CASE REPORT

Acute locked superior shoulder dislocation in a patient with cuff tear arthropathy

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SUMMARY

In the field of traumatic shoulder dislocations, this report of a 61-year-old female patient discusses the case of an acute locked superior shoulder dislocation in conjunction with a chronic rotator cuff arthropathy resulting from a low-energy fall on the outstretched and abducted arm. Radiological assessment revealed a complex combination of associated bony injuries including a fracture of the upper part of the glenoid and an impaction fracture of the inferior articular surface of the humeral head. Closed reduction and immobilisation were not successful in obtaining joint stability. This unique report highlights the clinical importance of accurate management of bony injuries in traumatic shoulder dislocation.

BACKGROUND

The most frequent form of traumatic unidirectional shoulder dislocations is classified as anterior (96%), though posterior (3%) and inferior (1%) subtypes may also be observed.¹ Depending on the mechanism of injury, shoulder dislocations are commonly associated with a variety of structural damages, including fractures of the glenoid, humeral head and tuberosities as well as soft-tissue injuries.² Regarding the frequency of incidence of all shoulder dislocations, a bimodal age distribution shows a peak in the age groups of 21–30 years as well as 61–80 years.³ Furthermore, the stability of the glenohumeral joint is attributed to the functional interaction of static (eg, glenoid concavity, glenoid labrum) and dynamic (eg, rotator cuff tendons) stabilisers.⁴ The imbalance of these stabilisers is a major cause for glenohumeral instability. In the elderly population, a massive rotator cuff tear may cause an impairment of dynamic stabilisers, disrupting the concavity compression and resting balance of the glenohumeral joint and leading to an upward migration of the humeral head caused by the pull of the deltoid muscle.

Following is a case report of an elderly woman with chronic rotator cuff arthropathy, who sustained a superior-locked dislocation of the shoulder caused by a low-energy fall. To our knowledge, this form of shoulder dislocation with resultant radiographic appearance is unique. Furthermore, no report addresses follow-up after conservative treatment for traumatic superior glenohumeral dislocation in the English literature. The only described case report of a documented superior glenohumeral dislocation is specified by Downey *et al.*⁵

CASE PRESENTATION

After a first fall in February 2015, a 61-year-old right-handed female patient was admitted to our department. She presented with intense right shoulder pain and limited range of motion. Clinical examination revealed weakness in abduction, flexion and internal rotation, yet she still managed to lift her right arm above her head. Further imaging (conventional radiographic and MRI) showed a massive and irreparable rotator cuff tear including the tendons of the supraspinatus, the infraspinatus and the subscapularis, with upward migration of the humeral head (classified as type II–III by Hamada *et al.*) (figure 1).⁶ An associated fracture was excluded. Based on clinical and radiological examination, the first diagnosis of a chronic rotator cuff arthropathy was confirmed. The risk of surgical treatment was considered too high due to the patient's poor general health status including recent spondylodiscitis, septic bacteraemia, severe ischaemic cardiomyopathy, chronic kidney failure and diabetes mellitus. Instead, conservative management of the affected right shoulder was warranted.

After another low-energy fall in May 2015, the patient presented again with moderate pain and inability to raise her right arm. Additionally, the arm was locked in approximately 30° of abduction and no further active or passive adduction was possible. The shoulder was swollen, and a haematoma was visible on the anterior aspect. A two-dimensional (2D) CT with three-dimensional (3D) reconstruction confirmed a locked superior dislocation of the shoulder with a fracture of the upper portion of the glenoid and the coracoid process, including an impression fracture of the inferior articular surface of the humeral head (figure 2). There was no evidence of neurovascular deficit. Due to the patient's extremely poor health status, a clearance for the advised surgical treatment could not be obtained. Instead, a closed reduction followed by immobilisation in internal rotation of the affected arm for 4 weeks and subsequent physical therapy was recommended. At 6 weeks, active range of motion was allowed.

The patient was advised about her case being submitted for scientific publication and gave her informed consent and permission.

OUTCOME AND FOLLOW-UP

Conventional follow-up radiography after 8 weeks revealed a redislocation with chronic superior-locked shoulder dislocation (figure 3). The patient was suffering from episodes of moderate

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Figure 1 Conventional two-view radiography (A/B) and MRI (C/D) of the affected right shoulder revealing a massive rotator cuff tear without any fractures. (A) Standard anteroposterior view, (B) axial view, (C) coronal oblique view, (D) axial view.

pain (Visual Analogue Scale: 4), especially when sleeping, limited active and passive range of motion and weakness. Functional examination demonstrated an abduction of 40°, flexion of 45°, external rotation of 5° and an internal rotation behind the back reaching to her waistline and decreased strength on resisted testing. The results based on the Constant Score and Simple Shoulder Test were 15 and 2 points, respectively. As compared with a normal shoulder function, the patient rates the affected shoulder at 5%. Despite these physical limitations, the patient is now capable of performing gentle activities of daily life (eg, preparing a meal and putting on a sweater) with her affected arm. The patient was fairly satisfied with the final situation and refused any further surgical procedures at this time. At annual follow-ups, further radiological examinations of the affected shoulder showed a static superior dislocation of

the humeral head with a supraglenoid pseudojoint formation (figure 4).

