Medication Timeliness in Emergency Department in Pediatric Sickle Cell Disease Population Presenting with Vaso-Occlusive Episode

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**Background**

Vaso-occlusive episode (VOE) is the most common acute complication for individuals with sickle cell disease (SCD) and the most common reason to seek medical care.

- Recommendations are rapid initiation of analgesia therapy upon arrival to emergency department (ED) within 60 minutes of registration and subsequent doses every 20 minutes as needed for pain.
- At Children's Mercy Hospital (CMH), recommendation is initial intravenous (IV) dose of analgesia within 60 minutes of registration and subsequent doses every 20 minutes as needed for pain.
- At CMH, a delay in initiation of analgesia therapy upon arrival to ED as well as delay in initiation of CI of pain medication has been observed (Figure 1).
- Delays in medication administration lead to poor pain control.

**Aim Statements**

- By December 2018, reduce time to <60 minutes in patients with SCD presenting to ED with VOE for:
  1. Time interval between registration and 1st dose of pain medication in 80% of patients.
  2. Time interval between 1st and 3rd dose of pain medication in 80% of patients.
  3. Time interval between initiation of continuous infusion of pain medication and 3rd dose of pain medication in 60% of patients.

**Methods**

- Pediatric patients with SCD presenting to the ED with VOE.
- Utilization of intranasal fentanyl for initial pain medication option; adjust reassessment prompt following bolus dose to every 20 minutes; consolidate initial ED pain per plan (PP) and separate CI PP into single PP.

**Scope:**

- Pain management for pediatric patients with SCD presenting to the ED for VOE.

**Process Measures:**

- Percentage of patients meeting <60 minute time parameter for 1st dose of pain medication, 1st dose to 3rd dose of pain medication, and 3rd dose to initiation of CI of pain medication.
- Balancing Measures:
  - Staff dissatisfaction with more rapid delivery of pain medications and initiation of CI in ED; patient/parent concern with effectiveness/comfort of intranasal pain medications.

**Results**

- Baseline data was obtained by retrospective chart review over a three-month period, represented on Figures 2, 3, and 4.
  - A median of 59.8% of patients were receiving an initial dose of analgesia therapy within 60 minutes of registration.
  - Sixty minutes between first and third dose occurred in 53.8% of patients.
  - Initiation of CI was occurring in 8.3% of patients within 60 minutes of the third dose of opioids.
  - Over the first three PDSA cycles (June 2018 – August 2018) improvement has been noted across all 3 aims:
    - For the initial doses, all 3 months were above baseline with one month reaching target at 80%.
    - For time between first and third dose of pain medication, 2 of 3 months were above baseline.
    - For time between third dose and initiation of CI, all 3 months were above baseline.
- Initial qualitative response from ED staff and nursing has been positive regarding initial countermeasures and care of the patients.

**Conclusions and Future Direction**

- Improved efficiency in time to initiation of analgesic support has been shown to lead to improved pain management in patients with SCD presenting to the ED for VOE.
- It is anticipated that with the eventual achievement of the aims, a decreased admission rate will be noted.
- For individuals still requiring further analgesic support, it is felt faster/institution of CI will lead to quicker control of VOE and, subsequently, shorter hospitalizations.
- Integration of process measures into PP will allow for sustainable improvement/development of new standard.
- Monitoring quantitative results will allow for identification of when PP not working has failed.
- Additional countermeasures are currently being vetted in anticipation to adding to the current interventions to further improve the project’s efforts and maintain the long-term success of this project over time.
- Plan will be to continue to run monthly PDSA cycles for a total of 6 months to evaluate response of timing to initial adjustments before integrating further interventions.
- At completion of a 12-month period of monthly data collection, data collection and review will be done quarterly.
- Presented at quarterly Hematology/Oncology/ED meeting.
- Qualitative data will also be discussed to ensure continued improvement established by current project.