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Evaluation and management after failed shoulder stabilisation surgery: A review

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ABSTRACT

Shoulder joint being the most mobile joint of the body is very much susceptible to dislocations accounting for half of the dislocations presenting to Emergency departments. Recurrence of instability is quite common owing to the structural defects created as a result of the traumatic event causing the first dislocation. Younger the patient higher is the chance of recurrence. Recurrence after stabilisation surgery is a complication that is indeed a challenge for every shoulder surgeon. Several factors ranging from patient's age and gender to technical errors to missed diagnoses may be responsible for the failure of primary stabilization. A thorough evaluation by detailed history, clinical exam and radiological imaging to explore the causes of failure and then performing the appropriate procedure addressing the causative factor is the key to a successful outcome. Various surgeries have been described in the literature to address the capsulo-labral as well as the bony defects responsible for recurrence. This review article focuses on the etiopathology, evaluation methodology and different surgical treatments available to address the problem of recurrence after primary stabilisation.

Contents

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1. Introduction

The shoulder is the most mobile joint in the body. This wide range of motion also makes the shoulder joint potentially unstable[1]. In the United States, the incidence of shoulder dislocations is 23.9 per 100,000 person-years, with the highest rates in adults in their 20s[2]. Shoulder dislocations account for approximately 50% of all joint dislocations presenting to emergency departments. A traumatic event is usually the precipitating factor for a shoulder dislocation. Recurrent instability following trauma is common due the resultant residual structural defect which is a Bankart lesion most commonly. Recurrent atraumatic instability will not be discussed in this article. Traditionally, open repair has been the gold standard for shoulder stabilization, however, with newer methods and implants, arthroscopic repair is now preferred. Numerous studies over the past decade have shown equivalent outcomes with arthroscopic techniques as compared to open surgery[3]. Despite improvement in outcomes following primary stabilisation surgery, an instability recurrence rate of 3–25% presents the most challenging post-surgical complication[4]. This review article analyses the causes for failure, clinical and radiological evaluation and appropriate management options available when considering revision surgery for failed primary stabilization of the shoulder.

2. Factors contributing to stability

2.1. Soft tissue stabilizers

Glenohumeral joint stability is achieved through a combination of dynamic and static components. The rotator cuff serves as the main dynamic stabilizer, providing compression of the humeral head against the glenoid concavity, centering it during range of motion. Rotator cuff tears can result in uncoupling of these balanced forces across the joint, resulting in instability. Static stability is maintained by the negative pressure within the Glenohumeral joint capsule, the labral complex and the capsuloligamentous structures. The labrum consists of fibrocartilaginous tissue that lines the rim of the glenoid, and serves several functions. First, it increases the surface area of the glenoid and deepens the socket by 50%, thereby providing a “bumper” effect along the bony periphery. Second, and more significantly, it provides a strong anchor point for the capsular ligaments, particularly the anterior band of the inferior glenohumeral ligament[5].

2.2. Bony stability

The shoulder joint is classified as a ball and socket joint, but the glenoid is shallow, it is however, further deepened by the labrum. The glenoid when viewed frontally, is pear shaped with the inferior half wider than the superior half[6]. With recurrent anterior dislocations, two types of osseous defects can result. In the first, attritional loss of the anterior-inferior aspect of the glenoid results from repetitive wear and erosion. Second is a cortical depression in the posterolateral head of the humerus. It results from forceful impaction of the humeral head against the anteroinferior glenoid rim when the shoulder is dislocated anteriorly known as Hill-Sachs lesion.

Burkhart and DeBeer[7,8] concluded that glenoid bone loss of over 22% resulted in a much greater risk of recurrence following arthroscopic treatment of anterior instability and coined the term inverted pear shape for the antero-inferior bone loss. They were the first to draw attention to the concept of engaging and non-engaging Hill-Sachs lesion. They noted that Hill-Sachs lesion with a long axis parallel to the anterior glenoid with the shoulder in the functional position of external rotation and abduction were more likely to result in symptomatic subluxation or dislocation. They defined defects with this obliquity as engaging Hill-Sachs lesions. In contrast, lesions with a long axis nonparallel to the anterior glenoid with the shoulder in the functional position of external rotation and abduction are unlikely to engage the glenoid rim and were termed non-engaging Hill-Sachs lesions. Patients with non-engaging lesions are “candidates for arthroscopic Bankart repair because they do not have a functional articular-arc deficit.”

3. Pathology of recurrent instability

Recurrent dislocation following failed repair needs to be evaluated before embarking upon repeat surgery as it is of paramount importance to identify the causative factors which resulted in a repeat dislocation. Ho et al[5] (2016) classified the causes of failure as recurrent trauma, patient factors, misdiagnosis and technique errors. (Table 1)

3.1. Recurrent trauma

Despite good surgical technique, robust fixation and ensuring compliance with rehabilitation to restore functional strength and range of motion of the athlete, return to the provocative sport, inevitably may compromise the primary repair.

Tauber et al[9] studied 41 patients presenting with recurrent anterior instability of shoulder following surgical repair. In their series 59% of cases of recurrent instability were due to recurrent trauma, and majority of these patients had undergone arthroscopic stabilisation as the index procedure. The recurrent instability due to trauma was higher among the patients who were treated arthroscopically as compared to those who had open surgery in their series. Moreover, trauma appears to be the primary mode of failure for open Bankart repair accounting for 100% of recurrences in several studies[10]. Patients who participate in collision, contact, and noncontact sports, including snowboarding, skiing, soccer, cycling, rock climbing, basketball, ice skating, judo, and tennis, are at risk.

Cho et al[11] conducted a study to analyze the clinical outcomes of arthroscopic anterior shoulder stabilisation in athletes and compared the results between collision and noncollision athletes. They concluded that compared with the non-collision group (6.7%), the collision group had a higher failure rate (28.6%).

3.2. Patient factors

Porcellini G et al[12] concluded that age at the time of the first dislocation, male sex, and the time from the first dislocation until surgery were significant risk factors for recurrence. In their series

Table 1
Risk factors for recurrent instability after primary stabilisation.

• Recurrent trauma
• Patient factors
Younger age
Male sex
Increased number of dislocations
Prior procedures
• Missed diagnoses
Anterior glenoid defect
Hill Sachs defect
Capsular laxity
• Technical errors
Medial placement of glenoid anchors
“High” placement of inferior glenoid anchors
Insufficient number of anchors
Improper suture configuration