**Ultrasound of Shoulder Pathology**

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**Disclosures**

• None relevant

**Educational Objectives**

• Following the presentation, participant should be able to:
  – Discuss diagnostic criteria for rotator cuff tears
  – Identify other common shoulder pathologies seen on US

**Biceps Tendon Abnormalities**

• Tendinosis
• Tendon rupture
• Tendon subluxation or dislocation
  – Exits groove medially

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**Biceps Tendinosis**

GT LT

**Ruptured Biceps Tendon “Empty Groove”**

LT GT

Trans Long
Ruptured Biceps Bilateral Comparison

Subluxated Biceps Tendon

Empty Bicipital Groove

Dislocated Biceps Tendon

Biceps Tendon Abnormalities
- Fluid in biceps tendon sheath
  - Rotator cuff tear
  - Biceps tendon tear
  - Tenosynovitis
  - Inflammatory or septic arthritis

Hemophiliac with Fever and Shoulder Pain
**Biceps Tenosynovitis**

**Subscapularis Tendon**

www.essr.org

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**Subscapularis Tear**

**Long Axis**

Hyaline Cartilage

**Rotator Cuff Tears**

**Criteria**

- Full thickness tears
  - Complete absence of cuff
  - Hypoechoic defect
  - Focal atrophy of cuff
  - Accentuate by compression

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**Rotator Cuff**

**Normal US appearance**

- Homogeneous echotexture
- Convex external contour
- Smooth bony margins

**Complete Absence of Cuff:**

**Acute Tear**
Massive Acute Tear

Massive Chronic Tear

Rotator Cuff Arthropathy

Critical Zone Supraspinatus Tear

RCT With Compression

38-Year-Old Weight Lifter Felt “Pop”
Small Full Thickness Tear: Accentuated by Compression

Rotator Cuff Tears
Criteria
- Partial tears
  - Hypoechoic, or mixed hypo- and hyperechoic
  - Extend to either bursal or articular surface of cuff
  - Often associated with bony irregularity

Partial Articular Surface Tear

Delaminating Partial Tear

Partial Bursal Surface Tear

21 Year Old Tennis Player with Shoulder Pain for 1 Year
"Sonobursography"

Rotator Cuff Footprint

Bursal Sided "Footprint Tear"

Interstitial "Footprint Tear"

Rotator Cuff Tendinosis
- Thickened, heterogeneous tendon
- Nodular hypoechoic areas
- Calcification
- Interstitial splits
- Increased Doppler flow (variable)

Supraspinatus Tendinosis
**Calcific Tendinosis**

- Hyperechoic focus in tendon
- May or may not shadow depending on size
- Can see calcifications as small as 1-2mm

**Calcific Tendinosis, Supraspinatus**

**Calcific Tendinosis Supraspinatus**

**Subacromial-Subdeltoid Bursitis**

**Pain After Rotator Cuff Repair**

**Post Op Supraspinatus**
**Subacromial Impingement**

- Trapping of soft tissues in subacromial space
  - Between acromion process, humeral head, and coracoacromial ligament
- Presents with pain and/or decreased range of motion

**Subacromial Impingement US diagnosis**


- Dynamic imaging
  - Arm abducted in real time
  - Internal rotation, elbow extended
- Probe along supraspinatus long axis
- Identify if anything impedes gliding motion

**Subacromial Impingement Causes Seen by US**

- Subdeltoid bursal pathology
  - Acute bursitis
  - Chronic bursal thickening
- Tendinosis
  - Thickened tendon
  - Large calcification: “rock block”

**Normal Shoulder Abduction**

**Bursal Impingement**
Calcific Tendinosis, Supraspinatus

“Rock Block”

Impingement from Tendinosis

Differential Diagnosis

- Adhesive capsulitis
  - If don’t see active impingement, passively abduct and feel “end point”
  - Painful end point without US evidence of impingement suggests diagnosis
  - Loss of external rotation most sensitive

Posterior Shoulder Joint

Shoulder Effusion
Normal AC Joint

Severe AC Joint Sprain

Accuracy of MRI, MR Arthrography, and Ultrasound in the Diagnosis of Rotator Cuff Tears: A Meta-Analysis
Joseph de Jesus, Laurence Parker, Andrea J. Frangos, Levon N. Nazarian
AJR 2009; 192:1701-1707

Summary Data
All Tears

<table>
<thead>
<tr>
<th>Modality</th>
<th>Sensitivity</th>
<th>Specificity</th>
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<tbody>
<tr>
<td>US</td>
<td>85.1%</td>
<td>92.0%</td>
</tr>
<tr>
<td>MRI</td>
<td>85.5%</td>
<td>90.4%</td>
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<tr>
<td>MRa</td>
<td>91.7%</td>
<td>96.5%</td>
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P < 0.0001

MRI Test of Choice
- Labral tears
- Ligamentous injuries
- Fractures
- Bone tumors

SRU Consensus Conference on Imaging Workup of Suspected Rotator Cuff Disease
October 18-19, 2011
Chicago, IL
**Definition of Problem**

- Shoulder pain is second leading reason to seek orthopedic care, trailing only lower back pain
- At least 60% of shoulder pain is related to the rotator cuff
- No standard imaging work-up for rotator cuff pathology

**Algorithms:**

- Rotator cuff: native
- Rotator cuff: repaired
- Rotator cuff: arthroplasty

**Post-Rotator Cuff Repair**

**Post-Arthroplasty**

*Unless X-ray finding obviates need for ultrasound*
Conclusions

• Ultrasound is an important complementary test to MRI
  – Better spatial resolution
  – Better tolerated
  – No contraindications
  – Dynamic studies
  – Guided interventions