

Arthroscopically Determined Degree of Injury After Shoulder Dislocation Relates to Recurrence Rate

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Abstract

Background The glenohumeral joint is the most mobile articulation in the body and the most commonly dislocated diarthrodial joint with peaks in the incidence of dislocation occurring during the second and sixth decades. Age at the time of the initial dislocation is inversely related to the recurrence rate. Traumatic anterior instability is often associated with intraarticular injuries. The frequency of injuries may increase with dislocation or subluxation episodes.

Questions/purposes We compared the frequency of lesions associated with traumatic anterior instability in patients with primary and recurrent instability.

Methods We retrospectively reviewed 96 selected patients with traumatic anterior instability treated arthroscopically between 2005 and 2008. Forty-five had arthroscopy after a first episode of dislocation (Group I) and 51 had two or more episodes of instability (Group II). We compared the frequencies and percentage of intra-articular lesions in both groups.

Results We observed a Bankart lesion in all patients of both groups. The posterior Bankart lesion was observed more frequently in Group II than in Group I: 47% versus 28%. SLAP lesions were observed in 12% in Group I and

24% in Group II. In 10 patients in Group II, there was an associated rotator cuff tear.

Conclusions Patients with recurrent shoulder dislocation had a higher arthroscopic degree of injury. These patients presented more posterior labral lesions, SLAP tears, and rotator cuff pathology than patients with a first episode of shoulder dislocation.

Level of Evidence Level II, prognostic study. See Guidelines for Authors for a complete description of levels of evidence.

Introduction

The shoulder has the largest ROM of all joints in the human body, and preservation of its stability is essential to its function [10]. Glenohumeral joint stability results from static and dynamic restraints as well as negative intra-articular pressure and concavity compression. It is unstable only in pathologic states and is susceptible to a variety of injuries. Traumatic injury is the major cause of shoulder instability, accounting for approximately 95% of shoulder dislocations. The overall incidence of shoulder dislocation in adults aged between 18 and 70 years was 1.7% in one report and three times more common in male patients [9]. The prevalence of dislocations in patients younger than 21 years is 19.7 in 10,000 for men and 5.01 in 10,000 for women [13]. Anterior shoulder instability can be functional instability, microinstability as well as subluxation or dislocation. Age at the time of the initial dislocation is inversely related to the recurrence rate: recurrent dislocation is higher in patients younger than 20 years old. Acute and recurrent anterior shoulder instability is accompanied by secondary injuries of the humeral head, articular cartilage, anterior and posterior capsule, glenohumeral

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ligaments, and glenoid and biceps tendon. Major injuries frequently occur during the initial shoulder dislocation event [22]. In patients younger than 20 years of age, recurrent dislocation rates may be as high as 90% in the athletic population. The rate of recurrences drops to 50% to 75% in patients 20 to 25 years of age [3]. The severity of labral lesions in posttraumatic shoulder instability may increase with time [7].

All reconstructive procedures in the unstable shoulder are intended to reduce the amount of pathologic translation and avoid secondary morbidity. In the ACL-deficient knee, several studies suggest delay in ACL reconstruction is associated with increases in the incidence of associated meniscal and osteochondral injuries [11, 12]. It is unclear whether recurrent instability of the shoulder is associated with such associated injuries.

We therefore asked whether the frequency of injuries associated with anterior traumatic instability increases with the number of episodes of dislocation.

Patients and Methods

We retrospectively reviewed 96 selected patients with traumatic anterior instability treated arthroscopically between 2005 and 2008. Forty-five had arthroscopy after a first episode of dislocation (Group I) and 51 had two or more episodes of instability (Group II). We compared the frequencies and percentage of intraarticular lesions in both groups. The indications for surgery were: (1) first episode in patients younger than 22 years old; (2) recurrent symptomatic instability; and (3) high-risk sports activities (rugby, soccer). We excluded patients with previous shoulder injury but without instability, previous shoulder surgery, multidirectional instability, concomitant ipsilateral fracture with dislocation (other than Hill Sachs), and symptomatic or asymptomatic laxity. Patients were divided into two groups. Group I consisted of 45 patients with a first episode of dislocation with an average age of 22.3 years. Group II consisted of 51 patients with two or more episodes of dislocation with an average age of 33.4 years. All acute dislocations were confirmed by radiography and MRI was performed. In patients with recurrent dislocations, we performed arthro-MRI. The index surgery was performed between 10 days and 1 year after the first episode of dislocation and between 4 months and 2 years in patients with recurrent instability. In all patients, a discrete shoulder injury episode was reported, whereas none had a history of shoulder instability or other shoulder symptoms before dislocation. The occurrence of dislocation was verified radiographically in 96% of the patients. The first dislocation occurred during athletic

contact activities in 78% and after a motor vehicle accident in 7%.

The preoperative diagnostic evaluation included a detailed history, clinical examination, and imaging studies. The clinical evaluation included performance of the anterior and posterior drawer tests, the sulcus test, and the apprehension and relocation tests. The preoperative radiographic evaluation included AP and axillary views. In Group I we performed an MRI, whereas in Group II we performed arthro-MRI.

