Rheumatoid Arthritis

What it means for your patient’s hands

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General Presentation

- 1% of the population
- Females 3X as affected as males
- Affecting the wrist, MP, PIP joints, and tendons
- Disease can manifest in a few joints with a self limited course or be global and steadily progressive
- + RF in 80% of patients, non specific
Primary Presentation

- More diffuse
- “Tendon connected”
- Can precede joint involvement by months
Microscopic Features

- Synovial pannus
- Sheets of histiocytes and fibroblasts, B&T cells
- Giant cells
- Secretion of lysosomal enzymes
- Enzymatic tissue degradation (prostaglandin, cytokine, interleukin-1, TNF-α)
Choking off bone and cartilage

- Hyalin cartilage breakdown deprived of synovial nutrition
- Pressure of pannus on articular cartilage
- Stretch supporting ligaments
- Osteopenia, osteoclasts
- Process irreversible
Joint Destruction

- Osteopenia
- Chondrolysis
- Joint instability, subluxation
- Frank destruction
- With 6 months 40% have joint erosion and by two years have joint destruction

Two years apart
Typical Primary appearance

- Swelling, rash, morning stiffness, pain, generalized fatigue
Medical Treatment

- Non steroidal anti inflammatories NSAID’s (i.e. MOBIC)
- Disease modifying anti rheumatic drugs DMARD’s initially given too late now given within 3 months in the disease process to prevent irreversible joint destruction
- Methotrexate, leflunomide, azathioprene, entanercept, infliximab
- Modifies the response to TNF- α, inhibition of clonal B-cell growth and migration,
Non Steroidal anti-inflammatory
Meloxicam in RA

- By 2002: seven studies with 2500 patients
- Limited duration 3-12 weeks
- Significant improvement in joint swelling and subjective assessment of pain and dysfunction
- No change in ESR, CRP, RF
- Effect similar to naproxen 750 mg BID
Mobic Long Term in RA

- Increased withdrawals with Mobic than Naprosyn 2° to less effectiveness but these were in the first two months.
- In 18 month study, effectiveness increased up to 1 year and then leveled off.
- 15mg > 7.5 mg, re: AM stiffness and grip strength.
- ? Role for 22.5 mg?
Hand surgical care:
almost every branch of hand surgery involved

- Teno-synovectomy, synovectomy
- Joint stabilization
- Soft tissue realignment
- Tendon repair, transfer, grafting
- Arthroplasty
- Arthrodesis
HAND SURGEONS vs. RHEUMATOLOGISTS

- Alderman and Chung, ASSH 2002
  - HS (RS) vs. Rheum
    - MP arthroplasty
      - 83% vs. 34%
    - Tenosynovectomy
      - 93% vs. 55%
    - Synovectomy
      - 53% vs. 13%
Surgical Principles

- Weakness, functional loss, ↓ ADL’s, pain relief, progressive deformity
- “tailor made” surgery: no cookbook
- Proximal deformities first!
- Limit surgery to that can be done in 2 hour tourniquet time
Joint and tendon failure

- DRUJ separation (TFCC rupture), loss of carpal height, carpal translocation, tendon rupture
“Prophylactic” Surgery: Extensor Teno-synovectomy Dorsal Stabilization
Dorsal Stabilization

- Central 1/3 of the extensor retinaculum
- Threaded beneath the tendons
- Reinforce joint
- ECRL ECU transfer
- Prevent bowstringing: leave some retinaculum
Vaughn-Jackson

- Carpal supination
- Proud caput ulnae
- Volar carpal subluxation
- DRUJ synovitis, TFCC attrition, ECU sublux
- Extensor tendon shift over the ulnar head
- Attritional ext. tendon rupture
- R/O radial nerve palsy
  (tenodesis test)
Extensor Tendon Rupture

- Lysosomal enzymes
- Sharp bone edges
- Ischemic changes
- Ulnar to radial progression
Darrach DRUJ stabilization

- DRUJ synovectomy
- Capsule, tendon stabilization
- Suave-Kapandji

86% g→e results in RA
36% g→e results in trauma
Extensor Tendon Reconstruction

FCU → EDC I, V
+/− tendon graft
EIP → EPL

EDC IV, V → EDC II, III
Flexor Tenosynovitis
This is **not** a trigger finger!!

- The stenosis can be at the A-1, A-2 & A-4
- Teno-synovectomy, FDS excision
- No pulley release (bowstringing)
Carpal Tunnel Syndrome

- Flexor Tenosynovitis
- Severe median neuropathy
Mannerfelt Syndrome

- Attritional rupture of the FPL and FDS and FDP to the index finger
- Teno-synovitis and friction over scaphoid tubercle
“Prophylactic” Surgery

- Shaving down the scaphoid tubercle
- Periosteal repair
- Teno-synovectomy
Reconstruction

- FDP-3 → FDP-2 (side to side)
- FDS-4 → FPL
Wrist Pathology

- Chronic synovitis
- Ligament, bone destruction
- Ulnar head dissolves
- Ulnar carpal drift
- Carpal bone, distal radius destruction
- Zig-zag deformity

- SL dissociation
- Rotatory subluxation
- Loss of carpal height
- Palmar/ulnar carpal sublux
Wrist synovectomy
open vs arthroscopic
Wrist synovectomy

**Open**
- Pain relief
- Grip strength preserved
- Wrist stiffness
- Carpal collapse not prevented

**Arthroscopic**
- Pain relief @ 4 years
- Grip strength preserved
- No wrist stiffness
- Can be repeated
- Can be very useful early in the disease
Arthroscopic images: Wrist
Total wrist arthroplasty

