COMMON CARPAL INJURIES IN ATHLETES
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I HAVE NO CONFLICTS OR DISCLOSURES TO REPORT

OUTLINE
• The carpus
• Scaphoid fracture
• Scapholunate ligament tear
• Perilunate fracture/dislocation
• Dorsal triquetral avulsion fracture
• Hook of hamate fracture
THE CARPUS
- 8 small bones that make up the wrist joint
  - Scaphoid
  - Lunate
  - Triquetrum
  - Pisiform
  - Trapezium
  - Trapezoid
  - Capitate
  - Hamate

RADIOCARPAL JOINT

MID CARPAL JOINT
SCAPHOID FRACTURE

- Most common carpal bone fracture in the wrist
- 3 types:
  - waist 65%
  - proximal pole 25%
  - distal pole fractures 10% (but most common in kids)
- Retrograde blood flow
- Requires careful management

HEALING POTENTIAL

- Distal pole > waist > proximal pole
  - 100%
  - 85%
  - 30%

PRESENTATION & EXAM

- Fall on outstretched hand, wrist extended and radially deviated
- Swelling dorsally and radially
- Tenderness in anatomic snuff box
- Pain with wrist radial and ulnar deviation
TREATMENT ALGORITHM

Suspect fracture based on history and exam

X-ray (+)
X-ray (-)

Displaced
Non-displaced

Surgery
Non-op

Cast and follow-up x-ray 2-3wks

Sprain
MRI

MANAGEMENT

• Non-operative management indicated in non-displaced fractures
  • Casting: long arm vs. short arm vs. thumb spica
  • 6wks to 20wks
  • No return to play until fully healed on X-ray or CT scan
  • Union rate 90-95%

SURGICAL MANAGEMENT
NON-DISPLACED FRACTURE

• Consider surgical fixation in non-displaced fractures, especially athletes
  • Percutaneous vs open
    • Why?
      • decreased time to union
      • faster return to work/sports
      • same cost as casting
      • Union rate 90-95%
      • Time union 5-7wks shorter than non-operative management
    • Less overall time in cast
SURGICAL MANAGEMENT
DISPLACED FRACTURE

- Almost always require surgery with open reduction and fixation
- Must achieve reduction and correct the deformity in displaced fracture

COMPLICATIONS

- Nonunion - 5-10%
- Union rate after revision surgery - 70-90%
- Avascular necrosis
  - proximal 1/5 - 100%
  - proximal 1/3 - 60-70%
SCAPHOLUNATE LIGAMENT TEAR

• Ligament connects the scaphoid to the lunate
• Injury usually occurs during a fall when wrist is extended and ulnarily deviated

EXAM & DIAGNOSIS

• Swelling radial wrist
• Tenderness dorsally over scapholunate ligament and within anatomic snuff box
• + scaphoid shift test
• Wrist X-rays + power grip view
• MRI

MANAGEMENT

• Non-operative management only indicated in acute, non-displaced tears
• Many surgical ways to reconstruct and/or repair the ligament
  - Direct repair
  - Ligament reconstruction
  - RASL
  - Capsulodesis
PERILUNATE DISLOCATION

Most common carpal dislocations

Common in men 20-30 yrs

Common mechanism is hyperextension, ulnar deviation, and intercarpal supination with applied axial load

Result from hyperextension of wrist caused by fall from height, MVA, MCC, contact sports

Rare in elderly b/c without good bone stock the distal radius fails before carpal bones or ligaments

In kids the hyperextension force usually injures the radial physis rather than carpal ligaments

84% of carpal dislocations have associated trans-scaphoid fracture

8% of all fracture dislocations of wrist also have a capitate fracture

STAGES OF INJURY

- Stage 1 - scapholunate dissociation
- Stage 2 - lunocapitate dislocation
- Stage 3 - luinotriquetral disruption
- Stage 4 - lunate dislocation
PATTERNS OF INJURY

- Rate of load determines pattern of injury
- Slower loading results in carpal fractures
- Faster loading results in ligamentous injury

DIAGNOSIS

- Swollen, tender wrist and pain w/ minimal ROM
- Nerve exam may reveal symptoms of median nerve compression 25-45% of patients
  - Acute: nerve contusion
  - Delayed: hemorrhage/edema
  - 16-25% of perilunate injuries initially missed by ED staff and present as late, chronic dislocations
  - Outcomes worse with delayed/chronic injuries
  - X-rays

MANAGEMENT

- Urgent reduction and splinting
- Almost all require surgery +/- carpal tunnel release
- Pins removed at 8wks but cast removed at 12wks post-op
OUTCOMES

• Even with early recognition and surgery patients still have poor outcomes
• Expect significant loss of ROM
• Loss of grip strength
• Persistent pain in wrist
• May ultimately require limited or total wrist fusion

DORSAL TRIQUETRAL AVULSION FRACTURE

• 2nd most common carpal fracture
• Represent avulsion of the dorsal radiotriquetral ligament
• May also develop from impingement with ulnar styloid
• Fall on outstretched hand +/- ulna deviation
EXAM & MANAGEMENT

- Dorsal ulnar wrist pain with focal tenderness
- Non-operative management
- Wrist brace or cast for 4wks
- May resume activity/sport as pain allows

HOOK OF HAMATE FRACTURE

- Classically occur with stick handling sports, i.e. golf, hockey, tennis, baseball
- Most common type of hamate fracture
- Ulnar artery and nerve pass adjacent to hook of hamate
- May have ulnar nerve symptoms
- Weak or painful grasp
- Hypothenar tenderness
- Pain with resisted small finger flexion
MANAGEMENT

- Non displaced fractures treated 6wks in cast
- Displaced fractures may require surgery
- Nonunions
  - asymptomatic - observation
  - symptomatic - bone grafting and fixation or excision

REFERENCES

THANK YOU