Curbing Opioid Use
Alternatives to Opioids for Acute Pain in the Emergency Department

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Objectives

• Describe the mechanism of action for select non-opioid analgesics
• Outline the efficacy and safety literature for non-opioid analgesics
• Define a specific non-opioid pain management strategy for patients in the emergency department
National Overdose Deaths
Number of Deaths from Prescription Opioid Pain Relievers

- Total
- Female
- Male

Source: National Center for Health Statistics, CDC Wonder

Opioid Use in the Emergency Department

• 42% of ED visits have a chief complaint related to pain

• ED providers are some of the top prescribers of opioids in the United States

• Increased focus on pain control from the Joint Commission in 2001

• ED providers lack information to help determine appropriate patients to prescribe opioids

Balancing Act

Oligoanalgesia

Iatrogenic Addiction
Are opioids the best medications to use?

• Side effects
  • Nausea, vomiting, dizziness
  • Sedation, respiratory depression
  • Hypotension, histamine release
  • Constipation
  • Dependence
Iatrogenic addiction

Association of ED Opioid Initiation with Recurrent Opioid Use
Hoppe et al

- Opioid Naive patients
- Treated for acute pain in the ED
- 1.8 times more likely to be using opioids 1 year later when given opioid prescription in the ED

Incidence and Risk Factors for Progression from Short-term to Episodic or Long-term Opioid Prescribing
Hooten et al.

- Opioid Naive patients in the community
- 27.3% progressed to continued opioid use
- History of substance abuse and nicotine use put patients at higher risk

Mechanism Specific Pain Regimens

- Channel Enzyme Receptor Targeted Analgesia (CERTA) strategies
  - Targeting more specific pathophysiology of patients pain
  - Multimodal approach with different combinations of analgesics

- Holistic approach

- Patient education

Opioid Free Emergency Department

- Maimonides Medical Center, Brooklyn NY
- Most published institution for opioid-free pain management
- 8 hour, opioid free shift
  - September 9, 2014
  - CERTA strategies
  - Protocols built into their EMR


EMR: Electronic Medical Record
CERTA: Channel Enzyme Receptor Targeted Analgesia
Opioid Reduction in the ED

• St. Joseph’s Regional Medical Center
  • Patterson, NJ
  • 170,000 patient visits annually

• Alternatives to opioids
  • Trigger point injections
  • Nitric Oxide
  • Holistic therapy
    • Acupuncture
    • Therapy harp

• Patient Education

Therapeutic Alternatives to Opioids

Ketamine
Stimuli

NMDA

opioid

PAIN
Dose-Effect Profile

- Dissociation
- Analgesia
- Amnesia

Intravenous Ketamine Dose

- 0.3 mg/kg
- 1 mg/kg
- 2 mg/kg

Effect of Ketamine

Dysphoria
Ketamine Dosing

- Subdissociative dosing
  - 0.15 – 0.6 mg/kg
- Procedural sedation
  - 1 – 1.5 mg/kg
- Rapid sequence intubation
  - 1.5 – 2 mg/kg

Subdissociative Ketamine in the ED

- Prospective randomized trial in adults (18-55 years)
- Acute pain

<table>
<thead>
<tr>
<th>Abdominal</th>
<th>Flank</th>
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</thead>
<tbody>
<tr>
<td>Back</td>
<td>Musculoskeletal</td>
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</table>

- Randomized to receive
  - Morphine 0.1mg/kg IV push
  - Ketamine 0.3mg/kg IV push

Reported Pain Score

<table>
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<tr>
<th></th>
<th>Baseline</th>
<th>15 min</th>
<th>30 min</th>
<th>60 min</th>
<th>90 min</th>
<th>120 min</th>
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<tr>
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<td>8.6</td>
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<td>4.1</td>
<td>4.8</td>
<td>4.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Morphine</td>
<td>8.5</td>
<td>4.2</td>
<td>3.9</td>
<td>3.4</td>
<td>3.9</td>
<td>3.7</td>
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</tbody>
</table>

95% CI: -1.19 to 1.46
95% CI: -0.77 to 1.05
Ketamine Administration

- Important when educating staff
  - Increased adverse events when given via fast IV push
  - Disorientation
  - Dizziness
- IV push
  - Dilute in at least 10mL, push over 5-10 min
- IV infusion
  - Can dilute in piggyback, run over 10-15 min

Case 1

- 38yo male presents with cc: abdominal pain. Has a history of chronic abdominal pain with multiple visits to the ED.
- Vitals: BP 135/90, HR 110, RR 15, weight 90 kg
- PMH: chronic pain, depression
- Home medications: oxycodone, sertraline
- Patient currently rates his pain at a 9 and is asking for “dilaudid”
Which of the following would be the best initial choice for this patient’s pain?

