Improving Acute Pain Management for Inpatients Using a Patient-Customized Opioid Tolerance Program

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Indiana University Health

Indiana University Health is Indiana’s most comprehensive healthcare system.

A unique partnership with Indiana University School of Medicine, one of the nation’s leading medical schools, gives patients access to innovative treatments and therapies.

IU Health is comprised of hospitals, physicians and allied services dedicated to providing preeminent care throughout Indiana and beyond.

Indiana University Health

- Total admissions: 143,219
- Total outpatient visits: 2,244,320
- Total staffed beds: 3,326
- Total Physicians: 3,707
- Total Nurses: 9,000+
- Total full-time employees: 26,596
- 11 clinical programs ranked among the top 50 national programs (U.S. News & World Report)
- 10 specialty programs at Riley Hospital for Children at IU Health ranked nationally among top children’s hospitals
- Six Magnet-designated hospitals
Conflict of Interest Disclosure

• Authors’ conflicts of interest;
  – J. Payne, no conflict of interest
  – J. Ryser, no conflict of interest

Pain Control Continues to Be a Problem

• Unrelieved pain costs millions of dollars annually as a result of longer hospital stays, readmissions and visits to emergency rooms.
• 2012 inpatient HCAHPS survey demonstrated 59.2% on “pain well controlled” question.
  – Nearly 1,000 patients told us their pain was not well controlled.
• In 2013, pain domain goal is 69.2% to reach the 80th percentile.

Level of Opioid Tolerance

• Opioid naïve: A patient who has minimal or sparse exposure to opioids
• Tolerance: Normal neurobiological event characterized by need to increase the amount of pain medicine taken to achieve adequate pain control
• Physical dependence: Normal state of adaptation that is manifested by withdrawal symptoms if abruptly stopped, rapid dose reduction, or administration of an antagonist
Level of Opioid Tolerance

- *Pseudoaddiction*: Behaviors that appear like addiction but stop once the pain is resolved.
  - Example: “Clock-watcher”
  - The term “pseudoaddiction” is grossly overused, so be careful!

- *Addiction*: Primary, chronic, neurobiological disease characterized by impaired control over drug use, compulsive use, continued use despite harm, and craving.

Goals for Comprehensive Pain Management Program

- Improved pain management through the development of tiered opioid pain plan
- Include opioid usage assessment and selection of appropriate pain plan
- Utilize an interprofessional approach
  - Representation from pharmacy, nursing, chemical dependency and physicians
- Collaborate for one source of pain management plans

- Integrate right expertise
  - Design escalation strategy
    - Patient outcomes dictate the level of response
    - Guides the nurse on who to contact for support
  - Design decision tree for prescribers
    - Recommendations based on evidence-based practice for those cases that involve tolerance or addiction

*Design a tiered opioid pain management order set that stratifies opioids and adjunctive medications based on patient’s tolerance level*
Getting Started

• Establish the patient’s baseline opioid use
  – How do I find out what they’re really taking?
    • Ask the patient
    • Run an INSPECT report
    • Collaborate with the family
    • Review other medical records/admissions
  – Continue patient’s chronic meds via home medication reconciliation
    • This is your patient’s baseline
    • Similar to a diabetic, you must start with the patient’s baseline and add to it, if needed, for acute pain control on top of their chronic pain

Opioid Management Order Set

• Step 1: Assign the patient an opioid tolerance level based on their daily use of opioids for the past six weeks

<table>
<thead>
<tr>
<th>Drug</th>
<th>Brand Names</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td>Hydrocodone Hydrocodone, EndoCet, Percocet, Tramadol, Tylox</td>
<td>10-50 mg</td>
<td>61 mg or more</td>
<td>41 mg or more</td>
</tr>
<tr>
<td>oxycodone</td>
<td>hydrocodone</td>
<td>10-50 mg</td>
<td>91 mg or more</td>
<td>81 mg or more</td>
</tr>
<tr>
<td>opioids</td>
<td>oxycodone, hydrocodone</td>
<td>10-50 mg</td>
<td>91 mg or more</td>
<td>81 mg or more</td>
</tr>
<tr>
<td>fentanyl patch</td>
<td>gabapentin, metadone</td>
<td>25 mcg or less</td>
<td>More than 25mcg</td>
<td>More than 25mcg</td>
</tr>
<tr>
<td>morphine patch</td>
<td>dilaudid</td>
<td>Less than 3 mg</td>
<td>4-22mg</td>
<td>More than 22mg</td>
</tr>
<tr>
<td>HYDROMORPHINE</td>
<td>DIASORI</td>
<td>Less than</td>
<td>4-22mg</td>
<td>More than 22mg</td>
</tr>
</tbody>
</table>

