CASE REPORT

Rotator cuff tears in luxatio erecta: an arthroscopic perspective of two cases

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SUMMARY

Luxatio erecta accounts for only 0.5% of all shoulder dislocations. More than 150 cases have been described in the literature, focusing mainly on the method of reduction and/or associated complications. Some of the well-described complications include injuries to the humeral head, glenoid, clavicle, rotator cuff, capsules and ligaments, brachial plexus and axillary artery/vein. Among these, rotator cuff injuries are reported to occur in about 80% of cases. However, in the majority of instances, cuff injuries have been managed conservatively and have been reported to apparently provide optimal functional outcomes. We report our experience with two cases of luxatio erecta associated with massive rotator cuff injuries, which were evaluated and further managed by arthroscopic repair. The emphasis in these cases is to define cuff injuries and proceed based on patients' age, demands and characteristics of the cuff tears. Arthroscopic evaluation and cuff repairs should be contemplated in these patients, to improve shoulder functions.

near a construction site. The patient presented with acute pain in the right shoulder and inability to use his upper right limb. During the fall, he attempted to grab a nearby rope with his right hand, resulting in sudden and forceful hyper-abduction of the right shoulder. There was no history of shoulder instability. There was no history of any medical comorbidity. On examination, the shoulder was typically held in a position of 140° abduction, elbow flexed to 90°, and forearm pronated (figure 1). The humeral head was palpable in the axilla. There was no distal neurovascular deficit. There was no evidence of any generalised ligament laxity. Anteroposterior radiographs of the shoulder revealed a subglenoid type inferior dislocation with no associated fractures (figure 2).

Case 2

A 55-year-old woman presented to the emergency room after having been involved in a road traffic accident. She was holding on to a roof handle with

BACKGROUND

Inferior dislocation constitutes approximately 0.5% of all shoulder dislocations. The infrequency of this injury has led to relatively abundant and enthusiastic isolated reports or short case series detailing its initial management, but, the information given lacks further clarity regarding management of associated cuff injuries. Moreover, there is a paucity of reports in the literature on the arthroscopic management of concurrent cuff injuries in this type of shoulder dislocation. A meta-analysis has reported that about 80% of luxatio erecta can have fractures of greater tuberosity or rotator cuff tears,¹ and another article has reported approximately 50% of associated rotator cuff injuries.² In the long term, untreated large rotator cuff injuries can translate to chronic pain, decreased range of motion and further rotator cuff arthropathy. This high frequency of concomitant cuff injuries warrants further evaluation in every case of luxatio erecta; these cuff injuries should be treated on par with other isolated cuff injuries in order to achieve optimal, pain-free shoulder movement. We present two cases of luxatio erecta that were managed by arthroscopic surgery, and describe the intra-articular findings associated with it.

CASE PRESENTATION**Case 1**

A 52-year-old man, a labourer, presented to the emergency room after having had a 12-foot fall

Figure 1 Clinical image (case 1)) (typical attitude of luxation erecta).

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Figure 2 X-ray of the right shoulder, anteroposterior view.

her left hand in a car that met with a head-on collision. The decelerating force resulted in her left shoulder receiving sudden and forceful hyper-abduction. There were no other external injuries and no known medical comorbidities. On examination, the shoulder was abducted to 100° and elbow flexed to 90° (figure 3). The humeral head was palpable in the axilla; there was no distal neurovascular deficit. A plain radiograph of the left shoulder revealed a subcoracoid inferior dislocation without any fracture (figure 4).

INVESTIGATIONS

An ultrasound of the shoulder was performed the day following initial presentation, in both cases. In *case 1*, it revealed a complete tear of the supraspinatus and infraspinatus with torn ends retracted up to the humeral head, leaving a bare footprint and thin cortical break in the greater tuberosity. It also showed a Lafosse type III subscapularis tear with subluxated biceps tendon. In *case 2*, a postreduction ultrasound of the shoulder

Figure 3 Clinical image (case 2).

Figure 4 X-ray of the left shoulder, anteroposterior view.

revealed a complete tear of mid and posterior fibres of the supraspinatus along with infraspinatus, with a small fragment in the region of the infraspinatus tendon insertion. The biceps tendon was subluxated but the subscapularis appeared normal.

DIFFERENTIAL DIAGNOSIS

The clinical picture is distinctive. In unilateral affection, the attitude of 'statue of liberty' and in the bilateral case the 'hands-up' posture of the upper limb locked in overhead abduction (110°–160°) has been classically defined. However, it has been observed that it can sometimes be confused with the more common anterior dislocation of the shoulder, especially the subglenoid variant.³ Additional scapular Y view and axillary views allow appropriate evaluation of the relationship of the humeral head to the glenoid and further show possible fractures of the glenoid, coracoid process and humeral head.⁴ There is even a report of a missed diagnosis due to lack of classical 'overhead-abducted limb' presentation leading to delay in management.⁵

TREATMENT

Both patients underwent closed reduction of the dislocation under sedation, using Nho's two-step manoeuvres, in the emergency room.⁶ Postprocedure radiographs confirmed the reduction. Two weeks later, both cases underwent all-arthroscopic rotator cuff repair in lateral decubitus position under general anaesthesia and ipsilateral scalene block.

Case 1

Standard diagnostic arthroscopy from the posterior portal revealed a subluxated biceps with Lafosse type III subscapularis tendon tear. The cartilage over the glenoid and labrum appeared normal. There was no Hill-Sachs lesion. The biceps tendon was tenotomised and the subscapularis tendon was repaired using a single, triple loaded 5.5 mm Mitek PEEK anchor (Mitek, Depuy, Johnson and Johnson, USA). Standard bursoscopy revealed a large, moderately retracted crescent shaped supraspinatus tear further involving the complete infraspinatus tendon, as well (figure 5). After subacromial decompression, the supraspinatus and infraspinatus underwent standard, double-row suture bridge technique repair (figure 6).

