Post-operative Shoulder

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Fundamentals of Musculoskeletal Ultrasound are copyrighted
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Objectives:
• Understand the appearances of the rotator cuff after surgery
• Recognize rotator cuff re-tear
• Familiar with ultrasound appearances after biceps tenodesis and arthroplasty

Outline:
• Rotator cuff repair
• Biceps tenotomy and tenodesis
• Shoulder replacement

Rotator Cuff Repair: surgery
• Arthroscopy
• Open surgery
  – Deltoid detachment and reattachment
• Mini-open
  – Arthroscopy-assisted
  – Split deltoid for access without detachment

Rotator Cuff Repair: surgery
• Partial tear repair:
  – Articular <50% and bursal: debridement
  – Articular >50%: repair or convert to full tear
• Full-thickness repair:
  – Trans-osseous fixation + trough
  – Decorticated tuberosity + direct apposition
Rotator Cuff Repair Techniques


Rotator Cuff Repair: surgery

- Subacromial-subdeltoid bursa:
  - Debrided or resected
- AC joint:
  - Subacromial enthesophyte spur resection
  - AC joint osteophyte resection
  - Coracoacromial ligament release from acromion
  - Distal clavicle resection: Mumford procedure

Repaired Cuff: ultrasound

- Post-op intact tendon:
  - Variable and heterogeneous echogenicity
  - Variable thickness
- Reimplantation trough
- Echogenic sutures & anchors


Post-operative cuff: intact

T1w fat-sat coronal MR arthrogram

Open arrow = suture

Post-operative cuff: intact

T1w fat-sat sagittal MR arthrogram

Open arrow = trough

Post-operative cuff: intact

PDw fat-sat coronal MR arthrogram

Open arrow = trough
Post-operative cuff: intact

Post-operative Cuff: abnormal
- Recurrent rotator cuff tear
- Deltoid muscle detachment:
  - If open surgery
- Infection

Recurrent Cuff Tear: ultrasound results
- Sensitivity = 95%, specificity = 90%, accuracy = 94%\(^1\)
- Tendon defects at 1 year may heal\(^2\)
- Defects increase in size with decreased strength but may be asymptomatic\(^3\)
- Structural integrity does not correlate with pain or function\(^4\)

Post-operative Rotator Cuff
- Recurrent tear:
  - Defined tendon defect
  - Ultrasound: anechoic or hypoechoic
  - MRI: fluid or contrast signal
  - Tendon non-visualization (ultrasound)
  - Tendon retraction

Post-operative cuff: retear

Post-operative cuff: recurrent tear

\(^1\)Yen, Clin Imaging 2004; 28:69
\(^3\)Dodson, Am J Sports Med 2010; 38:35
\(^4\)Russell RD et al. JBJS 2014; 96A:265
Post-operative cuff: recurrent tear

Rotator Cuff Repair:
- How does the repaired tendon appear at specific time points after surgery?
- How does the appearance change over time?
- When should the tendon appear “normal”?

Rotator Cuff Repair:
- Most recurrent tears: within 3 months
- Tendons start to look “normal” by 6 to 9 months
- Focal defects are equivocal, may be post-surgical, may disappear
- Recurrent tears tend to be larger or get larger
- If unsure, get follow-up scan

Rotator Cuff Repair:
- Patients with intact tendons may have continued symptoms
- Patients with recurrent tears may be asymptomatic
- Large recurrent tears are more likely symptomatic
Gossypiboma

- Retained surgical sponge or cotton
  - Textiloma
  - Latin “gossypium” = cotton
  - Swahili “boma” = place of concealment
- Complications:
  - Foreign body response
  - Infection
- May remain silent for years

AJR 2009; 193:S94

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Biceps Tendon:

- Tenotomy: surgical transection of intra-articular aspect of long head biceps brachii tendon
- Tenodesis: surgical transection + fixation of proximal stump to intertubercular groove

Biceps Tendon: tenodesis

Pitfall Alert!

Pseudo Biceps Tendon

- Biceps brachii long head
- Complete retracted tear
- Visible “fibers” in groove
  - Collapsed tendon sheath
  - Aponeurotic expansion of supraspinatus
- Look for distal retracted tendon and absent tendon in rotator interval
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Shoulder Arthroplasty:
• Total shoulder arthroplasty or hemiarthroplasty
  – Rotator cuff normally inserts onto tuberosities
• Reverse total shoulder arthroplasty:
  – Used when tear of rotator cuff
  – No cuff or tuberosities

Shoulder Arthroplasties

Arthroplasty: Intact Cuff

Arthroplasty: Cuff Tear
Humerus Screws: into deltoid muscle

Take-home Points

• Repaired rotator cuff:
  – Most recurrent tears: within 3 months
  – Appears somewhat normal by 6 – 9 months
  – Diagnose retear if obvious defect
  – If equivocal, follow-up scan
• Tenodesis
  – Suture anchor in bicipital groove
• Arthroplasty:
  – Use greater tuberosity landmarks

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