Peri-operative pain control

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Disclosure

- No current conflicts of interest

Objectives

- Discuss studies evaluating the transformation of undertreated post-operative acute pain to chronic pain
- Describe the evidence for pre-emptive peri-operative analgesia based on a patient case scenario
- Employ principles of opioid equianalgesic dosing for opioid tolerant patients in the peri-operative setting

Return to MC

- 39 year old female
  - 65 inches, 173 lbs (BMI 28.8)
- PMHx:
  - FMS, IBS, Migraine w/o aura, TMJ, GERD
- Current meds:
  - CR morphine 30mg Q8H
  - IR oxycodone 5mg PRN (average 3 doses / day)
  - Milnacipran 50mg Q12
- Scheduled for total knee arthroplasty w/ admission
- Any need for peri-operative pain planning?

STEP ONE SHOULD BE EVALUATING IF THE PATIENT IS CONSIDERED OPIOID NAÏVE!

Can acute lead to chronic?

- Numerous surgical models suggest
  - Higher intensity acute pain leads to chronic pain
  - Perception of pain relief affects chronic pain
  - Duration of under or untreated acute pain affects chronic pain
- Evidence to suggestion surgically-based peripheral and central sensitization exist

Wylde V, et al. The effect of local anaesthetic wound infiltration on chronic pain after lower limb joint replacement: A protocol for a double-blind randomised controlled trial. BMC Musculoskelet Disord 2011;12:53.
Burke S, Shorten GD. When pain after surgery doesn't go away. Biochem Soc Trans 2009.37:318-22.
Hinrichs-Rocker A, et al. Psychosocial predictors and correlates for chronic post-surgical pain – a systematic review. Eur J Pain 2009;13:719-30.

Sequential Multimodal Therapy

- Pre-operative gabapentin / pregabalin
- Pre-operative duloxetine
- Pre-operative nerve block
- Peri-operative wound infiltration

1. Durkin B, et al. Pregabalin for the treatment of postsurgical pain. Expert Opin Pharmacother 2010;11:2751-8.
2. Ho KY, et al. Duloxetine reduces morphine requirements after knee replacement surgery. Br J Anaesth 2010;105:371-6.
3. Carli F, et al. Analgesia and functional outcome after total knee arthroplasty: Periarticular infiltration vs. continuous femoral nerve block. Br J Anaesth 2010;105:185-95.
4. Gupta A. Wound infiltration with local anaesthetics in ambulatory surgery. Curr Opin Anaesthesiol 2010;23:708-13.

Peri-operative Sequential Analgesia

- RCT, placebo controlled study
- N = 150 partial or radical mastectomy
  - Arm 1: venlafaxine
  - Arm 2: gabapentin
  - Arm 3: placebo
- Results
  - Reduced pain severity at rest (treatment vs. placebo)
  - Reduced pain after movement (gabapentin > venlafaxine) vs. placebo
  - Reduced morphine consumption
  - Reduced chronic pain @ 6 months (venlafaxine)

1. Amr YM, Yousef AA. Evaluation of efficacy of the perioperative administration of venlafaxine or gabapentin on acute and chronic postmastectomy pain. Clin J Pain 2010;26:381-5.

Wound Infiltration

- RCT active-control study
- N = 40 total knee arthroplasty
  - Arm 1: intraoperative intra-articular ropivacaine, ketorolac, epi
  - Arm 2: epidural ropivacaine and IV ketorolac
- Results
  - Decreased median morphine consumption (PCA)
  - Decreased pain scores at rest and mobilization
  - Decreased length of stay

1. Andersen KV, et al. A randomized, controlled trial comparing local infiltration analgesia with epidural infusion for total knee arthroplasty. Acta Orthop 2010;81:606-10.

Post-operative pain control

- **Opioid naïve vs. opioid tolerant**
  - 60mg daily of oral morphine or equivalent
- Bolus dosing and patient controlled analgesia
  - Intravenous vs. epidural
  - When to select basal rate
- Drug selection
  - Morphine
  - Hydromorphone
  - Fentanyl

What is MC's 24 hr morphine EQ?

a) 30mg morphine equivalents
b) 60mg morphine equivalents
c) 120mg morphine equivalents
d) 180mg morphine equivalents

CR morphine 30mg Q8H
IR oxycodone 5mg PRN (average 3 doses / day)

What's the bolus??

- ~ 120mg oral morphine equivalent (ME)
- 120mg / 3 = parenteral morphine equivalent
- 40mg parenteral daily ME
- 5% - 10% of total daily dose should be starting bolus
- 2mg - 4mg IV morphine bolus
  - Clinican administered until pain ↓ 25-50%
- Questionable when this should be initiated

What about the basal??

- Basal rate for replacement only!
  - What is the patient's ME pre-op outpatient?
  - Consider volume and potency of opioid
- Calculate the hourly basal rate for MC
  - 40mg parenteral daily ME / 24 hrs
  - 1.667mg / hr (lets just make it 1.5mg / hr)
- How about hydromorphone or fentanyl?

Equianalgesic Opioid Dosing

Drug	IV (mg)	Oral (mg)
Morphine	10	30
Buprenorphine	0.3	0.4 (SL)
Codeine	100	200
Fentanyl	0.1	- -
Hydrocodone	- -	30
Hydromorphone	1.5	7.5
Meperidine	100	300
Oxycodone	10	20
Oxymorphone	1	10

McPherson ML. Demystifying opioid conversion calculations. Bethesda, MD: American Society for Health-System Pharmacists, Inc; 2010.

Hydromorphone PCA

- 40mg of parenteral ME = 6mg of IV hydromorphone
- 6mg / 24 hrs = 0.25mg / hour basal rate
- Bolus dosing 5% - 10% of 24 hr total
- 0.3mg to 0.6mg of bolus hydromorphone
- Consider lack of cross tolerance at opioid rec.
  - Pain uncontrolled = no reduction
  - Pain controlled = decrease 25% to 50%

Fentanyl PCA

- 40mg of parenteral ME = 0.4mg IV fentanyl
- 400mcg / 24 hrs = 16mcg / hr basal rate
- Bolus dosing 5% - 10% of total 24 hr total
- 20mcg to 40mcg of bolus fentanyl

What should the lock-out be?

Drug	Lock-out time
Morphine	8-10 minutes
Hydromorphone	8-10 minutes
Fentanyl	6-8 minutes

Restarting home medications

- Usually post-op PCA only needed 24-48hrs
- Can patient take meds by mouth
- Two scenarios to consider:
  - Surgery for painful condition, IR opioids only on dc
  - Surgery for non-chronic pain condition, restart CR
    - Give CR morphine dose, stop basal 1-2 hrs following
    - Oral oxycodone as previously prescribed

Write your own post-op PCA order

- CH comes in for radical hair transplantation
- PMHx:
  - Chronic low back pain w/ radiculopathy
  - Type 2 DM with bilateral painful neuropathy
- Current Meds:
  - Oxycodone CR 60mg Q12H around the clock
  - Oxycodone IR 15mg Q4H PRN (~ 5 doses / 24 hrs)
  - Metformin 1000mg Q12H