Arthroscopic Repair of the Recurrent Anterior Shoulder Dislocation (El-Zahaar and Mahdy Simplified Technique)

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Abstract. Twenty-four recurrent anterior traumatic unidirectional shoulder dislocations were stabilized arthroscopically with a muscular capsulolabral suturing technique. A Bankart lesion was diagnosed and repaired in all cases. Postoperative follow-up averaged 26 months (range 24–36 months). All results were rated excellent. All patients achieved full, painless range of motion, and no instances of postoperative instability occurred. There was one complication with stitch sinus. The details of the operative technique are described.

Introduction

There are 3 pathomechanical factors described in the literature suggesting the cause for the development of the recurring problem of shoulder dislocation. These are the inadequate capsule/ligament apparatus of the shoulder [1], the Bankart lesion [2] and the Hill–Sachs lesion [3]. Based on these 3 pathomechanical mechanisms, 3 general approaches are reported to stabilize the shoulder.

The first general approach is to transpose the anterior muscles, especially the subscapularis muscle limiting the external rotation [4]. The second approach is to stabilize the joint using the capsule and its ligaments. The Bankart style reconstruction of the inferior glenohumeral ligament is the most widely used procedure [5–7] of this type. The last approach is a rotational osteotomy to prevent the Hill–Sachs lesion from hanging over the anterior glenoid [8]. All these procedures have such complications as limited external rotation, difficult techniques, excessive blood loss, complications of metallic fixation, and prolonged morbidity.

New dynamic and biomechanical examination of the mobility of the shoulder joint demonstrates that the subscapularis muscle and the middle and inferior glenohumeral ligaments play an essential role in the stabilization of the shoulder joint with adduction of the arm [9]. All recurrent anterior dislocation of the shoulder exhibited increased laxity and decreased tone of the subscapularis muscle. In 33% of the shoulders, the dislocated humeral head fitted into a large synovial pouch on the anterior aspect of the neck of the scapula extending to the base of the coracoid process [10]. Labral tears of the shoulder including the middle and inferior glenohumeral ligaments and the corresponding part of the capsule constitute labral complex pathology, which is the main factor in anterior recurrent dislocation of the shoulder where the head escapes and engages the anteroinferior pouch.

Bankart procedure is commonly used because of its success rate [5–7,11]. However, it often leaves the patient with limited external rotation. It is technically difficult to expose the anterior glenoid rim sufficiently to be able to drill holes in it. Therefore, anterior capsular plication procedures which are much simpler to accomplish, were developed [5,6,11,12].

Arthroscopic knee surgery, with its low morbidity rate and early complete rehabilitation, encouraged similar attempts at diagnostic arthroscopic surgery of the shoulder [12–15], and arthroscopic stabilization of the shoulder joint [12,16]. The advantage of the arthroscopic procedure is minimal surgical trauma, allowing a lowered morbidity and a shortened hospital stay and rehabilitation period.

The purpose of this article is to report our experience with an arthroscopic procedure developed to reattach the Bankart lesion by suture to the anterior glenoid rim and scapular neck with shortening of the anterior capsule and subscapularis in a selected group of recurrent traumatic unidirectional anterior shoulder dissociations.

Materials and Methods

We wished to treat only recurrent traumatic unidirectional anterior shoulder dislocation with this procedure; thus, patients with symptoms of shoulder instability were carefully screened by history and physical examination to exclude subluxation, and the inferior and multidirectionally unstable group defined by Neer and Foster [17]. All patients who underwent arthroscopic stabilization had a preoperative history of recurrent (3 or more) traumatic
shoulder dislocations, of which at least 3 were documented radiographically and required a manipulative reduction. All patients had a preoperative positive apprehension sign in 90° of abduction with external rotation, as well as tenderness to deep pressure along the anterior glenoid region with the shoulder in a neutral position. No patient had multiple apprehension signs, a "sulcus sign" to downward arm traction, or a nontraumatic or voluntary history to their dislocations. All patients were evaluated with standard plain radiographs of the involved shoulder, including anterior posterior films with rotational view and a "West Point" axillary view.

