Update on Management of Common Hand Disorders

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Common Hand Disorders

- Compression Neuropathy
- Lumps & Bumps
- Tendon related pathology
- Arthritis
- Infection
- Hand Injury
Common Presenting Symptoms

- Pain (hand/wrist/elbow)
- Paraesthesia
- Lumps and bumps
- Deformity
- Stiffness
- Paralysis/Paresis
- Loss of function
General Concept

- Hand as Tissue Composite
- Structural specialization for functional adaptation
- High functional demand
Basic Hand Functions

- Grasp & Release
- Pinch
- Sensation
- Communication
- Cosmesis
- Self-image
4 Functional Units

1. Opposable Thumb
2. Stable I/F & M/F for pinch and power
3. Flexible R/F & L/F as mobile unit
4. Wrist for positioning
9 Tissues Composite

- Skin
- Nail & Nail Bed
- Nerve
- Vessel

- Tendon
- Ligament
- Bone
- Cartilage
- Muscle
Dorsal Skin

3 cm excursion & 25% ↑ in area on fisting
Palmar Skin

- Thick, hairless, glabrous
- Resist Shear
- Facilitate Grasping, Cushioning and Molding of Objects
- Tactile function
Timed Allen’s Test
Hand Circulation

- Peripheral pulse
- Colour
- Capillary Refill
- Tugor
- Temperature
- Sensation
Extensor & Flexor Mechanism

- Closely related to bony architecture
- Need perfect gliding mechanism in extremely confined spaces
- Prone to develop adhesion
Function of Pulley System

Isolated excision of the A2 pulley in experimental studies decreases total range of motion by 1.6% to 10%.

Joint Relationship

- 85% Arc of Motion in MCPJ & PIPJ
- Importance of Collateral Ligament
- Highly Mobile CMCJ of Thumb
General Approach to hand disorders

- Part of systemic problem
- Referred symptom
- Regional /localized pathology
Compression Neuropathy

- Carpal Tunnel Syndrome
- Cubital Tunnel Syndrome
- Thoracic Outlet Syndrome
- Double Crash Syndrome

- Radial Tunnel Syndrome
- AIN/PIN Compression
- Pronator Teres Syndrome
- Ulnar Tunnel Syndrome
Compression Neuropathy

- Need to be distinguished from:
  - Cervical radiculopathy/myelopathy
  - Brachial plexopathy
  - Peripheral neuropathy
Diagnosis

- Predictable site of compression
- Typical symptoms
- Neurological deficit in peripheral nerve pattern (if +ve)
- Provocative tests
- Electrodiagnostic tests (CTS & CuTS)
Carpal Tunnel Syndrome

- Common in 40-50 yrs old
- F:M =3-4:1
- Idiopathic in majority
- Need to r/o secondary causes
  - DM : without neuropathy  14%
  - with neuropathy 30%
  - Pregnancy 50%
  - Obesity
  - Hypothyroidism
  - Renal disease/amyloidosis
  - Acromegaly
  - Inflammatory arthritis
- Watch out for congenital anomaly in younger patients
Pathophysiology

● Mechanical factor vs ischemia
  - Resting pressure: Normal 2.5-10mmHg
    CTS patient 30mmHg

● Pressure study:
  - 20-30mmHg venous occlusion/axonal transport
  - 60-80mm Hg intraneural vascular occlusion
  - 130-150mmHg conduction block
Carpal Tunnel Syndrome

- Provocative Tests (beware false -ve)
  - Direct Compression test (Durkan’s sign)
  - Phalen test
  - Percussion test (Tinel Sign)
  - Reverse Phalen
  - Sphygomanometer compression test
- Thenar wasting
- APB strength
- Sensory deficit: monofilament test, vibrometry, 2 points discrimination
- Tenosynovitis, SOL
- Double crash syndrome
  - TOS
  - Pronator Teres syndrome
Conservative Rx

- Splint
- Local steroid injection
- Medication:
  - Oral steroid
  - Pyridoxine
  - Anti-diuretics
  - NSAID
- Physiotherapy
  - Ultrasound
  - Iontophoresis
- Exercise
  - Yoga
  - Tendon & nerve gliding
    - Improve failure rate from 71% to 43%
- Activity modification
Indication for surgery

