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Arthroscopic Treatment of the First Anterior Shoulder Dislocation in Young Skiers

ABSTRACT: The purpose of this paper was to describe the results of arthroscopic shoulder stabilization in skiers following the first episode of anterior dislocation. Between 1999 and 2001, 18 patients aged 19–27 years were treated arthroscopically following an acute, primary anterior shoulder dislocation. All patients were active skiers and were injured during skiing. The detached anterior labrum was reattached on the glenoid articular surface using 2–5 bone anchors, mainly metallic. Postoperative evaluation was performed with the Rowe-Zarins scale with a mean follow up of 31 months. There have been no recurrences and all patients returned to their preinjury level. According to the Rowe-Zarins scale the outcome was excellent in 15/17 cases. Arthroscopic shoulder stabilization in selected, active patients provides good mid-term functional results. The quality of glenohumeral ligaments was better compared to patients with chronic instability and the secondary injuries were less common.

KEYWORDS: arthroscopy, arthroscopic stabilization, Bankart lesion, dislocation, instability, primary anterior dislocation, shoulder, suture anchor

Introduction

The shoulder is one of the most complex joints in the body allowing significant range of motion. The glenohumeral joint is inherently unstable and its stability relies on the condition of the glenohumeral ligaments and the surrounding muscles. Shoulder dislocation is a common injury affecting young people. The direction of traumatic shoulder instability is usually anterior and the major finding is avulsion or tear of the anterior labrum and capsule, which is called a Bankart lesion. The healing potential of the injury is low resulting in shoulder dysfunction. Age is the most significant prognostic factor for recurrence of dislocations and subluxations. Patients under the age of 20 display a recurrence rate of more than 90 % [1–3].

Shoulder instability represents a spectrum of pathophysiological disorders, which have to be elaborated and treated accordingly. A patient with an unstable shoulder may present with episodes of subluxation or complete dislocations. In patients with uncompensated instability surgical treatment is advocated. The treatment of choice, i.e., open versus arthroscopic is a matter of debate. Arthroscopic treatment of anterior shoulder instability is a continuously evolving surgical technique with various technical details and difficulties, while the learning curve is considered steep. Open reconstruction is still the gold standard with which all arthroscopic procedures must be compared.

Shoulder dislocation in a young, active patient engaged in sporting activities represents a patient group, which necessitates special attention.

Arthroscopic treatment of the first shoulder dislocation in selected active patients may provide better results compared to conservative treatment.

The purpose of this paper was to evaluate the results of arthroscopic shoulder stabilization in 18 patients following the first episode of anterior dislocation.

Patients and Methods

This is a case series of 18 patients aged 19–27 years (mean age 22.4 years), who were treated arthroscopically following an acute, primary anterior shoulder dislocation. All patients were men, active skiers

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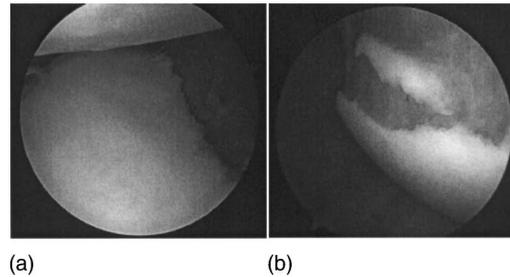


FIG. 1—Arthroscopic findings in an anteriorly dislocated shoulder. Arthroscopic view of the Bankart lesion in the left shoulder of patient in the lateral decubitus position. The labrum and capsule are avulsed from the anterior glenoid rim, where cartilage injury is noted [Fig. 1(a)]. In Fig. 2(b) a Hills-Sachs lesion represents a compression fracture of the articular surface in posterolateral part of the humeral head.

and were injured during skiing. All had a preoperative MRI performed and the intraarticular lesions were verified through arthroscopy. The shoulder was arthroscopically reconstructed within the first week after the injury using suture anchors. Patients with atraumatic or chronic instability were excluded. All patients had a Bankart and a Hill-Sachs lesion. All patients were followed in a dedicated follow up clinic at regular intervals. Evaluation of the results was performed according to the Rowe-Zarins scale, which includes objective criteria of shoulder stability and mobility and the subjective satisfaction of the patient. The maximum score in the Rowe scale is 100. A score of >89 points is considered very good, between 75 and 89 points good, between 51 and 74 moderate, and less than 51 points poor.