DISCUSSION

Traumatic shoulder dislocations resulting from a fall onto the shoulder are widely described and are often accompanied by structural defects including osseous lesions of the humeral head and glenoid depending on trauma mechanism. In the chiefly occurring traumatic anterior shoulder dislocations, a prevalence of glenoid and humeral bone defects up to 95% are reported.⁷ 2D or 3D CT scans are recommended when identifying and quantifying bone loss in shoulder instability.⁸

Previous studies revealed a strong correlation between shoulder dislocation and the prevalence of rotator cuff tears in 34%–87%

Figure 2 CT (A) with three-dimensional reconstruction (B and C) of the affected right shoulder demonstrating a superior-locked glenohumeral dislocation with bipolar bony defect including an impaction fracture of the inferior articular surface of the humeral head and fracture of the upper part of the glenoid.

Figure 3 Conventional two-view radiography (A and B) of the affected right shoulder revealing a chronic superior-locked glenohumeral dislocation. (A) Standard anteroposterior view, (B) axial view.

of patients over the age of 60.^{9 10} Based on the concavity-compression mechanism for providing glenohumeral stability, biomechanical studies demonstrated the effect of pre-existing rotator cuff tears on motion patterns leading to shoulder dislocations on low-impact trauma.¹¹ Furthermore, smaller defects of static stabilisers (eg, Bankart lesion) are sufficient to induce instability in the presence of rotator cuff tears as compared with a normal shoulder.¹¹ Early operative management must be considered to restore function and stability and to avoid progression of rotator cuff damage.¹² Itoi and Tabata have reported satisfactory results in patients with shoulder dislocations and rotator cuff tears after surgical treatment.¹³

The patient presented in this case report suffered from a locked superior shoulder dislocation based on a chronic rotator cuff arthropathy. The mechanism of trauma involved a laterally directed fall onto the outstretched arm in approximately 45° of abduction with direct axial loading. The injury pattern may be related to direct impact of the humeral head against the upper glenoid fossa with subsequent anterosuperior engagement of the inferior articular surface of the humeral head with the superior aspect of the glenoid. Early closed reduction was unsuccessful due to re-engagement of the bipolar bony defect facilitated by chronic superior translation of the humeral head. In contrast, Downey *et al* reported

on a superior dislocation of the humeral head in a 28-year-old male patient. No associated injuries (eg, fractures of the humeral head and glenoid surface) have been revealed. While closed reduction was planned, spontaneous repositioning of the humeral head was demonstrated.⁵ Reverse shoulder arthroplasty with concomitant glenoid reconstruction would have been the treatment of choice to restore shoulder balance and function. However, due to the patient's poor general health status, clearance for surgery could not be obtained and ongoing conservative treatment was arranged including pain management and physical therapy.

Learning points

- Superior shoulder dislocation can result from a fall in patients with a chronic rotator cuff arthropathy.
- CT scan of the affected shoulder is recommended when identifying and quantifying bone loss in shoulder instability.
- Early closed reduction might be unsuccessful due to re-engagement of the bipolar bony defect facilitated by chronic superior translation of the humeral head.

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REFERENCES

- 1 Zaccilli MA, Owens BD. Epidemiology of shoulder dislocations presenting to emergency departments in the United States. *J Bone Joint Surg Am* 2010;92:542–9.
- 2 Saupe N, White LM, Bleakney R, *et al*. Acute traumatic posterior shoulder dislocation: MR findings. *Radiology* 2008;248:185–93.
- 3 Krøner K, Lind T, Jensen J. The epidemiology of shoulder dislocations. *Arch Orthop Trauma Surg* 1989;108:288–90.
- 4 Lippitt S, Matsen F. Mechanisms of glenohumeral joint stability. *Clin Orthop Relat Res* 1993;291:2077–28.
- 5 Downey EF, Curtis DJ, Brower AC. Unusual dislocations of the shoulder. *AJR Am J Roentgenol* 1983;140:1207–10.
- 6 Hamada K, Fukuda H, Mikasa M, *et al*. Roentgenographic findings in massive rotator cuff tears. A long-term observation. *Clin Orthop Relat Res* 1990;254:927–96–6.
- 7 Edwards TB, Boulahia A, Walch G. Radiographic analysis of bone defects in chronic anterior shoulder instability. *Arthroscopy* 2003;19:732–9.
- 8 Moroder P, Resch H, Schnaitmann S, *et al*. The importance of CT for the pre-operative surgical planning in recurrent anterior shoulder instability. *Arch Orthop Trauma Surg* 2013;133:219–26.
- 9 Sonnabend DH. Treatment of primary anterior shoulder dislocation in patients older than 40 years of age. Conservative versus operative. *Clin Orthop Relat Res* 1994;304:74–7.
- 10 Simank HG, Dauer G, Schneider S, *et al*. Incidence of rotator cuff tears in shoulder dislocations and results of therapy in older patients. *Arch Orthop Trauma Surg* 2006;126:235–40.
- 11 Pouliart N, Gagey O. Concomitant rotator cuff and capsuloligamentous lesions of the shoulder: a cadaver study. *Arthroscopy* 2006;22:728–35.
- 12 Pevny T, Hunter RE, Freeman JR. Primary traumatic anterior shoulder dislocation in patients 40 years of age and older. *Arthroscopy* 1998;14:289–94.
- 13 Itoi E, Tabata S. Rotator cuff tears in anterior dislocation of the shoulder. *Int Orthop* 1992;16:240–4.

Figure 4 Conventional radiography of the affected shoulder revealing a static superior dislocation with development of a pseudojoint 1 year (A) and 2 years (B) after initial trauma. FU = follow-up.

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