Analgesia

et al.

Dr William Dooley

SIMPLY FINALS
Plan

- Pain assessment
- Acute vs. Chronic pain
- Overdose / Toxicity

- Some calculations
- Other common meds
  - Anti-emetics
  - Laxatives
Pain assessment

The 5th Vital Sign

History, History, History

S - Site
O - Onset
C - Character
R - Radiation
A - Associated symptoms
T - Time
E - Exacerbating/Relieving factors
S - Severity
Pain assessment

### Visual Analog Scale

<table>
<thead>
<tr>
<th>No pain</th>
<th>Mild pain</th>
<th>Moderate pain</th>
<th>Severe pain</th>
<th>Very severe pain</th>
<th>Worst possible pain</th>
</tr>
</thead>
</table>

0 1 2 3 4 5 6 7 8 9 10

### Graphic Scale

- 1: No pain
- 2: Moderate pain
- 3: Worst possible pain

### Verbal Scale

“On a scale of 0 to 10, with 0 meaning no pain and 10 meaning the worst pain you can imagine, how much pain are you having now?”

### Functional Pain Scale

- **0**: No pain
- **1**: Tolerable and pain does not prevent any activities
- **2**: Tolerable and pain prevents some activities
- **3**: Intolerable and pain does not prevent use of telephone, TV viewing, or reading.
- **4**: Intolerable and pain prevents use of telephone, TV viewing, or reading.
- **5**: Intolerable and pain prevents verbal communication
Common Analgesia

- Paracetamol
- NSAIDs
- Weak opioids
- Strong opioids
Paracetamol (Acetominophen)

500mg-1g QDS (Max. 4g/24hrs)
PO/PR/IV

Analgesia / Anti-pyrexial

Onset of action 10-30 mins
Half life 1-4 hours

Metabolised by the liver and is hepatotoxic
Metabolites are then excreted by the kidney

MOA poorly understood ? COX inhibition
At therapeutic doses

Oxidation by cytochrome P450 enzymes is a minor route

Paracetamol

Conjugation is the major route of metabolism

Paracetamol conjugates

NAPQI

Reacts with SH-group in glutathione

NAPQI conjugate
Case of Overdose

44yo male

Found unconscious with multiple packets of empty medications. Lives alone, was found by visitor.

PMH - depression (previous suicide attempts), chronic ETOH abuse, malnourished.

SH - Unemployed

What are his risk factors for suicide?

What more would you ask in the history??
Paracetamol Overdose

History / History / History

HPC
- Dose: unreliable historian / mixed
- Time: once or staggered overdose
- Symptoms: nausea and vomiting → RUQ pain
- Psych: intentional / support / planned / alone /
  cry for help / warning / letter

PMH
- ETOH Abuse
- Previous DSH / Suicide attempts
- Chronic Liver Disease

DH
- Enzyme inducing drugs (e.g. Carbamazepine, phenobarbital, phenytoin,
  rifampicin, St John’s wort etc.)
Paracetamol Overdose

Examination
Low BMI / malnourished
Liver damage - jaundice / reduced GCS / asterixis / RUQ tenderness

Investigation
Serum paracetamol levels – measured between 4-16hrs post ingestion
LFTs (particularly transaminases)
Clotting and INR
U+E
?Urinalysis – ketones = poor nutrition
Factors that increase the risk of liver injury

High chance of glutathione depletion:

- Malnourished
- Eating disorders (anorexia or bulimia)
- Failure to thrive or cystic fibrosis in children
- AIDS
- Cachexia
- Chronic Alcoholism
Treatment of paracetamol OD

**Activated charcoal**
Decreases absorption of paracetamol
Needs to be given quickly (within 1hr)

**N-acetylcysteine (NAC)**
Antedote
Acts as precursor to glutathione to increase levels and reduce liver damage

*Adverse effects*
Nausea and vomiting
Anaphylactoid reaction which is histamine mediated
NAC use

1. Do they need treatment

2. Dose of treatment
Case

54yo female, PMH- depression (previous suicide attempts), chronic ETOH abuse, malnourished. Found unconscious with multiple packets of meds.

1. Do they need treatment

2. Dose of treatment
Would you treat these?

1. OD 15x500mg tablets at 12:00. Blood at 18:00. PPC= 100mg/litre

2. OD 24x 500mg tablets at 09:00. Blood at 17:00. PPC= 30mg/litre

3. OD at 20:00 ?amount. Blood at 07:00. PPC= 30mg/litre

What would you do?