Operative Technique

All operations were performed in the lateral decubitus position with lateral arm traction. General anaesthesia was administered and interscalene brachial plexus block was performed to provide postoperative analgesia.

The glenohumeral joint was inspected with a 30° arthroscope through a standard posterior portal and the operation was carried out through the anterosuperior and anteroinferior working portals. All anterior portals were created lateral to the coracoid and superior to the upper border of the subscapularis tendon to avoid neurovascular injuries with the inside-out technique and arthroscopic cannulas were used to facilitate instrument passage. Correct placement of the portals is necessary to allow access to the inferior glenohumeral ligament and to facilitate correct anchor placement. The intraarticular pressure was kept constant at 40 mm Hg with an arthroscopic pump. The condition of the articular cartilage, ligaments, labrum, biceps tendon and of the underside of the rotator cuff were evaluated. The subacromial bursa and the rotator cuff were examined after redirecting the arthroscope into the subacromial space. Detailed description and video recordings of all pathological findings was performed.

Following the initial inspection the arthroscope was switched to the anterosuperior portal to examine and mobilize the Bankart lesion (Figs. 1–5). Recreation of the labral bumper was the aim of arthroscopic instability repair. An electrocautery device was inserted through the anteroinferior portal to mobilize the avulsed capsule and labrum from the glenoid neck and the underlying subscapularis. In acute dislocations

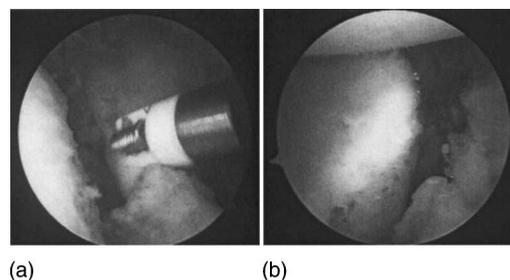


FIG. 2—The anterior labrum is mobilized from the glenoid neck and subscapularis to restore capsular tension [Fig. 2(a)]. The mobilized anterior labrum and capsule viewed from the anterosuperior portal [Fig. 2(b)].

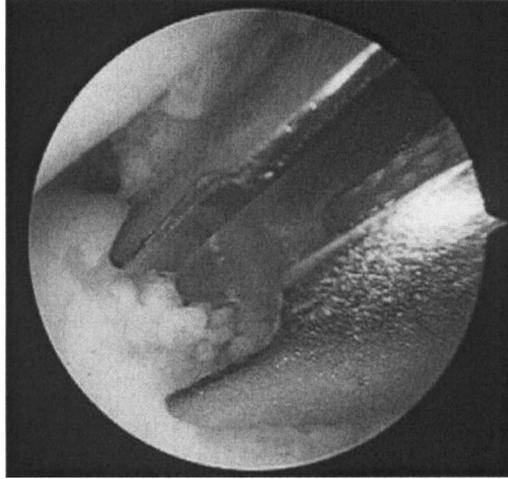


FIG. 3—A bioabsorbable Panalok anchor (Mitek, Johnson & Johnson) is inserted into the glenoid face. The first anchor to be placed is the most inferior one, 2–3 mm on the glenoid face to provide adequate bony purchase.

mobilization is straightforward compared to chronic cases where the capsule assumes a medialized position and is strongly attached to the underlying tissue. The scapular neck was abraded with a motorized burr down to bleeding bone to improve soft tissue healing. The labrum and capsule were reattached to the glenoid using 2–5 suture anchors, both metallic and bioabsorbable. In 14 cases only bioabsorbable anchors were used (Panalok, Mitek, Norwood, MA), in three cases only metallic Corkscrew anchors (Arthrex, Naples, FL) were used and in one case a combination of both was used. All anchors were loaded with

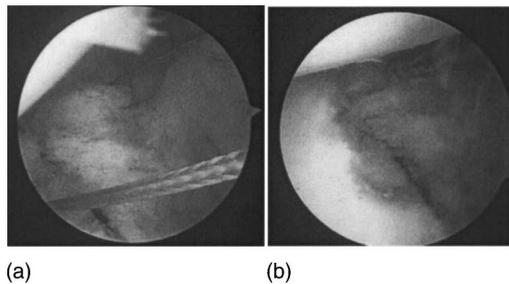


FIG. 4—A nonabsorbable suture is passed through the capsule [Fig. 4(a)]. The avulsed capsule is reattached with a locking sliding knot [Fig. 4(b)].

