CARPAL TUNNEL SYNDROME (CTS)

CTS: why does it matter?

- Fairly prevalent
- Early detection may prevent permanent impairment
Learning Objectives

• To review:
  – Signs/symptoms
  – Causes
  – Management
    • prevention
    • treatment

CTS:
CASE DEFINITION:

Median Nerve Entrapment…
at the Wrist.
Median Nerve

• Motor Function:
  – Lumbricals D2-3
  – thumb opposition, abduction, flexion

• Sensory
  – palmar aspect of thumb, index, middle finger, half of ring finger
  – dorsal aspect of tip of thumb, index and middle finger
Carpal Tunnel Syndrome

• CTS is felt in all fingers except?
  – the thumb
  – the index
  – the long finger
  – the ring finger
  – the little finger
Pathophysiology of CTS

• Microvascular insufficiency (ischemia of the median nerve)

• Mechanical compression of the nerve

CTS: DIAGNOSTIC CRITERIA

Main symptoms of this mononeuropathy:

➢ Paresthesias of the first three fingers, maximal at night or on awakening;

    but localization of symptoms may not be precise in the early stages of the lesion.

➢ may be associated with ache or with a burning sensation;

    but pain is virtually never the only symptom.

Motor impairment occurs later (weakness of the abductor pollicis brevis; thenar wasting).
CARPEL TUNNEL SYNDROME (CTS)

RISK FACTORS FOR CTS:

Often multifactorial. Conditions which can cause or contribute to its development include:

RISK FACTORS for CTS:

1. **Systemic** pathologies (eg hypothyroidism, connective tissue disorders, etc.) and conditions (eg pregnancy) that may increase pressure within the carpal tunnel.
CARPEL TUNNEL SYNDROME (CTS)

Prevalence of CTS in the general population:

up to 10% in prospective population-based studies.

In 56.8% of cases, concomitant diseases or conditions are present;

- the most common are diabetes,
- pregnancy and thyroid disorders.

Clinical Scenario

- A 26-year old pregnant woman complains of nocturnal pain in her right hand. This awakens her and is relieved only by vigorous shaking of the hand. She describes the pain as “tingling”, especially in the index and middle fingers.
RISK FACTORS for CTS:

1. **Systemic** pathologies (eg, hypothyroidism, connective tissue disorders, etc.) and conditions (eg, pregnancy) that may increase pressure within the carpal tunnel.

2. **Anatomical** factors that may alter the shape or volume of the carpal tunnel (eg, abnormalities of wrist bones, tumours, cysts, etc.).

RISK FACTORS for CTS:

1. **Systematic** pathologies and conditions

2. **Anatomical** factors

3. **Biomechanical** stress resulting from pressure of sufficient frequency, force and duration (“high force high repetition”), vibration:
   - handling items > 1 kg;
   - lack of change in task or
   - lack of breaks for at least 15% of the shift;
   - short work cadence (elementary operations < 10s).
Quiz Question

- A 30 year old secretary reports chronic, episodic numbness and tingling involving her right thumb, 2nd and 3rd fingers, especially at night.

Carpal Tunnel Syndrome

- The volume of the carpal tunnel is greatest when the wrist is?
  - flexed maximally towards
  - bent maximally downward
  - rotated maximally outward
  - rotated maximally inward
  - aligned straight with the forearm
Carpal Tunnel Syndrome

- The volume of the carpal tunnel is greatest when the wrist is?
  - flexed maximally towards
  - bent maximally downward
  - rotated maximally outward
  - rotated maximally inward
  - aligned straight with the forearm

CTS

- Which of the following is likely to be associated with increased risk of CTS?
  - dehydration
  - chronic renal failure
  - working in a poultry plant
  - pregnancy
  - working as a car mechanics
CTS

• Which of the following is likely to be associated with an increased risk of CTS?
  – being a concert violinist
  – fracturing your distal radius
  – septic arthritis of the wrist

Wrist Examination

• Inspection:
  – OA:
    • Heberden’s nodes (DIP)
    • Bouchard’s nodes (PIP)
  – Rheumatic arthritic deformities
Wrist Examination

• Special Tests:
  – Tinel’s
  – Phalen’s

• Neurovascular Examination
CTS: Electrophysiological studies

Objective measure of nerve damage (high sensitivity).

Characteristics:

- slowing of median nerve conduction across the wrist,
- other nerves being normal.
THERAPEUTIC AND PREVENTATIVE INTERVENTIONS for CTS

Primary Prevention:

Reduce the duration and frequency of exposure to forceful repetitive work:

- job rotation
- regular breaks
- ergonomic modifications of activities

Secondary Prevention:

As previous plus:

- identify all relevant risk factors.

For instance:

- Surgery not indicated in cases of obvious reversible factors (e.g., pregnancy).
- Treatment of an underlying metabolic or inflammatory disease may alleviate CTS manifestations.