Monitoring Parameters, Call Orders and Adjunctive Medications

• Step 2: Fill in physician name/service line for all calls related to pain
• Step 3: Select additional monitoring parameters
• Step 4: Regardless of tolerance level, adjunctive medications should be prescribed for multi-modal pain management (gold standard)

Options For All Patients:
- pregabalin (Lyrica) 75mg PO BID
- celecoxib 600mg PO Q6hr PRN mild pain
- Do not order celecoxib if patient has NSAlD allergy, Creatinine Clearance less than 50mL/min, or age greater than 70 years old
- celecoxib (Celebrex) 200mg PO BID, start x 2 times or q4hr
- NURSALAC (Tonsilol) 15mg IV Push q8hr PRN mild moderate pain x 48 hours
Opioids by Tolerance Level

- **Step 5: Opioid tolerance level 1**

  **Opioid Tolerance Level 1: Patients**

  **Mild pain**
  - Choose One:
    - **HydroCODONE 5mg/325mg acetaminophen (Norco)** 1 tab PO Q4h PRN mild pain
    - **HYDROcodone 30mg acetaminophen (Percoate)** 1 tab PO Q4h PRN mild pain
    - Maximum of 4 grams acetaminophen per day from all sources

  **Moderate pain**
  - Choose One:
    - **HydroCODONE 10mg/325mg acetaminophen (Norco)** 2 tabs PO Q6h PRN moderate pain
    - **HYDROcodone 30mg acetaminophen (Percoate)** 2 tabs PO Q6h PRN moderate pain
    - Maximum of 4 grams acetaminophen per day from all sources

  **Severe pain**
  - Choose One:
    - **HYDROcodone 60mg / 80mg capsule** 2 tabs PO Q6h PRN severe pain X 48 hours
      - OR
      - **HYDROcodone 60mg / 80mg capsule** 2 tabs PO Q6h PRN severe pain X 48 hours
    - See PCA order set (check PCA order set)
      - **Recommended morphine PCA 2 mg IV q 4 hours, maximum dose of 2 mg in 4 hours**
      - OR
      - Recommend HYDROcodone PCA 60mg IV q 4 hours, maximum dose of 4 mg in 4 hours
      - Discontinue PCA by

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Level 2 – Patients Have Experience with Opioids at Home

- **Opioid tolerance level 2**

  **Opioid Tolerance Level 2: Patients**

  **Mild pain**
  - Choose One:
    - **HydroCODONE 5mg/325mg acetaminophen (Norco)** 3 tab PO Q4h PRN mild pain
    - **HYDROcodone 30mg acetaminophen (Percoate)** 3 tab PO Q4h PRN mild pain
      - Maximum of 4 grams acetaminophen per day from all sources

  **Moderate pain**
  - Choose One:
    - **HydroCODONE 10mg/325mg acetaminophen (Norco)** 3 tab PO Q4h PRN moderate pain
      - Maximum of 4 grams acetaminophen per day from all sources

  **Severe pain**
  - Choose One:
    - **HYDROcodone 60mg / 80mg capsule** 3 tabs PO Q6h PRN severe pain X 48 hours
      - OR
      - **HYDROcodone 60mg / 80mg capsule** 3 tabs PO Q6h PRN severe pain X 48 hours
    - New PCA order set (check PCA order set)
      - **Recommended morphine PCA 2 mg IV q 4 hours, maximum dose of 2 mg in 4 hours**
      - OR
      - **Recommended morphine PCA 2 mg IV q 4 hours, maximum dose of 2 mg in 4 hours**
      - Discontinue PCA by

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Level 3 – Patient has High Tolerance

- **Opioid tolerance level 3**

  **Opioid Tolerance Level 3: Patients**

  **Scheduled**
  - If appropriate, choose one long-acting opioid:
    - morphine Tab 10mg (MS Contin) 1 tab PO Q8h
    - Methadone 10mg/acetaminophen 325mg 1 tab PO Q12h
  - **Note**: If patient is allergic to morphine, then use:
    - OXYcodeone 10mg/acetaminophen 325mg 1 tab PO Q8h
      - Maximum of 4 grams acetaminophen per day from all sources

  **Mild Pain**
  - Choose One:
    - **HydroCODONE 10mg/acetaminophen 325mg 1 tab PO q6h PRN mild pain
      - Maximum of 4 grams acetaminophen per day from all sources

  **Moderate Pain**
  - Choose One:
    - **HydroCODONE 10mg/acetaminophen 325mg 2 tabs PO q4h PRN moderate pain
      - Maximum of 4 grams acetaminophen per day from all sources

