Ulnar Nerve Entrapment

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Learning Objectives

• Identify clinical signs and symptoms of ulnar nerve entrapment
• Learn examination findings of nerve entrapment
• Learn basic EMG abnormalities of ulnar nerve entrapment
Case Presentation

50 y/o WM c/o weakness and loss of dexterity x several months in R hand
Patient is a physician and needs fine motor skills
Activites include weight lifting, golf, rock climbing, and adult league baseball
PMH essential negative, no meds
Social ETOH, no smoking
SUBJECTIVE

Numbness and tingling in 4th and 5th digits with increased sx at night

Medial elbow pain-mild, worse with full elbow flexion

R hand weakness with pinch, buttoning, typing and general loss of dexterity
OBJECTIVE

Inspection shows mild atrophy of 1st dorsal interosseous with no deformity of shoulder, elbow or wrist.

Palpation of ulnar nerve in retrocondylar groove and above elbow finds no subluxation from shoulder, elbow and wrist with no restrictions or deformities from C-spine without pain or restriction.
Deep branch of ulnar N. supplies the interossei muscles
CLAW HAND
INJURY TO THE ULNAR NERVE

EXTENSOR DIGITORUM IS UNOPPOSED

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Sensation (pinprick and light touch) exhibits a decrease in 4th and 5th digits with testing of the superficial terminal branch.
1. Superficial terminal branch
2. Palmar cutaneous branch
3. Dorsal cutaneous branch
Normal

Froment's positive
TESTS

Positive Tinel’s at elbow

negative at Guyon’s canal and upper arm
(1 cm proximal to medial epicondyle)

Positive Elbow Flexion

(sustained maximal elbow flexion with wrist in neutral x 1 minute) with increasedparethesias in fingers

Positive Pressure test

(pressure over ulnar nerve at groove with elbow flexion)
Effect of elbow flexion on the ulnar nerve

A. Extension

B. Flexion

This figure illustrates the effect of elbow flexion on the ulnar nerve. Note that with flexion (B), the distance between the olecranon and median epicondyle increases, thus resulting in compression of the nerve by the attached aponeurosis.
POSSIBLE CAUSES/MOI

Trauma elbow or wrist (acute or old)
Arthritis/osteophytes
Mass lesions/ganglion cysts
Repetitive overuse
Muscle imbalances and abnormal anatomy
Sports with overuse of elbow or hand i.e.; bicyclists, pitchers, wheelchair athletes
DIFFERENTIAL DIAGNOSIS

Proximal lesions C8/T1 or lower trunk of medial cord (usually differs with sensation involvement prox. to wrist in distribution of medial cutaneous nerve and motor involvement of non-ulnar muscles ie; flexor pollicis longus/ ext. pollicis and thenar muscles)

Central lesions would show wasting and weakness in ulnar distribution with absence of sensory deficits (ALS or monometric amyotrophic forms of motor neuron disease)
The Ulnar Nerve

- Muscles innervated
  - Flexor carpi ulnaris, flexor digitorum profundus, adductor pollicis, small digital muscles
- Motor functions
  - Finger adduction and abduction other than thumb; thumb adduction, flexion of digits 4 & 5; wrist flexion and adduction
- Sensory
  - Skin over medial surface of the hand through the superficial branch

ELECTRODIAGNOSTIC TESTING
Nerve Conduction Studies and EMG’s
- confirm diagnosis
- establish baseline results
- determine severity
- R/O other causes
Ulnar neuropathy at the Elbow-Within Retrocondylar Groove

**NCS: -Sensory**
- Ulnar sensory: Proximal Absent

**-Motor**
- Ulnar motor: > 90º block

**EMG:**
- Denervation
- ‘Inching’ Localizes Block
- Rapid Firing

**Presenting Signs**
- Weakness of grip, particularly interossei
- Numbness & tingling 4th & 5th digits
- Positive Tinel's sign at the medial elbow

**Common Risk Factors**
- Diabetes, alcoholism, HIV, leaning on elbows, telephone operators/receptionists

**Differential Diagnosis**
- C8-T1 radiculopathy
- Lower brachial plexus lesion
- Thoracic Outlet Syndrome (rare)
- R/O ALS especially if bilateral, fasciculations and/or other signs & symptoms (also rare)
Box 1
Synopsis of the recommendations of the AAEM practice parameter on ulnar neuropathy at the elbow
1. When using moderate-elbow flexion (70–90° from horizontal), a 10-cm across-elbow distance, and surface stimulation and recording, the following abnormalities suggest a focal lesion involving the ulnar nerve at the elbow:
   a. Absolute motor NCV from AE to BE of less than 50 m/s
   b. An AE to BE segment greater than 10 m/s slower than the BE-wrist segment
   c. A decrease in compound muscle action potential (CMAP) negative peak amplitude from BE to AE greater than 20%
   d. A significant change in CMAP configuration at the AE site compared with the BE site
   e. Multiple internally consistent abnormalities
2. If routine motor studies are inconclusive, the following procedures may be of benefit:
   a. NCS recorded from the FDI muscle
   b. An inching study
3. Needle examination should include the FDI, the most frequently abnormal muscle, and ulnar innervated forearm flexors. If ulnar innervated muscles are abnormal, the examination should be extended to include nonulnar C8/medial cord/lower trunk muscles to exclude brachial plexopathy, and the cervical paraspinals to exclude radiculopathy
Nerve Conduction studies

- amplitude of the maximal compound muscle action potential in response to the distal site of stim at the wrist is an indication of the number of functioning motor axons
- focal slowing or conduction block across elbow provides evidence of a localized lesion

EMG

- determines the presence or absence of acute or chronic motor axonal involvement
- can localize a lesion prox to wrist/forearm by exhibiting absence of abnormalities in the median and radial distribution
IMAGING

MRI
– nerve enlargement with increased signal intensity
T2 weighted or short T1 inversion recovery sequences

Ultrasound
– thickening nerve and altered echogenicity
  - excellent for evaluation of masses or cysts, compression lesions or trauma
TREATMENT

activity modification ie; decrease lean on elbow, sleep with elbow in relaxed position or splinting to prevent full flexion

sport evaluation and MOI or provoking motions

OMM

Nerve gliding exercises

Surgery
OMM
Articulatory and soft tissue mobilization to remove all restriction
Myofascial release
Muscle energy
Counterstrain
Nerve Gliding Exercises

1. Extend arm and clench fist.
2. Slowly open fist and relax.
3. Repeat for several repetitions.

4. Extend arm and rotate palm outward.
5. Return to starting position.
6. Repeat for several repetitions.
Surgical release
REHAB

Healing of 3-4 weeks
DISCUSSION
Second most common entrapment syndrome vs carpal tunnel
Must be able to Diff. Dx. from C8/T1 or brachial plexus
Identify location of entrapment
Advise patient on prolonged sx and complications if treatment is not successful
Thanks