Compressive Neuropathies

Anthony Foo
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Compressive Neuropathy

• Common entity
• Essentials
  • Aetiology
  • Pathophysiology
  • Clinical findings
  • Neuro-electro diagnostics
  • Treatment
Epidemiology & Aetiology

• Typical patient (Female>Male)

Risk factors
• Endocrine: pregnancy, menopause, thyroid
• Metabolic: diabetes, inflammatory arthritis, gout, CKD/ESRF
• Lifestyle: RSI
• Rare: HNPP
Question: Five of the following healthcare workers complain of hand numbness. Who is the **ODD** one out?
Pathophysiology

Compression

Demyelination

Axonal Loss

Neurapraxia

Axonotmesis

Focal Pressure

Blood Supply

Scarring

The Clinical Dogma

Transient Paresthesia

Constant Paresthesia

Weakness

Wasting
Carpal Tunnel Syndrome

According to Wiki.....

https://upload.wikimedia.org/wikipedia/commons/3/38/Carpal_Tunnel_Syndrome.png
CTS: Clinical Prudence

• Establish causative factors: lifestyle/occupation, metabolic/endocrine disease

• Impact of CTS on lifestyle: sleep pattern, occupation, hobbies

• Physical examination: ascertain level of nerve ‘injury’, severity, and associated factors
The Clinical Examination

**Basic**
1. Thenar wasting
2. PCB sensation
3. IF-LF discrepancy
4. Split RF
5. Tinel percussion
6. Compression test +2PD (Static)

**Advanced**
7. CMCJ OA
8. Trigger digit
9. Skin dryness
10. Wrist tendonitis: DQ, ECU
11. Forearm tendonitis: LE, ME
12. Dialysis access
13. Neck examination
   +Timed compression test
Investigations & Treatment Algorithm

- NCS: not mandatory (but encouraged)
- US: carpal tunnel morphology
- Doppler studies: ESRF
- Diagnostic/Therapeutic H&L

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Suggested Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic CTS (infrequent symptoms)</td>
<td>Splint (night ± day) Anti-inflammatory (NSAIDS, COX2) H&amp;L</td>
</tr>
<tr>
<td>Classic CTS (frequent symptoms)</td>
<td>Carpal tunnel release (open/endoscopic) H&amp;L</td>
</tr>
<tr>
<td>Advanced with impaired thumb abduction</td>
<td>CTR ± tendon transfer (Camitz/FDS4/APL)</td>
</tr>
<tr>
<td>Special circumstances</td>
<td></td>
</tr>
<tr>
<td>CTS + neuro pain</td>
<td>Splint + Gaba/Lyrica + Short course Pred before considering surgery</td>
</tr>
<tr>
<td>CTS + dialysis</td>
<td>Establish non-vascular steal before CTR</td>
</tr>
<tr>
<td>Persistent/Recurrent symptoms</td>
<td>Consult best ‘friend’</td>
</tr>
</tbody>
</table>

Prognostic Factors
- Age > 50
- Duration > 10m
- Constant paresthesia
- Tenosynovitis
- Phalen < 30s

Kaplan JHSB 1990
# CTS: Bluffer’s guide to NCS

Read NCS Summary

<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV (m/s)</td>
<td>&lt;50</td>
<td>20-40</td>
<td>N.R</td>
</tr>
<tr>
<td>DL (ms)</td>
<td>&lt;3.5</td>
<td>&gt;3.5</td>
<td>N.R</td>
</tr>
<tr>
<td>DML (ms)</td>
<td>&lt;3.5</td>
<td>?3.5-6.5</td>
<td>&gt;6.5 / N.R</td>
</tr>
</tbody>
</table>
CTS: FAQs

What is the natural history of CTS?
• NEP tends to deteriorate – clinical condition may differ
• Clinically: Non linear progression: some improve spontaneously

What is the outcome of CTR?
• >50% report improvement in symptoms regardless of severity
• Pearl: rule of ⅓

