Musculoskeletal Ultrasound of the Elbow

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Disclosures

• I receive royalties from Demo’s Publishing for a sports medicine book I co-edited.
Anterior

- 28 y/o right handed weight lifter with 3 month history of deep aching forearm pain, grip weakness, and radial palmar hand/finger paresthesias during weight lifting activities
- 0-6/10
- Worst during and after a cable “punch”
- Best when not lifting weights
- Tx: rest, forearm massage, tennis elbow strap, OTC meds
Anterior

- TTP over proximal volar/ulnar forearm
- + Tinel’s over median nerve just distal to antecubital fossa
- Normal strength, sensation, reflexes
- Symptoms increased with resisted forearm pronation
Anterior
Anterior

- Dx: Pronator syndrome
  - Median nerve entrapment between two heads of pronator teres
  - Pearl: ulnar head of pronator teres located between median nerve and ulnar artery
Anterior

• Pathology
  • Anterior interosseous nerve syndrome
    • Motor nerve (no cutaneous innervation). Innervates:
      • FDP to digits 2-3
      • FPL
      • Pronator quadratus
    • (+) OK sign
  • Sonographic findings
    • +/- compressive mass
    • Relevant muscle atrophy

Aldridge Clin Sports Med 2001
Anterior

- **Pathology**
  - Bicipitoradial bursopathy
    - Horseshoe shaped bursa around distal biceps tendon
    - Can compress the radial nerve
  - Biceps tendinopathy/tear
    - Use the pronator window to adequately image the distal biceps tendon
    - Tendinopathy = enlarged, hypoechoic, +/- hyperemia
    - Tear = absent fibers; hypoechoic, enlarged tendon ends (identify with refraction artifact)
    - May have minimal retraction if lacertus fibrosis is intact

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Anterior

• Pathology
  • Effusion, synovitis, loose bodies in anterior recesses
  • OCD of capitellum
  • Posterior interosseous nerve entrapment
    • Usually at arcade of froshe (entrance to supinator), but can be under radial recurrent artery
Medial

• 16 y/o RH football player
  • Valgus elbow stress while blocking
  • Immediate medial elbow pain, unable to continue playing
  • Developed echymosis next day
  • 4-8/10, sharp, non-radiating
  • Worse with elbow movement or valgus stress
  • Better with rest
  • No other sx
Medial

• PE:
  • Edema/echymosis
  • ROM = 10 – 90
  • TTP medial elbow
  • Pain/laxity with moving valgus stress test
  • Normal neurovascular
Medial
Medial

Symptomatic

Asymptomatic
Medial

- **Dx:** UCL sprain
- **Treatment Options**
  - Non-operative
  - Early repair
  - Delayed reconstruction
- Patient opted for non-operative treatment since in senior year
- Able to compete 2 months later in wrestling without difficulty
Medial

- Pathology
  - Ulnar collateral ligament sprain
    - Abnormal > 2 mm opening, or > 1 mm side to side difference
Medial

- Pathology
  - Flexor-pronator tendinopathy
    - hypoechoic, enlarged, hyperemic
  - Flexor-pronator tear
    - Partial thickness (intra-substance, superficial, deep)
      - Thinned in area of tear
      - Discontinuity of fibers at tear site
    - Full thickness
      - Complete disruption of fibers

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Medial

- Pathology
  - Epitrochlear lymphadenopathy
    - Enlarged
    - Rounded
    - Loss of hyperechoic hilum (center)
    - Thickened hypoechoic cortex
    - Increased peripheral vascularity
  - DfDx: infection (cat scratch disease), lymphoma, sarcoidosis

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Medial

- Pathology
  - Ulnar nerve entrapment
    - Usually under arcuate ligament (between 2 heads of FCU) at entrance of cubital tunnel
    - Enlarged > 7.5 mm²
    - Look for anconeus epitrochlearis (accessory muscle behind medial epicondyle)
    - Can also be entrapped under Supracondylar process and ligament of Struthers

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Medial

- Pathology
  - Ulnar nerve instability
    - Ulnar nerve dislocates with elbow flexion, relocates with extension
    - Look for snapping triceps
Posterior

• 28 y/o mogul skier developed sudden onset sharp posterior elbow pain while pole planting
  • 3-8/10
  • Increased with direct pressure, pushing against resistance
  • Improved with rest
  • Noted some echymosis and edema in injured area
  • Felt weak, but no numbness/tingling
  • Tx with ice, rest, ace wrap
Posterior

- Physical Examination
  - Edema/echymosis over distal triceps/olecranon region
  - TTP over distal triceps tendon near insertion on olecranon
  - Pain and 4/5 strength with resisted elbow extension
  - Normal sensation
Posterior
Posterior

• **Dx:** Partial thickness tear of the triceps tendon superficial fibers
• **Tx:** Multiple options, patient chose to proceed with PRP injection
Posterior

- Pathology
  - Triceps tendinopathy
  - Triceps tendon tear (partial or complete)
  - Olecranon bursopathy
    - Float transducer
    - Can be traumatic, inflammatory, infectious

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Posterior

• Pathology
  • Joint effusion (fluid in olecranon fossa)
    • Most common site to identify effusion in elbow
    • Fluid is compressible, synovial hypertrophy is not
    • Fluid can be simple (anechoic or hypoechoic) or complex (mixed echogenicity)
    • Dfdx of complex fluid = hemorrhage, infection, crystalline arthropathy, etc. Can’t tell difference between these sonographically – must get fluid analysis.
Posterior

- **Pathology**
  - Loose bodies (usually from OA, but can be from OCD)
  - Synovitis
    - Non-compressible, hypoechoic
    - May be due to OA, inflammatory arthritis, infection
  - Synovial osteochondromatosis (calcified foci in synovium)
  - Pigmented villonodular synovitis

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Lateral

- 22 y/o snowboarder, sudden onset lateral elbow pain and “pop” when planting arm and doing trick in half pipe
- 4-8/10
- Increased with elbow movement
- Decreased when arm held at side in supported position
- Weak in gripping/lifting
- No numbness or tingling
- + echymosis and edema
- Tx: ice, compression, sling
Lateral

• Physical Examination
  • TTP over lateral elbow/common extensor origin
  • Pain with resisted wrist/finger extension
  • Pain and laxity with moving varus stress test
  • No posterolateral instability
Lateral
Lateral

- Diagnosis: Partial thickness common extensor tendon tear, Grade III radial collateral ligament tear
Lateral

- Pathology
  - Lateral epicondylosis
  - Common extensor tendon tear
  - Radial collateral ligament sprain
    - Lateral epicondylosis with RCL injury/lateral elbow instability = worse prognosis for non-op tx

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Thank You