Pre-Emptive Analgesia in the Orthopedic patient - Stopping Pain before it Starts
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Pain- What is it?

• Personal experience
• Nociception-sensation of pain
• Stimulation of nociceptors in the skin or in the walls of internal organs
• Doesn’t always cause pain
• Injury causes a trigger to produce pain

PREEMPTIVE ANALGESIA

• Treatment started before and is operational during a surgical procedure
• Antinociceptive treatment that reduces altered sensory input
• Early 20th century literature
• Prevent wind up
• Prevent “hard-wired” nervous system
• Reduce effects of poorly controlled pain
• Improve patient, staff, and physician satisfaction
Preemptive analgesia

- Pain is still poorly controlled
- Over half of orthopedic patients reported that their pain was moderate or severe after surgery.
- Poor progress after 10 years
- Prevents central sensitization (wind up)
- Helps to prevent chronic pain

ORTHOPEDIC SURGERY

- One of the most painful surgeries
- Involves extensive manipulation
- Patients often have chronic pain prior to surgery
- Nurses have to address the chronic pain issue prior to surgery
- Surgeons using preemptive analgesia to reduce opioid requirement.

Orthopedic Surgery

- Requires a team approach
- Patients do better with pre operative teaching
- Part of Preemptive analgesia
- BONES HURT!!!!!!
- GOAL IS DECREASE PAIN IN ORDER TO FACILITATE REHAB AND DISCHARGE
**Preemptive analgesia**

- Meta-analysis (Ong, 2005) found that opioids alone did not produce sufficient analgesia
- Looked at pain intensity (pain scores) during the first 24-48 hours post-op
- Supplemental postoperative analgesic requirement
- Time to first rescue dose

**PREEMPTIVE ANALGESIA**

- Looked at 66 RCT’s
- Reviewed trials that used different methods of pain control
- Epidural analgesia, local anesthetics, NMDA antagonists, NSAIDs, and systemic opioids
- Most effective was preemptive epidural analgesia.

**Pain**

- Transduction
- Transmission
- Modulation
- Perception
### MEDICATIONS - NSAIDS

- Non-steroidal anti-inflammatory drugs
- Block prostaglandin production
- VERY GOOD WITH BONE PAIN
- Bleeding can be silent
- Some orthopedic surgeons use Toradol after joint replacement
- Need good kidneys
- Avoid in elderly (benefit/risk)

### NSAIDS

- Not effective by itself for preemptive analgesia
- Good for dental pain—may be enough by itself
- Timing
- Duration of effect
- Part of multimodal pre-emptive approach

### COX 2

- Less GI distress?
- Black box warning
- Once a day dosing possible
- Avoid if on ASA
- Avoid if on warfarin
- Not intended for long term use
COX 2

- Celecoxib -(Celebrex) Inhibits production of prostaglandin production.
- Decreased effect on COX 1?
- Studies on parecoxib (now off the market) showed no effect in pain with the use preemptive parecoxib alone
- Does have an opioid sparing effect when used with opioids

Gabapentin (Neurontin)

- In animal studies it helps to prevent allodynia
- Used preemptively, reduces anxiety in knee surgery. (Menigaux 2005)
- Unknown how this helps
- Renal dosing
- Studies have suggested that it helps preemptively by reducing wind up pain.

Pregabalin (Lyrica)

- "Neurontin on steroids”
- Has greater analgesic effect on neuropathic pain in animal models
- Titrate up, taper down
- Be careful with elderly
- Can cause ataxia, drowsiness
- 150mg prior to surgery
- Reduces Opioid induced hyperalgesia
- Weight gain
NMDA BLOCKERS

- Ketamine - used as anesthetic
- Helps to block neurotransmitters
- Used in CRPS
- Caution with patients with mental disorders

Medications

- In a study by Reuben et al patients were given 150mg Pregabalin, and 400 mg Celebrex 1 hour prior to spinal fusion surgery.
- Patients were given 200mg of Celebrex and 150 mg Pregabalin 12 hours surgery
- Less nausea, and a profound opioid sparing effect
- All used IV morphine PCA

Pregabalin/celecoxib

- This was compared to patients who received placebo capsules or celecoxib alone, or pregabalin alone.
- All used opioids, but the celecoxib/pregabalin had less pain and used less opioids post operatively
- Reduced opioid induced side effects
medications

- In one study, Rofecoxib and Gabapentin did not improve pain in hysterectomy patients.
- However, the combo was studied using orthopedic patients and the outcomes showed improved pain control.

Nerve blocks

- Block nerve impulses
- Performed before incision
- Less hypotension
- Unilateral (femoral)
- Not an issue with DVT prophylaxis
- Can cause nerve damage but incident low
- Need more studies

Nerve block

- Compared epidural analgesia to Peripheral nerve block in a meta analysis
- Looked at VAS, side effects in knee surgery
- Published in 2008 (Fowler)
- PNB had better results, better patient satisfaction
- Epidural not recommended as preferred pain management
EPIDURALS

• Provide good pain control
• Opioid sparing
• Problems with DVT prophylaxis?
• Post operative administration of LMWH should be started no earlier than 24 hours after surgery
• Do not place neuraxial catheter within 12-24 hours of low molecular weight heparin
• After removal of the indwelling catheter, LMWH should be started at least 2 hours later

Nerve blocks

• Wound infiltration—may help by reducing local inflammatory response to trauma or surgery
• May reduce up-regulation of peripheral nociceptors
• Skin, intra-articularly (knee and shoulder) or bone wounds
• Bupivacaine, ropivacaine—lasts 6 hours
• May use with disposable or patient operated pump.

Nerve block

• Intra-articular inflammation creates opioid binding sites in animal models
• Opioids injected in the intra-articular area reduce inflammation
• Used in shoulder and knee surgery
• Dose 1-5 mg Morphine has been used
• In a study of rotator cuff repair patients had better analgesia with a mixture of bupivacaine and Morphine than bupivacaine alone. (Tetzlaff)
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