  **Severe pain**
  - Choose One:
    - **HydroCODONE 10mg/acetaminophen 325mg 3 tabs PO q4h PRN severe pain
      - Maximum of 4 grams acetaminophen per day from all sources

  **Note**: Physician to order long acting opioid form home
  - **Note**: Resumed home long-acting opioid

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Symptom Management

- Option to order medications for nausea/vomiting or itching
- Naloxone is automatically ordered

Pre-op Medications for Elective Surgical Patients

- Tiered opioid pre-op companion order set
- Table to determine the patient’s opioid tolerance level
- Select medications for nausea/vomiting/itching prophylaxis and pain, if desired

For Level 2 or Level 3 Patients:
- Morphine Tab 15mg PO x 1 dose in AM Assessment
- Oxycodone SR 10mg PO x 1 dose in AM Assessment

Note: Do not order extended release morphine or Oxycodone if patient is greater than age 76.
Integration of Support Escalation Process

Guidelines for Prescribers

Implementation Readiness

- Scope includes medical/surgical units
- Education to all nursing, educators, physicians and extenders
- Deployed as powerplans and subphases in CPOE and recruited physicians to adopt
- Established CNS and pharmacy monitoring of variances based on the escalation map
- Working with statewide pain teams for integration with other exemplar work
Testing of a Tiered Opioid Pain Management Order Set

- Order set trialed for seven months on elective total joint patients with great results
  - Decreased calls to physicians to adjust pain medications
  - Increased satisfaction among nurses by having enough pain medication options to use
  - Improved patient satisfaction with pain control reported during post-discharge phone calls

_Spread learning and program across the system_

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Opioid Tolerance Pilot Data Analysis

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group</th>
<th>Control Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>59 (26, 86)</td>
<td>60 (31, 87)</td>
<td>0.580</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>11 (24.4%)</td>
<td>17 (37.8%)</td>
<td>0.255</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>82 (43, 187)</td>
<td>90 (50, 160)</td>
<td>0.198</td>
</tr>
<tr>
<td>Length of stay</td>
<td>4 (3, 9)</td>
<td>4 (2, 9)</td>
<td>0.492</td>
</tr>
<tr>
<td>Pain goal (0-10)</td>
<td>3 (1, 4)</td>
<td>3 (2, 5)</td>
<td>0.125</td>
</tr>
<tr>
<td># of pain assessments</td>
<td>32 (8, 78)</td>
<td>31 (7, 75)</td>
<td>0.831</td>
</tr>
<tr>
<td># of times at goal</td>
<td>14 (0, 35)</td>
<td>9 (1, 37)</td>
<td></td>
</tr>
<tr>
<td>% assessments at goal</td>
<td>50 (0, 100)</td>
<td>28 (3, 100)</td>
<td>0.081</td>
</tr>
</tbody>
</table>

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Opioid Level

<table>
<thead>
<tr>
<th>Opioid Levels</th>
<th>Intervention Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>8.9%</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>37.8%</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>22.2%</td>
<td></td>
</tr>
</tbody>
</table>
Changes to Treatment

![Bar chart showing changes to treatment between Intervention Group and Control Group. The Intervention Group shows a 60.00% improvement.](image)

Adjunctive Medications

![Bar chart showing use of Celecoxib (Celebrex®), Ketorolac (Toradol®), and pregabalin (Lyrica®) in the Intervention and Control Groups. Celecoxib shows a statistically significant difference (p=0.006) with an observed increase of 22.2% in the Intervention Group compared to 0.0% in the Control Group. Ketorolac shows no significant difference (p=0.001) with an observed increase of 0.0% in the Intervention Group compared to 0.0% in the Control Group. Pregabalin shows no significant difference with an observed increase of 0.0% in the Intervention Group compared to 0.0% in the Control Group.](image)

No Significant Difference in Harm

![Bar chart showing respiratory events and naloxone use in the Intervention and Control Groups. Both show no significant difference with respiratory events at 22.2% in the Intervention Group and 0.0% in the Control Group, and naloxone use at 0.0% in both groups.](image)
Statistically Significant Difference in HCAHPS

HCAHPS: Pain Well Controlled During Your Stay

Summary

- Managing complex pain challenges our interprofessional teams to a higher degree
- Approaching pain management with opioids requires not only a standardized plan that can be customizable to the patient’s tolerance, but also an escalation plan to include resources
- Pilot implementation demonstrated positive results, which have been generalized to larger populations with ongoing measurement
Thank You

• Questions?

References

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