MR: Wrist Injuries and Instability

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MR: Wrist Injuries and Instability

MRI of the Wrist

- Occult fracture
- Ganglion Cyst
- Ligament tear / instability
- Avascular necrosis
- Arthritis
- Tendon Pathology
- Nerve Impingement

Occult fracture

-Not visible on initial radiographs
-follow-up xray, CT
-MRI:
- MRI very sensitive for dx
- Use T2fs / STIR to detect
- Use T1 to DDx fx vs. bone bruise
- Determine extent of injury
- Osseous, soft tissue
- can dx alternate cause of pain
- Capitate fracture

- Distal radial fracture

- Occult scaphoid fracture

NBA player
Ganglion Cyst

- Common at wrist, esp. dorsal
- May simulate mass, or may be occult source of pain if small or deep
- Joint >> tendon sheath
- MRI:
  - Lobulated
  - Fluid signal
  - Rim-enhancement
  - May indicate underlying ligament tear

Ganglia: Common Locations

- Dorsal
  - Deep to tendons
  - Adjacent to lunate/capitate joint
  - Weak area of capsule
  - Extends around dorsal intercarpal ligament
- Volar
  - Radial aspect off radioscaphoid joint
  - Adjacent to radial artery – may be confused for vessel / aneurysm
- Other areas
  - Into carpal tunnel
  - Off tendon sheaths
Volar Radioscaphoid Ganglion

The “Angry Ganglion”

Extensor Tendon Ganglion

Ligament tear

- **Intrinsic ligaments**
  - Scapholunate
  - Lunatotriquetral
  - Triangular fibrocartilage complex
    - central (radial aspect)
    - peripheral (ulnar side)

- **MR arthrography**
  - Increases accuracy for dx of tear
Triangular Fibrocartilage "Complex" (TFCC)

Anatomy

- Triangular fibrocartilage
- Dorsal and volar radioulnar ligaments
- Ulnar-triquetral ligament
- Meniscal homologue
- ECU sheath

TFCC ANATOMY

Central: Attaches to cartilage of Radius
Peripheral: two attachments
- Look at slice with styloid

Attaches to Median Bursa of Flexor Carpi Ulnaris

TFCC - perforation

Perforations may not be clinically significant
Central TFCC Tear

Peripheral TFCC Tear

Peripheral TFCC Tear / LT Tear
ECU Subluxation / Peripheral TFCC Tear

ECU Tenosynovitis / Peripheral TFCC Tear

Ulno-lunate Abutment
Indirect Arthrogram – tear of central TFC with ulnar-lunate abutment

- Positive ulnar variance
- Cystic change in lunate
- TFCC tear

Scapholunate and Lunatotriquetral Ligaments

DORSAL AND VOLAR BANDS

- These bands are more mechanically important than central membrane

Scapholunate Ligament Tear
Direct MR arthrogram – scapholunate tear

Dorsal tilt of lunate (DISI deformity)
SL or LT tear can cause carpal malalignment
Scapholunate tear
Palmarflexion of scaphoid

Scapholunate advanced collapse (SLAC wrist)
DISI deformity
Proximal migration of capitate
Carpal osteoarthritis
Radiographic progression of SLAC

Early - radiocapitate joint narrowing

Intermediate

Late

SLAC wrist

SLAC secondary to rheumatoid arthritis

Inflammatory arthropathies can cause intrinsic ligament tears

Extensive synovitis

Marrow edema
Lunotriquetral Ligament Tear

Lunate may tilt in palmar direction along with scaphoid (VISI)

Avascular necrosis

-Lunate (negative ulnar variance)
-Scaphoid (fracture)
Progression: density, fracture, collapse, OA
- Keinbock’s disease
  - Replacement of fat signal c/w AVN

- Scaphoid fracture with AVN of the proximal pole

- Scaphoid nonunion
  - Humpback deformity
  - Acts like an SL lig tear
  - Radiocarpal OA
  - ... and AVN lunate
Arthritis

-Osteoarthritis
  -Subchondral cysts cartilage loss, spurs
  -Distribution depends on etiology
  -Trauma, instability, predisposing factors

-Inflammatory arthropathies
  -Classic: rheumatoid arthritis
    -Carpus, MCPs
    -Diffuse involvement
    -Synovitis, erosions

-Scapholunate Advanced Collapse (SLAC)

-Type 2 lunate with secondary OA
  Lunate articulates with hamate
**Rheumatoid Arthritis**

Marked synovial proliferation

**Rheumatoid Arthritis**

MRI can monitor activity, response to Tx

**Rheumatoid Arthritis**

Tenosynovitis in multiple sheaths suggests an inflammatory arthropathy
Tendon Pathology

- Tenosynovitis
- Tendon tear
- Pulley lesions

Extensor Tendons

COMPARTMENT 1
- Extensor Pollicis Brevis
- Abductor Pollicis Longus

COMPARTMENT 2
- Extensor carpi radialis brevis
- Extensor carpi radialis longus

COMPARTMENT 3
- Extensor pollicis longus

COMPARTMENT 4
- Extensor digitorum
- Extensor indicis

COMPARTMENT 5
- Extensor digiti minimi

COMPARTMENT 6
- Extensor carpi ulnaris

DeQuervain's Tenosynovitis
1st EXTENSOR COMPARTMENT
Intersection syndrome

Inflammation at distal forearm at crossing point of first and second extensor compartments

Complete Tear – Extensor Tendon

Partial Tear – Flexor Carpi Radialis
Longitudinal Tear

Chronic extensor tendon tear

Nerve Impingement

Median nerve
- Carpal tunnel syndrome
Ulnar nerve
- Guyon’s canal
Carpal Tunnel

- Pisiform / hamate medially
- Carpal bones dorsal
- Flexor retinaculum volar
- Median nerve deep to retinaculum
- Flexor tendons
- Flexor carpi radialis: outside the carpal tunnel

Carpal tunnel syndrome

- Flexor tenosynovitis
- Separation of tendons by synovial tissue

- Mass effect from muscle in carpal tunnel
CTS: Flexor Retinaculum Bowing

CTS: Proximal Enlargement and Fasciculation

Fasciculation: Looks like dots inside

-Volar ganglion cyst in carpal tunnel
Guyon’s Canal

- Ganglion cyst with Ulnar nerve impingement
Thank You!