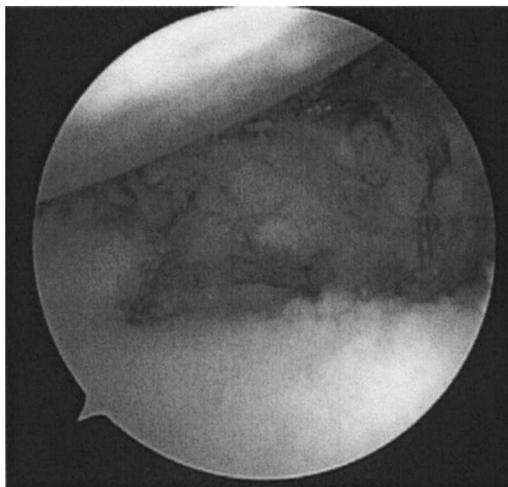


FIG. 5—Recreation of the labral bumper. The avulsed labrum is reattached using suture anchors and capsular tension is restored.

nonabsorbable sutures. Rotator interval closure and capsular shrinkage using absorbable sutures was performed in two cases with capsular laxity to ensure restoration of capsular tension. Capsular shrinkage was rarely performed by us and was finally abandoned because we think it is not appropriate to damage the capsule to provide a more or less reversible shrinkage. Shrinkage can be carried out more effectively using sutures and anchors.

After completion of the operation a sling was placed on the arm to prevent abduction and external rotation. The rehabilitation protocol was tailored to each patient and was closely supervised. The rate of progress was different in each patient and although the general rehabilitation goals and the time frame were respected the protocols were individualized. The arm was placed in a swath for three weeks and external rotation was not permitted. During the first four weeks passive range of motion exercises were performed along with isometric exercises for abduction/adduction and flexion/extension. From week 4 the range of permitted motion was increased excluding external rotation, which was initiated after week 8. Participation in sporting activities was allowed six months after the surgery. Follow-up investigations were performed at six weeks and at 3, 12, and 24 months, evaluating the range of motion, apprehension sign, relocation test, and the Rowe score.

In summary, the success of arthroscopic shoulder stabilization depends on the successful completion of several critical steps:

1. mobilization of the avulsed glenohumeral ligaments
2. freshening of the glenoid neck
3. reattachment of the labrum on the glenoid articular surface to avoid creation of an iatrogenic ALPSA (Anterior Labrum Periosteal Sleeve Avulsion) lesion
4. inferior to superior shift of the ligaments
5. insertion of 2–4 suture anchors
6. addressing associated lesions, such as SLAP (Superior Labrum Anterior to Posterior) lesions, rotator interval or capsular laxity
7. individualized and supervised postoperative rehabilitation

Results

During arthroscopy presence of a distinct Bankart and a Hill-Sachs lesion was evident in all patients. In two patients a SLAP II lesion was found, which was repaired using suture anchors. Loose bodies were removed from the shoulder joint of six patients. In one patient a small Bankart fracture was found, the presence of which was neglected and capsular repair was carried out in the usual fashion. There was no engaging Hill-Sachs lesion or inverted pear glenoid (glenoid with a significant anterior and inferior bone loss) in any of our patients. Partial tear of the articular surface of the rotator cuff was found in three patients, and was treated with debridement.

The follow-up ranged between 21 and 40 months (31 months), while only one patient was lost to follow up. There has been no recurrence until the present and all patients returned to their preinjury activity level. Patients were not allowed to return to sports earlier than six months postoperatively, although a few of them were comfortable after 4–5 months. According to the Rowe-Zarins scale the outcome was excellent in 16/17 cases. The average postoperative Rowe-Zarin score was 96.7 (88–100). There was no infection or any serious neurovascular complications, while only one patient developed stiffness, necessitating arthroscopic arthrolysis, with no further problems. Finally, there was no case with an external rotation deficit greater than 5 degrees.

Discussion

The treatment of first-time traumatic shoulder dislocation poses a difficult treatment problem. The results of conservative treatment in young, active patients are less satisfactory compared with older, less active patients. The redislocation rate in the more active patient group is high and primary repair has been advocated to reduce the incidence [4–8].

Arthroscopic techniques were considered to be not as successful as open techniques [6,7]. With the advent of arthroscopic techniques, arthroscopy was considered a panacea for all instability cases and was employed without selection to all patients. Additionally, the initially used techniques were unsatisfactory

and continued to evolve and this explains the variable results of the initial studies.

