

Kentucky Children's Hospital - Quality Story 2

Addressing Events during Dental Sedations via Multiple PDSA Cycles

Background: We provide deep sedation for dental procedures and the patients referred to our service typically require fillings, caps or extractions on 4 or more teeth. Manipulation of the mouth by the dentist to achieve visualization and leverage often results in airway obstruction. As part of our quality monitoring for all sedation patients, we follow the incidence of sedation events which are grouped into general categories (none, minor and major). As might be expected due to the nature of the procedure, major events for dental sedations were higher than for other patient populations.

Goal: This is an ongoing quality improvement project to decrease the percent of dental sedation cases that have major events.

Metric: Major Event rate: ($\#$ dental cases requiring ETT, LMA, BVM, having apnea, desaturation or laryngospasm/total number of dental cases)*100

Project Description:

Interventions: The initial intervention was standardization of the medication approach to include anticholinergic agents and a relatively standard sedative regimen which included the addition of ketamine. Our service had primarily used propofol for the majority of other procedural sedations. Following that, we modified our screening criteria to be more selective for dental cases and only include ASA I patients and exclude children that had symptomatic seasonal allergies, snoring or mild respiratory illness. Lastly, the use of prophylactic nasopharyngeal airways prevented airway obstruction from the dentists' manipulation of the jaw and mouth and kept the sedationist from continually interrupting to manage the airway.

Results: As the above modifications were made, the proportion of patients in each 20 patient cohort that had major events went from 70% at baseline to 60%, to 35%, then 50% and finally 25% in the last cohort of 20 patients.

Challenges: The challenges of this project were primarily the complexity and length of the procedure for which the children required sedation. Most procedures lasted an hour which is not long for an MRI but is more significant when the proceduralist is in the mouth. We are constantly balancing airway management with the dentists' access to the mouth. We are also challenged by not being able to predict which patients are going to have problems. Even though the overall major events have decreased, the rate of conversion to general anesthesia (defined as need to use an LMA or ETT) has increased of late to 25% in the last 20 patients. However, these patients did not seem to have any particular risk factor that was identifiable prior to sedation nor was the sedation practice different than many others that did not need an LMA or ETT placed.

Lessons Learned: We have learned that this is a population of patients for which continuous quality monitoring is important so that complacency doesn't set in after demonstrating initial success. Often a defined project with a set end date can make the team believe that they have achieved all that is possible, but continuous monitoring without an end date for the project can help everyone work toward continuous improvement.