Presentation objectives

- Outline principles for management of acute pain, with focus on perioperative and trauma pain
- Evaluate the evidence supporting, and the clinical application of, multimodal analgesia
- With the help of a patient case, explain approaches to tailoring regimens to individual patients, in particular those from high risk populations
Patient presentation

“VS” 32 yo Caucasian M
- Admitted to trauma service post MVA
- Multiple injuries – risk of internal bleeding
- Scheduled for fracture fixation in the OR
- Despite multiple doses of opioid, continues to report 9/10 pain

Summary of H&P

- PMH: IV heroin abuse
- MED:
  - Home
  - Methadone 28 mg po once daily
  - Inpatient
  - Hydromorphone PCA: PCA dose = 0.2 mg; lockout interval = 8 minutes; 4-hr limit = 6 mg.
- VS: T 36.4 C, HR 88, BP: 138/63, RR: 16, O₂ sats room air: 96%, ht: 183 cm, wt: 102 kg, IBW: 77.6 kg, BMI: 29.9 kg/m², Pain: 9/10 (generalized), eCrCl: > 120 ml/min
- LABS:
  - RBC 4.37 (4.2-5.9 x10⁶/µL)
  - Hgb 12.5 (14-17 g/dL)
  - Hct 36.6% (42-52%)
  - Plt 172 (150-350 x10³/µL)
Why is acute pain management important?

- Ethical need to treat pain
- Avoidance of short-term adverse events
  - Hyperglycemia
  - Pneumonia
  - Cardiovascular complications
- Risk of persistent post-surgical pain (PPSP)

“High risk” patients

- Growing number of opioid-dependent patients
  - Chronic pain and/or opioid maintenance
  - Prescribed and non-prescribed opioids
- Maintenance: methadone vs. buprenorphine/naloxone (Suboxone®)
- May have lower pain thresholds
General principles for acute pain management

- Guidelines recommend multimodal pharmacological/non-pharm approach\textsuperscript{1,2}
- Regimens may vary by patient and surgery

Principles for acute pain management \textit{in opioid dependent patients}

- Almost no evidence in this population\textsuperscript{1-5}
- Differentiate between dependence and addiction, but care may be similar
- Maintain uninterrupted therapy
  - Not the time for detoxification
  - Prevent withdrawal
Principles for acute pain management in opioid dependent patients

- Multimodal and nonpharmacological therapy\(^1,2\)
- Multidisciplinary care
- Reassure and involve patient
- Avoid mixed agonist-antagonists\(^3\)
- Will need higher doses of opioid than naïve pts in addition to maintenance dose

Components of multimodal regimens

- Opioids
- Nonopioids
  - NSAIDs
  - Acetaminophen
- Adjuncts
  - Ketamine, lidocaine, magnesium, gabapentinoids, clonidine, etc.
Opioids

- Still considered cornerstone for acute severe pain
  - Multiple adverse effects/safety concerns
  - May not be necessary in all patients\(^1\)

Opioids

- Common misconceptions in opioid tolerant patients\(^3\)
  - The maintenance opioid agonist provides analgesia
  - Opioids for analgesia may result in addiction relapse (?)
  - Opioid analgesic + opioid maintenance = \(\uparrow\) respiratory and CNS depression (?)
  - Reporting pain may be drug-seeking
Opioids: methadone patients

- Confirm dose with clinic
- Long and variable half life
- OK to prescribe without special DEA addiction license

2 options:
1. Continue and add prn opioids
   - Can split daily dose to provide some analgesia
   - If converting to parenteral, half to two-thirds of oral dose
2. Convert to short-acting opioids

Opioids: buprenorphine patients

- Partial agonist at mu receptor with high affinity
- Long terminal half-life (~ 28 hours)
- Confirm dose with PCP, Dr. First, Mass PMP

2 options:
1. Continue and add prn opioids
   - Can split daily dose to provide some analgesia
2. Convert to other opioid
   - If methadone: 20-40 mg daily
**Opioids: preoperative/admission**

- Preoperative visit (if elective)
  - Discuss patient concerns and set realistic goals
- Tox screens on admission
  - opioids *plus* alcohol, benzos, etc.
- Surgery:
  - *Elective*: administer daily maintenance/baseline opioid dose on morning of surgery
    - Keep fentanyl patch on?
  - *Emergent*: calculate opioid dose requirement and load with IV opioid

**Opioids: intra- and postoperative**

- Increase intraoperative and postoperative opioid dose 20-50%
- Maintain baseline opioids postoperatively
  - If oral, may have to convert to parenteral equivalent.
**Opioids: postoperative or non-operative**

**Patient controlled analgesia (PCA)**

- Alone or + epidural/regional techniques
- Higher loading dose, bolus and 4 h limit in opioid tolerant
- Baseline infusion = daily maintenance dose
  - Equianalgesic conversion
    - Heroin users?
    - Adjust for incomplete cross tolerance

**Opioids: postoperative or non-operative**

- Local infiltration with anesthetics
- Regional anesthesia
- Neuraxial: epidural or intrathecal
  - Reduces opioid requirements
  - Increases perfusion

Opioids: postoperative or non-operative

Epidural/intrathecal opioids

- Opioid tolerant:
  - May need higher amounts of opioid
  - Caution if using fixed opioid/LA combination
  - Maintain baseline opioid parenterally to avoid withdrawal?