Which is better: open vs endoscopic?
• Level 1: no difference
• Level 5: endoscopic more comfortable for early post op perineal care, no skin pain

What happens to the TCL after release?
• Reconstitutes – often indistinguishable from native TCL during late revision cases

What are the associated changes in hand mechanics following CTR?
• Mild degree of bowstringing, may aggravate trigger digits, CMCJ OA

Work related?
Link is not direct. Activity related – prolonged durations in wrist flexion/extension, vibrating devices
Cubital Tunnel Syndrome

Fig. 1 The five sites for potential ulnar nerve compression and the causes of compression at each site. (Adapted with permission from Amadio PC: Anatomical basis for a technique of ulnar nerve transposition. Surg Radiol Anat 1986;8:155-161.)
Ulnar Nerve Compression

- History: establish timeline, causative factors (trauma-elbow, wrist), “clumsiness”, “numbness”
- Compression: Elbow >> Wrist > Thoracic outlet
- Examination: next slide
- Investigation: NCS. XR elbow/C-spine
Probable Pathology for Compression
Elbow: Idiopathic >> Subluxation* >> Osteophyte > Accessory muscle/Ganglion/Tumor
Wrist: Ganglion/tumor
Thoracic outlet: Muscle – scalenes. 1st rib/clavicle
**Investigations and Treatment Algorithm: Cubital Tunnel Syndrome**

NCS is helpful: inching study can determine level of pathology (elbow)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Splint (elbow in about 30 flexion)</td>
</tr>
<tr>
<td></td>
<td>Activity modification</td>
</tr>
<tr>
<td>Moderate</td>
<td>Surgery*</td>
</tr>
<tr>
<td>Severe</td>
<td>Surgery* +/- tendon transfer</td>
</tr>
</tbody>
</table>

XR: osteophytes, childhood distal humerus malunion

Grading (Cubital Tunnel)
McGowan/Dellon

Mild (I): sensory
Moderate (II): sensory + weakness
Severe (III): +wasting

*mainstay of surgery is decompression by one of the following methods:
1. Simple decompression
2. Extended decompression
3. Decompression +transposition (any route)
4. Medial epicondylectomy
CuTS: FAQs

• What is the significance of subluxing ulnar nerve?
  • 16% of population reported to have subluxing ulnar nerve
  • May develop friction neuritis
  • Not conclusively associated with CuTS
  • If surgery → consider tranposition

• What are the activities that can aggravate ulnar nerve symptoms?
  • Elbow: high flexion angle>90
  • Thoracic outlet: heavy back packs, overhead

• Which procedure is better?
  • Apart from transposition for subluxing nerve, no clear advantage from either
The Other Compressive Neuropathies

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Location</th>
<th>N.B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>Pronator Tunnel</td>
<td>Body builders Volar forearm pain – neuropathic kind</td>
</tr>
<tr>
<td>AIN</td>
<td>Forearm</td>
<td>Exceedingly rare ?Parsonage Turner</td>
</tr>
<tr>
<td>PIN</td>
<td>Proximal forearm</td>
<td>Differential for finger drop in R.A Synovitis / PRUJ pathology in R.A can cause palsy</td>
</tr>
<tr>
<td>Radial</td>
<td>Radial tunnel</td>
<td>If tennis elbow recalcitrant to treatment... consider this</td>
</tr>
<tr>
<td>Lower limb</td>
<td>Peroneal Tarsal tunnel</td>
<td>If associated with Upp Limb – consider HNPP Others: mononeuritis multiplex</td>
</tr>
</tbody>
</table>
Summary

• Majority of compressive neuropathies are idiopathic
• Majority are of chronic neurapraxic pathophysiology
• Contributory factors: DM, double crush (cervical spond), RSI/vocational
• NCS is ‘SAFE’ but not ‘mandatory’
• Imaging (US/MRI) is an increasingly popular trend
• Treatment: mainly conservative