PAIN MANAGEMENT FOR THE SURGICAL RESIDENT
(in 30 min or less)

THE AMERICAN GERIATRICS SOCIETY
Geriatrics Health Professionals.
Leading change. Improving care for older adults.
CASE PRESENTATION

• 46-year-old man has history of left above-the-knee amputation for sarcoma

• Home meds
  - **MS Contin** 60 mg BID
  - **MSIR** 10 mg q2hr PRN (~10% of the 24-hour dose)
  - **Neurontin** 800 mg TID

• Presents to ER with escalation of pain due to progression of tumor
• Findings on physical exam
  ➢ BP 160/92
  ➢ Pulse 126
  ➢ RR 34
  ➢ Pulse oximetry 92%
  ➢ Palpable mass on left thigh above surgical site
• In ER, patient receives 2 mg MSO4 IV push
• Yet rates pain as 10/10, moaning in pain
• Order for Vicodin 10 mg orally x 1
PAIN REMAINS SEVERE—WHY?
CASE PRESENTATION (cont’d)

- In ER, patient received 2 mg MSO4 IV push
  - That dose = 6 mg oral
  - PRN doses for stable patients should be at least 10% of the 24-hour dose

- Vicodin 10 mg orally × 1
  - Less than 10% of the 24-hour dose
CONVERT ALL NARCOTICS TO MORPHINE EQUIVALENTS

• MS Contin 60 mg orally BID = 120 mg/24 hr

• Convert to 24-hour daily dose
  = 120 mg orally or 40 mg IV morphine

• Basal rate 40 mg/24 hours = 1.7 mg/hour
PATIENT-CONTROLLED ANALGESIA

- Also known as patient-initiated dose or patient-demand dose
- PCA devices need the following orders:
  - **PCA dose** in mg or mcg
  - **Delay interval (aka lockout)** in minutes (period during which the patient cannot obtain additional medication)
  - **Continuous infusion rate** in mg/hour or mcg/hour (if continuous infusion is used)
WHERE DO WE START?
DOSING: OPIOID-NAIVE PATIENTS

• Morphine is the drug of first choice for most patients
  ➢ Dosing and delay interval will differ with other opioids

• Initial PCA demand dose = 1–3 mg MS

• Delay interval = 8–10 min

• Calculate the total dose given over 4 hours and determine an hourly continuous infusion rate (eg, 16 mg given over 4 hours = 4 mg/hour)

• Calculate a new PCA demand dose at 50% of the hourly continuous infusion rate
  ➢ Example: 4 mg/hour / 2 = 2 mg PCA demand dose
DOSING: NON-NAIVE PATIENTS

• Our patient is non-naive!

• Convert the current total oral/transdermal dose to a total 24-hour IV dose

• Divide by 24 to give the hourly continuous infusion rate (mg/hour, IV)

• The PCA demand dose is initially calculated at 50% of the hourly rate
The patient is admitted with a morphine PCA

- What basal rate?
- What demand rate?
- What lockout interval?
The patient is receiving 200 mg IV morphine equivalents.

What to do with a PCA?

- 120 mg/24 hours = 5 mg/hour oral/3 for IV dose = 1.7 mg/hour IV morphine
- Demand 50% 1-hour dose = 0.83 mg q8min
- The demand dose has a peak effect within 10 minutes
  - Thus, if the breakthrough dose is inadequate it can be safely increased, as often as every 15–30 minutes, to achieve analgesia, without a need for rapid upward titration of the basal rate.
CASE PRESENTATION (cont’d)

- Reassess the need for a change in the basal rate no more frequently than every 8 hours
- Use the number of administered demand doses as a rough guide when calculating a new basal rate
  - However, never increase the basal rate by more than 100% at any one time
  - When increasing the basal rate, always administer a loading dose so as to more rapidly achieve steady-state blood levels
RISK OF OVERDOSE

A patient using PCA will fall asleep before serious signs of overdose occur, as long as only the patient pushes the button.
EQUIANALGESIC DOSING

• Always convert to IV (or oral) morphine equivalents
• Rule of thumb — morphine IV is 3× more potent than oral morphine
• Hopkins Opioid Conversion PDA Program
  ➢ Downloads quickly
  ➢ Free
  ➢ Serve your patients well!
# HOPKINS OPIOID PROGRAM (2 of 3)

