CARPEL TUNNEL SYNDROME – DIAGNOSIS AND MANAGEMENT

Introduction

- Entrapment Neuropathy –

✓ Pressure induced injury to peripheral nerve
✓ Secondary to anatomic or pathologic structures

- Debilitating clinical condition with –

✓ Physical
✓ Psychological
✓ Economical

Patho-physiology

Early changes

- Disruption of blood-nerve barrier
- Dysfunction of intra-neural circulation
- Morphometric changes not apparent

Reversible

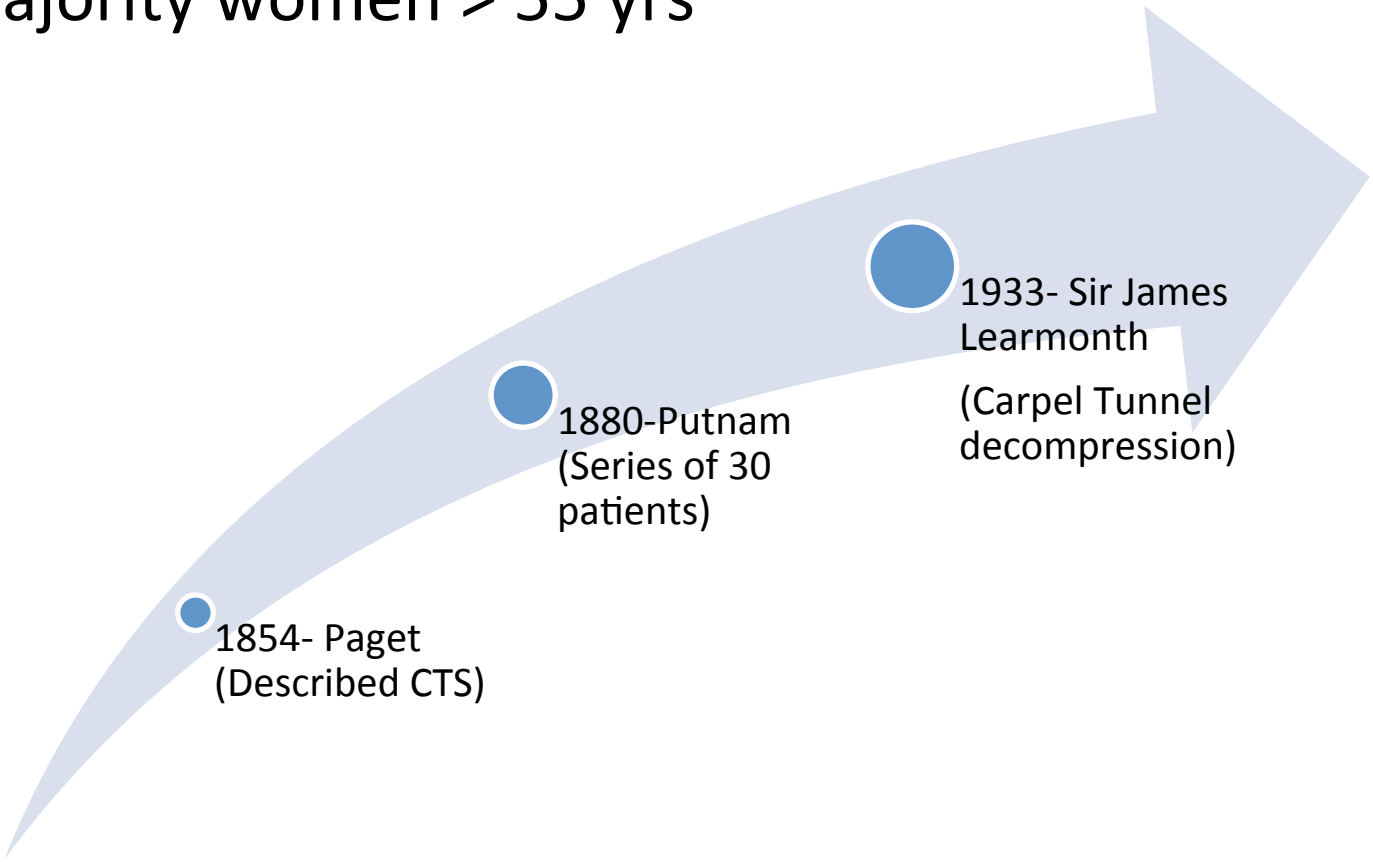
- Persistent ischemia
- Segmental Demyelination

