Implementation of a Pediatric-Based Algorithm
to Improve Care of Symptomatic Hypoglycemia

Amanda V. Arjoon

Abstract

**Problem:** Hypoglycemia in childhood is a low frequency, high-risk event that can lead to coma, seizures, and even death. Symptomatic hypoglycemia occurs when plasma glucose levels are low enough to cause signs and symptoms of impaired neurological function, increasing risk of neurogenic sequelae. In the pediatric emergency department at an urban academic medical center in the Mid-Atlantic region, delays in treatment occur due to pediatric-specific barriers including time intensive, weight-based calculations for drug doses and availability of multiple dextrose concentrations. Although there is no national benchmark for comparison, the average time from identification of symptomatic hypoglycemia to treatment on this unit is 35 minutes.

**Purpose:** The purpose of this quality improvement project is to implement an algorithm for treatment of symptomatic hypoglycemia for pediatric patients between one and five years in the proposed setting.

**Methods:** An algorithm was created based on recommendations from the Pediatric Endocrine Society, the American Academy of Pediatrics, and other accredited organizations. Thirty-two small educational sessions with 59 nurses and three physician assistants were conducted over two months to provide education on algorithm use. Anonymous pre- and post-surveys were administered during the educational sessions to assess for improvements in knowledge of evidence-based care for symptomatic hypoglycemia patients. The primary outcome was to reduce time from symptomatic hypoglycemia identification to enteral or parental treatment.

**Results:** The sample size (N=4) was smaller than expected due to a significantly reduced census on this unit during the COVID-19 pandemic. Three males and one female met inclusion criteria, with a mean age of 2.75 years. The mean time to treatment was reduced to 6.5 minutes. The most observed symptom was nausea, which appeared in all four cases. Nearly 93% of staff demonstrated improved knowledge in caring for pediatric symptomatic hypoglycemic patients through improved survey scores after the educational sessions.

**Conclusion:** Findings suggest that use of a standardized algorithm is effective in reducing the time from identification of symptomatic hypoglycemia to time of treatment. All patients meeting inclusion criteria received interventions consistent with the algorithm. Future directions include expanding implementation of an algorithm to incorporate pediatric patients of all ages.
Implementing Quiet Time on an Acute Care Unit

Janet Brown

Abstract

Problem: Hospitals are very noisy places, and the constant, excessive level of noise has deleterious effects on patients. After discharge, patients often comment about the noise and rate their hospital stay poorly because of the noise. In 2019, nationally, 60.3% of patients stated that the hospital environment was quiet all the time. On an acute care, neuroscience inpatient unit in Baltimore, MD, in 2019, only 45.1% of patients stated that the hospital environment was always quiet.

Purpose: The purpose of this quality improvement project was to implement and evaluate the effectiveness of quiet time in an inpatient, neuroscience, acute care unit to achieve improved patient satisfaction.

Methods: All staff were assigned a mandatory learning module on quiet time to be completed prior to implementation. Decibels were measured prior to and during quiet time to understand the differing noise levels. A quiet time checklist was used daily to ensure each element of quiet time took place. The survey Patient Survey on Noise During Hospital Stay was collected at discharge from appropriate patients to understand the patient’s feelings on quiet time and noise on the unit in general. Patient satisfaction data was analyzed, by date of discharge, specially related to questions “Rate quietness of the hospital environment” and “Noise level in and around room.”

Results: Results demonstrate decreased decibel levels during quiet time, a majority of patient’s stating they felt quiet time was effective and promoted a restful environment and varying patient satisfaction scores related to noise.

Conclusion: Implementing quiet time on an inpatient hospital unit has a positive effect on lowering the overall noise on the unit during quiet time hours and providing patients a quiet, restful environment.
Implementing an Intraoperative Oxytocin Administration Protocol

Adrienne Chavez

Abstract

Problem: Cesarean deliveries increase the risk of uterine atony and obstetrical hemorrhage, which are leading causes of maternal morbidity worldwide. Following fetal delivery, administration of the uterotonic agent oxytocin is considered the gold standard to manage uterine atony and effectively prevent postpartum hemorrhage. Ill-timed and/or excessive dosing of oxytocin has been associated with maternal hemodynamic instability, myocardial ischemia, adverse fetal effects, and even death. Although research consistently shows benefits of using oxytocin, data from national surveys demonstrates marked variability of oxytocin dosing regimens among providers. Utilizing an intraoperative protocol wherein oxytocin is administered at a timed interval using a fixed dose has been shown to be non-inferior in preventing postpartum hemorrhage. At the project site, oxytocin is administered according to provider preference, with dosing in excess of evidenced-based recommendations for efficacy.

