procedure. However, this was not statistically significant when compared with open stabilisation.

Introduction

The shoulder joint is a balance between mobility and stability. Stability of the glenohumeral joint is critical for precise and strong function of the upper extremity. Shoulder dislocations account for almost 50% of all large joint dislocations [1]. Recurrence after a traumatic shoulder dislocation is as high as 66 to 92% [2,3]. An avulsion of the capsulolabral-ligamentous structures from the glenoid rim and scapular neck is the most common abnormality noted in patients with recurrent anterior shoulder instability. This lesion is commonly known as a Bankart lesion [4] (Figure 1). A commonly associated lesion is an indentation fracture of the postero- lateral humeral head created as the soft base of humeral head impacts against relatively hard anterior glenoid. This is known as the Hill-Sach's defect [5] (Figure 2).

Military personnel are prone to shoulder injury due to their high level of physically activity [6,7]. Studies have shown that there is a high chance of recurrence after shoulder dislocation in the military population [8]. Operative stabilisation whether open or arthroscopic has shown satisfactory results in high demand populations such as military recruits and athletes [9]. Open approaches have yielded consistently low rates of recurrent instability [10-13], however, proponents of arthroscopic stabilisation describe benefits related to less loss of motion and quicker return to sports [9]. As a result of this uncertainty, especially in relation to the different pathological lesions present, we developed an algorithm for selective arthroscopic or open stabilisation based on different aetiologies. The aim of this study is to report our initial experience with this algorithm.

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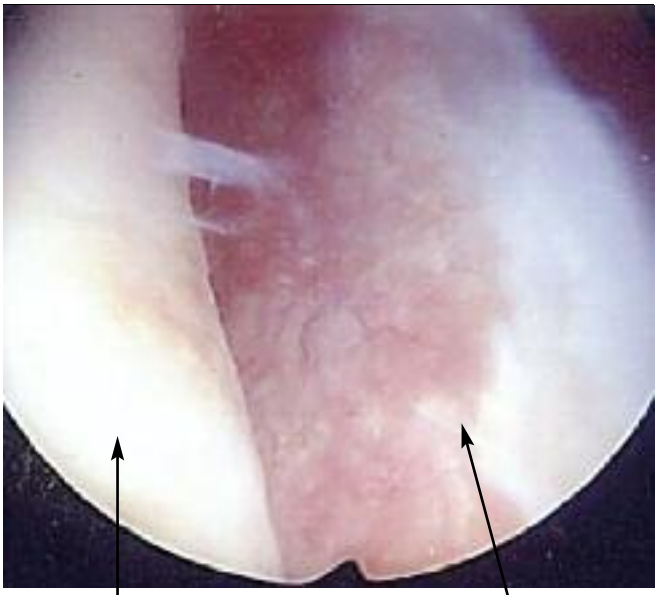


Figure 1 – Avulsion of the labrum – Bankart Lesion

Methods

A retrospective review of the medical records and operative notes of all the shoulder stabilizations performed by a single surgeon between August 2004 and August 2005 at a district general hospital serving both military and civilian population was undertaken. The presentation, clinical and operative findings were noted and compared in the arthroscopic and open stabilisation group.

All patients had a clear history of shoulder dislocation needing reduction and had at least 2 episodes of dislocation.

Figure 2 – Hill Sachs lesion, with indentation and loss of articular surface on the posterior aspect of the humeral head