Irreversible

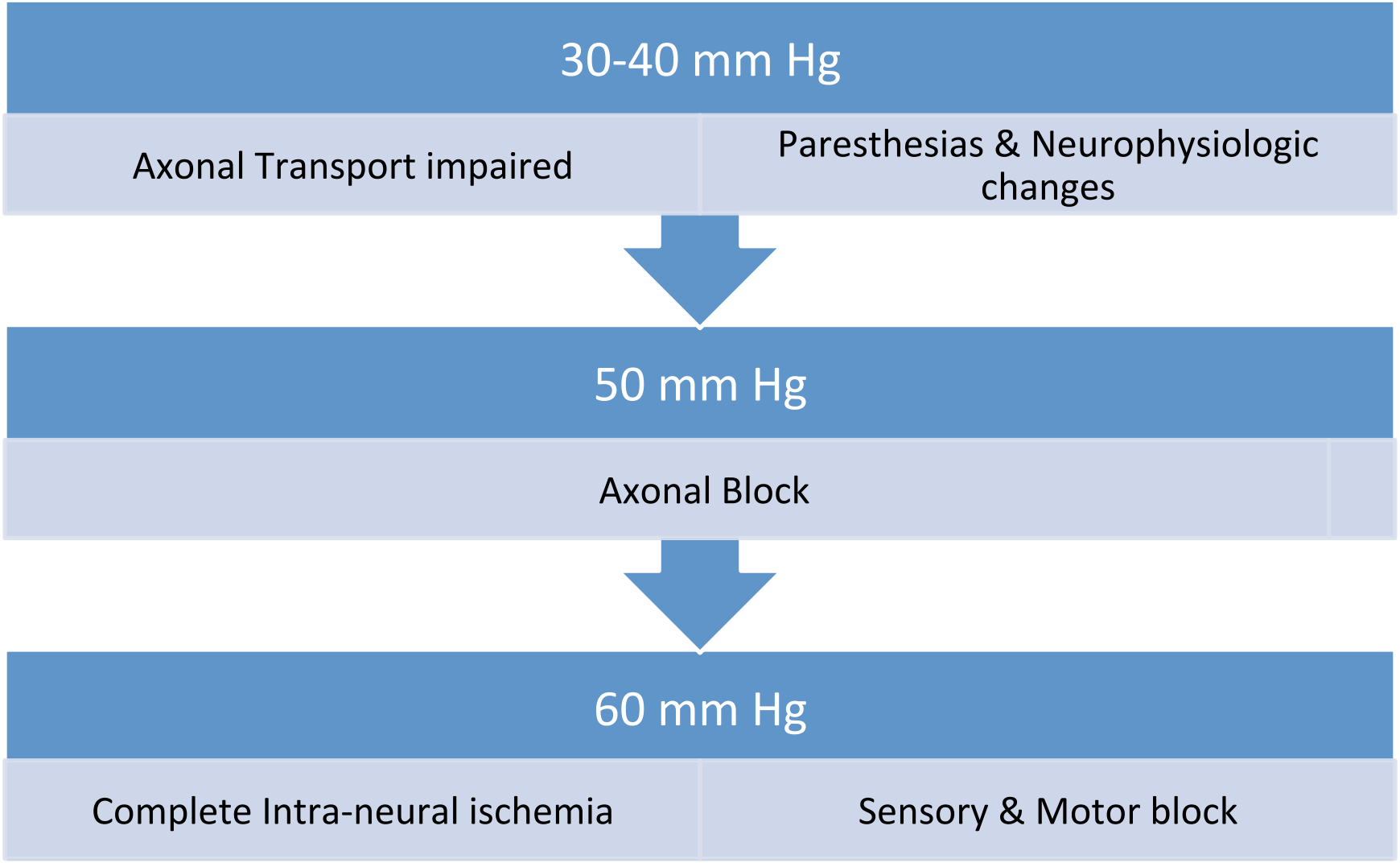
- Edema with epineural fibrosis & nerve thickening
- Damage to myelin sheath & axonal disruption

