

# **Non-Opioid Treatment of Acute pain**

- NSAIDs and COX-2 inhibitors, local anesthetics, steroids, antidepressants, anticonvulsants ...
- Nonpharmacologic analgesic techniques (Acupuncture and acupressure; transcutaneous (TENS) and percutaneous (PENS) electrical nerve stimulation; Low-level laser therapy (LLLT) and high-intensity cold laser therapy; physical therapy, e.g. exercise, yoga, massage)
- Interventional procedures, e.g. trigger point injections, nerve blocks, and epidurals.

# **I. Ketorolac tromethamine (Toradol)**

- NSAID for moderate to severe pain
- 30 mg/ml, IV push or IM q6hr; not to exceed 120 mg/day.
- 5-day treatment
- Risk of gastrointestinal (GI) bleeding.
- More cost-effective than IV morphine.
- Not be used for mild or long-term painful conditions.

## 2. Ibuprofen (Caldolor)

- NSAID for moderate to severe pain  
Monotherapy or in combination with opioids
- IV ibuprofen is 400 mg to 800 mg every 6 hours as necessary with a maximum of 3200 mg per day
- No limit on duration of use
- Contraindicated in the setting of CABG surgery

### 3. **Diclofenac sodium**

- NSAID for moderate to severe pain
- Monotherapy or in combination w/opioid
- 37.5 mg IV bolus injection infused over 15 seconds q6hr as needed, not to exceed 150 mg/day.
- Short duration
- Patients must be well hydrated prior to IV administration

## 4. Parecoxib sodium

- first parenteral COX-2 inhibitor
- 20 and 40 mg, IV or IM
- similar to that of Ketorolac, 15 to 30 mg IV and 30 to 60 mg IM, and
- similar to IV morphine 12 mg.
- It has an additive effect with morphine.

# **Acetaminophen (Ofirmev; Propacetamol)**

- approved in 2010 by the FDA for intravenous use for moderate to severe pain, with adjuncts
- IV dose for patients >50 kg (110 lbs) is 1000 mg q6h, or 650 mg q4h.
- most common side effects - constipation, nausea, injection site pain, pruritus, and vomiting.
- >4000mg/d – severe hepatic injury

# **Ketamine (Ketamine HCl, Ketalar) IV**

- nonbarbiturate general anesthetic
- procedural sedation and rapid sequence intubation
- Peak effect in minutes
- Typical duration of 10–15 minutes.
- After 15-20 mg IV ketamine, may be followed immediately by continuous ketamine infusion at 20 mg/h for 1 hour for severe pain.

# 7. Dextromethorphan IV

- N-methyl-D-aspartate (NMDA) receptor antagonist.
- non-controlled drug, structurally related to the opiate codeine, with which it shares its antitussive properties.
- When used perioperatively, it reduces postoperative opioid consumption.
- Side effects; and deaths



## 8. Lidocaine IV

- Useful acute pain adjunct
- Enhanced recovery after surgery.
- Anti-inflammatory, anti-hyperalgesic, and gastrointestinal pro-peristaltic drug.
- Acute hyperalgesia particular benefit.
- ***i.v. lidocaine*** 1–2 mg kg<sup>-1</sup> as an initial bolus followed by a continuous infusion of 0.5–3 mg kg<sup>-1</sup> h<sup>-1</sup>.

## **9. Exparel (bupivacaine liposomal)**

- long acting local anesthetic used to produce local analgesia for pre- or post-operative pain control for specific nerve blocks.
- It inhibits nerve impulse initiations and conduction by inhibiting sodium ion channels
- Prolong the time to first opioid use after surgery by 14 hours.