Bilateral irreducible inferior shoulder dislocation: A case report

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\section*{A B S T R A C T}

\textbf{INTRODUCTION:} Bilateral inferior shoulder dislocation is rare; but the dislocation is almost always reducible by closed means. We present a unique case of irreducible bilateral inferior shoulder dislocation.

\textbf{PRESENTATION OF CASE:} A 35-year old male fell down from height. Direct axial loading while both shoulders were fully abducted resulted in bilateral inferior shoulder dislocation. All attempts of closed reduction failed. Open reduction revealed that the cause of irreducibility was the entrapment of the humeral head in a button-hole through the inferior joint capsule and the surrounding soft tissue envelope. At 6 months, there was almost full range of motion and no pain.

\textbf{DISCUSSION:} The direct axial loading resulted in a narrow defect in the inferior joint capsule/soft tissue envelope; and this may have led to button-hole entrapment of the dislocated humeral head and irreducibility. Open reduction required widening of the button-hole while protecting the axillary neurovascular bundle.

\textbf{CONCLUSION:} We present a rare case of bilateral irreducible inferior shoulder dislocation. We highlight the pathomechanics of irreducibility: button-hole entrapment of the humeral head. We emphasize technical tips during open reduction such as widening of the button-hole and protection of the axillary neurovascular bundle. The outcome is good although some limitation of shoulder abduction is to be expected.

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\section*{1. Introduction}

Among all joints of the body, the shoulder joint allows the widest range of motion, and hence it is considered as the most unstable joint in the body [1]. The most common presentation of traumatic glenohumeral dislocation is unilateral anterior dislocation. Bilateral dislocations are rare, and they usually occur posteriorly following seizures and electroconvulsive therapy [1–3]. The rarest form of shoulder dislocation is bilateral inferior dislocations (also known as bilateral luxatio erecta) [4]. Closed reduction is almost always successful in reducing inferior dislocations [4]. To our knowledge, only one case of irreducible luxatio erecta caused by an aberrant position of the axillary nerve was reported [5].

In this paper, we report on a case of bilateral irreducible luxatio erecta caused by entrapment of the humeral head in a button-hole through the inferior joint capsule and the surrounding soft tissue envelope. The work has been reported in line with the SCARE criteria [6].

\section*{2. Presentation of case}

A 35-year old previously healthy Egyptian male fell down from 15 m height. The accident was work-related and occurred while fixing windows in a building. At the time of impact on his out-stretched hands, both shoulders were fully abducted. The direct axial loading resulted in bilateral luxatio erecta. Initial assessment at the emergency room by the trauma team revealed no concurrent spine or systemic injuries. At the time of presentation, both arms were fixed in abduction. The elbows were flexed, the forearms were pronated, and the hands were above the head. Neurovascular examination of the hands did not reveal any evidence of vascular or brachial plexus injury. Radiographic examination confirmed bilateral inferior dislocation of the shoulders with fracture of the greater tuberosity of the humerus on the left (Fig. 1). Under general anesthesia, attempts of closed reduction using the “traction-counterraction” technique were unsuccessful. We then proceeded to open reduction through the deltopectoral approach. Our vascular surgeon was on stand-by in the operating room. The humeral heads were entrapped in a button-hole through the inferior joint capsule and the surrounding soft tissue envelope. The axillary vessels and axillary nerve were visualized and protected. The button-hole was widened and the surrounding soft tissue around the humeral head was dissected bluntly. Once this was done, reduction was easily obtained using the “traction-
countertraction” technique. Finally, fixation of the left greater tuberosity fracture was done using 4 cannulated screws (Fig. 2). The post-operative course was uneventful and there was no evidence of any neuro-vascular injury after the reduction. The shoulder was immobilized for 4 weeks in adduction. Passive range of motion was started during the fifth week and active/strengthening exercises were started on the sixth week. Exercises and strengthening were done through regular formal visits to our Rehabilitation Department. The patient returned to work at 3 months. At 6 months, examination showed that both shoulders were stable with pain-
less range of motion. Full external rotation was present bilaterally. Abduction was 170° on the right and 160° on the left. The strength of all shoulder movements was rated as 5/5 bilaterally.

