The Cases for MSK US

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Musculoskeletal Ultrasound (MSKUS)
What is it?

• Use of high frequency sound waves (3-17 MHz) to image soft tissues and bony surfaces
• Exquisite detail with sub-millimeter images
• Provides larger images and higher resolution than MRI for superficial structures
• Used for diagnostic musculoskeletal imaging
• Used for guiding precise injections
Advantages of MSK US

• Ability to image dynamically
• Allows sonopalpation while imaging
• Contralateral limb can be used as control
• Able to guide highly accurate injections
• Portable
• Relatively inexpensive
• No radiation
• Minimal metal artifact
• No contra-indications (pacers/defibrillators/cochlear implants/claustrophobia)
Disadvantages of MSK US

• Limited field of view
• Incomplete evaluation inside bone & joints
  – Cannot see deep to bone and calcifications
• Limited penetration
• Operator dependent
• Steep learning curve
• Evolving certification/accreditation standards
• Equipment cost and variable quality
Case 1: Distal Quadriceps Calcific Tendonitis

- Persistent pain despite NSAIDs and PT
- Xrays with mild Ca++ superior patella
- Diagnostic US shows sig Ca++ quad insertion
- Discussion: US guided needling +/- PRP
- Patient chooses US guided needling + PRP
Diagnostic US
Calcific Tendonitis Distal Quad
US guided needling of Ca++
Post injection needling + PRP distal Quadriceps Ca++ Tendonitis

• Put into knee immobilizer x 5 days
• Increased ROM to 30 degrees flexion x14 d
• Begin PT at 2 weeks post injxn
• Complete PT @ 6 weeks post injxn
• No pain with activities 6 weeks post injxn
• Returned to running pain-free
Case 2: Retrocalcaneal calcific bursitis

- Chronic persistent posterior heel pain and swelling
- Failed PT and PLO cream
- Upcoming cruise, surgery must wait
- Xray: Mild Haglund’s deformity
- Diagnostic US: Calcific retrocalcaneal bursitis with hypervascular Achilles tendinosis
Insertional Achilles Tendonitis
Ultrasound Achilles
Diagnostic US Retrocalcaneal bursitis
US guided needling of Ca++ retrocalcaneal bursitis + steroid injection
Post-injection: Calcific Retrocalcaneal Bursitis

• NWB in tall boot x 3 days
• Tall walking boot x 3 weeks, coming out for NWB ROM
• Begin PT at 3 weeks
• f/u at 6 weeks post injection patient without pain
• f/u after cruise at 10 wks post, no flares
Case 3: Tibial Nerve Hydrodissection for Tibial Neuritis

- 72 yo male with h/o Rheumatoid Arthritis
- Chronic posteromedial ankle pain with shooting burning pain into medial heel/arch
- Had prior successful tarsal tunnel release
- Pain has recurred, limiting ambulation and sleep
- Failed PT and PLO anti-neuritic pain creams
- Diagnostic US: reveals a very thickened, and edematous tibial nerve. Surrounding edema and inflammation
Tibial Neuritis

Tom, Dick, And Nervous Harry

Tibialis Posterior

Flexor Digitorum Longus

Tibial Artery

Tibial Nerve

Flexor Hallucis Longus
As in carpal tunnel syndrome, nerve conduction studies have been highly correlated with US abnormalities in tarsal tunnel syndrome.

-Ibrahim et al, AJM 2013. (49) 95-104.
Diagnostic US: Tibial Neuritis
Doppler US: Inflammatory Tibial Neuritis
US guided tibial nerve hydrodissection
Post hydrodissection course

• Immediate pain relief
• Near total pain relief with focal persistent pain into medial heel
• Repeat injection of the medial calcaneal branch resolved this medial heel pain
• Far better sleep, less pain and less narcotic pill usage lasting 4 months
• Repeat injection required, helped again x 2
Medial Calcaneal Nerve Injection
Case 4: Partial Ulnar Collateral Ligament Tear in Thrower

• 15 yo male baseball player with worsening pain with throwing in the medial elbow
• MRI suggested UCL partial tear
• Outside orthopedist offered surgery or steroid injection
• Our review of MRI suggested interstitial partial interstitial tear
• Diagnostic US and O’Driscoll’s stress test performed dynamically showed interstitial tear
• With a stable partial UCL tear, surgery not essential
Diagnostic US right elbow UCL
Interstitial Tear of Elbow UCL
US guided PRP injection of interstitial tear of the elbow UCL
Post PRP injection care of elbow UCL interstitial tear

- Hinged elbow brace locked at 60 degrees x 5 days
- Allowed ROM 30-90 days 5-14
- Begin gentle PT after 2 weeks
- Gradual increase in ROM, strength x 6 wks
- Pain-free @ 6 weeks w/ gentle toss, able to return for senior season without surgery
Review: The Cases for MSK US

- Useful in a variety of orthopedic conditions
  - Calcific tendonitis, retrocalcaneal bursitis, tibial neuritis and partial UCL tear in thrower
  - Guided injections of steroid, visco or PRP
  - Diagnosing rotator cuff tears and other joint problems
- Optimizes diagnostic accuracy with dynamic, high resolution imaging
- Optimizes non-surgical management of orthopedic conditions
- Clarifies need for surgery if complete tears or if failing optimal conservative care