A Primary Care Guide To Carpal Tunnel Syndrome
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Conflict of Interest Disclosure
I have no conflicts and nothing to disclose

What is Carpal Tunnel Syndrome?
• Most common nerve disorder today
• Compression of the median nerve in the carpal tunnel
• Affects 4-10 million Americans
• Occurs three times more in women than men
• Seen more in middle age individuals
Causes

- Typically due to reduced space versus a problem with the nerve itself
  - Carpalized is a bad space
  - Thickening of the lining of the tendons due to microtrauma
  - Repetitive hand/finger motion
  - Use of vibrating equipment
  - Trauma – fractures, dislocations
  - Arthritis
  - Fluid retention of pregnancy, menopause, obesity
  - Medical conditions with increased incidence of inflammation
  - Thyroid disease, pituitary imbalance, rheumatoid arthritis, diabetes
  - Mass effect
  - Cyst, lipoma, other tumor

Differential Diagnosis

- Overuse syndromes
  - Myositis, tendinitis, fibrositis, epicondylitis
- Vascular pathology
  - Raynaud’s syndrome, thrombosed artery
- Cervical radiculopathy
  - C6-8
- Thoracic outlet syndrome
- Pronator syndrome
- Basal thumb arthritis
- Peripheral neuropathy
  - Diabetes, chemotherapy, vitamin B12 deficiency, hypothyroidism

Anatomy

- Borders
  - Transverse carpal ligament – palmar
  - Carpal bones – dorsal
  - Hamate / Pisiform – ulnar
  - Scaphoid / Trapezium – radial
- Contents
  - Flexor Digitorum Superficialis tendons – index, middle, ring, small fingers
  - Flexor Digitorum Profundus tendons – index, middle, ring, small fingers
  - Flexor Pollicis Longus tendon – thumb
  - Median nerve
  - Motor branch can arise proximal, distal, or through the transverse carpal ligament to innervate flexor muscles
### Signs / Symptoms
- Numbness/tingling – thumb, index, middle, radial 1/2 ring
- Feeling of swelling without physical swelling
- Thenar muscle weakness – grip strength, dropping items
- Numbness during sleep – due to flexed wrist, fist clenching
- Finger stiffness in the AM
- Flick sign
- Difficulty with fine motor movement
- Numbness during activity with hands elevated or with fixed hand/wrist position
- Sloppy penmanship
- Shooting electrical pain

### Physical Exam Findings
- Tinel’s sign – least sensitive, most specific
- Phalen’s test – most sensitive
- Carpal compression test – held for 1-2 minutes
- Combined flexion/compression test – held for 20 seconds, 82% sensitive, 99% specific
- Thenar atrophy

### Diagnostic Tests
- X-ray
  - Fractures
  - Dislocations
- Lab tests
  - Thyroid, diabetes, pituitary, vitamin deficiency
- Nerve conduction studies / electromyography
  - Determine severity
  - Rule out other pathology
- MRI
- Ultrasound
**Treatment Options**

- Non-surgical – slows progression but does not stop it
  - Behavior modification
  - Avoid aggravating activities
  - Night splinting
  - Medications
  - NSAID, gabapentin, B6
  - Modalities
  - Hand therapy, yoga, massage therapy
  - Weight loss
  - Control medical conditions
    - Thyroid, diabetes
  - Steroid injection
    - Improves symptoms for 3 months then recurs
    - No improvement in electrodiagnostic results
    - 63% will require surgical management

- Surgical
  - Improved symptoms and electrodiagnostic testing at 3 months
  - 95% success rate
  - No need to wait for severe symptoms
  - No improvement – genetic?
  - Open Technique
    - Traditional incision
  - Endoscopic Technique
    - Incision proximal to transverse carpal ligament
    - Earlier return to work
    - Earlier return of grip strength
    - Lower risk of scar tenderness
    - Increased incidence of nerve injury

**Results**

- Non-surgical management
  - Does not stop progression
  - Most effective in those with clinical symptoms but mild or no electrodiagnostic findings
- Surgical Management
  - Increases space within the carpal tunnel
  - Short-term improvement typically reduces burning symptoms but numbness may persist
  - Long-term recovery may take 6-12 months
  - Residual numbness may be permanent in severe cases
  - Rate of recurrence < 5%
Questions?

The End

Thank you for your time and enjoy the rest of the conference!