Case 2

Diagnostic arthroscopy from the posterior portal revealed a medially subluxated biceps tendon with Lafosse type 1

Figure 5 Case 1 Arthroscopic image showing the extent of tears and suture anchors in place. (SS, supraspinatus; IS, infraspinatus; GT, greater trochanter).

subscapularis tendon tear. The anteroinferior labrum appeared thin and a grade I cartilage injury of the glenoid was noted. There was no Hill-Sachs lesion. The biceps tendon was tenotomised. The frayed superior border of the subscapularis tendon was debrided. After standard subacromial decompression from the posterior portal, a medium sized, crescent-shaped supraspinatus tear with mild retraction extending into the infraspinatus tendon was noted (figure 7). The supraspinatus and infraspinatus tendons were repaired employing a standard single row technique using two anchors, as it was a medium sized tear (figure 8).

OUTCOME AND FOLLOW-UP

In both cases, the shoulder was supported in an arm sling and a standard rotator cuff rehabilitation protocol was adopted. Both shoulders were immobilised for 4 weeks. Only elbow, wrist and finger movement was allowed. Gradual passive mobilisation was

Figure 6 Arthroscopic image showing the completed repair (double row suture bridge technique).

Figure 7 Case 2 Arthroscopic image showing the extent of tears (SS, supraspinatus; IS, infraspinatus; GT, greater trochanter).

allowed after the fifth week, and by the seventh week, active assisted mobilisation was started. A repeat ultrasound scan was performed at the end of the 12th week, to check the integrity of the repaired cuffs. Both cuff repairs were found to be normally healing at the footprint, without any retear. Subsequently, complete active mobilisation was allowed with strengthening of the cuff. Twelve months postoperatively, the Constant-Murley score of the right shoulder in case 1 was 88, and he returned to his previous high demanding labour activity. At 9 months postoperatively in case 2, the left shoulder Constant-Murley score was 94. There was no cuff retear or recurrence of instability 13 months postsurgery in either of the cases.

DISCUSSION

Luxatio erecta can be the result of two different mechanisms of injury—direct and indirect. In the majority of cases, the aetiology is generally an indirect mechanism in the form of hyperabduction force at the shoulder joint resulting in proximal humerus abutting the acromion and humeral head being levered out of the inferior rim of the glenoid. The direct mechanism,

Figure 8 Arthroscopic image showing the completed repair (single row technique).

less common, involves axial loading of the humerus from above, with the arm completely abducted at the shoulder and the elbow extended.¹ Both our patients encountered an indirect mechanism of injury, and in both instances, it was a high-velocity injury.

Closed reduction techniques are traction-counter-traction manoeuvres and Nho's two-step manoeuvres.⁶ We preferred Nho's two-step manoeuvres as it is performed under minimal conscious sedation and with minimal force.

Postreduction, it is preferable to evaluate for cuff injuries by ultrasonography or MRI. Using MRI, it was noted that three of four patients of luxatio erecta had complete supraspinatus and infraspinatus tears, and one patient also had a subscapularis and biceps tendon injury. Moreover, injury to the glenoid labrum and to the anterior and posterior bands of the inferior glenohumeral ligament was also demonstrated using MRI.⁷ Although it is very well documented that there is a high incidence of associated rotator cuff injury, only a handful of authors have shed any light on this soft tissue injury component of luxatio erecta. Some authors have advocated surgical repair of the rotator cuff, especially in young patients, whereas others have suggested non-operative management, with good results.⁸

To the best of our knowledge, there have been only two articles describing the arthroscopic assessment of the shoulder in luxatio erecta. One case had a greater tuberosity avulsion along with a SLAP (superior labrum anterior and posterior) tear. Open reduction and internal fixation of the greater tuberosity was performed, and the capsulolabral complex was reduced and fixed with bone anchors.⁹ The other case described recurrent inferior shoulder dislocation in a footballer. Arthroscopic findings revealed an extensive anterior capsulolabral injury, type II SLAP tear, extensive articular cartilage changes of the anterosuperior glenoid, a posterior Hill-Sachs lesion and an anterosuperior humeral head cartilage indentation.¹⁰ SLAP repair and plication of the redundant capsule into the labral repair with suture anchors were carried out, and the remainder of the lesions were debrided arthroscopically.

Patients with rotator cuff tear may do well for a short duration. However, in the long term, an untreated torn rotator cuff is prone to fatty degeneration, muscle atrophy and rotator cuff arthropathy. Concomitant injuries to the rotator cuff and capsules can lead to significant long-term morbidity in the form of shoulder stiffness and lack of power for active elevation. Unlike anterior dislocations, recurrence or instability is not of as much concern as stiffness. Both our cases presented with medium to large rotator cuff tears, for which conservative management would not have sufficed.

We performed arthroscopic surgery in both cases, which served diagnostics as well as aiding in definitive treatment. With these two cases, we support the advocacy of "immediate reduction of the dislocation followed by surgical repair of the rotator cuff at a later date", which has been previously recommended.⁹ Postoperatively, standard rotator cuff protocol exercises ensure a gradual return of strength and function, enabling these patients to perform their activities of daily life with ease and comfort.

Learning points

- ▶ Many concomitant rotator cuff injuries are seen in luxatio erecta; these warrant a thorough work up.
- ▶ Besides shoulder reduction, the priority should also extend to defining and managing rotator cuff injuries, to achieve optimal shoulder function.
- ▶ Arthroscopy offers a thorough assessment of intra-articular soft tissue injuries and it concurrently addresses them effectively.

Competing interests None declared.

Patient consent Obtained.

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