Opioids: discharge

- Maintenance
  - If converted to another opioid, restart maintenance opioid
  - Reduce opioid dose gradually down to baseline

- Chronic pain
  - If surgery provides complete pain relief, opioids should be slowly tapered
    - 50% on first day, 25% thereafter

- Outpatient visit with patient’s addiction specialist or pain clinic follow-up, respectively
NSAIDs

- Recommended (+ acetaminophen) in patients with no contraindications\(^1,2\)
- DC preoperatively?
  - Celecoxib 200-400 mg recommended pre-op, 200 mg bid postop\(^1\)
- Parenteral options: ketorolac (diclofenac, ibuprofen)
  - Ketorolac reduces opioid-induced AEs\(^6\)

---

NSAIDs

- AEs\(^1\)
  - Bleeding, esp GI
  - Renal
  - Cardiovascular
    - Contraindicated post CABG
  - Bone non-union?
  - Anastomotic leak in intestinal surgery?
**Acetaminophen**

- 500-1000 mg po or iv q6h
- IV reduces opioid requirements
  - Expensive, not superior to po\(^1,7\)

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Paracetamol</th>
<th>Placebo</th>
<th>Mean Difference</th>
<th>Weight</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean(SD)</td>
<td>N</td>
<td>Mean(SD)</td>
<td>IV/Fixed 95% CI</td>
</tr>
<tr>
<td>Calan 2008</td>
<td>20</td>
<td>4.2 (0.6)</td>
<td>20</td>
<td>5.4 (0.8)</td>
<td></td>
</tr>
<tr>
<td>Jahr 2012 Study 3, 65+</td>
<td>15</td>
<td>2.3 (2.8)</td>
<td>12</td>
<td>3.8 (5)</td>
<td></td>
</tr>
<tr>
<td>Jahr 2012 Study 3, 65-</td>
<td>15</td>
<td>1.5 (2.1)</td>
<td>19</td>
<td>5.9 (5)</td>
<td></td>
</tr>
<tr>
<td>Urat 2013</td>
<td>20</td>
<td>7.7 (3.7)</td>
<td>20</td>
<td>9.8 (3)</td>
<td></td>
</tr>
</tbody>
</table>

**Gabapentinoids**

- Gabapentin and pregabalin
- Recommended in opioid-tolerant\(^1\)
- Only available orally
  - Gabapentin 600 mg one time pre-op; 300 mg post-op (single or multiple doses)
- Mixed efficacy data: opioid sparing, ↓ pain\(^8\)
- Good safety profile
Ketamine

- Often reserved for high risk patients\(^1\)
- NMDA antagonist
- Subanesthetic doses
  - 0.5 mg/kg preop; then 0.1 mg/kg/h
- Hallucinations, nightmares: may pre-treat with benzodiazepine
- Controlled substance (C-III)
- Reduces pain and opioid requirements; may reduce PPSP\(^9,10\)

Lidocaine

- Patch
  - Can be cut to size
  - 12 h on, 12 h off
  - Very limited data for acute pain\(^11\)
- Infusion
  - Efficacy in abdominal surgery\(^1\)
  - Induction dose of 1.5 mg/kg; then 2 mg/kg/h intraop
  - DC on unit/floor
Our patient: pharmacy recs

- Continue methadone (7 mg bid if IV) and increase PCA dose
- Gabapentin, ketamine infusion, lidocaine patch
- If NSAID prescribed:
  - Hold for 24 h before surgery.
  - DC postop if epidural/intrathecal placed?

Our patient: pharmacy recs

- Monitor: sedation, respiratory rate, oxygen saturation, other opioid-induced AEs
- Add bowel regimen, prn meds for nausea, itch
- Monitor platelets (DC NSAID if < 75K) and signs of bleeding
- Monitor BUN/serum creatinine

Ultimately, the decision was made to postpone surgery.
Summary

- Opioid dependent patients tend to have lower pain thresholds
- Multimodal analgesia is key:
  - Opioid: maintain baseline dose and expect to give higher doses of additional opioid
  - Consider PCA, neuraxial and local analgesia
  - Nonopioids and adjuncts have varying efficacy
- Individualize care

References

Thank you!!
Questions?

??????