Streamlining Care for VOE in the Pediatric Emergency Department

A Quality Improvement Initiative

Patricia Kavanagh, MD
Program Director
HRSA Sickle Cell Disease and Newborn Screening Program
Department of Pediatrics
Boston Medical Center

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Financial Disclosures

- I have none to disclose
SCD Painful Episodes

- Most common reason for emergency department visits and hospital stays
- Significant impact on quality of life
  - Missed school – academic performance
  - Missed work for parents – loss of job
- Emergency department care
  - Pain not treated as emergency
  - Adolescents and adults: Can be treated as drug seekers, pain level questioned
Pediatric ED at BMC

- Level 1 Trauma Center, 27,500 visits/yr
- Safety net hospital: >80% Medicaid
- Clinical Setting
  - 16-bed ED (no day hospital available)
  - RN Staff: 5 acute beds staffed by 1-2 nurses/shift
  - MD Staff: 1-2 Pediatric ED attendings, 1 fellow and 4-5 residents
- ~200 children with sickle cell disease
Every system is perfectly designed to get the results it gets

-Paul Batalden
Multidisciplinary Team

- QI Advisor
- Pedi ED
- Pharm
- Social Work
- Nursing
- IT
- Patients
- Pedi Heme
- SCD Researcher
Pre-intervention Data

- Patients were triaged and put in room in <10 minutes

- IV access can be problematic
  - Hard to give timely pain medicines
  - Most took oral pain medicines appropriately before coming to ED

- Time to 1\textsuperscript{st} IV dose: 50 mins
- Time to 2\textsuperscript{nd} IV dose: 1 hr 45 mins
Step 1: Initial Pain Medicine

- Intranasal Fentanyl
  - Used in ED to control acute pain due to fractures, abscess drainage
  - Onset 5-10 mins, lasts ~30 mins
  - Can give 2 doses, 10 mins apart
  - Approved by BMC P&T Committee
Step 2: SCD Pain Protocol

- Standardize SCD acute pain care, like acute asthma care
  - Medications checked/re-checked quickly
  - Info on when, how often to provide

- Directs timely care to patient, minimizes disruption of ED flow
Sickle Cell Patient with Pain?

Use Excel spreadsheet for all dose calculations

**Moderate/Severe (Pain ≥ 5)**

See Resevor for MILD pain

1. Assess Pain (Document in BEX)
   - Time: __________

2. Give 2 DOSES of Intranasal Fentanyl, 5 minutes apart, to all patients > 10kg (Document in BEX)
   - INF Dose 1
     - Time: ________ ≤ 15 min
   - INF Dose 2
     - Time: ________ ≤ 25 min

3. Reassess pain and give 1st dose IV opiate pain med (Document pain and time given in BEX)
   - Time: ________ ≤ 30 min

4. Give 2nd dose IV opiate pain med (Document time given in BEX)
   - Time: ________ ≤ 50 min

5. Reassess Pain and page Pedi Hematologist on call AFTER 2 doses of Intranasal Fentanyl AND 2 doses IV pain medication
   - Time: ________ ≤ 70 min

6. Order PCA, Teradex and request inpatient bed
   - Time: ________ ≤ 120 min

7. Initiate PCA (Document time given in BEX)
   - Time: ________

<table>
<thead>
<tr>
<th>2 doses IN Fentanyl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 doses IV Opioid</td>
</tr>
<tr>
<td>To PCA/Admit or Oral/DC</td>
</tr>
</tbody>
</table>

**Note:**
- REMEMBER to administer IV dosing ASAP if IV is already placed
- REMEMBER to offer DEXA pain med after 2-3 IV attempts
- REMEMBER to continue IV dosing until PCA is initiated

**Admission:**
- Decision: ________ ≤ 90 min
- Date of Visit: __/__/____

**Help us learn reason(s) for delay:**
- □ Imaging
- □ IV access
- □ Reduced
- □ Other: ____________________

**Signatures:**
- RH Print Name: ____________________
- RH Signature: ____________________
- MD Print Name: ____________________
- MD Signature: ____________________
Step 3: Pain Med Calculator

- Easy access: Located on Pedi ED Intranet page AND in EMR

- Enter patient’s age and weight
  - Calculates IV, intranasal, PCA, oral doses

- Print out to be used by MD (order) and nurse (check dosing)
Enter Age and Weight

<table>
<thead>
<tr>
<th>Enter Patient Weight (kg)</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter Patient Age (yr)</td>
<td>10</td>
</tr>
</tbody>
</table>