Twenty-four young athletic patients were observed for a minimum of 2 years and they were checked regularly every 3 months for repeated evaluations. This group consisted of 19 males and 5 females whose ages ranged between 17 and 31 years with an average of 24.5 years. The mean period of observation was 26 months (range 24–36 months). The dominant side was affected in all the patients as 21 shoulders were of the right side and the remaining 3 were dominantly left-sided. The duration of instability for a complete traumatic luxation ranged from 3 months to 2 years (average of 1–2 years). Fifteen patients were injured during the repeated vigorous muscle training while 9 sustained their injuries during hard competition in strong sports. All the patients were dislocated repeatedly 4–12 times (mean 8), and 12 patients were able to reduce their dislocated shoulders independently without the need of an orthopedist’s help. The mean interval between the last dislocation and arthroscopic repair was 4–12 weeks (mean 8 weeks). Preoperative arthroscopic findings were middle or inferior labral detachments, or inverted labrum inside the joint and redundant capsule.

Operative Technique

After endotracheal entubation anesthesia, the patient is placed in a lateral position. Examination of the shoulder is performed. Through a standard posterior portal, the arthroscope is introduced. Examination of the labrum, capsule, and glenohumeral ligament is done under direct vision identifying the pathology. An anterior portal is made, through which a 7-mm inner diameter cannula is placed. A motorized suction abrader is placed through the anterior cannula, and under direct arthroscopic visualization, is used to abrade the glenoid rim and scapular neck anteriorly for the entire extent of the Bankart separation.

A sharp curved long needle with a single strand of #2 silk suture material is inserted anteriorly into the shoulder joint. Under direct arthroscopic visualization the tip of the needle is passed laterally through the middle of the glenohumeral ligament near the humeral origin and progressed to the separated labrum. Then, after passing the labrum, the needle takes its way through the skin. Its exit will be medial to the inlet about more than 1 inch and in the same horizontal plane. During the exit the needle passes the skin, superficial and deep fasciae, deltoid, subscapularis, capsule, and glenohumeral ligament. During the exit, it passes the labrum, capsule, subscapularis, short head of biceps, coracobrachialis, deltoid or pectoralis major, deep and superficial fasciae, and skin. Another needle is passed just below the first suture by about half an inch. This suture is passed through the inferior glenohumeral ligament and the inferior pouch with the labrum in its way out the skin below the first exit (Figures 1 and 2).

A large sharp aneurysmal needle is passed from the first inlet to its exit below the deltoid and above the subscapularis, carrying with it the strand of the inlet, in its eye, to the exit opening. The strand is released from the aneurysmal needle’s eye. The aneurysmal needle is pulled single (without the strand) out of the skin. The same procedure is repeated in the lower stitch (Figure 3).

The arm is internally rotated and both stitches are knotted firmly just above the subscapularis. The strands are cut short as deep as possible (Figures 4 and 5).

Postoperatively, the arm is strapped to the trunk with adhesive plaster in abduction and internal rotation for 3 weeks. The patient is mobilized on the first postoperative day and is discharged within 2–3 days especially if there is no general or local signs of infection. After removal of the bandage, passive and then active exercises are performed. The forced abduction and external rotation is permitted after the sixth postoperative week. Sports are resumed after about 3 months.

Results

Radiographic Findings

In the axillary projection, 8 shoulders had a Hill–Sachs lesion of the posterolateral humeral head. No bony Ban-
Fig. 2. The needle-exit will be medial to the inlet just more than 1 inch and in the same horizontal plane. Another needle is passed just below the first suture by about half an inch.

Fig. 3. A large aneurysmal needle is passed from the first inlet to its exit below the deltoid and above the subscapularies, carrying with it the strand of the inlet, in its eye, to the exit opening out through the skin.

Fig. 4. The arm is internally rotated and both stitches are knotted.

Fig. 5. The knots are just above the subscapularis and cut short.

terior labral tears (flap or bucket handle) were excluded from this series; however, most cases had fraying of the leading edge. An associated Hill–Sach lesion of the posterolateral humeral head was documented in 14 shoulders was graded as mild in 50%, moderate in 50%, and severe in none. No significant abnormalities of the biceps tendon, glenoid articular cartilage, posterior labrum, or undersurface of the rotator cuff were identified.

Clinical Rating

Using a shoulder rating system described by Rowe et al. [18] which awards points for stability, motion, function, and pain, we rated all 24 shoulders excellent. All patients except 1 achieved full, active range of motion, resolved their preoperative positive apprehension sign, and were able to return to their preinjury level of activity without symptoms of pain or instability. No postoperative dislocations or symptoms of subluxation had occurred. During the postoperative period, most patients obtained full shoulder motion by 3 months.

