

Posterior Shoulder Dislocation due to an Unusual Injury Mechanism

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Abstract

We present a case of a 21-year-old male who sustained a posterior dislocation of his dominant shoulder following poor weight-lifting technique. His shoulder was highly unstable following the injury. The shoulder dislocation was initially reduced by an Orthopaedic surgeon using closed technique in the emergency department. The shoulder was immobilised in an abduction, external rotation brace, and Orthopaedic Trauma clinic follow up was arranged. Ongoing symptomatic instability warranted operative stabilisation. We present this case with its previously undocumented mechanism, to highlight the injury to frontline emergency medical teams, create awareness of its presentation and to discuss its potential mechanism and treatment.

Keywords: *Glenohumeral Joint; Posterior Shoulder Dislocation; Weightlifting; Unusual Mechanism*

Background

Posterior shoulder dislocations are rare injuries constituting 2 - 5% of all dislocations of the shoulder [1], with a reported incidence of 1.1 per 100,000 per year [2]. The most common mechanisms for injury are electrocution, seizures and high force trauma [2]. These injuries can be missed if careful evaluation of the patient and adequate radiographs are not performed at initial presentation. Late or missed diagnosis can result in significant morbidity and disability, or ultimately avascular necrosis of the humeral head complicating management.

We present a case of posterior dislocation in a healthy 21-year-old gentleman caused by an unusual mechanism. We discuss injury mechanics, investigation and treatment.

Case Presentation

A 21-year-old independent and high-functioning amateur bodybuilder presented to the Emergency Department of an urban trauma centre with acute, left sided, shoulder pain. He experienced sudden onset of pain and lost function of his left shoulder as he hoisted a weights bar stacked with 130kg whilst trying to perform an atypical "deadlift" style exercise. The patient performed his deadlift with the barbell positioned behind his body. The exercise was performed by rising from a squatting leg position (knees and hips flexed) whilst gripping the barbell behind him (shoulder adducted and internally rotated, elbows extended and wrists in a neutral position).

On presentation, he was correctly assumed to have a dislocated shoulder on clinical grounds alone. He remained neurovascularly intact. Posterior dislocation was confirmed with plain film radiographs (Figure 1). Closed reduction was attempted by the Emergency Department staff using sedatives. Although the joint was reducible clinically, it re-dislocated when a standard upper limb sling was applied.



Figure 1: Anteroposterior and lateral radiographs demonstrating posterior dislocation.

The patient was referred to the Orthopaedic Emergency Team. The shoulder was reduced by applying longitudinal traction whilst the shoulder was adducted and internally rotated. With in-line traction the shoulder was gradually externally rotated and abducted until it reduced. The reduction was maintained in this position with an external rotation brace. Check x-rays were obtained to confirm reduction.

Our patient was previously fit and well, left handed and worked as a pipe fitter. He had never previously suffered any injuries to his shoulder, did not suffer from seizures, bone disorders or hypermobility. He had normal skeletal development and was skeletally mature.

The patient was initially treated with non-operative treatment in the form of shoulder strengthening and stabilising physiotherapy but experienced a further three dislocations following minor events. Magnetic resonance arthrogram revealed a small reverse Hill-Sachs defect and a labral injury. Ten months following his initial injury he continued to experience subluxation of his left shoulder on normal movements and had a positive apprehension test. He had been unable to return to exercise, was limited in his work and was now keen to try operative management.

He underwent arthroscopic posterior stabilisation of his shoulder joint approximately 1 year after his injury. Intra-operatively a posterior labral tear was repaired using fibrewire (Arthrex, Naples) and Pushlock bone anchors (Athrex, Naples).

Post-operatively the patient's left upper limb was immobilised in a sling with an abduction wedge for 3 weeks. The patient was given simple analgesia. Clinical review and check radiographs were performed at 1, 3 and 6 weeks, 3, 6 and 12 months. At 3 weeks post-operation the patient was able to commence graded, passive range of movement exercises with the physiotherapist. Active abduction was restricted to 45 degrees and internal rotation to neutral for 6 weeks from operation at which point unrestricted physiotherapy was commenced and the sling removed. Ongoing posture advice and scapular control exercises were given throughout.

At his last review, 12 months post surgery, the patient was pain-free and able perform full range of movement. There were no clinical signs or symptoms of instability. He had returned to exercise. His Oxford Shoulder Score was 40.

Discussion and Conclusion

Posterior shoulder dislocation is not a common injury. The injury is well documented following high force trauma, electrocution or seizure activity. We present a case of posterior shoulder dislocation in a young and fit male patient following an unusual mechanism. Our patient was successfully treated with surgery. The injury mechanism has not previously been documented in the literature to the best of our knowledge.

The variety of mechanisms associated with these injuries can make diagnosis difficult. Missed or delayed injuries have been reported in upto 49% of patients further complicating treatment [3,4]. Awareness of underlying injury mechanisms can aid physicians in making the diagnosis in patients suffering from altered consciousness or reduced perception of pain such as the post-ictal seizure state. The typical mechanism resulting in dislocation during a seizure is imbalance in the forces generated between external and internal rotators of the shoulder [5]. Pectoralis and latissimus dorsi muscles are able to overpower infraspinatus and teres minor when the shoulder is flexed, adducted and internally rotated. Sufficient counterforce provided by muscle contraction of infraspinatus and teres minor can overcome the ultimate tensile strength of bone and result in humeral neck fractures, although this is uncommon. Approximately two thirds of posterior shoulder dislocations follow trauma [2]. Direct high-energy force with the shoulder in adduction, flexion, and internal rotation is the most frequent mechanism associated with trauma [6]. There is a paucity of literature on such injuries as a consequence of indirect force and in young athletes.

Our patient suffered an acute posterior shoulder dislocation in the absence of muscle imbalance and direct force. Indirect force was transmitted through the joint by combination of longitudinal traction and internal rotation producing sufficient torque to dislocate his shoulder posteriorly. Reduction was achieved using simple manoeuvres.

Physical examination is especially important in circumstances where patients are unable to provide a history or the cause of injury is unclear. The shoulder is internally rotated, the coracoid is prominent and head displacement results in fullness in the axilla. The patient is unable to externally rotate the shoulder. Jerk test, posterior load and shift test, posterior drawer test and the inability to supinate the forearm are more useful in chronic dislocations.

In the absence of fracture we opted for MRI as the choice for further imaging. MRI arthrogram is useful in identifying the associated soft tissue lesion requiring repair including avulsed capsules, cuff tears, biceps tendon tears and posterior labral pathology. Soft tissue injuries are associated with up to 65% of posterior shoulder dislocations [7]. Posterior labral injuries are found in up to 58% of patients [8]. Computed tomography is useful in quantifying bone defect (such as reverse Hill-Sachs) or defining fracture geometry and was not indicated for our case.

Non-surgical treatment is often successful after an initial dislocation. Surgical treatment may be considered in patients suffering from recurrent dislocation and instability symptoms.

Our case is a reminder of the risk posed by improper weightlifting technique. Amateur bodybuilding is a key feature of contemporary fitness trends. Heavier weight increases the force transmitted across joint and results in a greater risk to the user. Although we were able to find a single case report documenting posterior shoulder dislocation whilst performing the "benchlift" [9], the mechanism reported in this case report has not been previously described.

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