Intranasal Fentanyl (not used in patients <10 kg)

<table>
<thead>
<tr>
<th>Dose</th>
<th>1.5 mcg/kg, round to closest 10 mcg</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>60 mcg/mL</td>
<td>0</td>
</tr>
</tbody>
</table>

For Moderate - Severe Pain (IV/IM/Subq)

<table>
<thead>
<tr>
<th>IV Morphine (mg)</th>
<th>0.1 mg/kg</th>
<th>0.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV Hydromorphone (mg)</td>
<td>0.015 mg/kg</td>
<td>0.0</td>
</tr>
<tr>
<td>IV Ketorolac (mg)</td>
<td>0.5 mg/kg</td>
<td>0</td>
</tr>
<tr>
<td>&lt;12 yr: 15mg MAX/Dose</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>≥15yr: 30 mg MAX/Dose</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

PCA Orders

<table>
<thead>
<tr>
<th>Loading Dose mg/kg</th>
<th>0.05</th>
<th>0.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal Rate (mg/kg/hr)</td>
<td>0.02 - 0.04 mg/kg/hr</td>
<td>0.0 - 0.0</td>
</tr>
<tr>
<td>PCA Dose (mg/kg)</td>
<td>0.015 mg/kg</td>
<td>0.0025 mg/kg</td>
</tr>
<tr>
<td>Lockout Period (min)</td>
<td>≥6 min</td>
<td>6</td>
</tr>
<tr>
<td>One hr Limit</td>
<td>0.17 - 0.19 mg/kg/hr</td>
<td>0.028 - 0.032 mg/kg/hr</td>
</tr>
</tbody>
</table>

Oral Medications

**Short Acting Opioids**

<table>
<thead>
<tr>
<th>In ED, use: Oxycodeone (immediate release) 5 mg, 15 mg tab 5 mg/5 mL solution</th>
<th>0.1 - 0.2 mg/kg MAX 15 mg/dose</th>
<th>0.0 - 0.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine (immediate release) 15 mg, 30 mg tab 10 mg/5 mL solution</td>
<td>0.2 - 0.5 mg/kg MAX 60 mg/dose</td>
<td>0.0 - 0.0</td>
</tr>
<tr>
<td>Hydromorphone (Dilaudid) 2 mg tab</td>
<td>0.03 - 0.08 mg/kg MAX 2 mg/dose</td>
<td>0.0 - 0.0</td>
</tr>
</tbody>
</table>

**Long Acting Opioid**

(not commonly used in patients <60 kg, check with hematologist)

| Morphine (sustained release-MMS Continus) 15 mg, 30 mg, 80 mg SR tab | 0.3 - 0.6 mg/kg MAX 60 mg/dose | 0 - 0 |

**Non-opioid Pain Medication**

| Ibuprofen 200 mg, 600 mg, 800 mg tab, 100 mg/5 mL solution | 10 mg/kg MAX 800 mg/dose | 0 |
| Acetaminophen 325 mg (only form aval. BMC), 500 mg tab 180 mg/5 mL | 15 mg/kg MAX 1000 mg/dose | 0 |

All Doses Calculated
- IV
- Intramuscular
- Subcutaneous
- PCA
- Oral
Time to First Opioid – IN or IV

Mean Time to First Parenteral Opioid Dose Sept 2010 - June 2012

- Intranasal Fentanyl
- Algorithm: Streamlined Care Steps

Time (min):
- Sep
- Oct
- Nov
- Dec
- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec
- Jan
- Feb
- Mar
- Apr
- May
- Jun

30 min
Time to 1\textsuperscript{st} Dose: IN vs. IV

Graph showing the time to the 1\textsuperscript{st} dose for IN and IV fentanyl, with bars representing the data for each month from May 2011 to June 2012. The graph indicates a comparison between IN and IV administration times, with a notable difference in the time to the 1\textsuperscript{st} dose. The data is presented with error bars for each month, suggesting variability in the measurement times. Additionally, a horizontal line is drawn at 30 minutes, indicating a benchmark for comparison.
Time to Second IV Dose

Mean Time to Second Opioid IV Dose Sept 2010 - June 2012

Month
Time to PCA Initiation

Mean Time to PCA Initiation Sept 2010 - June 2012

Intranasal Fentanyl

Algorithm - Streamlined Care Steps

3 hr
2 hr
Future Work

- Individualized vs. Standardized care
- Time to pain med vs. Time to pain control
- Patient experience and satisfaction
- Pediatric ED vs. Adult ED
Thank you!

- Questions?