RADY 403 Anterior Shoulder Dislocations

Shawn Ahuja, 07/22/22
Focused patient history and workup

• 18 y/o M with no PMHx

• Initially dislocated their left shoulder while wrestling
  • Reduced by a “family friend” EM physician

• ~3 weeks later had another dislocation after forceful abduction when colliding with another player in a lacrosse game
  • Shoulder deformity noted, reduction by athletic trainer failed which prompted ED visit.

• No other injuries, grossly neurovascularly intact, reduced in the ER

• Restored ROM with mild pain on external rotation at 1 week clinic visit
List of imaging studies

• X-Ray of the left shoulder (AP and axillary views)

• MRI of the left shoulder with contrast (MR Arthrogram)
X-Ray (AP View)
X-Ray (AP View)

- Loss of shoulder contour
- Glenoid with missing humeral head articulation
- Anterior and inferior dislocation
X-Ray (Axillary view)
X-Ray (Axillary view)

Medial and inferior displacement of the head of the humerus
X-Ray (AP and Axial, post reduction)
MRI (T1FS and T2FS, Axial)
MRI (T1FS and T2FS, Axial)

H = Humerus, G = Glenoid/Scapula

Impaction of posterior lateral surface
Bone marrow edema
Detachment of Anteroinferior glenoid labrum
MRI (T1FS vs T2FS, Coronal)
MRI (T1FS vs T2FS, Coronal)

Redemonstration of posterolateral impaction

Bone marrow edema
Shoulder dislocations: Anterior vs Posterior

• Anterior:
  • Most common
  • Usually results from forced abduction, external rotation, and extension
  • Can be further classified by where the humeral head lies

• Posterior:
  • Far less common
  • Usually results from a posteriorly directed force while the Humerus is in internal rotation and abduction.
  • Classically shows a “light bulb” sign, due to fixed internal rotation

Image source: Boston Children's Hospital
Anterior Dislocation

Posterior Dislocation
Anterior Dislocation

- Loss of shoulder contour
- Humeral head dislocated anteriorly and inferiorly

Posterior Dislocation

- Lack of overlap between the glenoid and the humeral head
- The shoulder is rotated such that the humeral head has a 'light bulb' appearance.
Complications of Anterior Shoulder Dislocations

- Subscapularis muscle
- Scapula
- Infraspinatus muscle
- Glenoid labrum
- Greater tubercle
- Humeral head
- Joint capsule
- Long biceps tendon
- Bankart lesion
- Hill-Sachs lesion

Image source: AMBOSS
Hill-Sachs Lesion

• Posterolateral humeral head depression fracture due to impaction of the anterior glenoid rim during an anterior dislocation

• Plain film will show a posterolateral wedge shape defect, MRI and CT will show smaller defects with bone marrow edema during acute injury.¹-²

<table>
<thead>
<tr>
<th>Modality</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR²</td>
<td>97%</td>
<td>91%</td>
</tr>
<tr>
<td>X-Ray²</td>
<td>84%</td>
<td>83%</td>
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</tbody>
</table>
Axial STIR MRI

Concurrent Hill Sachs Lesion

Osseous fragment of inferior glenoid c/w Bankart Lesion

Fraying of anterior glenoid labrum c/w Bankart lesion
Bankart Lesion

• Injury to the anteroinferior glenoid labrum during an anterior shoulder dislocation.

• Plain radiograph may show fracture of the anteroinferior aspect of the glenoid.³

• MRI will show frank displacement of the anterior labrum or can even show an abnormally small or absent labrum.⁴

<table>
<thead>
<tr>
<th>Modality</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR⁵</td>
<td>90%</td>
<td>85%</td>
</tr>
<tr>
<td>X-Ray⁶,*</td>
<td>86%</td>
<td>73%</td>
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</tbody>
</table>

*As detected glenoid bone loss with two views
Axial STIR MRI
### Appropriateness Criteria

#### Variant 1:
Traumatic shoulder pain. Any etiology. Initial imaging.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiography shoulder</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT arthrography shoulder</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT shoulder with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT shoulder without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT shoulder without IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>MR arthrography shoulder</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>MRI shoulder without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>MRI shoulder without IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>Bone scan shoulder</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>US shoulder</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
</tbody>
</table>

#### Variant 6:
Traumatic shoulder pain. Radiographs normal. Physical examination and history consistent with dislocation event or instability. Next imaging study.

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<tr>
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<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR arthrography shoulder</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>MRI shoulder without IV contrast</td>
<td>Usually Appropriate</td>
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</tr>
<tr>
<td>CT arthrography shoulder</td>
<td>May Be Appropriate</td>
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<tr>
<td>CT shoulder without IV contrast</td>
<td>May Be Appropriate</td>
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<tr>
<td>CT shoulder with IV contrast</td>
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<td>US shoulder</td>
<td>Usually Not Appropriate</td>
<td></td>
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</table>

### Appropriateness Category Name

- **Usually Appropriate**: The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients.
  - **Appropriateness Rating**: 7, 8, or 9

- **May Be Appropriate**: The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ratio, or the risk-benefit ratio for patients is equivocal.
  - **Appropriateness Rating**: 4, 5, or 6

- **May Be Appropriate (Disagreement)**: The individual ratings are too dispersed from the panel median. The different label provides transparency regarding the panel’s recommendation. “May be appropriate” is the rating category and a rating of 5 is assigned.
  - **Appropriateness Rating**: 5

- **Usually Not Appropriate**: The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable.
  - **Appropriateness Rating**: 1, 2, or 3

### Relative Radiation Level Designations

<table>
<thead>
<tr>
<th>Relative Radiation Level*</th>
<th>Adult Effective Dose Estimate Range</th>
<th>Pediatric Effective Dose Estimate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 mSv</td>
<td>0 mSv</td>
</tr>
<tr>
<td>☐</td>
<td>&lt;0.1 mSv</td>
<td>&lt;0.03 mSv</td>
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<tr>
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<td>0.1-1 mSv</td>
<td>0.03-0.3 mSv</td>
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<tr>
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<td>1-10 mSv</td>
<td>0.3-3 mSv</td>
</tr>
<tr>
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<td>10-30 mSv</td>
<td>3-10 mSv</td>
</tr>
<tr>
<td>☐ ☐ ☐ ☐ ☐</td>
<td>30-100 mSv</td>
<td>10-30 mSv</td>
</tr>
</tbody>
</table>
Patient treatment and outcome

• Hill Sachs lesion confirmed, no osseous Bankart lesion.
• Patient already at great ROM at time of MRI
  • No indication for surgery
• Following up with physical therapy to prevent future dislocations
UNC Top Three Key Take Aways

1. START WITH A TWO VW SHOULDER PLAIN FILM IN THE SETTING OF A TRAUMA
   Confirm the presence of a dislocation and more obvious Glenoid fractures

2. IF THERE IS PERSISTENT PAIN IN THE SETTING OF AN ANTERIOR DISLOCATION, CONSIDER A HILL-SACHS AND/OR A BANKART LESION
   MR Arthrography is the preferred modality for peds patients

3. IF YOU FIND HILL-SACHS LESION, LOOK CAREFULLY FOR CONCURRENT BANKART LESION
   The mechanism of injury makes both lesions occurring very likely
References


