Occupational peripheral nerve damage

Toxic damage

- Toxic neuropathy
- Typical character – symmetric, sensorimotor, distal polyneuropathy
- Sensory fibers are affected first because their bodies are in the dorsal root ganglion (i.e. outside the blood-brain barrier).
- It is distal because the part of the neuron that is furthest from the center of regeneration (i.e. from the cell body) suffers the most
- The longer the axon, the more susceptible it is to damage

Symptoms

- **Sensory** - Paresthesia or tingling especially at night. Reduction or disappearance of reflexes - distal ones disappear first (e.g. Achilles tendon reflex)
- Motor disorders appear later – typically there is Peroneal paresis (patient can't extend (lift) toes)

Examination

- Electromyography (Sural nerve, Tibial nerve)

Toxicity

- Lead, Mercury
- Organic solvents – carbon disulfide, hexane, trichloroethylene, acrylamide, polychlorinated biphenyl

Dif. dg

Symptoms are nonspecific:

- Mainly – alcoholic polyneuropathy (we will examine GGT (gamma-glutamyl transferase), CDT (carbohydrate-deficient transferrin))
- Diabetic, Paraneoplastic (mainly lung, ovarian, or hematogenous)
- Both in DM and in tumours, polyneuropathy can be the first symptom (must be considered when polyneuropathy occurs)

Therapy

- Termination of toxic exposure, vitamins B1, B6, B12, E, vasoactive substances, nootropics, pain medications – anti-epileptics

Overuse damage

- Tunnel syndromes
- 80% of patients have carpal tunnel syndrome. Cubital tunnel syndrome is the second-most common

Other rare damages:

- Peroneal nerve – compression when passing behind the head of the fibula (e.g. while squatting or kneeling)
- Tibial nerve – pressure in the tarsal tunnel (when passing behind the inner ankle)
- With frequent tiptoeing (plantar flexion) – Ballerinas (damage to the nerve by stretching), Jockeys (tightening in the stirrups), house painters (on stepladders)

Carpal tunnel syndrome

- There will be some expansion of the carpal tunnel – it has two main etiologies
  - **Endogenous** - hormonal changes (the syndrome will manifest itself bilaterally), inflammation (tendovaginitis), and metabolic changes
  - **Exogenous** – post-traumatic, from manual work
- The most common groups of activities leading to the syndrome:
  - Heavy physical work: flexor contractions (hammer, heavy loads)
  - Stereotypic repetition of finger flexion and extension (previously in milking cows, musicians, or typing)
  - Fine work with constant pinching of the fingers (watchmakers, fine mechanics)
  - Direct pressure on the wrist (dentists, scissor work, etc.)

- **Subjective** symptoms:
  - First phase – morning numbness in the fingers
  - Second phase - nocturnal paresthesia

    - Third phase – daytime paresthesia (mainly when working with hands above the head (for example, holding on to a handrail in public transport))
    - Fourth stage – clumsiness of small movements

- **Objective** signs – sensitivity disorders – we assess them on the 2nd finger (we compare sensation on the belly of the 2nd and 5th finger - the palmar part of the fifth finger is innervated by the ulnar nerve)
- As stated, motor defects arise later – mainly abductor pollicis brevis muscle atrophy
    - The resulting atrophy of this muscle makes such a dimple laterally on the thenar eminence
- We demonstrate the sign of a candle - hand palm-side up with the thumb sticking up, we push it into the palm and watch its resistance
- Sensation on the thenar eminence is normal (the subcutaneous branch originates from the median nerve before entering the carpal tunnel)
- Pseudoneuroma of the median nerve is formed - a spindle-like thickening of the nerve - as axoplasm (cytoplasm of axon) accumulates there due to the oppression
- Provocation tests – Tinel's sign – perpendicular tapping of the retinaculum with fingers (direct percussion) causes paresthesias (burning or prickling sensation)
    - Wrist hyeprflexion will do the same
- Objective examination - ENG (electroneurography) - the conduction speed of the axon on the forearm (before) and palm (after) will be normal, there is a slowdown in the tunnel

Dif. dg

- Pronator teres syndrome (median compression more proximally on the forearm)
- C6 root syndrome
- Cervicobrachial syndrome

Therapy

- Termination of exposure, splint positioning, vasoactive substances, NSAIDs, local corticoids
- Invasive (last) option - surgery - usually the worker can no longer return to work, as the movement of the wrist is altered

Other Syndromes

- Paresis of the ulnar nerve in the Ulnar nerve sulcus with claw hand deformity

Links

Related articles

- Ionising radiation

Source

- BENEŠ, Jiří. *Study materials* [online]. [feeling. 24/02/2010]. < http://jirben.wz.cz >.

References

- PELCLOVA, Daniela. *Occupational diseases and intoxication.* 2nd edition. Prague: Karolinum, 2006. 207 pp. ISBN 80-246-1183-X .