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

Lisa Rudolph MS RN CNS
St. Anthony Hospital
Oklahoma City, Oklahoma

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 opoid 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

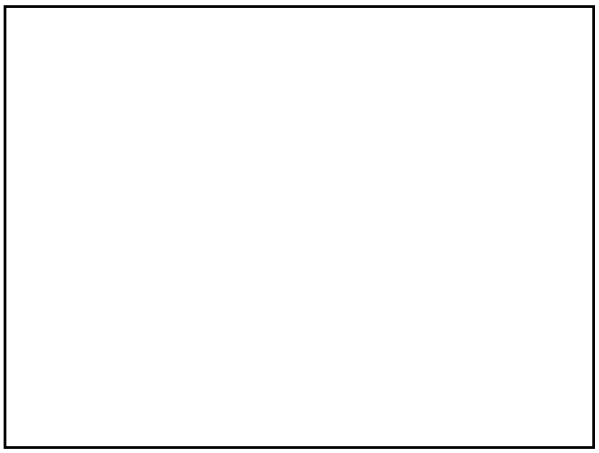
- Provide good pain control
- Opioid sparing
- Problems with DVT prophylaxis?
- Post operative administration of LMWH should be started no earlier than 24 hours after surgery
- Do not place neuraxial catheter within 12-24 hours of low molecular weight heparin
- After removal of the indwelling catheter,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



References for: Preemptive Analgesia in the Orthopedic Patient- Stopping Pain before it Starts.

Aida S and Shimoji K. Pre-emptive analgesia recent findings. Pain Reviews 2000; 7:105-117

Chang G, Chen L and Mao J. Opioid tolerance and hyperalgesia Med Clin N Am 91 (2007) 199-211

Cohen, M, Schecter W. Perioperative pain control: A strategy for management Surg Clin N. Am 85 (2005) 1243-1250)

Dahl J, Moiniche S, Pre-emptive analgesia. British Medical Bulletin 2004; 71: 13-27

D'Arcy Y, First strike: Does preemptive analgesia work? Nursing 2008 April p. 52-55

Doyle E and M.R. Bowler. Pre-emptive effect of multimodal analgesia in thoracic surgery Br. J. Anaesth 1998; 80: 147-151.

Fowler. SJ, Symons, J. Sabato S, et al. Epidural analgesic compared with peripheral nerve blockade after major knee surgery: A systematic review and meta-analysis of randomized trails. Br. J. Anesth. 2008; 100 (2): 154-164

Graber, R, Kraay M, Kreshman J et. al. Regional anesthesia for postoperative pain control. from E medicine www.emedicine.com/orthoped/TOPIC581. HTM accessed 7/14/2008

Gottschal K A, Smith DS. New concepts in acute pain therapy: Preemptive analgesia. American Family Physician 2001; 63, No. 10 P. 1979-1984

Gregoretli C, Becaroli D, Miletto A, et. al. Regional anesthesia in Trauma Patients.

Anesthesiology Clin 25 (2007) 99-116

Horlocker T. Does continuous peripheral nerve block provide superior pain control to opioids? A meta-analysis. Anesth Analg 2006; 102: 248-257

Horlocker T, Kopp S, Pagnano M, and Hebl JR. Analagesia for total hip and knee arthroscopy: A multimodal pathway featuring peripheral nerve block. J Am Acad Orthop Surg 2006; vol 14. No. 3 p. 126-135

Huddleston Jeanne, Long Kirsten, Naessens James M et. al. Medical and Surgical Comanagement after elective Hip and Knee Arthroplasty. Ann Intern Med 2004; 141: 28-38.

Jones A C, Beaupre L, Johnston DWC, et. al. Total joint arthroplasties; Current concepts of patient outcomes after surgery Rheum Dis Clin N Am. 33(2007) 71-86

Jung Young-Soo, Kim Moon-Key, Um Yoo Jung, et al. Oral Surg Oral Med OralPathol Oral Radiol Endod. 2005;100:559-63

.