5. OD at 0800. Admits taking 5 tablets with ETOH XS. Presents at 1100.
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1. Do they need treatment

2. Dose of treatment
2. Dose of treatment

Total dose (300 mg/kg in 20 hours)

150 mg/kg in 200 mL (glucose 5%) over first 0.25 hours
50 mg/kg over next 4 hours in 500 mL
100 mg/kg over next 16 hours in 1000 mL

What dose regime would you prescribe for a 50kg patient?

1. $50 \times 150 = 7500$ mg NAC in 200ml glucose 5% over 15 minutes
2. $50 \times 50 = 2500$ mg NAC in 500ml glucose 5% over 240 minutes
3. $100 \times 50 = 5000$ mg NAC in 1000ml glucose 5% over 960 minutes
Liver Transplant

Criteria for possible transplant:

- **Metabolic Acidosis** - Arterial pH less than 7.3

- **Hepatic encephalopathy** grade III/IV and **serum creatinine** concentration >300 µmol/L and **prothrombin time** >100 seconds

- **Arterial lactate concentration** >3.5mmol/L on admission or >3.0mmol/L 24 hours after paracetamol ingestion or after fluid resuscitation

Discuss with liver transplant unit as soon as the possible need is identified
Non-Steroidal Anti-Inflammatory Drugs

<table>
<thead>
<tr>
<th>Drug name</th>
<th>Dose</th>
<th>Anti-inflammatory</th>
<th>Side effect risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>300-400mg TDS</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Naproxen</td>
<td>500mg BD</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Diclofenac</td>
<td>75-150mg total/day</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Indometacin</td>
<td>50-200mg total/day</td>
<td>+++</td>
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**MOA:** COX 1 and COX 2 inhibitors so inhibit prostaglandin production

**Indications:** inflammatory conditions e.g. inflammatory arthritidies, rheumatoid arthritis, osteoarthritis, back pain, soft tissue injury

**Side Effects:**

**COMMON**… especially in elderly

Gastric- indigestion/nausea and gastric erosions (+/- UGI Bleed).

*Co-prescribe proton pump inhibitor if patient also on anti-coagulant*

Bronchospasm- type 1 hypersensitivity reaction. **C/I in those with asthma**

*Less common; fluid retention, hypertension, acute kidney injury*
COX-2 inhibitors

e.g. Celecoxib / Etoricoxib

Reduce GI side effects by 50%
Expensive
?increased CV events

Contraindicated
CV Disease or cerebrovascular disease
Relatively with CV risk factors

Try NSAIDs first
Opioids

Mode of action
- Presynaptic inhibition of production of neurotransmitters
- Postsynaptic suppression activity in nociceptive pathway
- Increased transmission of the descending inhibition
Opioids

Morphine

SC/IM/PO
10mg (max 30mg/24hours), titrate to symptoms/response

Side effects
Nausea and vomiting → usually co-prescribe antiemetic (e.g. Metoclopramide)
Constipation → usually co-prescribe laxative (e.g. lactulose PRN)
Drowsiness
Respiratory depression

Overdose
Accidental / Iatrogenic / Intentional
Reversal with **NALOXONE** 400mcg-0.2mg IV (increased by 100mcg/ 2 mins PRN)
Naloxone half life < Morphine half life (so may need multiple doses)
Opioids

Codeine
30-60mg 4 hourly (max 240mg/24hrs)
Orally
Analgesia (normally used in combination with above e.g. co-codamol/co-dydramol)

Side effects
Constipation

Tramadol
50-100mg 4 hourly
Orally (rarely IV)
Opioid action + enhancement of the serotonergic and adrenergic pathways

Fewer typical opioid side effects

Fentanyl
Patches 25 / 100 ug/hr
Change every 72 hours
Patient Controlled Analgesia

Allows self administration of pre-determined dose of medication e.g. morphine

Can determine:
- Dose (usually start with 1mg morphine)
- Maximum dose (over 24 hours)
- Lock-out period (usually 5 mins)
Palliative Symptom Control

_Palliative Care:_
Active & total care of incurable disease aim to improve QOL within wide MDT

Symptoms can be caused by disease or treatment
Detailed history and examination required to determine cause/best treatment options

_Main symptom groups:_

- **GI Symptoms**
e.g. nausea/vomiting, anorexia, constipation, bowel obstruction

- **Respiratory Symptoms**
e.g. Breathlessness, secretions

- **Pain Symptoms**...
Pain Control in Palliative Care

70% cancer patients experience moderate to severe pain

Prescribe regular analgesia with PRN/Breakthrough back-up

WHO Analgesia ladder exists for analgesia management decisions
Mrs CA is a 80yo has known inoperable metastatic breast cancer. She is complaining of significant pain which has previously been managed with non-opioid analgesia.

