Radiology Case 7

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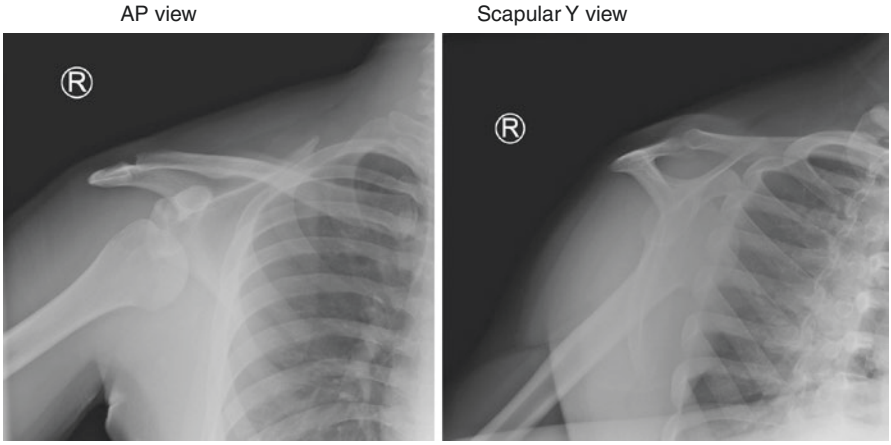
Caitlin Hackett and Joshua K. Aalberg

Case 7a Indication for Exam 19-year-old male wrestler presents with shoulder pain during a match. The right shoulder is painful with a low lying humeral head and the arm held in slight abduction and internally rotated.



Radiographic Findings Humeral head is displaced anteriorly, medially, and inferiorly compatible with anterior subcoracoid glenohumeral dislocation.

Diagnosis Anterior Shoulder Dislocation

C. Hackett · J. K. Aalberg (✉)
Department of Emergency Medicine, Wexner Medical Center at The Ohio State University, Columbus, OH, USA
e-mail: Caitlin.Hackett@osumc.edu; joshua.aalberg@osumc.edu

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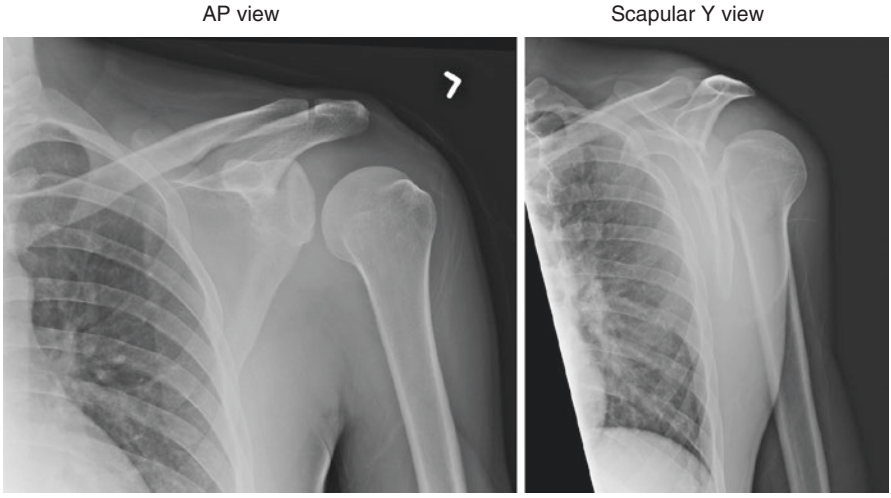
Case 7b Indication for Exam 26-year-old male presents with shoulder pain after an assault. The left shoulder is painful, deformed, and fixed in internal rotation.



Radiographic Findings The AP view shows widening of the glenohumeral joint. The scapular Y view shows posterior displacement of the humeral head relative to the glenoid compatible with posterior dislocation.

Diagnosis Posterior Shoulder Dislocation

Learning Points

Priming Questions

- How are anterior and posterior dislocations different?
- What are the common associated injuries?
- Does the management differ for anterior vs. posterior dislocations?

Introduction

The shoulder is the most commonly dislocated joint in the body.

- Anterior shoulder dislocations account for 95% of shoulder dislocations. In those cases, the humeral head is displaced anteriorly, inferiorly, and medially. The peak age is 15–25 years, and it is more common in males. The four types of anterior dislocation are subcoracoid, subclavicular, subacromial, and intrathoracic. [1]

- Posterior shoulder dislocations account for 2–4% of glenohumeral dislocations. The humeral head usually dislocates straight posteriorly (subacromial). Rarely, the humeral head may dislocate subglenoid or subspinous. The peak age is 35–55 years, and it is more common in males. It can occasionally be bilateral depending on the mechanism [2].