Karaaslan K, Sivaci R, Akbulut G, et. al. Preemptive analgesia in laparoscopic cholescystectomy: a randomized controlled study. Pain Practice. Vol 6, Issue 4 2006; 237-241.

Katz Joel, Cohen Lorenzo, Schmid Roger, et. al. Postoperative morphine use and hyperalgesia are reduced by preoperative but not intraoperative epidural analgesia. Anesthesiology. 2003;98: 1449-60.

Kelly D, Ahmad M, and Brull SJ. Preemptive analgesia II: Recent advances and current trends Can J anesth 2001; 48: 11. 1091-1101.

Kong, V.K.F. and Irwin. M.G. Gabentin: A multimodal perioperative drug? Br. J Anaesth. 2007; 99(6): 775-786.

Martinez, Valeria , Belbachir, A.,Jaber, Aithem et al. The influence of timing of administration on the analgesic efficacy of parecoxib in orthopedic surgery. Anesth Analg . 2007;104:1521-1527.

Masafumi M, Imamura Y, Usui, T and Asai T. Effects of Preemptive analgesia using continuous subcutaneous morphine for postoperative pain in scoliosis surgery – a randomized study J Pediatri Orthop vol 24, No. 5. Sept 2004: p. 576-580

McDonald, Deborah. Postoperative pain management for the aging patient. Geriatrics Aging 2006; 9(6) 395-398

Menigaux C, Adam F, Guignard B. et. al. Preoperative gabapentin decreases anxiety and improves early functional recovery from knee surgery. Anesth Analg 2005; 100: 1394-9

Ochroch, E. Andrew, Mardini, Issam and Gottschalk, Allan What is the role of NSAIDS in pre-emptive analgesia? Drugs 2003; 63 (24): 2709-2723

Ong C, Lirk P, Seymour RA, and Jenkins BJ. The efficacy of preemptive analgesia for acute postoperative pain management: A meta-analysis Anesth Analg 2005; 100: 757-73

Pasero. C, McCaffery M. Orthopaedic post operative pain management J. of Perianesthesia Nurses 2007; 5: 160-173

Pasero, C and McCaffery M. Managing postoperative pain in the elderly. AJN 1996; 10, 39-46.

Parvizi J, Dellavalle C, and Viscusi ER Undermanaged pain in the orthopedic surgical patient: Techniques to improve outcomes. From www.medscape.com/viewprogram/7062.pnt accessed 12/18/2007

Reuben Scott, Buvanendran Asokumar, Kroin Jeffrey, Raghunathan Karthik, The analgesic efficacy of celecoxib, Pregabalin and their combination for spinal fusion surgery. Pain Medicine 2006 103: 1271-1277.

Reuben S, Ekman EF, Chunon D, Evaluating the analgesic efficacy of administering celecoxib as a component of multimodal analgesia for out patient anterior cruciate ligament reconstruction surgery. Anesth Analg 2007; 105-227

Sandkuhler Jurgen and Ruscheweyh Ruth. Opioids and central sensitization: I. Pre-emptive analgesia European Journal of Pain. 2005; 9: 145-148.

Sanlinas F, Liu S, Mulroy M. The effect of single-injection femoral nerve block versus continuous femoral nerve block after total knee arthroplasty on hospital length of stay and long-term functional recovery within an established clinical pathway. Anesth analg 2006; 102: 1234-9

Wenrui Xie, Strong Judith A. Johanna T A et al. Neuropathic pain: early spontaneous afferent activity is the trigger Pain 2005;116: 243-256.

Wiezel M, Gotlschaldt U, Hennelsach R et. al. Complications and adverse effects associated with continuous peripheral nerve blocks in orthopedic patients Anesth analg 2007; 104: 1578-82

Yukawa Y, Kato F, Ito K, et. Al. A prospective randomized study of preemptive analgesia for postoperative pain in the patients undergoing posterior lumbar interbody fusion Spine 2005 vol 30, no. 21 p. 2357-2361