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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) with timely subsequent doses given 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 given every 20 minutes as needed for pain
 - If patient is determined to need admission for further pain management, goal at CMH is to initiate continuous infusion (CI) of pain medication within 60 minutes of last bolus dose of 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:
- Time interval between registration and 1st dose of pain medication in 80% of patients
 - Time interval between 1st and 3rd dose of pain medication in 80% of patients
 - Time interval between initiation of continuous infusion of pain medication and 3rd dose of pain medication in 60% patients

Methods

Scope: Pediatric patients with SCD presenting to the ED with VOE
Process Measure: Utilization of intranasal fentanyl for initial pain medication option; adjust reassessment prompt following bolus dose to every 20 minutes; consolidate initial ED power plan (PP) and separate CI PP into single PP
Outcome Measure: Percentage of patients meeting <60 minute time parameter for 1st dose of pain medication, 1st to 3rd dose of pain medication, and 3rd dose of pain medication 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

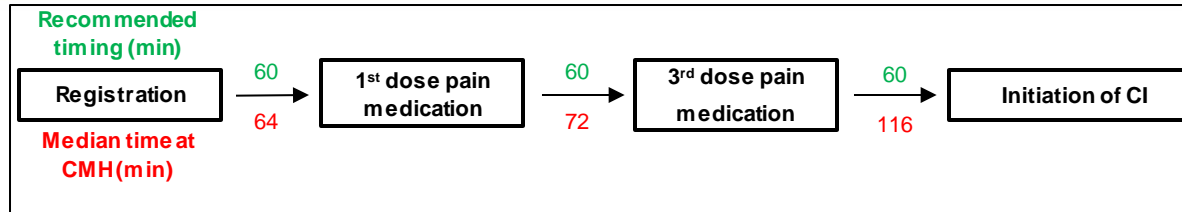


Figure 1: Process map outlining current recommended timing (in green) along with current CMH timing (in red) from registration to 1st dose of pain medication, 1st dose to 3rd dose of IV pain medication, and 3rd dose to initiation of CI of pain medication.

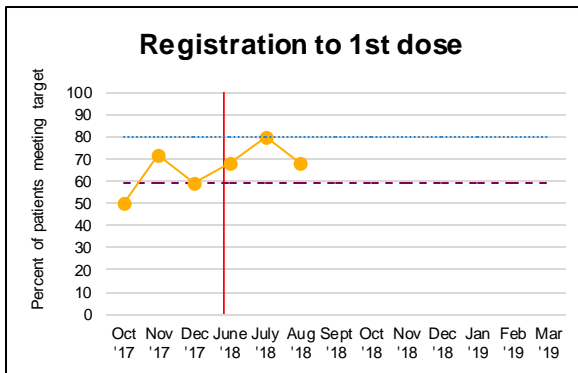


Figure 2

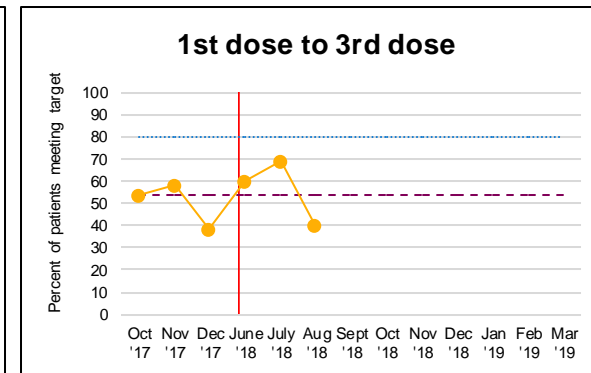


Figure 3

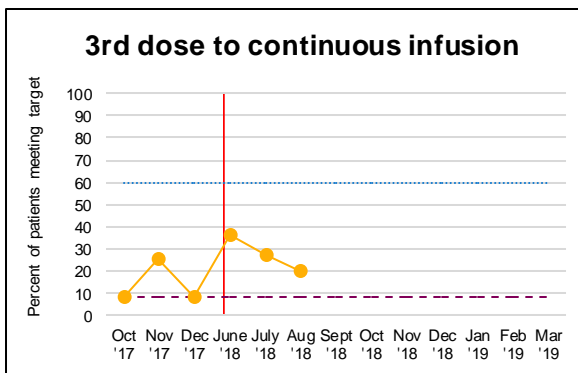


Figure 4

Figure 2: Outlines data on time from registration to 1st dose of pain medication and percentage of patients meeting aim of <60 minutes from registration to 1st dose

Figure 3: Outlines data on time from 1st dose to 3rd dose of pain medication and percentage of patients meeting aim of <60 minutes from 1st dose to 3rd dose of pain medication

Figure 4: Outlines data on time from 3rd dose to initiation of CI of pain medication and percentage of patients meeting aim of <60 minutes from 3rd dose to initiation of CI of pain medication

Key for Figures 2-4:
■ Process Measure Implementation
- - - Baseline
● Actual
⋯ Target

Results

- Baseline data was obtained by retrospective chart review over a three month period, represented on Figures 2, 3, and 4
 - A median of 58.8% of patients were receiving an initial dose of analgesic 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 dosing, 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 those individuals still requiring further analgesic support, it is felt faster initiation 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 then be done quarterly
 - Presented at quarterly Hematology/Oncology/ED meeting
 - Qualitative data will also be discussed to ensure continued improvement established by current project