CASE REPORT

Luxatio erecta humeri with neurovascular compromise: inferior glenohumeral dislocation illustrating associated injuries

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SUMMARY

Luxatio erecta humeri (LEH) is a rare type of shoulder dislocation in which the humeral head becomes trapped beneath the glenoid. Patients present with the arm in a fixed hyperabducted position. LEH is estimated to occur in 0.5% of all shoulder dislocations, most often caused by trauma and has a significant association with local bone, ligament and less frequently neurovascular injury. We present a case with initial neurovascular compromise and sustained neurological impairment at long-term follow-up. Urgent closed reduction is advocated and subsequent treatment is dependent on associated injuries.

BACKGROUND

Luxatio erecta humeri (LEH) is very rare. Recognition of LEH and its associated injury pattern is critical in the immediate and subsequent management of the condition. This case describes LEH with neurovascular injury with clinic photograph, prereduction and postreduction radiographs, MRI and ultra sound imaging, and arthroscopy and clinical examination findings.

CASE PRESENTATION

A 30-year-old right hand dominant male patient presented following a motorcycle accident with isolated left LEH. He described 'super manning' after losing control of his motocross bike over a jump and landing with both shoulders flexed and forearms extended, to break his fall. On hitting the ground he had immediate pain, numbness in his arm and inability to move it from a hyperabduction position. On examination the patient's arm was fixed in an abducted position of ~170° (figure 1). The patient's hand was perfused but pulseless and neurological function was diminished consistent with injury to all three cords of the brachial plexus. X-ray confirmed the diagnosis of LEH with associated greater tuberosity fracture (figure 2). Reduction was performed with procedural sedation using the two-step manoeuvre described by Nho *et al*¹ by moving the shoulder into the position of an anterior dislocation and then reducing the shoulder from this position. Following reduction, strong distal pulses were palpable and motor and sensory function returned in the distribution of the posterior and lateral cords. Motor and sensory function remained diminished in the distribution of the medial cord. Postreduction X-ray (figure 2) demonstrated successful reduction. The patient was

immobilised in a sling for 4 weeks to allow the tuberosity fragments to heal.

OUTCOME AND FOLLOW-UP

Subsequent MRI of the brachial plexus confirmed continuity of the cords. Ultrasound scan of the shoulder revealed a possible intrasubstance tear of subscapularis and full thickness tear of supraspinatus. Examination under an anaesthetic at 24 months failed to demonstrate shoulder instability. Shoulder arthroscopy revealed a healed antero-inferior labrum tear with an intact rotator cuff. The patient has been unable to return to his pre-morbid employment as a factory foreman. He described chronic pain and eight episodes of subluxation, without radiographic evidence of dislocation. Neurological examination revealed full motor recovery of the brachial plexus, but persistent sensory changes in the medial cord in the distribution of the median and ulna nerves.

DISCUSSION

LEH was first reported in the modern literature in 1859.² It most commonly presents as a closed injury

Figure 1 Patient with left arm in fixed abducted position on presentation to the emergency department.

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Figure 2 Prereduction and postreduction films of luxatio erecta humeri demonstrating a minimally displaced greater tuberosity fracture.

in male patients and is associated with trauma. The classic presentation of LEH is a patient with a fixed abducted arm, with pronation of the forearm, often resting on or behind the head.

Although this case report describes injury from a hyperflexion injury, it is thought that the injury pattern in LEH results from a hyperabduction force that causes the humerus to lever off the acromion that acts as a fulcrum.³ This may cause fracture of the humeral head. Axial force applied to the arm causes shearing of the humeral head on the glenoid and as the humeral head is driven into the axilla, damage to the inferior capsule, ligaments and glenoid fracture may occur. Tension from the supraspinatus tendon may result in avulsion of the greater tuberosity.

LEH is most commonly associated with fracture of the greater tuberosity, humeral head and surgical neck in the humerus and fracture of the acromion, glenoid and scapular body in the scapula. The incidence of these injuries is much greater than in other types of shoulder dislocation.⁴

Soft tissue injury is increasingly reported in the literature in LEH. This is probably due to increased use of MRI. Mallon

reported a 12% incidence of rotator cuff injury in a review published in 1990.⁴ Hassanzadeh in a study using MRI showed that all four patients had labral tears.⁵ Krug identified rotator cuff tears in three of the four patients, with labral tears and inferior humeral glenohumeral ligament (IGHL) (anterior and posterior band) injury in all patients.⁶ The literature also documents superior labral tear from anterior to posterior (SLAP), Bankart and anterior labroligamentous periosteal sleeve avulsion (ALPSA) lesions in this population.⁷⁻⁹

Neurovascular injury is associated with LEH in previous reports. Mallon noted a 59% incidence of neurological impairment; however, it must be noted that the vast majority of these resolved in the postreduction period.⁴ Perron, in a review of 195 cases of all-types of shoulder dislocation, noted an acute nerve palsy incidence of 13%, with three-quarters resolving postreduction.⁶ The brachial plexus and axillary nerve and axillary artery and circumflex humeral artery are most often affected due to direct impact or tension on these structures caused by inferior dislocation of the humeral head.

Neurovascular structures are at a greater risk of injury in LEH compared with other forms of shoulder dislocation,⁷ which may account for the higher incidence of neurological injury in LEH.¹⁰ Unlike most cases of neurological impairment, the patient in our case report has persistent neurological symptoms after shoulder reduction, and that this may be a contributing factor for poor patient outcome.

LEH is a rare form of shoulder dislocation that typically results from trauma. The pattern of injuries is different to other

forms of shoulder dislocation due to a combination of sheer force and axial loading in a hyperabducted shoulder. Immediate reduction is advocated to ameliorate neurovascular damage. Further management is dependent on associated injuries.

Contributors DO initially examined the patient and drafted case report. MN drafted the case report. PM followed up the patient. MT drafted the case report.

Competing interests None declared.

Patient consent Obtained.

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Learning points

- ▶ Luxatio erecta humeri (LEH) is a very rare form of shoulder dislocation that has a characteristic presentation which should be identified and treated accordingly.
- ▶ LEH occurs via hyperabduction of the shoulder or via an axial force through an abducted or flexed shoulder. Appreciation of the mechanism of injury allows for understanding of associated injuries in LEH.
- ▶ There is a relatively high rate of soft tissue injury in these patients, and in cases where patients have not recovered full function after reduction relevant imaging studies should be performed.
- ▶ LEH can be associated with neurovascular injury, which can be persistent after reduction, and may adversely affect patient functional outcome.

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