



An Icy Incident!

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Karen's presentation

- Karen, 59, presents after slipping on ice and landing prone on both outstretched arms.
- She has significant pain, is unable to move her right shoulder and complains of numbness and tingling in her right forearm and hand.



Figure 1. Karen holds her right hand behind her head.

Examination results

- Karen has poor range of motion and pain in her right shoulder when she holds it in abduction at $> 90^\circ$.
- She has her right hand behind her head to hold her arm up. Any attempts at range of motion causes significant pain (Figure 1).
- She has significant paresthesiae along the ulnar aspect of her right arm, extending from the fourth and fifth fingers to the elbow.
- Vascular flow to the extremity is intact.
- Right shoulder radiography was performed (Figures 2 and 3).

What could it be?

1. Displaced humeral surgical neck fracture
2. Anterior shoulder dislocation with axillary nerve involvement
3. Cervical spine injury with radiculopathy
4. Inferior shoulder dislocation with brachial plexus injury
5. Rotator cuff injury
6. Elbow fracture with ulnar nerve involvement

Questions & Answers

1. What is the diagnosis?

The initial positioning ($> 90^\circ$ abduction) of the patient's shoulder displayed an inability and severe pain when attempting to adduct the shoulder, indicating the likelihood of an inferior shoulder dislocation or *luxatio erecta humeri*. This patient's radiographs demonstrate the inferior position of the humeral head to the *glenoid fossa* (Figure 2 and 3). The position of the humeral shaft is parallel with the scapular spine, a feature of *luxatio erecta*, in contrast to anterior shoulder dislocation. The patient also demonstrated an associated brachial plexus injury, with significant forearm sensory changes.

2. What is the mechanism of the injury?

Inferior shoulder dislocation is the least common of shoulder dislocations, occurring in approximately 0.5% of cases. The mechanism of injury is usually hyperabduction, occurring in this patient during forcible lateral and superior displacement after falling forward onto her arm with axial loading. The humeral head is forced against the acromion and further levering causes inferior displacement of the humeral head with rupture of the inferior glenohumeral ligament and joint capsule. The humeral head comes to rest inferior to the *glenoid fossa*, with the shoulder abducted and elbow flexed as the position of most comfort.

Back to our patient...

Karen's initial emergency room treatment

- Management is aimed at achieving reduction of the dislocation, once pre-existing neurovascular status has been documented and a search for other associated injuries or fractures is performed.
 - An effective technique involves providing axial traction to unlock the humeral head from the inferior glenoid rim and gentle abduction, with countertraction aided by a bedsheet and sedation. This usually reduces the dislocation.
 - The arm is then adducted and internally rotated, maintaining axial traction (Figure 4).
- Karen underwent procedural sedation with fentanyl and propofol, resulting in successful reduction of the injury with partial improvement in the right brachial plexus findings. Karen was placed in a velpo-type sling and provided analgesics.

What followup is required?

An urgent orthopedic referral is required because of the high long-term morbidity of this injury. Rotator cuff injuries may require operative repair. Neuropraxic injuries are common and there have been case reports of axillary artery thrombosis. Long-term sequelae can also include adhesive capsulitis.



Figure 2. Indicates a small fracture on the glenoid labrum.




Figure 3. Right shoulder radiograph.



Figure 4. Inferior shoulder dislocation, technique for reduction.

3. What are potential associated problems?

Luxatio erecta is almost always accompanied by a rotator cuff injury. Associated fractures, as well as neurologic complications, are also extremely common, and there are case reports of axillary artery thrombosis. Therefore, this injury demonstrates the wisdom of mandatory neurovascular examination with a search for associated fractures and other problems in all musculoskeletal trauma. A good emergency department reference source for orthopedics is also recommended. 

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This department covers selected points to avoid pitfalls and improve patient care by family physicians in the ED. Submissions and feedback can be sent to diagnosis@sta.ca.