- Low demand patients
- Bilateral involvement
- Titanium and polyethylene (Biaxial)
- Loosening, subsidence (25%)
- Athrodesis salvage

- “Swanson” silicone
- 40% failure rate @ ten years
- Wear particles-synovitis, implant breakage,
TWA contraindications

- Upper extremity weight bearing
- Prior sepsis
- Severe loss of bone stock
- Dislocation
- Extensor tendon ruptures
- Failed prior arthroplasty unless custom prosthesis used
Wrist arthrodesis

- One or two rods
- Trans/intermetacarpal
- w/wo tension band
- Plate if not osteopenic
- Can do partial fusion: radiolunate or radioscaphocapitate (can preserve 30° ROM)
- Bilateral fusions don’t affect function

90-95% fusion rate
Metacarpophalangeal deformities

Deformed hand with marked ulnar deviation of fingers and subluxation of MP joints. Deformities secondary to rheumatoid arthritis.
Pathomechanics

- Synovial inflammation - joint laxity
- Destruction primarily at the collateral ligament insertion
- Ulnar EDC sublux
- Volar MP subluxation
Clinical picture

- Divergent pattern
- late
- early
MP synovitis

Can be isolated
Or diffuse
Joint space maintained
MP Synovectomy
open vs arthroscopic
Arthroscopic images

MP view

Dorsal recess synovitis
Soft tissue repairs

- Extensor tendon centralization
- Radial sagittal band imbrication
- Rerouting of extensor slip
- Crossed intrinsic transfer (stiffness)
MP Arthroplasty
Clinical images

- Intra-operative
- Transverse or longitudinal incisions
- Post-operative
- Early protected motion
Pyro-carbon Arthroplasty

- Contraindicated if there’s joint instability
Post op care

- Begin dynamic splinting day 4-5
- Remove for active ROM often, early
- Night splinting
- D/C @ 4 wks
Follow-up correction

preop       postop
@10 years, 100% pain relief, 75%↑ function
↓ MP flexion ↑ extension

- 28% implant breakage
- 89% osteolysis
PIP Deformities

Boutonniere  Swan-neck
Swan neck deformity

- Hyperextension PIP, flexion DIP
- Attenuation of volar plate @PIP
- FDS rupture
- Dorsal lateral band displacement
- FDP tension, extensor insertion erosion: mallet DIP
Swan neck deformity: 4 types

- **Type 1**: supple active PIP motion 2° to DIP mallet.
  - **Rx**: DIP fusion
    - Sublimis tenodesis
    - ORL reconstruction for ↑DIP extension
    - Ulnar lateral band rerouting
    - Volar to axis of rotation
Swan-neck deformity

- Type 2: DIP mallet, intrinsic tightness (no PIP flexion when MP extended) MP volarly subluxed and ulnarily deviated

RX: DIP arthrodesis
ulnar intrinsic release
sublimis tenodesis
MP arthroplasty PIP pin at 20° x 3 wks.
Swan neck deformity

Type 3: PIP extension contracture, ↓pROM, lateral band scarring, flexor tenosynovitis.

Rx: EUA manipulation
- PIP arthroplasty, fusion
- lateral band mobilization
- central slip lengthening
- flexor teno-synovectomy
Swan neck deformity

- Type 4: Severe DJD PIP joint
- Rx: PIP fusion
Boutonniere deformity

- PIP flexion DIP extension
- PIP synovitis
- Central slip attenuation
- Lateral band displacement volarly
- Transverse retinacular ligament contraction
Boutonniere deformity: 3 types

- Type 1: >15° extensor lag PIP joint, passively correctible
- DIP flexion passively OK
  - Rx: Night splinting PIP extension
  - Fowler extensor tenotomy (beyond PIP)
Boutonniere deformity

- Type 2: PIP flexion >30°
- MP hyperexpension
- Passively correctable PIP joint

Rx: central slip imbrication
TRL tenotomy
lateral band relocation
pin PIP x 3 wks. in extension
passive DIP flexion
**Boutonniere deformity**

- **Type 3: Significant PIP articular destruction**
  - Rx: PIP arthroplasty with soft tissue reconstruction
  - PIP arthrodesis
PIP Synovectomy
or RA nodule excision
PIP Arthroplasty
Pre/post op x-rays

pre-op

post-op
Post-op images
“Opera- Glass” Hand
Distal interphalangeal joint

- Joint destruction will require arthrodesis
- 25° flexion, neutral rotation, cascade effect
Rheumatoid thumb deformities
Deformity patterns: 5 types

- Type 1 Boutonniere deformity
- MP flexion, IP hyperextension
- MP synovitis, dorsal capsular distension
- Attenuation of EPB, extensor hood
- EPL displacement volar, ulnar
- Can start from IP with FPL rupture = hyperextension
Boutonniere

Rx: If MP & IP passively correctible then extensor reconstruction and synovectomy.
- EPL rerouting
- Distal EPL tenotomy and capsular augmentation

If MP joint stiff then MP fusion
If IP joint stiff then the IP fusion or arthroplasty
Boutonniere repair
soft tissue reconstruction
EPL tenodesis
Boutonniere repair: arthroplasty

- ligament rebalancing
- Central slip advancement
- EPL, EPB rerouting
Swan neck deformity type 3

- Starts at CMC joint
- Synovitis instability
- Metacarpal adduction
- MP volar plate laxity - hyperextension
- IP flexion
Swan neck deformity
Type 3

- Splinting
- Adductor tenotomy
- MP arthrodesis/
  no arthroplasty
- CMC arthroplasty/
  arthrodeses
Deformity patterns: IP Joint
Thank You for your attention!