- Fail to conservative Rx for 3-6 months
- Sensory deficit
- Motor deficit
- CTS 2° to SOL in carpal tunnel
- Poor prognostic signs (Kaplan)
  - Age >50
  - Duration > 10 months
  - Constant paraesthesia
  - Phalen test +ve in <30 sec.
  - Stenosing flexor tenosynovitis
Open Release

- Failure rate: 7 - 25%
- Prolonged scar sensitivity: 36%
- Hypertrophic scar: 1 - 5%
- Palmer cut. nerve injury: 4 - 6.5%
- Neurapraxia: 6.5%
- Grip weakness up to 3 - 6 months

Success: 86.8% - 91%

Hour-glass Deformity
Endoscopic carpal tunnel release (ECTR)
Endoscopic carpal tunnel release (ECTR)
Cubital Tunnel Syndrome

- Ulnar nerve entrapment at elbow
- Subtle loss of motor functions
  - Clumsiness
  - Dropping things
  - Weakness
  - “Dystonia” like
- Myelopathy/T1 vs Ulnar nerve
- Proximal vs distal compression
  - Claw hand
  - Dorsal sensory spare
  - FDP(V), FCU
- NCT false –ve in 50%
Cubital Tunnel Syndrome

- Look for elbow sign
  - Cubital valgus
  - ROM
  - Ulnar nerve thickening
  - Tinel sign
  - Subluxability of nerve
  - Osteophyte
  - Elbow flexion test

- Look for wrist sign
  - Wrist deformity
  - Direct compression Guyon canal
  - Tinel sign
Elbow pathology

- Lateral condyle non-union
- OA elbow
- Subluxable ulnar nerve
Sites of Compression
Conservative Rx

- Absence of any detectable sensory/motor deficit
- Soft elbow splint in extension
- Adjust elbow posture/loading
  - Avoid prolonged elbow flexion for 3 months (80%)
- Local steroid
  - Depigmentation
  - Fat necrosis
  - Nerve injury
- NSAID, pyridoxine
Surgical Rx

- Decompression in situ
- Decompression + medial epicondylectomy (King & Morgan 1950)
- Anterior transposition of ulnar nerve
  - Sub-cutaneous (Roux 1897, Curtis 1898)
  - Sub-muscular (Learmonth 1942)
  - Intra-muscular (Adson 1918)
- Ulnar tunnel plasty
Decompression in situ
Anterior Transposition of Ulnar Nerve
Medial Epicondylectomy
Thoracic Outlet Syndrome

- Compression of brachial plexus between 1st rib and clavicle
- Commonly affect C8/T1
- Fibrosis /edema around scalene muscle
- Fibrous band
- Cervical rib (rare)
- Pancoast tumour
- Fracture clavicle, 1\textsuperscript{st}/2\textsuperscript{nd} rib
Anatomically: thoracic outlet consists of region above the clavicle, occupied by layers of the scalene muscles; deep to the clavicle, and below it, deep to the pectoralis minor muscle. The important neuro-vascular structures within it are: the brachial plexus, and the subclavian vessels. Neurogenic or vasogenic symptoms are produced when these structures are compressed.
TOS

- Middle aged women
- Obese, short neck, large breast
- Slouch posture
- Anxious personality
- Excessive overhead activities
- Neurogenic vs Vascular presentation (rare)
- Clinical Dx by exclusion
Provocative Test

- Roo’s test
- Wright hyperabduction test
- Adson’s test
- Costa-clavicular compression test (Halstead Maneuver)
- Tinel sign at Erb’s point
Conservative Rx

- Anxioltyic
- Weight reduction
- Muscle relaxation/ stretching
- Scapular muscle strengthening
- Postural exercise
- Neck / shoulder physiotherapy
- Steroid injection to Erb’s point
ical Rx

- Seldom required
- Scalenectomy
- 1st rib resection
Anatomical approach to diagnosis

