Pain & Analgesia Post-Intubation in the Emergency Department

Category of submission (select as many as apply):

Resident/Fellow Project

IOM Domains that this project addresses (select as many as apply)

Safety
Patient Centered
Effective
Equitable

Please share how you defined your project. Consider addressing the questions below. (Max 500 Words)

What was the identified Quality Gap? - What was the improvement target? - What was the timeline of the project? - Who were the stakeholders? - What was the stakeholders' input? - What was the method for collecting stakeholder input? - What was the potential for significant impact to the institution? - What was the potential for significant impact to society?

The current Pain, Agitation, & Delirium (PAD) guidelines by the Society of Critical Care Medicine (SCCM) endorse the concept of "Analgesia-first Sedation." It is also known as "analgosedation," which prioritizes analgesia over sedation in the intubated patient. Prioritizing analgesia and minimizing sedation and depth of sedation has been shown to reduce mortality, number of days of being mechanically ventilated, and length of stay which could impact the institution as well as society. In the Emergency Department (ED) we recognized that while medications for sedation are often started closely after intubation, medications for analgesia are often delayed. This puts patients at risk of increased pain, in addition to mortality, days mechanically ventilated and longer length of stays. In our initial data analysis we found that only ~50% of ED patients received analgesia within 30 minutes of intubation (Quality Gap). The improvement target (AIM statement) was to increase the percentage of patients in the ED receiving post-intubation analgesia within 30 minutes of induction to 80% over a 3 month period. Our project timeline included 3 months of data collection and analysis, 2 months of identifying change ideas and implementing solutions, and then another 3 months of data collection post intervention. Stakeholders for this project included ED Attending Physicians and Residents, ED Nurses, ED Pharmacists and our Critical Care team who admitted the majority of our intubated patients. Stakeholder input was collected through a series of meetings as well as via email to identify change ideas that included, but was not limited to, easier access to sedation medications for nurses via the ED's automated pharmacy dispensing system (Omnicell), more streamlined order set in the electronic medical record that would prompt the ordering provider to choose post-intubation analgesia while ordering rapid-sequence intubation medications, and methods to promote and educate everyone in the department importance of early administration of post-sedation analgesia.

Please describe how you measured the problem. Consider addressing the questions below. (Max 500 Words)

What data sources were used? - Was a numeric baseline OUTCOME measure obtained? - What defined the sample size? - What counterbalance measures were identified? - What numeric baseline COUNTERBALANCES were obtained? - Was the outcome measure clinically relevant? - Was the outcome measure a nationally recognized measure?

Cooper's EMR system, EPIC, was utilized to gather data on all ED patients intubated over a three month period during late 2019. Each chart was reviewed and data was collected that included medications administered and the time intervals at which they were given. The time that induction medications were given was used as a surrogate for the intubation time. Intervals for those that did receive analgesia were classified as within 30 minutes, between 30-45 minutes, between 45-60 minutes, and greater than 60 minutes from the time that induction medications for intubation were given. We excluded patients that were <18 years old, patients intubated by EMS prior to ED arrival, and patients intubated during cardiac arrest that subsequently expired while under the care of the ED team. Baseline data demonstrated that only 51.3% of emergency department patients received IV analgesia within 30 minutes of intubation. In other words, 48.7% of patients were at risk of being in pain, agitated or remembering the peri-intubation period.

Please describe how you analyzed the problem. Consider addressing the questions below. (Max 500 Words) *

What was one factor contributing to the gap? - Were multiple factors contributing to the gap? - Was a structured root cause analysis undertaken? - What was the appropriate QI method or tool used for root cause analysis? - Was a root cause analysis performed prior to identifying potential solutions? - What was the rationale for selecting intervention(s)? - Did the project use a QI method or tool for selecting intervention(s)?

A root cause analysis was performed and two main barriers were identified that were felt to contribute to the large number of patient's not receiving timely post-intubation analgesia. First, it was found that unlike the other RSI medications for sedation and paralysis used during intubation, fentanyl could not be pulled by the nurses prior to an order in our EMR. This caused a delay in the administration of analgesia, particularly for patients requiring emergent intubation. In addition, it was felt that there were opportunities to improve our Intubation Orderset to make it more user-friendly to order analgesia for planned intubations. In addition, a knowledge gap on the ramifications of delayed analgesia was a potential contributing factor so frequent reminders and education to physicians, nurses, and staff was an area of focus.

Please describe how you improved the problem. Consider addressing the questions below. (Max 500 Words)

What was the implementation of intervention(s) (date/time of go live)? - Was the target measure re-measured afterwards with comparison graph? - Was a structured plan for managing change used? - Was the project counterbalance re-measured with a comparison graph? - Was the counterbalance adversely affected? - Is the improvement in target outcome measure shown? - Was a statistical significance demonstrated in the outcome measure?

With the assistance of our ED pharmacists, an override for a 100mcg IV push of fentanyl was implemented so that our nurses could pull the medication from a medication Omnicell prior to official orders being placed in the EMR for emergent scenarios. In addition, a new orderset was created that was more user friendly and included pre-selected medications for analgesia (fentanyl bolus and infusion) so that they would not be forgotten. In addition, there was universal education directed toward the nurses, EM residents and attending physicians about the benefits of "analgesia-first sedation" and the updates regarding the fentanyl override and the new Intubation Order Set. The fentanyl override was implemented on 2/1/21 and the new order set went live on 3/1/21. Education was provided throughout that period. Intubation data from 2/1/21 to 5/2/21 was then analyzed in the same manner as pre-intervention. During the project period we increased the percentage of patients receiving analgesia in under 30 minutes by 30% from 51% to 81% achieving our goal. In addition, we reduced the percentage of patients not receiving analgesia at all post-intubation by ~ 14% from 19.2% to 4.9%.

Please describe the control phase of your project. Consider addressing the questions below.
What were the lessons learned from the project? - Was there communication to stakeholders of the summary of the project, and lessons learned? - Was a process owner identified? - Did the process owner acknowledge ownership of ongoing monitoring? - What control measures were identified? - What was the reaction plan for deficiencies identified in the control measure? - Was there at least one year of sustained monitoring demonstrated? - Was the project successfully diffused in scholarly form (i.e. poster, manuscript, etc)?

Our Emergency Department is currently in the control phase of this project and plans to reanalyze the data periodically to ensure continued adherence to an "analgesia-first sedation" approach for our intubated patients. No specific control measures were analyzed for this specific project, however, further measures to look at could include pain/sedation tool (such as RASS) scores to examine depth of sedation. Further study could also include outcomes in the ICU for our ED patients including mortality, days mechanically ventilated and length of stay. The involvement of and communication with the key stakeholders in this project, primarily the pharmacists, physicians and nurses, was felt to be instrumental in the success of this project. Education was felt to be very important as well. Our ED is fortunate to have four full-time ED Clinical Pharmacists who are co-located in our ED 80% of the time. When present in the ED, our pharmacists are typically at the bedside during intubations and have helped to drive this initiative forward, educating both physicians and nurses in real time on the new process improvements. Key lessons learned include the fact that small changes to remove barriers such as medication override or optimizing an order set to include defaulted orders can drive important changes to improve quality of care.

Attachments

Post-intubation analgesia