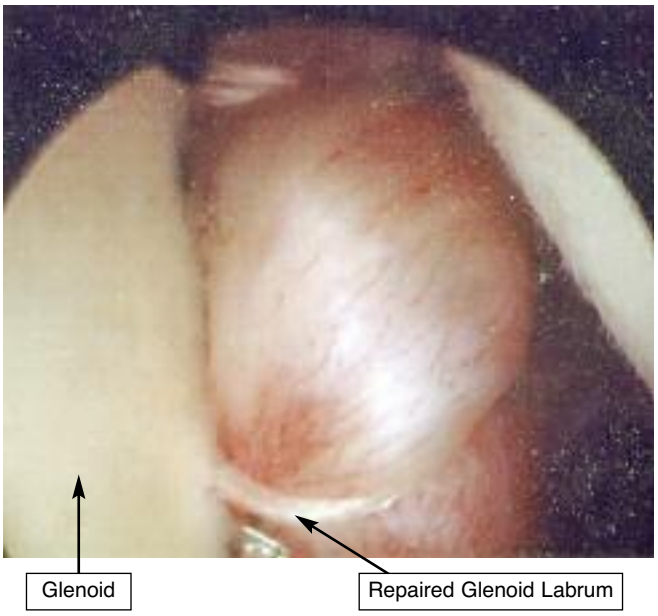


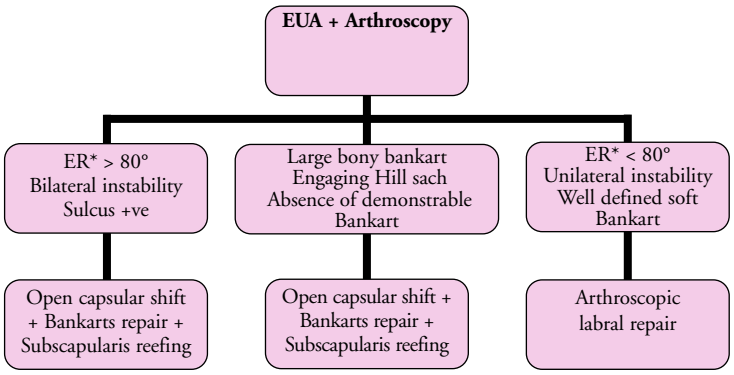
Figure 3 – Repaired Bankart lesion

Operative procedures

The senior author (JC) performed all operative procedures. All patients were positioned in beach chair position. All patients had a general anaesthetic with or without an interscalene block. Both shoulders were examined under anaesthesia.

An initial diagnostic glenohumeral arthroscopy was performed through a posterior portal. A systematic inspection was done to look for the SLAP, Bankart and the Hill-Sach lesions. A Hill Sachs lesion, if seen, was assessed to see if it was engaging or a non-engaging. The Hill-Sachs lesion was described as 'engaging' if its orientation or size was such that it engaged the anterior glenoid with the shoulder in abduction and external rotation before the shoulder dislocation i.e. the Hill Sachs caused the dislocation. SLAP (Superior Labrum Anterior and Posterior) are superior labral tears that begin posteriorly and extend anteriorly to include the anchor of the long head of biceps. These lesions are more common in the military population [14] and are best visualised and repaired at the time of arthroscopy.

The decision to proceed with open or arthroscopic procedure was taken after the EUA and arthroscopic examination (see algorithm). This algorithm was developed by the senior author (JC), prior to this study and was applied prospectively to the patients reported here.



* *ER = External rotation of shoulder with elbow behind body*

The arthroscopic labral repair (Figure 3) was carried out with bioabsorbable anchors; either bioknotless (Mitek) or 3.5 lactoscrew (Smith and Nephew). Three to four anchors were used depending on the extent of labral detachment. A concurrent SLAP lesion, if found, was repaired at the same time.

The open repair was performed through a deltopectoral approach preserving the cephalic vein. The conjoint tendon was retracted medially without division. Subscapularis was split in line of fibres with a vertical extension if required. It was then separated off the underlying capsule, which was opened laterally and the joint inspected. The anterior scapular neck was freshened and the capsulolabral complex was attached to it using one or two bioabsorbable anchors. Capsulorrhaphy was then used to address any capsular redundancy after the Bankart repair. The subscapularis tendon was repaired anatomically using No. 1 Ethibond.

Postoperative rehabilitation

Similar postoperative rehabilitation was followed in both groups. The arm was kept in a sling for 4 weeks. Abduction beyond 90 degrees and external rotation beyond neutral was not allowed for further 4 weeks. Unrestricted ranges of movements were allowed after 3 months and return to sports at 6 months.

Results

Between August 2004 and August 2006, 45 shoulder stabilisations were performed by the senior author, 39 of which were in military patients (all male) and form this study group. Of these 25 were arthroscopic stabilizations and 14 were open procedures. Table 1 illustrates the pathologies present, which determined the operative approach.

