pain management

Lecture headlines:

* Non-opioids: paracetamol and NSAID

* Adjuvants

* 3 step analgesic ladder

Bayan abualia
## Non-opioid

<table>
<thead>
<tr>
<th>NSAIDs</th>
<th>Salicylates</th>
<th>Acetic acids</th>
<th>Propionic acids</th>
<th>Oxicams</th>
<th>Coxibs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Acetylsalicylic acid</td>
<td>- Diclofenac</td>
<td>- Ibuprofen</td>
<td>- Piroxicam</td>
<td>- Celecoxib</td>
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<tr>
<td></td>
<td></td>
<td>- Ketorolac</td>
<td>- Naproxen</td>
<td>- Tenoxicam</td>
<td>- Parecoxib</td>
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<tr>
<td></td>
<td></td>
<td>- Indomethacin</td>
<td>- Ketoprofen</td>
<td>- Meloxicam</td>
<td>- Etoricoxib</td>
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<td></td>
<td></td>
<td></td>
<td>- Nabumetone</td>
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<td>- Lumaricoxib</td>
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### Non-acids

<table>
<thead>
<tr>
<th>Anilines</th>
<th>Pyrazolones</th>
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<tbody>
<tr>
<td>- Paracetamol</td>
<td>- Metamizole</td>
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</table>
Paracetamol ( acetaminophen )

Trade name ( panadol )

Mechanism of action: not completely understood.

This drug inhibits cyclooxygenase enzyme that controls prostaglandin synthesis from arachidonic acid.

It appears as selective inhibit COX in brain which contribute to its ability to treat fever and pain

but no work out CNS so no use as anti inflammatory.
Pharmacokinetics:
- Oral or IV in ER
- Absorbed by GI tract
- Primery metabolised in liver to toxic and non toxic compound
- Eventually excreted by kidneys
- Recommended maximum daily dose of paracetamol for healthy adults is 3 or 4 grams.
Uses:
Reduce fever (in people of all age).
Osteoarthritis (+ NSAID to reduce inflammation).
Low back pain
Headaches
Post operative
Dental pain
Cancer pain
In general .... Mild to moderate pain.
Side effect:
Liver damage -
- skin reaction -
- asthma -

Overdose:
Signs and symptoms of paracetamol toxicity may initially be absent or non-specific symptoms. The first symptoms of overdose usually begin several hours after ingestion, with nausea, vomiting, sweating, and pain as acute liver failure starts.
Contraindication:

1- acute liver failure.
2- severe renal impairment.
3- shock.
4- allergics.
NSAID

Arachidonic acid .. COX 1 .. Prostaglandins (GI mucosal)

prostaglandins (mediators for pain, fever, inflammation)
Diclofenac

Trade name: (voltaren)

Mechanism of Action: Inhibition of prostaglandin synthesis by inhibition of COX-2

The dose depends on the disease
Uses:

1- Inflammatory disorders may include musculoskeletal especially arthritis, rheumatoid arth complaints, pain management in cases of kidney stones and gallstonesritis used commonly to treat mild to moderate postoperative or post-traumatic pain, particular when inflammation is also present.

to treat chronic pain associated with cancer, especially if inflammation is present.
Contraindications:
Hypersensitivity against diclofenac

Active stomach and/or duodenal ulceration or gastrointestinal bleeding

patients with fluid retention or heart failure

Severe liver insufficiency)

Severe renal insufficiency

Third-trimester pregnancy.

Serious skin adverse events
Side effects:

**Congestive heart failure** (CHF), recent **heart attack**, or **high blood pressure**

Diclofenac can damage the lining of your stomach, putting you at risk for stomach ulcers and heartburn.

Liver damage occurs infrequently.

Depression, anxiety, irritability,

Acute kidney failure
Ketorolac

inhibition of prostaglandin synthesis by competitive blocking of the enzyme cyclooxygenase (COX).

Ketorolac is a non-selective COX inhibitor. [21] Ketorolac has been assessed to be a relatively higher risk NSAID
Uses:

• Ketorolac is used for short-term management of moderate to severe pain.

relaxing' of the iris muscles that will allow surgeons to perform cataract surgery.
Contraindications: • hypersensitivity, allergies to the medication, • history of peptic ulcer disease, • gastrointestinal bleeding, • alcohol intolerance, • renal impairment, • cerebrovascular bleeding, • cardiovascular disease, myocardial infarction, stroke, heart failure, coagulation disorders, and hepatic impairment.
Side effects:

Uncommon but potentially fatal (serious) ..... stroke, myocardial infarction, GI bleeding,

. A less serious and more common (>10%) side effect is drowsiness. Infrequent (<1%) side effects are paresthesia, prolonged bleeding time, injection site pain, purpura, sweating, abnormal thinking, increased production of tears, edema, pallor, dry mouth, abnormal taste, urinary frequency, increased liver enzymes, itching
Adjuvants

1. Antidepressants
2. Anticonvulsants
3. Local anesthetics
   antiarrhythmics
4. Corticosteroids
5. Botulinum toxin

Adjuvant pain medications are medications that are not typically used for pain but may be helpful for its management.
analgesic ladder:

This illustration is used by doctors and nurses to find the best medicines for your pain. It shows three steps and says that if pain persists, the next step should be used. The **lowest step** is for **mild pain** and shows that non-opioid medicines should be used, with or without other medicines. The **second**, higher step is for **moderate pain** and shows that a weak opioid should be used, with or without non-opioids and with or without other medicines. The third and **highest step** is for **moderate to severe pain**. It shows that a strong opioid should be used, with or without non-opioids and with or without other medicines.
bidirectional: the slower upward pathway for chronic pain and cancer pain, and the faster downward direction for intense acute pain, uncontrolled chronic pain,
Step 1: Non-opioid (e.g., aspirin, paracetamol or NSAID) +/- adjuvant

Step 2: Weak opioid for mild to moderate pain (e.g., codeine) +/- non-opioid +/- adjuvant

Step 3: Strong opioid for moderate to severe pain (e.g., morphine) +/- non-opioid +/- adjuvant

Flow:
- Pain persisting or increasing
- Pain controlled
Thank you