Biceps Brachii Pathology

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Biceps Brachii: long head

• Biomechanics: unclear
  – Stabilization
  – Depression of humeral head
• Tendinopathy:
  – Sensory sympathetic fibers
  – Pain:
    + Anterior shoulder
    + Bicipital groove

Biceps Brachii: pathology

• Tendinosis
• Tear: partial and full-thickness
• Subluxation and dislocation
• Association with:
  – SLAP and anterior rotator cuff tears
• Causes: acute injury, repetitive injury, degeneration

Biceps Brachii: treatment

• Conservative:
  – NSAIDS, physical therapy
  – Tendon sheath injection: corticosteroids
• Surgery:
  – Tenotomy: near labrum
  – With tenodesis:
    + Variable sites of attachment: bicipital groove
    + Improved cosmesis and function

Biceps Tendon:

• Glenohumeral joint effusion:
  – Collects around biceps tendon
  – Tendon sheath communication
  – Seen in 97% with joint effusion
  – Abnormal: > 1 mm

*Zubler et al. Eur Radiol 2011; 21:1858
Shoulder Joint Recesses
- Long head biceps tendon sheath
- Posterior recess:
  - Image with shoulder in external rotation
- Axillary recess
- Subscapularis recess

Biceps Tendon Sheath
- Intra-articular body
  - Echogenic
  - Possible shadowing
  - Single or multiple
  - Associated with glenohumeral joint osteoarthritis

Septic Joint
- Biceps tendon sheath distention
- Heterogeneous
- Increased blood flow
- Non-specific

Biceps Tendon:
- Tenosynovitis
  Unlike joint effusion:
  - Focal distention
  - Hyperemia with color Doppler
  - Pain with transducer pressure
  - No effusion in posterior recess

Inflammatory Tenosynovitis: biceps tendon
Biceps Tendon:
- Tenosynovitis

Subacromial-subdeltoid bursa: anterior
- Proximal
- Distal

Sagittal

Pitfall Alert!
- Deltoid fascia shadow
  - Deltoid fascia
  - Between segments of deltoid muscle
  - Shadow: simulate biceps tendinosis
  - Correct: move transducer to project shadow away

Biceps Tendon:
- Tendinosis:
  - Hypoechoic
  - Swollen
  - No inflammatory cells (not tendinitis)
  - Possible tenosynovitis

Aponeurotic Expansion of Supraspinatus Tendon:
- Up to 49% of shoulders
- Cleft: coronal plane
- Origin: supraspinatus
- Distal: pectoralis or bicipital groove

Skendzel J, et al. AJR 2011; 197:942
Moser et al. Skeletal Rad 2015; 44:223

Biceps Brachii: short axis
- Partial-thickness tear:
  - Hypoechoic /anechoic cleft
  - Tenosynovitis
  - Sensitivity: 27%
  - Accuracy: 88%
  - Subluxation / spur
    - Important secondary signs

Skendzel J, et al. AJR 2011; 197:942

Split + tenosynovitis

Split + Subluxation

Moser et al. Skeletal Rad 2015; 44:223
Biceps Tendon:

- Full-thickness tear:
  - Non-visualization proximally
  - Bicipital groove filled with fluid / granulation tissue
  - Distal retracted tendon stump
  - Ultrasound: 88% sensitivity, 97% accuracy

Skendzel J, et al. AJR 2011; 197:942

Biceps Tendon: full-thickness tear

Biceps Tendon: dislocation

Biceps Tendon: dislocation

Biceps Tendon (long head): full-thickness tear

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
Shoulder: biceps tendon

- Subluxation and dislocation
  - Medial from bicipital groove*
  - May only occur dynamically in external rotation and not identified with MRI
  - Possibly located within subscapularis or glenohumeral joint

Biceps Brachii: anatomy
- Origin: supraglenoid tubercle of scapula and labrum
- Reflection pulley: stability
  - Coracohumeral ligament
  - Superior glenohumeral ligament
  - Superior aspect of subscapularis

From: Ding et al. JBJS 2015; 96:E176

Rotator Interval Tear
- Abnormal hypoechoigenicity, non-visualization
- Abnormal supraspinatus, superior glenohumeral ligament, subscapularis
- Biceps instability
  - “Chondral Print Sign”
  - Intracapsular instability

Yellow Arrow = coracohumeral ligament

*Zappa M et al. Skeletal Radiol 2016: 45:35

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

Biceps Tendon: failed tenodesis

Take-home Points
- Don’t overcall tenosynovitis
- If you have to convince yourself that you are seeing the biceps tendon, it is not there
- Empty groove:
  - Full-thickness tear
  - Medial dislocation