COMMONWEALTH OF AUSTRALIA

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Pain Management

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Reference: Morris and Goucke, Essential Pain Management: ANZCA
Objectives

• Define pain
• Classify Pain
• Revise the physiology of nociception and pain
• Review pharmacology of analgesia
• Introduce the RAT approach to pain management
  – Recognize
    • How do I know the patient has pain
  – Assess
    • Type of pain
    • Severity of pain
  – Treat
    • Non pharmacological
    • Pharmacological
What is Pain?
What is Pain?

• International Association for the Study of Pain
  – Pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”.

• Are there any other definitions?
What is Pain?

• Pain is what the patient says hurts.
Classification of Pain

• Three main questions:

  1. How long has the patient had pain?
  2. What is the cause?
  3. What is the pain mechanism?
## Classification of Pain

<table>
<thead>
<tr>
<th>Duration</th>
<th>Acute</th>
<th>Chronic</th>
<th>Acute on chronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause</td>
<td>Cancer</td>
<td>Non-cancer</td>
<td></td>
</tr>
<tr>
<td>Mechanism</td>
<td>Nociceptive (physiological)</td>
<td>Neuropathic (pathological)</td>
<td></td>
</tr>
</tbody>
</table>
Acute versus Chronic

• Acute
  – Pain of recent onset and probable limited duration

• Chronic
  – Pain persisting beyond healing of injury
  – Often no identifiable cause
  – (Pain lasting for more than 3 months)
Cancer versus Non-Cancer

• Cancer pain
  – Progressive
  – May be mixture of acute and chronic

• Non-cancer pain
  – Many different causes
  – Acute or chronic
Nociceptive Pain

• Obvious tissue injury or illness
• Physiological pain
• Can be further classified into
  – Superficial somatic
  – Deep somatic
  – Visceral
• Descriptions include sharp, aching, dull, throbbing, cramping and pressure

Can you give examples?
Neuropathic Pain

• Nervous system damage or abnormality
• Pathological pain
• Tissue injury may not be obvious
• Description
  – Burning, shooting numbness, pins and needles
  – Not well localised

Can you give examples?
Pain Physiology and Pathology
Nociception is not the same as pain!

**Injury**

- Beliefs/concerns about pain
- Psychol. factors: anxiety/anger/depression
- Cultural issues: Language, expectations

**Pain**

What the patient says hurts. What must be treated.

- Other illnesses
- Coping strategies
- Social factors: e.g. family, work

Modified from Analgesic Expert Group. Therapeutic Guidelines 2007
Physiology

• 4 steps:
  – Periphery
  – Spinal cord
  – Brain
  – Modulation

• We will look at each step
Periphery

- Tissue injury
- Release of chemicals
- Stimulation of pain receptors (nociceptors)
- Signal travels in Aδ or C nerve to spinal cord
Spinal Cord

Dorsal horn is the first relay station

Aδ or C nerve synapses (connects) with second nerve

Second nerve travels up opposite side of spinal cord
Brain

Thalamus is the second relay station.
Connections to many parts of the brain
– Cortex
– Limbic system
– Brainstem

Pain perception occurs in the cortex
Modulation

- Descending pathway from brain to dorsal horn
- Usually decreases pain signal
Why is pain physiology important?

• Many factors affect how we feel pain.
  – Psychological factors are very important.
• Different treatments work on different parts of the pathway.
  – More than one treatment may be needed.
Neuropathic Pain

• Pathological pain
• Abnormality of:
  – Peripheral nerves
  – Spinal cord or brain
• Needs to be treated differently
Neuropathic Pain

• Peripheral
  – Damaged nerves (e.g. trauma, diabetes)
  – Abnormal firing of nerves

• Central
  – Changes in wiring
  – Abnormal firing
  – Loss of modulation

How do patients describe their pain?
Sensitisation

• Can occur in peripheral and central nervous system
• Persistent central sensitisation is a possible mechanism for some chronic pain conditions
Analgesic Medication
Paracetamol (Acetaminophen)

- **Mechanism of action**
  - Unclear but acts in CNS
  - Inhibits peripheral prostaglandin synthesis
  - Analgesic and antipyretic

- **Indications**
  - Analgesia either alone or in combination

- **Adverse effects**
  - Hepatic necrosis

- **Drug interactions**
  - Effects are additive with NSAIDs

- **Monitoring**
  - Safe dose is up to 4 g per day in adult
Non-steroidal anti-inflammatory medications

• Mechanism of action
  – Non specific inhibition of COX1 & 2 to inhibit PG synthesis
  – Analgesic, antipyretic, anti-inflammatory

• Indications
  – Analgesia alone or in combinations

• Adverse effects
  – Peptic ulceration
  – Renal impairment
  – Anti platelet action
  – Bronchospasm in asthmatics
  – Exacerbation of CCF

• Drug interactions
  – Reduce opioid requirements by 20-40%

• Monitoring
  – Care with renal impairment or hypovolaemia
Opioids

• Mechanism of action
  – Mu opioid receptors to produce analgesia
  – Site of action is the peripheral nociceptors, dorsal horn, cerebral cortex and descending tracts

• Indications
  – Severe pain

• Adverse effects
  – Sedation, respiratory depression
  – Nausea, euphoria, miosis, bradycardia, postural hypotension, urinary retention