	Open	Arthroscopic
Number	14 (64%)	25 (36%)
Mean age at surgery	29 years	28.6 years
Mean age at first dislocation	19 years	24 years
Mean interval between 1st dislocation and surgery	54 months	47 months
Mean number of dislocations before surgery	3.8	4.7
Bilateral laxity	9 (64%)	0 (0%)
Bankarts lesion	6 (43%)	25 (100%)
Engaging Hill Sachs lesion	4 (29%)	0 (0%)
Non-engaging Hill Sachs lesion	2 (14%)	24 (96%)
SLAP lesion	0 (0%)	2 (8%)

Table 1. Demographics and findings at arthroscopy

All patients were reviewed at 8 weeks and 6 months. None were lost to follow up.

All except one patient returned to their original level of duty without any restrictions. We had one failure defined as recurrence of dislocation or instability. The failure was a 26 year old who had a history of 6 dislocations over a 2 period. He was found to have a deficient anterior and inferior rim at arthroscopy with a nonengaging Hill Sachs. He had persistent instability after an arthroscopic stabilisation and subsequently underwent a bone augmentation (Bristow) procedure. He returned to full duties and has had no symptoms of instability since then.

Open surgery was more commonly performed in those who had their first dislocation at a younger age, and bilateral shoulder laxity was the most common indication for the open stabilisation. We also found that only one out of 9 patients who had bilateral laxity had a well-defined Bankart lesion and none had an engaging Hill Sachs. There was no statistical difference in the age at surgery, the number of dislocations before surgery, and the interval between their first dislocation and surgery.

Discussion

As discussed above, military personnel are physically active and commonly suffer from recurrent shoulder instability. The advantages of arthroscopic techniques including less loss of motion, lower risk of subscapularis failure, quicker return to sports, and higher patient satisfaction [9], have obvious benefits. Arthroscopy also allows improved visualization of the capsulolabral-ligamentous complex as well as other articular lesions.

However, a systematic review and meta-analysis of the literature comparing arthroscopic with open repairs for recurrent anterior shoulder instability indicates that arthroscopic approaches are not as effective as open approaches in preventing recurrent instability or enabling patients to return to work [15]. Arthroscopic approaches, however, resulted in better function as reflected by the Rowe scores in the randomized clinical trials.

As a result of the conflicting literature, it is uncertain what the correct method in military personnel is. We believe that treatment of traumatic shoulder dislocation should address the mechanical problem causing recurrence. The mechanical problems are primarily Bankart lesions, Hill-Sachs lesions or capsular laxity. The degree of capsular laxity varies from person to person and may not correlate with laxity in other joints. We believe that with a lax capsule, less force is needed to dislocate and this causes lesser damage to the labrum (Bankart) or articular cartilage (Hill-Sachs).

Capsular laxity is the most important factor in recurrence. A good Bankart repair (open or arthroscopic) may fail if the capsular laxity is not addressed. There have been recent studies evaluating arthroscopic capsulorraphy [16]. However they have a steep learning curve and long term results are unknown.

Attempts to formulate an algorithm have been made before. A study by Bukhart et al showed that arthroscopic Bankart repairs give results equal to open Bankart repairs if there are no significant structural bone deficits [17]. He also reported that contact athletes without structural bone deficits may be treated by arthroscopic Bankart repair. This is consistent with our algorithm.

We do not routinely perform a preoperative MRI to detect pathology, as we do not think that it alters our management in any way. Magnetic resonance imaging is very sensitive for detecting Hill-Sachs and Bankart lesions. However, its ability to detect other pathologic lesions such as superior labral lesions, rotator cuff tear, capsular tear and redundancy, is limited [18]. We therefore use MR arthrography only in revision procedures.

Our study group consisted of soldiers assigned to a variety of duties who are unable to modify demands placed on the upper extremities and the shoulder in particular. Our current approach is to offer all military personnel with shoulder instability an operative stabilization. Patients are consented for both arthroscopic or open stabilization.

We found that patients who had their first dislocation at a younger age more often needed open surgery. We think that this may be due to pre-existing primary capsular laxity in these patients, demonstrated by excessive external rotation and bilateral sulcus or instability. These patients may have localized shoulder laxity in the absence of generalized hyper laxity. Our high (early) success rate would appear to support the basis for our decision algorithim.

The limitations of our study are that it is retrospective and a short follow up of 6 months. But the patients were discharged only when they had returned to full duties consistent with short term success. We are now conducting a longer term prospective study to better the assessment of our algorithm.

In conclusion, we believe both open and arthroscopic stabilization give good results in the high demand military population if patients are appropriately chosen, based on findings at arthroscopy.

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