

CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 16 year old young man was roller skating and fell backwards, striking the posterior aspect of his right shoulder. His vital signs are unremarkable. The shoulder shows an obvious step-off deformity with tenderness over the deltoid muscle mass. The radial and ulnar pulses are intact and the right upper extremity sensation and motor function appears normal.

Which of the following imaging studies is the initial examination of choice for evaluation of post-traumatic shoulder pain?

- (a) magnetic resonance (MR) imaging of the shoulder
- (b) plain film examination of the shoulder
- (c) nuclear medicine bone scan
- (d) ultrasound (US) examination of the shoulder

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

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- (c) nuclear medicine bone scan
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The initial imaging study in almost all patients with acute shoulder pain following trauma is a plain film examination of the shoulder, and (b) is correct.

MR imaging of the shoulder (a) is very helpful for evaluation of the shoulder and may allow diagnosis of a variety of traumatic and non-traumatic shoulder abnormalities (including radiographically occult fractures, avascular necrosis of the humeral head, bone and soft tissue tumors, rotator cuff disease, and tears of the glenoid labrum). However, MR of the shoulder is typically performed only *after* plain film examination of the shoulder, and (a) is incorrect. A nuclear medicine bone scan (c) may be helpful in excluding areas of increased radiotracer indicating increased bone turnover such as might be seen in metastatic deposit or stress fracture. However, as in the case with the MR study, nuclear medicine is typically performed only *after* plain film examination of the shoulder, and (b) is incorrect. US examination of the shoulder (d) may be useful in some cases of suspected muscle tear including rotator cuff tear, but once more is not the typical initial imaging study of choice for evaluation of shoulder pain following trauma, and (d) is incorrect.

IMAGING STUDY AND QUESTIONS

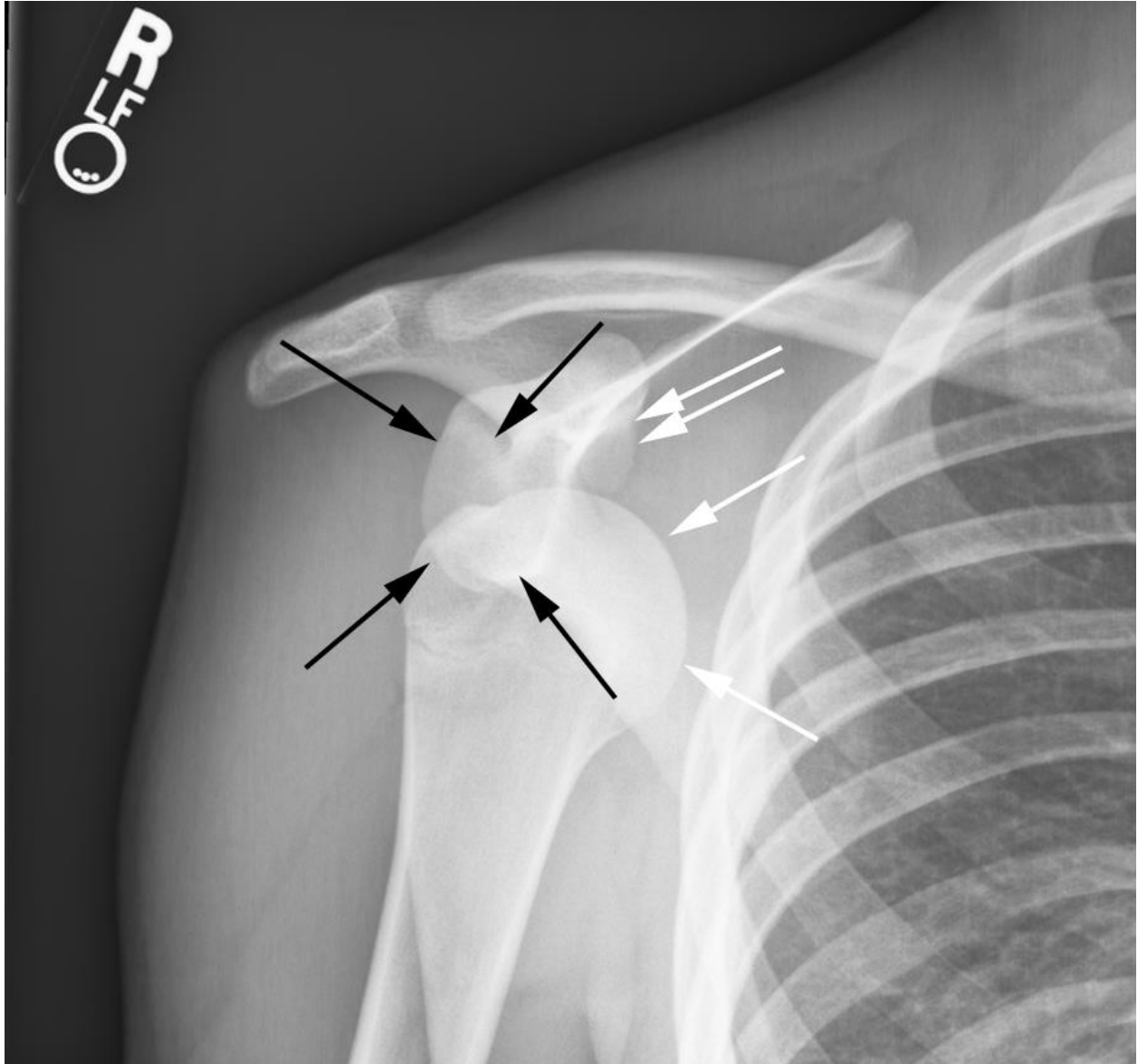
An imaging study was performed:



Imaging questions:

- 1) What type of study is shown?
- 2) Are there any abnormalities?
- 3) What is the most likely diagnosis?
- 4) What is the next step in management?

IMAGING STUDY QUESTIONS AND ANSWER



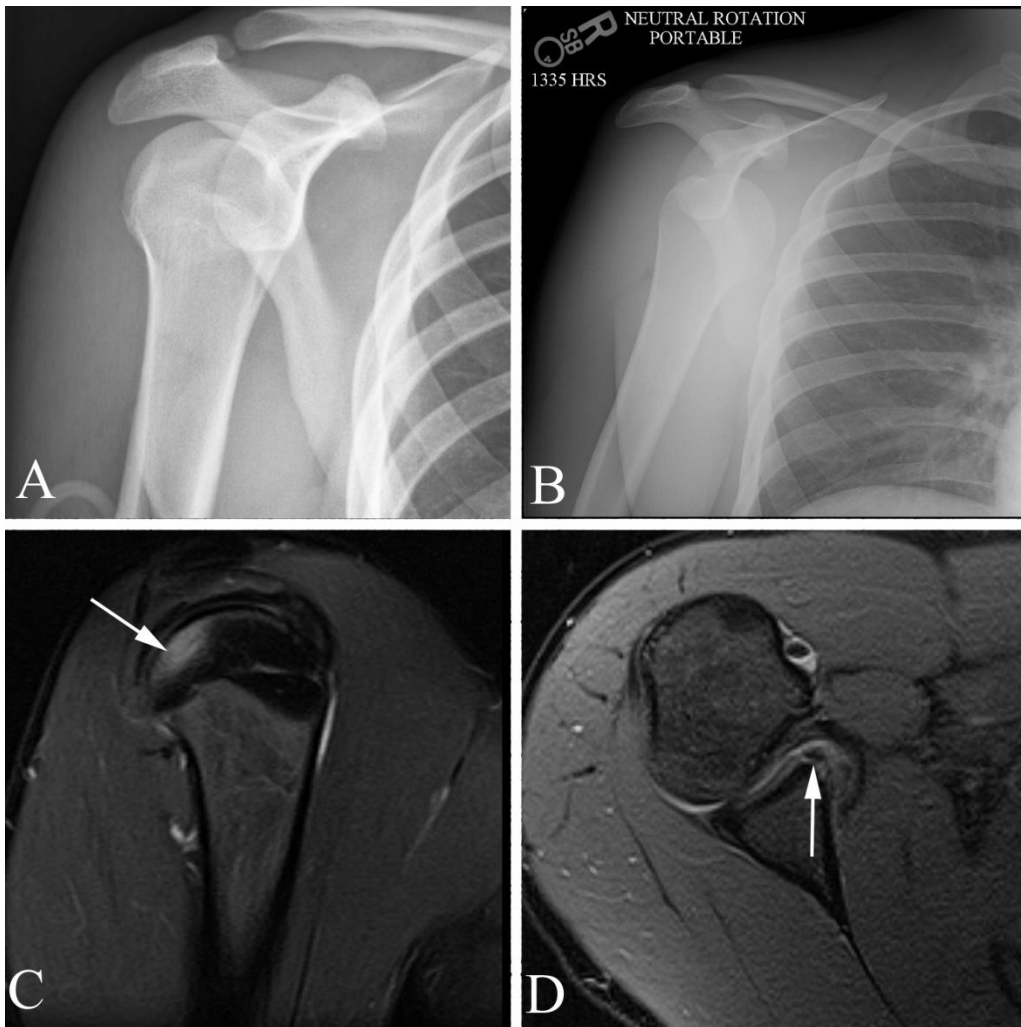
Imaging questions:

- 1) What type of study is shown? AP portable right shoulder plain film examination.
- 2) Are there any abnormalities? Yes. The humeral head (white arrows) is located inferior and medial to its expected location adjacent to the glenoid (black arrows) (see subsequent radiographs), and lies inferior to the coracoids process (double white arrow).
- 3) What is the most likely diagnosis? Acute subcoracoid glenohumeral (shoulder) joint dislocation.
- 4) What is the next step in management? Relocation of the patient's dislocated shoulder.

For additional quiz cases and information, please visit www.symptombasedradiology.com

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

The patient was given pain medication (intravenous morphine) and his shoulder dislocation was reduced (see below figure). He was referred to an orthopedic surgeon who prescribed physical therapy. The patient subsequently had a second skating accident, resulting in recurrent shoulder dislocation (see below figure). He was referred to a different orthopedic surgeon, who ordered an MR of the shoulder that demonstrated a contusion of the humeral head and a tear of the inferior labrum (see below figure). The patient was scheduled to undergo shoulder surgery, but then decided to postpone this as it would interfere with his matriculation to a college where he had been provided a scholarship for competitive downhill skiing.



16 (to 18) year old young man with repeated shoulder dislocations. A. Relocation of dislocated shoulder illustrated on Page 2, when the patient was 16. B. Dislocation of the right shoulder at age 18. C. Coronal short-tau inversion recovery (STIR) MR image demonstrating increased signal intensity of the posterior humeral head (arrow) compatible with a bone contusion. D. Axial fat saturated proton-density MR image demonstrating a tear along the anterior labrum (arrow).

SUMMARY

Presenting symptoms: The patient presented with acute shoulder pain following trauma. Immediate considerations (particularly considering deformity of the shoulder on physical examination) include isolated dislocation and fracture/dislocation.

Imaging work-up: The initial imaging study of choice for post-traumatic shoulder pain is a plain film examination of the shoulder. Views obtained typically include an anteroposterior (AP), a scapular “Y” view (an oblique view parallel to the blade of the scapula, with the blade forming the inferior limb and the scapular spine and coracoids process forming the upper limbs of the “Y”), and an axillary view (obtained through the axilla). An additional often helpful view is a Grashey view, which is an oblique view parallel to the glenohumeral joint. If the humeral head is dislocated and not fractured, follow-up films after reduction are typically obtained to document relocation and re-evaluate for fracture. If there is a fracture of the humeral head (with or without dislocation), orthopedic consultation is generally obtained, and the orthopedic surgeon will determine whether further imaging (for example, with computed tomography) is necessary to evaluate the nature and extent of the fracture.

Establishing the diagnosis: Plain films provide the diagnosis of shoulder dislocation. Note that anterior dislocations account for the vast majority of cases and are easily diagnosed with an AP examination, whereas posterior dislocations may be challenging to diagnose on an AP exam and much easier to see on the trans-scapular “Y” view or axillary view. Inferior dislocations (rare) are associated with obvious clinical deformity and are obvious on all views.

Take-home message: The initial study of choice for virtually all patients with acute post-traumatic shoulder pain is a plain film evaluation of the shoulder. In patients with shoulder dislocations without a fracture, follow-up films following reduction are usually obtained to document reduction and exclude fracture not seen on the initial films. When the initial films show a fracture or a fracture/dislocation, orthopedic consultation is generally required.

FURTHER READING

Modarresi S, Jude CM. Radiologic evaluation of the painful shoulder. UpToDate, accessed 11/6/09.

Renfrew DL. Single joint pain. Chapter 14 in *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at www.symptombasedradiology.com.

Sherman SC, Schaidler JS. Shoulder dislocation and reduction. UpToDate, accessed 4/6/12.

Weissman BN. Diagnostic imaging of joint pain. UpToDate, accessed 11/16/09.