- Skin
- Subcut. tissue
- Nerve
- Vessel
- Tendon
- Muscle
- Joint
- Bone
General approach

- S/S of malignancy
  - Recent change in size, pain, colour, discharge
  - Constitutional symptoms
- Cystic lesion can be observed, aspiration to confirm nature
- Solid lesion require excision/incision biopsy
- Deep subfascial mass of >5cm treated as malignant mass until proven otherwise
Facts about Ganglion

- Most common soft tissue tumour (Stack, 1960)
- Never becomes malignant
- Can resolve spontaneously
- Prevalent in young adult (peak 10-30) (Janzon, 1981)
- Etiology never clear
- Majority related to wrist joint (Angelides 1976)
Patient’s Perception

- Westbrook et al. JHS(B) 2000
  - Cosmetic 38%
  - Fear of cancer 28%
  - Pain 26%
  - Altered function 8%
The Only Absolute Indication for Operation

Uncertain Diagnosis
Observation

- Active neglect
- 40% spontaneous resolution (Zachariae 1973)
- Indicated in all “asymptomatic” cases
- Wait for?
Bible Therapy

- Recurrence 50-78% (Calberg 1977)
- Impossible to rupture in 50% (Razemon 1983)
- Painful & “brutal”
Aspiration

- Almost 100% effective
- Recurrence 68% (n=336)
- Improvement - Hyaluronidase injection
  - 49% cure (Paul & Sochart 1997)
  - 95% (Otu 1992 n=340)
- Volar vs Dorsal ganglion
Open Excision

- Simple excision 40% (McEvedy 1954)
- Radical excision 1-5% (Angelides 1976, Clay 1988)

(n=473)

Essential elements:
- Capsular-synovial junction at SL Ligament
- SL Ligament left intact
- Repair of capsular defect contraindicated
Arthroscopic Excision

- Marsupialization procedure leaving cyst wall intact
- One-way valve effect (Andren & Eiken 1971)
- Stalk in SL capsular-ligament junction (Angelides 1976)
Dorsal Ganglionectomy
Tendon-related Pathology

- Tendinitis
- Tendinosis
- Tenosynovitis
- Tenovaginitis
Trigger finger

Stenosing Tenovaginitis

Staging (Green):

I. Pain / Swelling
II. Triggering
III. Catching
IV. Fixed contracture
**Trigger Finger**

- Stenosing tenovaginitis of A1 pulley
- Common in R/F, M/F & thumb
- Rare in L/F
- Associated with DM
- Nodular v diffuse pulley thickening
DDX

- Dupuytren’s disease
- Inflammatory arthritis (MCPJ)
- Flexor tenosynovitis
- Sesamoditis
- Tendon rupture
- Nerve palsy
Conservative Rx

- NSAID
- Physiotherapy
- Steroid Injection
Dequervain Disease

- Tenovaginitis of 1st dorsal compartment (EPB/APL)
- DDx: Intersection syndrome, fracture of scaphoid/distal radius, 1st CMCJ OA, Wrist arthritis

- Local tenderness
- +ve Finkelstein test
- -ve Radio-carpal grinding test
- Tendon stress test
Conservative Rx

- Splint
- NSAID
- Activities modification
- Steroid injection
Complication of steroid injection

- Hypo-pigmentation
- Tendon rupture
- Local sepsis
- Fat necrosis
Operative Rx

- Open release
- Beware of separate compartment for APL/EPB
- Percutaneous/ endoscopic release
Arthritis

- Osteo-arthritis
- Rheumatoid arthritis
- Sero-negative arthritis
- Psoriatic arthropathy
- Gouty arthritis
- SLE
Osteo-arthritis

- $1^\circ$ vs $2^\circ$
- $1^\circ$ OA common in hand (DIPJ & 1$^{st}$ CMCJ) and elbow
- OA wrist usually $2^\circ$ to trauma e.g. carpal instability,
  carpal/distal radius fracture
Osteoarthritis of the first carpometacarpal joint
Forces down the thumb

- 1 kg pinch force at thumb tip
  - IPJ 3.68 kg
  - MCPJ 6.61 kg
  - CMCJ 13.42 kg
Thank you