



Unusual shoulder injury from a motorcycle crash

We were unable to place the patient's arm at his side after the accident. An x-ray revealed the reason.

A **38-YEAR-OLD MAN** was brought into our emergency department (ED) after driving his motorcycle at high speed into a tree. The patient, who hadn't been wearing a helmet, was thrown 30 feet. When EMS arrived, the patient was unresponsive, with his right arm in the air. En route, the patient regained consciousness; he appeared intoxicated and became combative.

The patient was evaluated in the ED and his vital signs were normal. His right arm was abducted and over his head (**FIGURE 1**). He reported significant pain with palpation and attempts at range of motion. We were unable to place the patient's arm at his side. Other than

some minor abrasions, the patient appeared to have no other injuries.

Routine laboratory tests showed an alcohol level of 0.175 g/dL and urine toxicology was positive for benzodiazepines and tetrahydrocannabinol. A focused assessment with sonography in trauma (FAST) exam was negative. We ordered a right shoulder x-ray and a chest x-ray.

- WHAT IS YOUR DIAGNOSIS?
- HOW WOULD YOU TREAT THIS PATIENT?

FIGURE 1

Right upper extremity on presentation



PHOTOS COURTESY OF MAINE MEDICAL CENTER

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➤ **Postreduction radiographs should be obtained to verify proper humeral placement and to assess for any associated fractures.**

**Diagnosis:
Inferior dislocation of the shoulder**

The right shoulder x-ray (FIGURE 2) revealed *luxatio erecta*—an inferior dislocation of the shoulder. The humeral head was displaced inferiorly with respect to the glenoid fossa and there was an associated greater tuberosity fracture. The chest x-ray demonstrated mild pulmonary contusions.

An uncommon dislocation

Inferior shoulder dislocation or *luxatio erecta* is the least common type of glenohumeral dislocation, comprising only about 0.5% of all shoulder dislocations.¹ The 2 other types of shoulder dislocations—anterior and posterior—account for 95% to 97% and 2% to 4% of dislocations, respectively.²

■ **Injury occurs in one of 2 ways**, either by a direct or indirect mechanism. A direct dislocation occurs when there is axial loading on an arm that is fully abducted at the shoulder.³ The indirect mechanism, which is more common, is caused by a hyperabduction stress that directs the humeral neck superiorly against the acromion process, forcing the humeral head out of the glenoid fossa inferiorly.² The indirect mechanism usually occurs when a patient falls and reacts by grasping an object above his or her head, resulting in hyperabduction.

■ **Sometimes, there is no trauma.** True inferior dislocations have also been reported in patients with stroke, septic arthritis, and other neuromuscular diseases.⁴

The presentation is distinctive

Patients with this type of dislocation present with their arm elevated, elbow flexed, and hand behind their head. Due to mechanical entrapment of the humeral head, patients can't move their arm. The abducted position of the arm may hinder further assessment with computed tomography (CT) for life-threatening injuries, as was the case with our patient.

While an immobile, abducted arm is virtually pathognomonic, radiographs are useful for confirming the diagnosis and assessing for associated fractures. It is essential to obtain anteroposterior, axillary, and Y views.⁵ Radiographs typically show the shaft of the humerus directed superiorly and parallel to the scapular

spine, with the humeral head below the coracoid process or glenoid fossa.^{3,5}

Rotator cuff tears are a common complication

There are a number of complications associated with *luxatio erecta*. Eighty percent of patients with this injury have either an associated rotator cuff tear or a fracture of the greater tuberosity (which we'll get to in a bit).³ Magnetic resonance imaging studies have shown rotator cuff injuries to involve the supraspinatus, infraspinatus, and, less frequently, the subscapularis tendon.⁶ It's believed that rotator cuff tears may be even more prevalent than reported in the literature since they are often underrecognized at the time of presentation with the dislocation.⁶