Pathophysiology/Mechanism

The most common mechanism of anterior dislocation is an anterior blow to the distal arm when the arm is held in abduction/external rotation. It can also be caused by direct blow to the back of the shoulder or violent arm traction [3].

The most common mechanism of posterior shoulder dislocation is seizure. It is also classically described with electrocution patients. Posterior dislocation can also be seen with a fall on outstretched hand or blow to flexed, adducted, internally rotated shoulder. The risk is increased if the glenoid is hypoplastic [4].

Making the Diagnosis

The diagnosis is often clinically apparent. Radiographs can confirm the diagnosis, exclude fracture, and assist with treatment. As with all musculoskeletal injuries, multiple views should be obtained.

If the dislocation is obvious on the frontal/AP view, it is most likely an anterior dislocation [5].

Posterior dislocation is apparent on axillary and scapular Y views but is missed 50% of the time on the AP view [6]. Signs of posterior dislocation on the AP view include

- Incongruency of the joint: joint may appear narrow or wide depending on the position of the humeral head.
- Rim sign: shoulder joint width > 6 mm, loss of normal overlap of humeral head and glenoid.
- Some authors report a "light bulb sign." The internal rotation of the humeral head in a posterior dislocation has a more rounded appearance compared to a typical AP view of the shoulder.
- Clinically, patients with posterior dislocations are unable to externally rotate their arm beyond 90 degrees in relation to their torso.

Treating the Patient

Closed reduction should be performed promptly to avoid muscle spasm and worsening of associated injuries. There are numerous different techniques described for anterior dislocations ranging from direct traction-countertraction to the Stimson

maneuver, which involves hanging a weight from the affected arm while the patient lies supine on the bed. There are fewer options described for posterior dislocations, and patients may require open reduction if closed reduction is unsuccessful. In general axial traction is applied to the arm along with forced adduction and internal rotation of the joint. Of note, closed reduction by the Emergency Physician is generally contraindicated if there is an associated humeral fracture, nerve injury, or major vascular injury (assuming the limb is still being perfused while the humerus is dislocated).

Postreduction radiographs should be obtained to confirm successful reduction as well as to look for associated injuries that may have been overlooked on the initial radiographs. Thirty-five percent of fractures are visible only after reduction [3]. If there is a sizeable effusion or hematoma in the joint, the shoulder may appear slightly inferiorly subluxed on the postreduction radiographs.

After successful reduction, patients should be placed in slings for up to 4 weeks and referred to orthopedic surgery to monitor their recovery, assess for concomitant injuries to the joint, and to discuss surgical options in the event they become chronic dislocators.

For anterior dislocations, patients younger than 20 have a 90% chance of recurrence. In patients older than 40, 10–15% have recurrence. Chronic dislocators should be taught to avoid positions when dislocation occurs and to strengthen dynamic stabilizers [7]. Nonemergent cross-sectional imaging may be helpful to determine whether additional injuries are present and to assist with surgical planning. Younger patients often eventually require surgery to repair labral tears that can cause instability. Bone grafts may be required if there are large defects in the glenoid rim or humeral head [8]. Below are some of the possible concominant injuries to the joint.

Anterior dislocations [9]

- Hill–Sachs lesion: 80%, impaction fracture of the posterolateral humeral head
- Bankart lesion: 75% have labral tear, 15% have fractures; tear or separation of the anterior inferior glenoid labrum, sometimes has fracture of adjacent glenoid rim (bony Bankart).
- Greater tuberosity fractures: in older patients.
- Glenohumeral ligament tears.
- Coracohumeral ligament tears.
- Subscapularis tears with possibly subluxation of long head of the biceps tendon or avulsion of the lesser tuberosity.
- Stripping of anterior joint capsule from glenoid attachment [6].

Posterior dislocations [6]

- Reverse Hill–Sachs: 75%, vertical compression fracture of the anterior humeral head due to anteromedial humeral head impaction on the posterior glenoid rim. The size of the reverse Hill–Sachs lesion is the best predictor of recurrence.
- Reverse Bankart: 30%.
- Posterior labrocapsular periosteal sleeve avulsion (POLPSA).

- Glenohumeral ligament tears.
- Teres minor tear.
- Lesser tuberosity fractures.

Discussion

- Glenohumeral dislocation may be obvious clinically, but radiographs can be used to confirm the type of dislocation and aid with reduction.
- Arguably, the more important radiologic findings in glenohumeral dislocation are the associated injuries as these contribute to future instability, though they rarely change management in the emergency department, as long as the patient is able to follow up with an orthopedic surgeon.

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