In recent years several studies have been published reporting very good results using arthroscopic techniques to treat the unstable shoulder [4]. The improvement of the arthroscopic results was due to improvement of surgical techniques, better understanding of the pathophysiology of shoulder instability, and better patient selection.

A more aggressive approach has been recommended during the last years in young athletes for the treatment of traumatic anterior shoulder instability because conservative management in this patient group is associated with high rates of recurrent instability [2–7]. Additionally, with immediate stabilization progressive secondary morbidity is avoided and the quality of life is improved in this age and activity level group compared to patients treated conservatively [5–7].

The most important prognostic factor for shoulder instability recurrence is age, while in patients younger than 20 years the recurrence rate is as high as 94 % [1,2,8]. Recurrence rates between 17–100 % have been reported with the highest rates of recurrence in the youngest patients [9–12]. Redislocation of the shoulder during the first six weeks after a primary dislocation occurs in patients with severe soft tissue disruption and significant bone lesions [13].

According to our results arthroscopic shoulder stabilization in selected, active patients provided good mid-term functional results. The quality of the glenohumeral ligaments is better compared to patients with chronic instability and the secondary injuries less common. Arthroscopic stabilization of first time dislocators is in our opinion the treatment of choice in active patients, who wish to return to their pre-injury competition level. Further studies are necessary to compare the benefits of shoulder stabilization in this patient group.

A variety of surgical treatment options are available for shoulder instability. The goal of reconstructive surgery in these patients is to reattach the avulsed anterior labrum and capsule and to tighten the loose or overstretched capsular tissue and ligaments. This goal can be achieved either by employing open or arthroscopic techniques.

The number of redislocations increases with time following any treatment, whether conservative or surgical [14].

Open shoulder reconstruction provides better results compared to older arthroscopic techniques such as Bankart repair using transglenoid sutures or bioabsorbable tacks, but this is not the case when compared with newer arthroscopic techniques using suture anchors [15–17]. The morbidity of arthroscopic repair is less, the cosmetic result better, the postoperative pain less, and the preservation of shoulder motion better [18].

Immediate shoulder stabilization versus conservative treatment has been examined in two studies [19,20]. In the first study the recurrence rate with nonoperative treatment was 47 % compared to 15 % following immediate stabilization [19]. The second study disclosed a recurrence rate of 79 % with conservative treatment compared to 11 % with surgery [20].

Following surgical treatment the quality of life improves significantly in the stabilized group compared to those treated nonoperatively. The improvements includes all four domains: physical symptoms and pain, sport and sport function, lifestyle and social functioning, and emotional well-being [19,21].

Patient selection is critical as with any other procedure. The ideal candidate for primary dislocation arthroscopic stabilization is the 18- to 30-years old athlete with a dominant shoulder injury. The condition of the shoulder ligaments are relatively good after the first dislocation. Recurrence increases the incidence of secondary injuries.

In all published series arthroscopic shoulder stabilization provides better results compared to conservative treatment in young athletic patients [8,22–25]. Good results from arthroscopic stabilization of the shoulder for acute primary dislocations using the transglenoid suture technique or tacks have been reported [26–28]. Although it is not a generally accepted practice arthroscopic lavage was shown to provide superior results compared with nonoperative treatment after the primary anterior shoulder dislocation [29].

Unfortunately, arthroscopic shoulder stabilization procedures are technically demanding with a steep learning curve and most surgeons are not adequately trained to perform them. Even among experienced surgeons, significant failure rates have been reported. Despite advances in arthroscopic stabilization, during the last decade the most common complication of arthroscopic stabilization remains recurrent instability.

Significant glenoid bone deficiency, giving the appearance of an inverted pear, an engaging Hill-Sachs

lesion, the absence of a discrete Bankart lesion, and poor capsuloligamentous tissue quality represent contraindications for arthroscopic shoulder reconstruction. When proper techniques are used participation in collision and contact sports is not a contraindication for arthroscopic anterior shoulder stabilization [30].

The surgeon should be prepared to convert an arthroscopic procedure to an open one when the arthroscopic findings contraindicate performing an arthroscopic reconstruction [31]. In conclusion, despite the technical difficulties inherent with arthroscopic shoulder surgery the first shoulder dislocation may be treated successfully in young, highly active patients.

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