Median Nerve – Carpel Tunnel Syndrome

- Prevalence – 2 % men and 3 % women
- Majority women > 55 yrs



Pressure-Perfusion Relation



Possible Entrapment Sites

Arm	• Struther's ligament/Supracondylar process humerus • Lacertus fibrosus (Bicipital aponeurosis)
Forearm	• Pronator Teres • Between 2 heads
Hand	• Flexor Digitorum superficialis • Carpel Tunnel

Clinical Findings

- Nocturnal Pain – Burning (? Venous stasis)
- Numbness
- Tingling
- Aggravates with strenuous activity
- To relieve the symptoms, patients often “flick” their wrist as if shaking down a thermometer (flick sign).

Systemic Review

- Third Trimester – Pregnancy
- Renal Failure/ Dialysis
- Rheumatoid arthritis
- Hypothyroidism
- Acromegaly
- Amyloidosis

Examination

- Phalen's maneuver
- Tinel's sign
- Pressure provocation test (Durkan's) –
  {Most specific and sensitive (85-99%)}
- Weak thumb abduction
- Two-point discrimination/Vibration testing

Phalen Sign –
Sensitivity 40-86%
Specificity 48-54 %

Tinel Sign –
Sensitivity 45-75%
Specificity 40-67 %

Differential Diagnosis

- C6, C7 radiculopathy
- Thoracic outlet syndrome
- Proximal median nerve entrapment
- Traumatic injury at the level of the wrist
  - handcuff neuropathy

- Double crush syndrome
  - Upton, McComas (Lancet 1973)
  - 81/115 patients with median/ulnar nerve sx also had cervical nerve root lesion

Diagnostic Evaluation

- History
- Physical examination
- Imaging – USG/CT/MRI

- NCV

Electro-diagnosis

- Palmar Sensory latency – Most sensitive
- SNAP's – Low amp / unrecordable
- EMG – APB/OP

✓ Spontaneous fibrillation
✓ Positive sharp waves
✓ Long duration, polyphasic MUP's

Electrophysiological Grading - CTS

Mild

- SNAP or Mixed NAP – prolonged
- Low amp. SNAPs

Moderate

- Mild CTS + Prolongation of median motor distal latency

Severe

- Median motor + sensory distal latency prolonged
- Absent SNAPs or mixed NAPs
- Reduced thenar compound MAPs
- Fibrillation, reduced recruitment

Imaging - USG

- Entrapped nerve –

✓ Hypoechoic
✓ Swollen
✓ Flattened

- Highly sensitive and specific
- Role in clinico-electrodiagnostic dilemma

Management

- CONSERVATIVE TREATMENTS
  - General measures
  - Wrist splints (Full time - optimal)
  - Oral Meds (Steroids > NSAIDs)
  - Local Injection of steroids (Transient)
  - USG therapy (Beneficial in long term)
  - Laser therapy (variable results)
  - Exercise therapy & Pyridoxine -- Ineffective
- SURGERY – Better results

Cochrane Database – 33 studies

Variable	OCTR	ECTR
Early Return to daily work	Less	More
Transient Nerve dysfunction	Less	More
Wound Infection	More	Less
RR of needing revision Sx	Less	More
Pain Score, Functional Status (Initial)	Less favorable	More favorable
Pain Score, Functional Status (8-12 weeks)	Same	Same

Bilateral CTS

Variable	Simultaneous	Staged
Total disability time	Less	More
Surgical Cost	Less	More
Self care	Compromised	Preserved

Our Department's Contribution

- Early vs Delayed Endoscopic CTR : Prospective randomized study

  World Neurosurgery, Sept – 2012; Chandra PS, Singh PK, Tripathi M et al

- ✓ N 100 patients – 51 early Sx (< 1 week) & 49 delayed Sx (> 6 months)
- ✓ Moderately severe CTS
- ✓ Improvement significant in both groups ($p < 0.001$)
- ✓ Comparative analysis revealed – Early decompression better ($p < 0.001$)

Thank You