■ **Other complications.** Sixty percent of patients report some degree of neurologic dysfunction after the dislocation.⁵ The most common nerve affected is the axillary, followed by the radial, ulnar, and median nerves.³ These injuries are more likely to occur with associated fractures of the greater tuberosity or axillary artery injuries.⁷ Symptoms generally resolve after reduction, although

FIGURE 2
Right shoulder radiograph reveals *luxatio erecta* with greater tuberosity fracture



there have been cases that have taken up to 6 weeks to resolve.⁸

■ **Vascular compromise**, most commonly occurring as a result of axillary artery injury, has been reported in 3.3% of cases.⁵ This injury is most common in elderly patients, with 75% of cases occurring in patients older than 60 years.⁷ It's been hypothesized that this is due to the loss of arterial elasticity as an individual ages. The most common presenting signs and symptoms include absent radial and/or brachial pulses, severe pain, axillary swelling, axillary masses due to hematoma formation, and neurologic deficits.⁷ Complications are minimal if diagnosed and treated early.

The most expeditious way to diagnose this complication is to obtain a Doppler ultrasound of the injured extremity. If surgery is indicated, saphenous vein graft has been reported as a successful treatment.³

■ **Fractures** are another complication to watch for. The most common fractures are of the greater tuberosity, although fractures to the glenoid, humeral head, acromion, and scapular body have also been reported.⁸ Fracture management depends on the characteristics of the fracture, including displacement, size of the fragment, and joint stability.

Treatment involves traction and countertraction

Luxatio erecta is normally treated by closed reduction using the traction-countertraction technique. In this maneuver, the shoulder is reduced with direct traction, while countertraction is applied with a sheet wrapped over

the clavicle on the affected side and pulled down and across the chest toward the unaffected side. The affected arm is pulled in a cephalad direction and further abducted until the humeral head is reduced within the glenoid fossa. After reduction, the arm is gradually moved downwards toward the patient's side and splinted in the adducted position.⁸

Special care should be taken with patients who are at risk of cervical spine injuries. Post-reduction radiographs should be obtained to verify proper humeral placement and to assess for any associated fractures. While closed reduction is the definitive treatment, patients run the risk of recurrent instability that may necessitate capsular reconstruction.¹

Our patient recovered well

Our patient was sedated with fentanyl and midazolam, and his shoulder was reduced with the traction-countertraction technique described earlier. Postreduction radiographs revealed satisfactory alignment of the right glenohumeral joint and that the greater tuberosity was reduced to within a centimeter of its normal position. No additional fractures were identified.

After the reduction, a head CT scan was done; it revealed a small intracerebral hemorrhage. The patient was admitted overnight and discharged the following day with a sling and swathe and instructions to follow up with orthopedics. **JFP**

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References

- Groh GI, Wirth MA, Rockwood CA Jr. Results of treatment of luxatio erecta (inferior shoulder dislocation). *J Shoulder Elbow Surg.* 2010;19:423-426.
- Goldstein JR, Eilbert WP. Locked anterior-inferior shoulder subluxation presenting as luxatio erecta. *J Emerg Med.* 2004;27:245-248.
- Yamamoto T, Yoshiya S, Kurosaka M, et al. Luxatio erecta: a report of 5 cases and a review of the literature. *Am J Orthop.* 2003;32:601-603.
- Sonanis SV, Das S, Deshmukh N, et al. A true traumatic inferior dislocation of shoulder. *Injury.* 2002;33:842-844.
- Yanturali S, Aksay E, Holliman CJ, et al. Luxatio erecta: clinical presentation and management in the emergency department. *J Emerg Med.* 2005;29:85-89.
- Krug DK, Vinson EN, Helms CA. MRI findings associated with luxatio erecta humeri. *Skeletal Radiol.* 2010;39:27-33.
- Plaga BR, Looby P, Feldhaus SJ, et al. Axillary artery injury secondary to inferior shoulder dislocation. *J Emerg Med.* 2010;39:599-601.
- Sewecke JJ, Varitimidis SE. Bilateral luxatio erecta: a case report and review of the literature. *Am J Orthop.* 2006;35:578-580.



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