- Acetaminophen 1000 mg PO
- Ketamine 45 mg IV infusion over 15 min
- Morphine 4 mg IV push
- Ketamine 25 mg IV push over 10 min
Lidocaine

- Multiple modes of administration
  - Topical
  - Local injection
  - Intravenous infusion
  - Nebulized

- Mechanism of Action
  - Non-competitive voltage dependent sodium channel blockade
  - Decreases nerve depolarization and propagation of the pain signal

Intravenous Lidocaine for Renal Colic

- Lidocaine 1.5mg/kg vs. morphine 0.1mg/kg

<table>
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<th></th>
<th>Baseline</th>
<th>5 min</th>
<th>10 min</th>
<th>15 min</th>
<th>30 min</th>
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<tr>
<td>Lidocaine</td>
<td>9.65</td>
<td>3.18</td>
<td>1.83</td>
<td>1.37</td>
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<tr>
<td>Morphine</td>
<td>9.74</td>
<td>4.45</td>
<td>2.89</td>
<td>2.55</td>
<td>2.23</td>
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Lidocaine

• Side Effects
  
<table>
<thead>
<tr>
<th>Perioral numbness</th>
<th>Transient dizziness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>Dysartrhia</td>
</tr>
</tbody>
</table>

• Avoid in patients with cardiac disease

• Other Indications
  
  • Radicular back pain
  • Neuropathic pain
  • Post-operative pain
  • Herpetic pain

Regional Anesthesia

- Ultrasound Guided Regional Anesthesia (UGRA)

<table>
<thead>
<tr>
<th>Significant pain relief</th>
<th>Reduced opioid requirements</th>
<th>Patient satisfaction</th>
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</thead>
<tbody>
<tr>
<td>Prevent procedural sedation</td>
<td>Decreased resource utilization</td>
<td></td>
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</tbody>
</table>

- Hip fractures
- Shoulder dislocations
- Upper extremity fractures and abcesses
- Dental Blocks
- Hematoma Blocks for distal radius fractures

NSAIDs

- Effective analgesic and anti-inflammatory
  - Decrease prostaglandin synthesis
- Compared to Opioids
  - Similar pain relief for mild-moderate pain
  - Decrease opioid requirements in moderate-severe pain

NSAIDs for Renal Colic

• Renal colic pain
  • Obstruction of urinary flow by kidney stone
  • Increase pressure in urinary tract wall, smooth muscle spasm, edema, inflammation
  • Results in increased pressure of local blood flow
  • Renal pelvis tension leads to local prostaglandin release and vasodilatation
  • NSAIDS a direct target for pathophysiology of renal colic pain

NSAIDs

- Available IV and PO
  - Similar pain relief with IM ketorolac vs. PO ibuprofen
- Drawbacks
  - Risk for renal dysfunction
  - Gastric ulcers/bleeding complications
  - Heart failure
  - Ceiling effect → cannot titrate
  - Delayed onset for IM/PO (45 minutes)

Case 2

- 45yo male presents with flank pain, N/V and CVA tenderness. History of kidney stones. Rates pain 8/10
- Urine dip shows hematuria and 3+ leukocytes
- PMH: HTN
- Vitals: BP 133/85, HR 81, RR 16, Weight 75 kg
Which of the following would be the best initial option for the treatment of his pain:

- 30mg IV ketorolac
- 75 mg IV lidocaine
- 15 mg IV ketamine
- 400 mg PO ibuprofen
Acetaminophen

- Use of IV acetaminophen in the ED gaining attention
- Meta analysis of 14 studies by Sin et al.
  - 21% IV APAP > comparator
  - 58% No difference
  - 21% comparator > IV APAP
- Multiple methodological flaws, low evidence
- No comparison to PO acetaminophen
- No strong evidence to support its use


APAP: acetaminophen
IV: Intravenous
Muscle Relaxants

• Effective component in pain regimen for musculoskeletal pain

• Multiple options
  • Diazepam 5-10 mg IV/PO
  • Cyclobenzaprine 5-10 mg PO
  • Methocarbamol 500-1500 mg PO
  • Tizanidine 2-4 mg PO
  • Carisoprodol 250 mg PO

• Use in combination with NSAID/APAP for back pain and other musculoskeletal pain

Nitric Oxide

• Most commonly used in dental offices
  • “Laughing Gas”

• Gaining popularity in the emergency department

• Partial agonist at mu and kappa opioid receptors
  • Prevents action potential propagation centrally

• Procedural sedation
  • Laceration repairs
  • Orthopedic procedures

Additional Agents

- Propofol
- Gabapentin
- Dexmedetomidine
- Clonidine
- Droperidol
- Cannabis
There is adequate literature to support the use of IV acetaminophen as monotherapy for renal colic

- True
- False
Non-Opioid Pain Regimen Recommendations
Back Pain

• Oral Management
  • Ibuprofen 600-800 mg
  • Acetaminophen 1000 mg
  • Methocarbamol 500-1000 mg
  • Diazepam 5 mg

• Parenteral Management
  • Ketorolac 30 mg IV
  • Ketamine 0.3 mg/kg IV
  • Lidocaine 1.5 mg/kg IV
Abdominal Pain

- NSAID
  - Ketorolac 30 mg IV
  - Ibuprofen 600-800 mg PO
- Acetaminophen
  - 1000 mg PO
- Ketamine
  - 0.3 mg/kg IV over 10 minutes
Renal Colic

- NSAID
  - Ketorolac 30 mg IV push
  - Ibuprofen 600-800 mg PO
- Acetaminophen
  - 1000 mg PO
- Lidocaine
  - 1.5 mg/kg 2% lidocaine IV over 10-15 min
Musculoskeletal Pain

• Regional Nerve Block
• NSAID
  • Ibuprofen 600-800 mg PO
  • Naproxen 375-500 mg PO
  • Ketorolac 30 mg IV
• Acetaminophen 1000 mg PO
• Ketamine 0.3 mg/kg IV
Conclusion

• Alternative options are available for the treatment of acute pain in the ED
• Challenges in changing patient attitudes
• Opioids may still be necessary for some patients
• Discharge opioid prescriptions are another large target to decrease opioid use/abuse
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