[Image of a webpage from Hopkins Opioid Program]

## Current Regimen

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxycodone (oral) (mg/day)</td>
<td>20</td>
</tr>
<tr>
<td>Morphine (oral) (mg/day)</td>
<td>200</td>
</tr>
<tr>
<td>Morphine (parenteral) (mg/day)</td>
<td>4</td>
</tr>
</tbody>
</table>

## New Regimen

<table>
<thead>
<tr>
<th>Opioid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine (parenteral) (mg/day)</td>
</tr>
</tbody>
</table>

[Website link: http://www.hopweb.org/hop/]

---

[Copyright © 2009 - 2009 The Sidney Kimmel Comprehensive Cancer Center At Johns Hopkins. All Rights Reserved.]
<table>
<thead>
<tr>
<th>Opioid</th>
<th>type</th>
<th>Relative Potency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td>oral</td>
<td>200</td>
</tr>
<tr>
<td>Codeine</td>
<td>parenteral</td>
<td>130</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>oral</td>
<td>N/A</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>parenteral</td>
<td>0.1</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>oral</td>
<td>7.5</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>parenteral</td>
<td>1.5</td>
</tr>
<tr>
<td>Levorphanol</td>
<td>oral</td>
<td>4</td>
</tr>
<tr>
<td>Levorphanol</td>
<td>parenteral</td>
<td>2</td>
</tr>
<tr>
<td>Meperidine</td>
<td>oral</td>
<td>300</td>
</tr>
<tr>
<td>Meperidine</td>
<td>parenteral</td>
<td>75</td>
</tr>
<tr>
<td>Methadone</td>
<td>oral</td>
<td>10</td>
</tr>
<tr>
<td>Methadone</td>
<td>parenteral</td>
<td>5</td>
</tr>
<tr>
<td>Morphine</td>
<td>oral</td>
<td>30</td>
</tr>
<tr>
<td>Morphine</td>
<td>parenteral</td>
<td>10</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>oral</td>
<td>20</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>parenteral</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Demand doses first hour =

\[0.83 \times 3 \text{ doses} = 2.5 \text{ mg first hour}\]

Hours 2 to 8 \(\times\) \(~1\) dose/hour =

\[0.8 \text{ mg/hour} = 5.8 \text{ mg total for 7 hours}\]

Reassess at 8 hours

- Basal = \(1.7 \text{ mg} \times 8 \text{ hours} = 13.6 \text{ mg}\)
- Demand = \(2.5 + 5.8 = 8.3 \text{ mg}\)
- Basal (13.6 mg) + demand (8.3 mg) =

\[21 \text{ mg/8 hours} = 2.6 \text{ mg/hour}\]
CASE PRESENTATION (cont’d)
CASE PRESENTATION (cont’d)
MODERATE TO SEVERE PAIN:
- Increase by 50%–100%

MILD TO MODERATE PAIN:
- Increase by 25%–50%, irrespective of starting dose

WHEN DOSE-ESCAPALATING LONG-ACTING OPIOIDS OR OPIOID INFUSIONS:
- Do not increase the long-acting drug or infusion basal rate more than 100% at any one time, irrespective of how many bolus/breakthrough doses have been used

These guidelines apply to patients with normal renal and hepatic function

- For elderly patients, or those with renal/liver disease, dose-escalation percentages need to be reduced
The recommended frequency of dose escalation depends on the half-life of the drug

- **Short-acting oral single-agent opioids** (e.g., morphine, oxycodone, hydromorphone, not combination products) can be safely dose-escalated every 2 hours.

- **Sustained-release oral opioids** can be escalated every 24 hours, except that for Duragesic (fentanyl transdermal), methadone, or levorphanol, an interval of no less than 72 hours is recommended.
PAIN MANAGEMENT PRINCIPLES

• Calculate 24-hour dose (scheduled and PRN)
• Convert to IV morphine equivalents
• Administer 24-hour dose equivalent
• Order PRN at 50% PCA hourly dose OR 10% of 24-hour oral dose
• Reassess for change in basal rate q8hr for PCA and q24hr for oral
THANK YOU FOR YOUR TIME!

Visit us at:
www.americangeriatrics.org

Facebook.com/AmericanGeriatricsSociety
Twitter.com/AmerGeriatrics
linkedin.com/company/amERICAN-GERiatricS-sOCIETY