• Drug interactions
  – Other sedative agents

• Monitoring
  – Sedation, CV and respiratory
Tramadol

• Weak opioid effect plus inhibitor of serotonin and noradrenaline reuptake (modulation)

• Advantages
  – Less respiratory depression
  – Can be used with opioids and simple analgesics
  – Not a controlled drug

• Disadvantages
  – Nausea and vomiting
Amitriptyline

• Increases descending inhibitory signals

• Advantages
  – Cheap, safe in low dose
  – Good for neuropathic pain
  – Also treats depression, poor sleep

• Disadvantages
  – Anti-cholinergic side effects (glaucoma, urinary retention)
Anti-Epileptic Drugs

- Carbamazepine (Tegretol)
- Sodium valproate (Epilim)
- Gabapentin/Pregabalin
- Membrane stabilisers
  - Reduce abnormal firing of nerves
- Good for neuropathic pain
# Drug Treatments

<table>
<thead>
<tr>
<th></th>
<th>Acute nocimi</th>
<th>Acute nocisevere</th>
<th>Acute neuro</th>
<th>Chronic non-cancer</th>
<th>Chronic cancer</th>
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</thead>
<tbody>
<tr>
<td>Paracetamol</td>
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<td>++</td>
<td>+</td>
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<tr>
<td>NSAIMs</td>
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<tr>
<td>Codeine</td>
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<td>-</td>
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<tr>
<td>Morphine</td>
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<td>++</td>
<td>-</td>
<td>+++</td>
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<tr>
<td>Amitriptyline</td>
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<td>++</td>
<td>++</td>
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<tr>
<td>Gabapentin</td>
<td>-</td>
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<td>++</td>
<td>++</td>
<td>+</td>
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</tbody>
</table>
The RAT Approach to Pain Management
Approach to Pain

- Recognize
- Assess
- Treat
Approach to Pain

Recognize

• Does the patient have pain?
  – Ask
  – Look (frowning, moving easily, sweating?)

• Do other people know the patient has pain?
  – Other health workers
  – Patient’s family
Assess- Pain History SOCRATES

- **Site**
- **Onset**
- **Characteristics- nociceptive & neuropathic pain descriptors**
- **Radiations**
- **Alleviating & Aggravating factors**
- **Treatments received- effective & ineffective**
- **Extra considerations- biological, psychological, social**
- **Specialists involved**

- **Examination- Exclude new pathology. Neurological.**
Approach to Pain
Assess

• Measure the severity
  – What is the pain score?
    • At rest
    • With movement
  – How is the pain affecting the patient?
    • Can the patient move, cough?
    • Can the patient work?
Measuring Pain

• Helps guide treatment

• Methods
  – Verbal (e.g. mild, moderate, severe)
  – Numerical
    • 0 (no pain) to 10 (worst pain imaginable)
  – Visual
    • Visual Analogue Scale (VAS)
    • Faces pain scale
Visual Analogue Scale

**Number Score**

Ask the patient to show where their pain comes on the scale of 1 - 10

- 0: no pain
- 1 - 3: mild pain
- 4 - 6: moderate pain
- 7 - 9: severe pain
- 10: worst possible pain
Faces Pain Scale

Faces Score
Ask the patient to point to the face which shows how bad their pain is
Approach to Pain

Assess

• Make a pain diagnosis!
  – Acute or chronic?
  – Cancer or non-cancer?
  – Nociceptive or neuropathic?
    • Look for neuropathic features:
      – Burning or shooting pain
      – Phantom limb pain
      – Other features (pins and needles, numbness)
Approach to Pain

Assess

• Are there other factors?
  – Physical factors (other illnesses)
  – Psychological and social factors
    • Anger, anxiety, depression
    • Lack of social supports
Approach to Pain

Treat

- **Non-Drug Treatments**
  - RICE
    - Rest, ice, compression, elevation of injuries
  - Nursing care, physiotherapy
  - Surgery, acupuncture, massage, TENS
  - Psychological
    - Explanation and reassurance
    - Input from social worker / pastor
    - Relaxation, imagery, distraction
    - Coping strategies
Approach to Pain

Treat

• Drug Treatments – Nociceptive Pain
  – Mild
    • Paracetamol ( ≠ NSAID)
  – Moderate
    • Paracetamol ( ≠ NSAID) + codeine/oxycodone/tramadol
  – Severe
    • Paracetamol ( ≠ NSAID) + morphine/oxycodone
    • Regional anaesthesia
    • Adjuvants (alpha 2 agonists, NMDA antagonists)
Approach to Pain

Treat

• Drug Treatments – Multimodal approach
  – Analgesic agents act at one or more sites along the nociceptive and pain pathways
Approach to Pain
Treat – multimodal drug treatment

Sites of action
- Peripheral nociceptors
- Peripheral nerves (A-delta, C)
- Dorsal root ganglia
- Dorsal Horn
- Ascending tracts
- Cortex
- Descending inhibitory modulation
Approach to Pain

Treat

• Drug Treatments – Neuropathic Pain
  – Traditional drugs may not be as useful
  – Use other drugs early
    • Amitriptyline
    • Carbamazepine
    • Gabapentinoids
  • Don’t forget non-drug treatments
Questions?
Summary

• Defined pain
• Classified pain
• Refreshed the physiology of nociception and pain
• Reviewed the pharmacology of analgesia
• Used a RAT approach to management