3. Discussion

Bilateral luxatio erecta is rare and is worth reporting. In 2013, Saxena and Pradhan [4] reviewed the literature and found only 17 cases of bilateral luxatio erecta. Our case was also unique because the dislocation was irreducible by closed means. Our literature review showed only one case of irreducible luxatio erecta [5]. In that case the dislocation was unilateral and two factors might have contributed to the irreducibility. Firstly, there was concurrent both-bone forearm facture; and this may have prevented the application of adequate traction during the reduction. Secondly, the axillary nerve had an aberrant (anterior) position, blocking the reduction. In our case, the irreducibility was due to entrapment of the humeral head in a button-hole through the inferior joint capsule and the surrounding soft tissue envelope. Once this button-hole was widened, the reduction was easily obtained using the same technique attempted preoperatively.

The pathomechanics of the luxatio erecta is well described in the literature [7]. Most cases result from forceful hyper-abduction at the glenohumeral joint (such as slipping from a moving train or bus while holding the gate bar) [4]. Hyper-abduction leads to impingement of the neck of the humerus against the acromion; driving the humeral head through the inferior capsule. The second mechanism of injury is less common and involves direct axial loading on the fully abducted limbs (usually from falling from a height as seen in our case). With this mechanism, the breach in the inferior capsule is more rapid with a more straight-axis of entry, resulting in a narrower defect in the capsule and the surrounding soft tissue envelop. The entrapped humeral neck in this relatively narrow defect is also compounded by the soft tissue edema; leading to irreducibility.

At our center, the period of immobilization following closed reduction of shoulder dislocations is usually 3 weeks. In the current case, we extended the immobilization period to 4 weeks because there was a need for open reduction. Furthermore, we were worried about recurrence of the dislocation with early mobilization because we have widened the button-hole to obtain the reduction.

Finally, the surgeon should be aware of the various concurrent fractures and neurovascular injuries associated with luxatio erecta. Fractures may involve rotator cuff avulsion fractures as well as fractures of the greater tuberosity, clavicle, acromion and coracoid. Common neurovascular injuries include the brachial plexus, the axillary nerve and the axillary vessels [7–9]. Documentation of such injuries prior to reduction is important from the medico-legal point of view, and also for proper primary management of these injuries. We also believe that if open reduction is required, a vascular surgeon should be stand-by in the operating room for safer protection of the axillary vessels and the immediate availability of the vascular surgeon in case of inadvertent injury during surgery.

There are no definitive data in the literature regarding the prognosis and outcome of open reduction of irreducible luxatio erecta. The case reported by Frank et al. [5] had near normal range of motion except for shoulder abduction which was restricted to 90°. The outcome in our case was better because the restriction of shoulder abduction was minimal (160° on the left and 170° on the right). The restriction in shoulder abduction indicated a variable degree of inferior capsular contracture.

4. Conclusion

A rare case of bilateral irreducible inferior shoulder dislocation is described. We highlight the pathomechanics of irreducibility: button-hole entrapment of the humeral head. We emphasize technical tips during open reduction such as widening of the button-hole and protection of the axillary neurovascular bundle. The outcome is good although some limitation of shoulder abduction is to be expected secondary to a variable degree of inferior capsular contracture.

Conflict of interest

None.

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Ethical approval

The study was approved by the Research Committee of National Hospital (Riyadh Care), Riyadh, Saudi Arabia.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by Editor-In-Chief of this journal on request.
Authors’ contribution

All authors contributed significantly and in agreement with the content of the manuscript. All authors participated in data collection and in writing of the manuscript.

Registration of research studies

Not relevant here.

Guarantor

M.M. Al-Qattan.

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