Diagnosis and treatment of median nerve entrapment at the elbow by lacertus fibrosus

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Introduction

• First description of the Pronator Syndrome: Seyffarth 1951 (1)
• Common sites of Proximal Median Nerve Entrapment (PMNE) at the elbow:
  • Ligament of Struthers
  • Between the heads of the pronator teres
  • The Gantzer’s muscle
  • Sublime bridge (tendinous arch connecting the radial and humeral heads of the flexor digitorum superficialis muscle)
  • Lacertus fibrosus LF (bicipital aponeurisis)
• The first case of PMNE by LF reported in the literature: 1978 (2)

Anatomy

- Lacertus fibrosus is not an anatomic variation
- LF: Myofascial connection of the biceps brachii muscle to antebrachial fascia
- The myofascia connections create an anatomical continuity between different muscles, basis of the chaînes musculaires, sequences, and myofascial trains (1).
“This fascial sling seems to be a mechanism of nature to keep the tendon of biceps angulated during flexion so that it can work efficiently as a supinator, while the 2 heads together can bring about flexion at the elbow joint.”

<table>
<thead>
<tr>
<th>Forearms dissected</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF present</td>
<td>55</td>
</tr>
<tr>
<td>LF was thickened</td>
<td>44</td>
</tr>
<tr>
<td>LF resting directly on the median nerve</td>
<td>27</td>
</tr>
<tr>
<td>High insertion of the pronator teres</td>
<td>17</td>
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Diagnosis

• PMNE by the LF is a clinical diagnosis (1)

1) Elbow Pain
at the level of the lacertus fibrosus
reproductive by a pressure of the median nerve at this level

2) Muscle Weakness
loss of strength: key pinch,
dropping objects
FPL, FDP II, FCR

3) Scratch Collapse Test (SCT)

1. Elisabet Hagert
Clinical diagnosis and wide-awake surgical treatment of proximal median nerve entrapment at the elbow: a prospective study.
Hand. 2013;8:41–46
Surgical technique

Anesthesia
Wide Awake Local Anesthesia Non Tourniquet (WALANT)
Axillary block

Surgical approach
Anterior minimally invasive approach
Our series

<table>
<thead>
<tr>
<th>44 Patients</th>
<th>28 Women 16 Men</th>
<th>Mean Age 43.7 y Range 24-66 y</th>
</tr>
</thead>
<tbody>
<tr>
<td>46 nerves released</td>
<td>29 Right 17 Left</td>
<td></td>
</tr>
<tr>
<td>Antecedent</td>
<td>11 Carpal Tunnel Syndrome (CTS) 02 Epicondylitis 01 Wrist arthrodesis 01 Forearm compartment syndrome 01 De Quervain 01 Raynaud</td>
<td></td>
</tr>
<tr>
<td>Anesthesia</td>
<td>WALANT 14 Axillary blocks 32: 29 CTS associated 01 Synovial cyst 01 Epicondylitis</td>
<td></td>
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</tbody>
</table>
Results

After release:
All patients recovered muscle strength

Complications:
01 case: hyperesthesia of the forearm, patient with fibromyalgia
Loss of strenght first!

- The **motor branches** to the forearm muscles are most **superficial** at the elbow whereas the sensory branches destined for the hand are more centrally located \((1,2)\).

Scratch Collapse Test

- The stimuli used with the SCT would not be considered a noxious stimulus to normal tissue (1).
- The response correlates to the prevalence of Substance P in the injured area (1).

What Is Substance P?
- Substance P, a neurotransmitter, is a modulator of nociception which is involved in the signaling of noxious stimuli (2).
- Elevated levels of Substance P has been documented in the carpal tunnel (3).

And Paresthesia...

- 26/28 of patients with paresthesia have CTS confirmed by EMG/NCS

**Double Crush Syndrome**

- Concept first introduced in 1973 by Upton and McComas (1).
- Constraints to axoplasmic flow from a proximal nerve compression or lesion can make the distal nerve more prone to compression (2).

What about Electrodiagnostic?

**Recommendations...**

- Surgical treatment should be provided only in cases where the diagnosis of PMNE has been confirmed by abnormal EDS (1).

**But...**

- Entrapment at the elbow is less apt to cause abnormalities in conduction (2).
- EMG/NCS in PMNE may simulate CTS (3).
- PMNE can be intermittent, dependent on the position of the elbow and/or the rotational position of the forearm (4).

*Dynamic Compression = Dynamic Exploration*

Take Home Message

Clinical diagnosis

**Motor testing** in CTS is capital

**SCT:** new diagnostic tool for nerve entrapments

**WALANT:** Intraoperative testing/Comfort/Low morbidity