Pain

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The Function of Pain

An unpleasant sensory and emotional experience associated with actual or potential tissue damage'

- Motivator for action from real/perceived threat
- Protection/healing
- Warning signal
- Not an indicator of how bad damage is
- Subjective: physiological/social/psychological factors

Nociceptive Pain

The process whereby noxious stimulation is conducted from the periphery to the central nervous system (CNS)

- Nociceptors are specific sensory receptors within the skin which detect threatening stimuli, to protect from any, or further tissue damage.
- Nociceptors can respond to signals which are:

Mechanical

Thermal

Chemical

There are two common nociceptive sensory nerves:

1. A delta (Aδ)
2. C nerves

→ These neurones extend to the dorsal horn, whereby the electrical stimulation is then passed through the spinal cord to the brain, where the sensation of pain is generated.

Inflammatory chemicals (released post-injury) sensitise the nociceptors. This will:

- Reducing the activation threshold - increasing the generation of action potentials in the neurones
- Result in *hyperalgesia, secondary hyperalgesia*, as well as lead to the sensitisation of the dorsal horn, more commonly referred to as *central sensitisation*.

Central Sensitisation

- An amplification of neural signalling within the CNS that elicits pain hypersensitivity.
- Enhancement in nociceptive pathway - often manifests as reduced threshold, an increase in neuron responsiveness, prolonged after effects to stimuli and enables non-injured tissues to produce pain.
- Cognitive emotional factors further activate system.
- Creates difficulty with professional diagnosis due to CNS distorting and amplifying pain.

Somatic Pain

- Subset of nociceptive pain- normal response to a noxious injury to tissues.
- Classified into two types: superficial or deep.
- Superficial somatic pain - nociceptors in the skin or other tissue.
- Deep somatic - muscles and joints
- Exhibited as dull, gnawing feeling, expands into wide difficult to localise areas

Acute – Pain response due to tissue damage/injury

Subacute – Pain associated with recovery from injury

Chronic – Over 3-6 months/expected time for recovery

- Nociception vs Pain

Visceral Pain

- Characterised as pain arising from internal organs.
- Pain convergence of afferent (sensory) nerve fibres entering the spinal cord at the same level as superficial, somatic structures
- Viscery (sensory) afferents are exclusively Aδ myelinated nerve fibres and C unmyelinated nerve fibres with these fibres innervating viscera to the CNS through autonomic sympathetic and asympathetic nerves.
- Symptoms such as nausea, vomiting, changes in vital signs, emotional manifestations, lower back tension and feelings described as deep, squeezing or dull.

Neurogenic Pain

- Result of injury or disease to somatosensory component of NS, either peripheral or central.
- Lesions- Sever connection, prevent normal transmission
- Disease- Hyperglycemia affecting nerve integrity
- Neuromas- E.g Mortons, compression caused by nerve thickening

Recognising:

- Hyperlgesia/Allodynia (non-painful stimulus)- Ectopic impulse/Peripheral Sensitization (Primary) Central Sensitization (secondary)
- Sensory Loss/Motor weakness- Conductions blocked
- Subjective/Objective- History, Dema/myotomes, special tests
- Electroneuromyography (ENMG)
- MRI
- VAS- Tracking progress

Management of Pain

- Treatment through identifying cause of pain and symptoms
- Often treated with analgesics, NSAIDs, spasmolytic and anti-depressants.
- Opioid prescription - Block transmission of neurotransmitters and potential generation. Precaution for tolerance development, and Opioid Induced Analgesia.
- Oral gabapentin – reduces tactile allodynia and hyperalgesia of central sensitisation
- Education about pain - reduce fear
- Goal setting - realistic expectations
- Positive feedback
- Active rehabilitation - exercise progression
- Lifestyle changes - relaxation/sleep management/mindfulness/stress management/diet

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