Lateral Elbow Pathology

Jon A. Jacobson, M.D.

Professor of Radiology
Director, Division of Musculoskeletal Radiology
University of Michigan

Disclosures:
• Consultant: Bioclinica
• Advisory Board: GE, Philips
• Book Royalties: Elsevier
• Not relevant to this talk

Note: all images from the textbook Fundamentals of Musculoskeletal Ultrasound are copyrighted by Elsevier Inc.

Pathology:
• Joint effusion and bursa
• Tendon abnormalities
• Ligament abnormalities
• Nerve abnormalities
• Soft tissue masses

Joint Effusion
• Olecranon recess
• Displaced hyperechoic fat pad by anechoic / hypoechoic fluid
• Best place to look with US*
• Other recesses:
  – Anterior: radial, coronoid
  – Lateral: annular recess

De Maeseneer, Invest Radiology 1998; 33:117

Complicated Fluid vs. Synovium
• Both may appear hypo- or isoechoic

Findings that suggest effusion:
• Displacement with transducer pressure
• Joint recess collapse w/ joint movement
• Negative flow on color Doppler imaging
• Swirling with transducer pressure

Septic Joint: Coccidiomycosis

Capitellum

Longitudinal
Sagittal T1w + gado
Annular Recess

Synovial Hypertrophy
Intraarticular Body

Radial Head and Annular Recess

Capitellum: osteochondral injury

Synovial Fold Syndrome
- Normal capsular tissue
  - Hyperechoic, triangular
- Abnormal:
  - Thickened > 3 mm
  - Heterogeneous
  - Adjacent synovitis

Pathology:
- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- Nerve abnormalities
- Soft tissue masses

Lateral Collateral Ligament Complex
- Radial collateral ligament (arrows)
- Common extensor tendon (E)
- Annular ligament (arrowhead)
- Lateral ulnar collateral ligament (curved arrow)
Tendon Abnormalities:
- Tendinosis: hypoechoic, swollen
- Partial-thickness tear: anechoic focus, no retraction
- Full-thickness tear: discontinuity
  - Dynamic imaging: retraction

Epicondylitis:
- Common flexor and extensor tendons
- Abnormal hypoechogenicity
  - Mucoid degeneration, tendinosis
- Anechoic: partial-thickness tear
- No inflammatory cells*

* Potter, Radiology 1995; 196:43
  Connell, AJR 2001; 176:777

Common Extensor Tendon: elbow
- Often called “tennis elbow” or “lateral epicondylitis” or “epicondylitis” or ……
- All terms are misnomers
- Those inflicted usually do not play tennis (professionally or correctly)
- It is not inflammatory
- It is not a primary problem of the epicondyle
Common Extensor Tendon: epicondylitis

Pathology:
- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- Nerve abnormalities
- Soft tissue masses

Common Extensor Tendinosis + RCL Tear

Collateral Ligament Tear
- Partial tear: hypoechoic, thickened
- Complete tear: anechoic fluid tracking through ligament defect
- Dynamic examination: stress

Miller et al. Skeletal Radiol 2004; 33:386

Radial Collateral Ligament: complete tear

Radial Collateral Ligament Complex: injury

Longitudinal Coronal T2w
Radial Collateral Ligament Complex: injury

Pathology:
- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- Nerve abnormalities
- Soft tissue masses

Radial tunnel
- Radial nerve: deep branch
  - Originates from radial nerve between brachioradialis and brachialis
  - Passes between deep and superficial layers of supinator muscle
  - Exits as posterior interosseous nerve

Jacobson JA. et al. Sem Musculoskel Rad 2010; 14:473

Radial Nerve
- Radial nerve: deep branch
  - Supinator syndrome:
    - Motor deficits (wrist, finger extension)
    - Abnormal electrodiagnostic studies
    - Nerve enlargement: entrapment
  - Radial tunnel syndrome:
    - Pain, no motor deficits, normal EMG
    - Muscle denervation on MRI
    - No nerve enlargement

Ferdinand BD et al. Radiology 2006; 240:161

Radial Nerve: deep branch
- As it enters into supinator under Arcade of Frohse
- Normally flattens in AP dimension: 50%
- Cross-sectional area does not change

Supinator Syndrome: deep br. radial nv.

Abnormal
Normal

Humerus
Radius
Supinator

Transverse
Abnormal
Normal

Lateral Antebrachial Cutaneous Nerve

- Continuation of the musculocutaneous nerve
- Abnormalities:
  - Compression from biceps brachii tendon injury
  - Injured at cephalic vein phlebotomy
  - Pain and dysesthesia: anterolateral forearm (red highlighted area)

Lateral Antebrachial Cutaneous Nerve

- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- Nerve abnormalities
- Soft tissue masses

LABCN: compression

Note biceps brachii tendon injury (yellow arrows)
Open white arrow = lateral antebrachial cutaneous nerve

Pathology:

Chiaravas et al. Skeletal Radiol. December 2011

Chiavaras et al. Skeletal Radiol.
December 2011

Courtesy of M. Chiavaras, Hamilton, Ontario
Ganglion Cyst: radial nerve compression

Ganglion Cyst (elbow): aspiration

Take-home Points:
- Joint: aspirate if concern for infection
- Biceps and triceps:
  - Anatomy explains partial-thickness tears
- Nerves: don’t forget to look
- Dynamic imaging
  - Ulnar nerve dislocation, snapping triceps
  - Ulnar collateral ligament evaluation

Syllabus on line and other educational material:
www.jacobsonmskus.com
Twitter handle: @jjacobsn