Pain Management

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What we’re gonna talk about?

1. Pain definition
2. Pain types
3. Pathophysiology of pain
4. Pain management and the gate theory.
What is pain?

Pain definition: an unpleasant sensory and emotional experience associated with actual or potential tissue damage.
Types of pain:

- **Acute pain:**
  
  # the normal body responds to noxious stimuli with the experience of pain.
  # Most pain goes away, you recover from surgery. Your toothache gets treated. Your sprained ankle heals. That occasional headache responds to aspirin.

- **Chronic pain:**

  # Chronic pain is pain that won’t go away, lasting three months or longer.
  # The sensitized nervous system responds more readily to both noxious and innocuous stimuli.
Chronic pain has two major categories:
Nociceptive pain: (tissue injury)
(associated with inflammation)

- Aches and sprains (back pain)
- Cancer pain
- Headache
- Arthritis

# results from stimulating a normal nerve. Nociception in general means detection of noxious stimuli by specialized peripheral nerve endings (nociceptors); this involves the activation of these receptors by external stimuli (mechanical, thermal or chemical). These receptors are found in both somatic and visceral structures, once they are directly stimulated by an external stimulus >> release of bradykinin, prostaglandins, histamine, interleukins.

# the sensitized nervous system responds more readily to both noxious and innocuous stimuli

# Innocuous sensations such as touch, warmth, or vibration can then be perceived as painful stimuli
Nociceptive pain is classified into 2 types:

1- **Somatic pain**: arising from skin, muscles, joints, bone or connective tissue > Localized, aching and throbbing in nature.

2- **Visceral pain**: arising from internal organs (pleura, peritoneum, GIT, etc...).
Neuropathic (Nerve damage) pain:

- Primary lesion dysfunction of the nervous system (peripheral or central). With neuropathic pain, the nerve fibers themselves might be damaged, dysfunctional or injured, and these damaged nerve fibers send incorrect signals to other pain centers. In this type, pain usually is NOT in proportion with the amount of injury i.e. there is some sort of dissociation between the severity of pain and the amount of injury:

  *(there may be exaggerated painful responses to normally noxious stimuli: \{hyperalgesia\})*
  *
  - painful responses to normally non noxious stimuli: \{allodynia\}.

- Many examples for that:
  1. Post herpetic neuralgia (shingles)
  2. Phantom limb pain.
  3. multiple sclerosis
Let’s hit some pathophysiology...
Pain may be generated in a number of ways:

1. **Simple stimulation**: Normal activity causing stimulation of tissues can lead to pain; for example the sensation of pressure when maintaining an uncomfortable posture is relieved on shifting position.

2. **Tissue injury**: This results in structural elements being damaged and an inflammatory response occurs. Many chemicals are released, including: Histamine, bradykinin, 5-HT.

3. **Other stimuli**: Impulses from pain and temperature receptors are carried in similar small nerve fibers and the threshold for stimulation may be reduced at low temperatures. For example, arthritis patients commonly complain of increased pain during cold weather. It is not necessary for there to be tissue damage to elicit pain from the periphery; pathways may be stimulated by unusual stimuli: eating ice-cream too quickly often provokes an intense headache but is not usually perceived as a threat to bodily integrity!

4. **Prostaglandins**: These sensitize nerve endings to react more intensely to further stimulation; for example a fingernail when hit with a hammer, although perhaps not showing signs of damage, is very sensitive to further touch and movement.

5. **Central pain**: Damage of the thalamic pathways which carry nociceptive information can lead to the experience of pain. As with many chronic pains, the problem is within the central nervous system and it rarely responds to conventional analgesia.

6. **Denervation**
Lastly: Pain management provides relief so you can enjoy life. But treatment is complex and can lead to harmful effects if not properly administered and monitored. That’s why pain management may require the involvement of a physician anesthesiologist who specializes in pain medicine.