All patients were operated on by the same surgical team (VG, JM, MP, FR). All procedures were performed with the patient in the lateral decubitus position. The shoulder received systematic evaluation while posterior and anterior portals were created. Increased capsular volume at arthroscopy was based on the presence of a drive-through sign and redundancy of the capsule and glenohumeral ligaments with and without saline solution distention of the joint. Other criteria were the presence of external rotation greater than 80° and at least 50% anterior humeral head translation during arthroscopy. Labral repairs were performed if necessary. After completion of the operation and infiltration with local anesthetic, the skin wounds were sutured and the upper limb was immobilized.

Patients were allowed to remove the sling to do pendulum exercises on their own 2 days after surgery and encouraged to exercise the elbow, wrist, and hand. After 3 weeks, patients were free of immobilization and started supervised physical therapy three times a week. The fourth month after surgery, patients were allowed to start sport-related activity in the gym.

Patient followup was weekly the first month, every 2 weeks during the second month, and monthly until the end of fifth month when patients were allowed to return to sports. During followup visits, ROM, presence of pain, and muscle strength were evaluated. All authors independently reviewed the surgical records and videos of all cases.

We compared the frequencies of injuries between the two groups and used a parametric unpaired t-test. We determined whether the frequency of injuries was greater with greater age.

Results

The percentage of patients with a posterior Bankart lesion was lower ($p < 0.001$) in Group I. The frequency of SLAP lesions (superior labrum from anterior to posterior) was higher ($p < 0.001$) in Group II. We observed more ($p < 0.001$) frequent rotator cuff tears in Group II than in Group I, 20% versus none. Hemiarthrosis was present in 38 patients with a first episode of shoulder dislocation and only in seven patients with recurrent episodes. In Group I,

Table 1. Arthroscopic findings

	Number		Percent	
	Group I	Group II	Group I	Group II
Bankart	45	51	100	100
Hill-Sachs	37	48	82	94
HAGL	2	0	4	0
Bankart P.	16	24	36	47
SLAP	7	12	16	24
Osteochondral	1	3	2	6
Rotator cuff tear	0	10	0	20

HAGL = Humeral avulsion of the inferior glenohumeral ligament; SLAP = Superior labral anterior-posterior.

the presence of a Hill-Sachs lesion was noted in 37 of the 45 patients (82%). We observed a Bankart lesion in all patients of both groups (100%). In 36% of the patients, we observed a reverse Bankart lesion (between 6 and 10 o'clock). In Group II, a SLAP lesion was noted in 12 patients (24%) and a reverse Bankart lesion in 24 patients (47%). Rotator cuff tears were observed in 20% of Group II. No humeral avulsion of the glenohumeral ligament or bony Bankart lesion was noted (Table 1).

We found more instability episodes and rotator cuff tears in patients aged older than 30 years.

Discussion

The glenohumeral joint is stable as a result of static and dynamic restraints as well as negative intraarticular pressure and concavity compression. Traumatic injury is the major cause of shoulder instability, accounting for approximately 95% of shoulder dislocations. Age at the time of the initial dislocation is inversely related to the recurrence rate. Recurrent dislocation is higher in patients younger than 20 years old. Recurrent anterior shoulder instability is accompanied by secondary injuries of the humeral head, articular cartilage, anterior and posterior capsule, glenohumeral ligaments, and glenoid and biceps tendon. We asked whether the frequency of injuries associated with anterior traumatic instability increases with the number of episodes of dislocation.

Our study has some limitations. First, we analyzed only patients who were treated surgically and have no data on those who were treated nonoperatively. Second, the amount of energy involved in the first episode of shoulder dislocation between the patients of each group cannot be measured, so two episodes could differ in the amount of injury produced. Third, the treatment of the patients in the second group could differ from that of the first group with

resulting different rehabilitation schemes and arthroscopic degree of injury inside the group for future evaluations.

In both groups, we observed multiple lesions. The spectrum of the pathoanatomic lesions encountered in shoulder instability is broad [1, 2, 6, 8, 14–16, 18, 20]. The incidence of arthroscopic lesions between the first episode and recurrent shoulder dislocations differs from each other. We noted similar findings as reported in previous literature [5, 19]. The Bankart lesion was considered the essential injury of anterior shoulder instability. Sugaya et al. [18] found 72% Bankart lesions in their series. We observed this lesion in all of our patients. The reverse Bankart lesion was previously reported by Burkhart et al. [4] (2.4%), Tischer et al. [20] (6%), and Westerheide et al. [21] (30%). We noted a 36% in Group I and 47% in Group II. We believe this difference is possibly a result of repeated dislocation episodes. Bankart lesions, Hill-Sachs lesions, and SLAP lesions are more prevalent in the recurrent dislocation group of patients as a result of repeated dislocation episodes. The presence of SLAP tears can also be influenced by patient age and the presence of an unrelated degenerative SLAP lesion. We found rotator cuff tears in 20% of our study, all of them from the second group.

We found more instability episodes and rotator cuff tears in patients aged older than 30 years, specifically when there were more than seven dislocations [17]. The incidence of Hill-Sachs lesion is generally higher than previously believed. This lesion occurs on the articular surface posterior to the humeral greater tuberosity and must be distinguished from the denuded articular cartilage, the nonarticulating bare area of the humeral head. The Hill-Sachs lesion may be limited to the articular cartilage or may extend to the subchondral bone [16]. The incidence of Hill-Sachs lesions in Group I was less than in Group II (82% versus 94%).

We found associated injuries such as SLAP lesions, rotator cuff tears, and posterior and reverse Bankart lesions are more common in shoulders with recurrent dislocations.

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