

## Vascular and Brachial Plexus Injury Following Inferior Shoulder Dislocation; A Case Report

### Abstract

Inferior shoulder dislocation is a rare form of joint dislocation which is commonly associated with injury to the surrounding soft tissues. Reduction of the dislocation must be done as fast as possible to avoid complications. This is a report of an inferior shoulder dislocation who presented with brachial vein contusion and brachial plexus injury. The dislocation was reduced in emergency room, and arm sling applied. All the symptoms resolved within four weeks after treatment.

Inferior shoulder dislocation is rare, it is usually associated with injury to contiguous structures. High index of suspicion towards neuro vascular injury is needed for early diagnosis and treatment.

Keywords: Shoulder, Contusion, Brachial Plexus, Arm.

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### Introduction

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Inferior dislocation of the shoulder, also called luxatio erecta humeri (LEH) is rare, constituting about 0.5% of all shoulder dislocations. Shoulder dislocation is the most common dislocation in large joints, the majority are anterior 95% and less common is posterior 5%<sup>(1-3)</sup>. Inferior shoulder dislocation commonly occurs when there is loading force on the fully abducted shoulder<sup>(4,5)</sup>.

The challenge is not in diagnosis with the usual obvious position of the abducted shoulder, nor from reduction, but from associated complications of brachial plexopathy, rotator cuff injury and vascular injury. Among these, complications, the vascular complication is the least common<sup>(3,6,7)</sup>.

The aim of this report is to show that inferior shoulder dislocation can occur with vascular and brachial plexus injury both of which can be managed nonoperatively.

### Case Report

A 30 year old Egyptian male manual worker presented to our level three trauma center in Tubarja general hospital, Aljouf region of Kingdom of Saudi Arabia, in October 2018, with pain and deformity of the right shoulder joint following a fall from height while at work. The shoulder was abducted at about 90 degree with swelling and ecchymosis of the arm extending to the elbow, the axilla and ipsilateral chest wall. He also had mild head injury and soft tissue laceration on the posterior aspect of the arm.

The power in the muscle group of right upper limb averaged 2, and there was associated paraesthesia on the limb. There was no obvious generalized ligamentous laxity in the patient, and no clinical sign of compartment syndrome. The volume of the right radial pulse was reduced compared with the contralateral side. Doppler ultrasound done by the vascular surgeon before reduction of the dislocation confirmed brachial venous contusion with intact brachial artery.



**Figure 1: xray of a dislocated shoulder.**

X-ray confirmed inferior shoulder dislocation (Figure 1), and close reduction was done in the emergency room under sedation and muscle relaxant, with abduction and counter-traction method. Post reduction x-ray was acceptable but it was observed that the shoulder could sublux easily. A diagnosis of multiply injured patient, with mild head injury, and inferior shoulder dislocation with associated brachial plexus injury and brachial vein injury was made.

The forearm was splinted with collar and cuff after reduction of dislocation. 5 days later there was partial recovery of the brachial plexus, and reduction in swelling of the forearm. One month after discharged, there was complete recovery of the brachial plexus as the power in muscle groups of right upper limb become five, swelling resolved completely, no more subluxation, and the volume of pulse equal the contralateral side.

## Discussion

Inferior shoulder dislocation is the rarest of all shoulder dislocations<sup>(1-3)</sup>. It has been reported by many authors sometimes as bilateral<sup>(1,7)</sup>. Generally, the mechanism of injury has mostly followed hyper-abduction injury following falls from height, common amongst manual

workers (which was the case in the patient reported in this article, that had a direct force on the hyper-abducted shoulder). Most reported cases involve the young age groups, who are more prone to trauma<sup>(3,8)</sup>.

Most cases of inferior shoulder dislocation present acutely to the emergency department and diagnosis may be a challenge for the non-specialist. Diagnosis is easy on x-ray and so is the reduction under sedation and muscle relaxant<sup>(6,8)</sup>. Only few cases needed operative reduction<sup>(9)</sup>.

The common soft tissue injuries associated with inferior shoulder dislocation are: rotator cuff injury, glenohumeral ligament injury, glenoid labrum avulsion, Hill-sach's lesion, brachial plexus injury or isolated axillary nerve injury<sup>(10,11)</sup>. However magnetic resonance imaging done in this patient showed normal rotator cuff, normal Gleno-humeral ligament and no Hill-Sach's lesion.

Vascular damage is less reported and this could cause a diagnostic dilemma in its mode of presentation<sup>(12)</sup>. This patient presented with gross swelling of the arm and ipsilateral lateral and anterior chest wall ecchymosis. A diagnosis of brachial venous contusion was made by the vascular surgeon after Doppler ultrasonography. This diagnosis may be difficult to make in a centre that has no doppler ultrasound and this may impair the management of the patient.

The method of reduction used in this patient was the popular single step "traction-counter traction" method, where the arm is pulled to reduce the humeral head back to its anatomical position. However Nho et al described a two-step method which involved first converting the inferior dislocation to anterior dislocation before eventually reducing the dislocation. They claimed that this two-step method is easier than the one step traction-counter traction method<sup>(13)</sup>.

After reduction of the dislocation, radial pulse was present but with reduced volume when compared to the contralateral radial pulse, which may have been due to soft tissue edema

compressing the vessel proximally, since the volume increases as the swelling reduces. The associated brachial plexus injury was most likely neuropraxia from the pressure of the head of the dislocated humerus on the nerve cords. All symptoms resolved within four weeks post treatment.

## Conclusion

Inferior shoulder dislocation is a rare presentation and even rarer is the vascular complication that could be associated. High index of suspicion is needed for diagnosis and its management.

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