Complications

Only 1 (4.1%) case had infected stitch sinus and was cured after stitch removal and chemical cauterization of the wound with silver nitrate. This case was treated for 1 month conservatively without improvement until removal of the stitches. After 6 months there was no pain nor instability, and good motion and function.

There was limitation in abduction movement at 15° in only 1 patient at a rate of 4.1%. Limited external rotation was also recorded in 2 (8.2%) patients. One patient was studied with limitation of both external rotation with 90° adduction (4.1%). That may be because of the excessive intraoperative capsular gathering.

Arthroscopic Findings

All 24 shoulders in this series had a Bankart lesion at diagnostic arthroscopy. Cases with secondary large an-
To date, none of the 31 cases demonstrated early complications involving neurovascular damage, infection, or degenerative changes observed during radiography (Table 1).

All the patients were participating actively in the same sport and hard training exercises at the time of post-operative evaluation.

Discussion

Recurrent dislocation of the shoulder is one of the orthopedic problems that only requires operative interference. The objective of any surgical intervention in its stabilization should be to prevent recurrence and to achieve free mobility of the shoulder joint. The Bankart procedure is commonly used because of its success rate [5-7,11]; however, it often leaves the patient with limited external rotation. It is technically difficult to expose the anterior glenoid rim sufficiently to be able to drill holes in it. Therefore, anterior capsule plication procedures [5,6,11,12], which are much simpler to accomplish, were developed.

Arthroscopy and arthroscopic surgery is now becoming widely used in the knee and other joints. In the shoulder, it was used originally as a diagnostic tool for varied shoulder pathology and recurrent dislocations [6,14,19]. Many surgical techniques have been developed employing arthroscopy aiming at minimizing the surgical trauma, allowing a low morbidity and shortening the hospital stay and rehabilitation period together with avoiding the limitation of the shoulder external rotation movement.

This procedure was developed in an attempt to secure arthroscopically the anterior capsule structures of a Bankart lesion anatomically back to the glenoid rim and scapular neck, to close the inferior pouch, and to shorten both the capsule and the subscapularis muscle. There is no drilling through the scapula, nor using internal metallic fixation avoiding their complications (loosening, breakage, improper placement, migration, and cutting of the anterior capsular structures).

The clinical results of this series to date appear to have achieved this goal. In this collection of young trauma patients, no degenerative changes were present in the labral tear.

Accordingly, there are many techniques described for open repair, and the general rule in surgery is to adapt the repair to deal with the pathological changes. There are many complications for open repair including the disfiguring scar, blood loss and complications of transfusion, limitation of shoulder adduction and external rotation, and long hospitalization.

The morbidity of such an arthroscopic suture is minimal, with the trauma and very minute scars, which results in a good cosmetic result. Even though no intraoperative complications occurred, it must be noted that extravasation and generalized swelling of the entire shoulder joint may prolong the operative time due to difficult orientation for bony landmarks of the shoulder. Thus, it is essential before surgery to color the shoulder landmarks with a sterile methylene blue.

Because we report only on early results, it is unknown whether or not this procedure will circumvent recurrence of shoulder dislocation. We therefore plan to follow these patients regularly to compare the long-term results with the open Bankart procedure.

Conclusions

In this series of patients carefully screened to include only recurrent traumatic unidirectional anterior shoulder dislocation, a Bankart lesion was found in all cases. The early results of repair of this lesion by this arthroscopically assisted suturing technique was safely and successfully accomplished with excellent results without any recurrence of dislocation and without complications. Advantages over conventional open procedures include full shoulder range of motion and lower cost.

Table 1. Traumatic luxations

<table>
<thead>
<tr>
<th>Direction of loss</th>
<th>Degree of loss</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abduction</td>
<td>15</td>
<td>1</td>
<td>4.1%</td>
</tr>
<tr>
<td>External rotation</td>
<td>10</td>
<td>2</td>
<td>8.2%</td>
</tr>
<tr>
<td>External rotation with 90° abduction</td>
<td>20</td>
<td>1</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

References

3. Hill HA, Sachs MD. The groove defect of humeral head, a frequently unrecognized complication of dislocation of the shoulder joint. Radiology 1940; 35:690
4. Magnusson PB, Stock JK. Recurrent dislocation of the shoulder. JAMA 1943; 123:889