What dose of morphine would you prescribe?

Morphine Sulphate 5-10mg every 4 hours with Morphine Sulphate 5-20mg PRN 2-4hrly
Case…

Mrs CA’s pain is relieved by Morphine Sulphate 10mg but the relief is not sustained until the next dose 4 hours later.

How would you change the regular prescription?

Increase dose by 50%

So now; Morphine Sulphate 15mg every 4 hours with Morphine Sulphate 5-20mg PRN 2-4hrly
Mrs CA is eventually controlled over a 24 hour period using morphine sulphate as prescribed below:

<table>
<thead>
<tr>
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<td>2100</td>
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</tr>
<tr>
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<td>2200</td>
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<td>10mg</td>
</tr>
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<td>15mg</td>
</tr>
<tr>
<td>2000</td>
<td>Morphine Sulphate</td>
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Would you change the prescription? If so, how?
Case…

To change regular immediate acting morphine prescription into regular prescription

Work out total 24 hour analgesia requirement to control pain...

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Total = 120mg

REMEMBER SIDE EFFECTS

1. Change to Controlled Release morphine preparation
   Either : Morphine Sulphate MR / MST 120mg OD or 60mg BD

2. Plus Breakthrough Pain prescription PRN
   One-sixth of total dose
   Morphine Sulphate 20mg PRN
Other Analgesia methods

**Neuropathic pain**

*Antidepressants*

Amitriptyline (TCA) / Duloxetine
Descending NA/Serotonin pathways to the spinal cord limit the pain signals.
Antidepressants relieve neuropathic pain in non-depressed persons

*Anti-convulsants*

Gabapetnin/Pregabalin – block neuronal Ca channels. Ix diabetic neuropathy.
Carbamazepine effective in trigeminal neuralgia

**Other**

**Transcutaneous electrical nerve stimulation (TENS)**

?MOA: Block pain transmission through stimulation of A-fibre / Endorphin release.
No evidence that TENS provides more analgesia than placebo

**Nitrous oxide**

Short term analgesia for procedure/labour.
Easy / able to use intermittently / can self adminster. Can cause drowsiness / nausea
Spinal vs. Epidural
Anti-emetics

**Cyclizine** 50mg TDS PO/IM/IV  
Post op / GI obstruction / vestibular disorders

**Ondansetron** 4-8mg BD PO/IM/IV  
Severe / resistant cases e / chemo or radiotx

**Metoclopramide** 10-20mg TDS PO/SC/IM/IV  
GI causes, migraine, with opioids

**Domperidone** 10-20mg TDS PO  
Parkinson Disease, chemotherapy

**Haloperidol** 0.5-1.5mg PO/SC  
Opiate s/e, post op, chemo/radiotherapy

**Levomepromazine** 6.25-25mg OD or BD  
Broad spectrum

- Anti-histamine
- 5HT3 antagonist
- Benzamine
- Phenothiazine

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**Steps for Managing Anti-emetics**

**STEP 1**
- Start narrow-spectrum drug – choose most appropriate agent based on cause of the N&V

**STEP 2**
- Try alternative or add 2nd narrow spectrum agent
- Consider dexamethasone if cause is brain tumour or chemotherapy

**STEP 3**
- Try levomepromazine or a 5-HT3 antagonist

**STEP 4**
- ↑ levomepromazine
- Consider dexamethasone
Laxatives

Osmotic
Non-absorbable salts which increase water retained in large bowel
e.g. Lactulose, magnesium sulphate, macrogols

Bulk-forming
Increase faecal mass which stimulates perstalisis. For those with small hard stools.
e.g. Dietary fibre, wheat bran, Ispaghula Husk

Stimulant
Increase intestinal motility. s/e abdo cramping
e.g. Senna, dantron bisacodyl, docusate sodium

Suppositories
e.g. glycerol, bisacodyl

Enemas
e.g. docusate sodium, arachis oil
Summary

Discussed common analgesia

Acute analgesia

Chronic/Palliative prescribing

Paracetamol Overdose

Laxatives/Anti-emetics