Purpose: The purpose of this QI project is to implement and evaluate an intraoperative oxytocin administration protocol over a 15-week period in the obstetric operating room (OR) at a community hospital for healthy women undergoing an elective cesarean section.

Methods: Anesthesia providers were trained on the intraoperative oxytocin protocol which included administering up to three oxytocin boluses of three IU and initiating a three IU/hour maintenance intravenous infusion of oxytocin following fetal delivery. Implementation strategies included assembling a site team of key stakeholders, cultivating commitments, creation of learning materials, ongoing training sessions for anesthesia providers, identification of barriers and facilitators, and offering incentive structures. Weekly monitoring and regular communication with the project team and health care providers was critical to the successful implementation.

Results: Pre-implementation, anesthesia provider knowledge, attitude, and perceived barriers regarding oxytocin best practices were evaluated using pre- and post-implementation surveys. Protocol adherence and oxytocin administration was evaluated through weekly chart audits. Adherence to the oxytocin protocol increased from 71% in week one and two to 100% in week four and thereafter.

Conclusion: The intraoperative oxytocin protocol is a safe and effective practice to prevent postpartum hemorrhage. The simplicity of the protocol and strength of the evidence makes this a highly feasible initiative for implementation into obstetric ORs.
An Algorithm for Diaper Dermatitis Management in the Neonatal Intensive Care Unit

Laura Crampton

Abstract

**Problem:** Diaper dermatitis (DD) is inflammation of the skin in the perianal area that ranges from mild erythema to broken skin and bleeding. At baseline, 20% of infants ≥ 30 weeks gestation had DD in the target Level IV Neonatal Intensive Care Unit (NICU). Historically, DD was managed based on individual nursing judgment due to a lack of current standardization of care for infants with DD and resulted in inconsistent care of infants with DD.

**Purpose:** The purpose of this quality improvement project was to implement and evaluate the effectiveness of an algorithm for the prevention and treatment of DD in infants ≥ 30 weeks gestation in a Level IV NICU in an urban, academic medical center.

**Methods:** Bedside nurses were given education on DD and the new algorithm for the management of DD. They also completed pre-and post-knowledge surveys. The algorithm was placed at the bedside of each infant for reference and the educational PowerPoint was emailed to all bedside nurses. Once a week, bedside nurses documented incidence of DD, if prophylactic or therapeutic treatment was performed, and if the algorithm was followed. Continued education was provided throughout implementation, reminder cards were placed on each nurse computer, and reminder texts to document DD data were sent out via unit phones each Monday.

**Results:** The use of the algorithm and the use of prophylactic petroleum jelly increased from 0% at baseline to 100% over the 15-week data collection period. The prevalence of diaper dermatitis decreased from 20% prior to implementation to 18% on the last week of data collection. Following the education on DD and the implementation of the algorithm, the majority of nurses stated that they were more aware of DD and monitored for it more closely during diaper changes.

**Conclusions:** The use of an algorithm for the management of diaper dermatitis helped to increase the use of prophylaxis and education on the algorithm increases bedside nurses’ awareness of DD in their patients on this unit.
Laryngeal Mask Airway Cuff Pressure Monitoring
to Decrease Post-Operative Sore Throat

Adam D. Diem

Abstract

Problem: As many as 42% of patients receiving general anesthesia via a laryngeal mask airway report postoperative sore throat. Current evidence suggests, postoperative sore throat can be easily averted leading to improved patient outcomes, decreased length of stay, decreased cost, and increased patient satisfaction.

Purpose: The purpose of this quality improvement project was to implement and evaluate the effectiveness of reducing laryngeal mask airway cuff pressures to below <60 cmH2O to reduce postoperative sore throat in the adult general surgery population at a community hospital in the Baltimore region.

Methods: Evidence suggested the key to decreasing postoperative sore throat was decreasing the laryngeal mask airway cuff pressure. In order to decrease the cuff pressure, the provider utilized a manometer to measure, adjust and document the cuff pressure below 60 cmH2O. Lastly the presence or absence of postoperative sore throat is recorded by the post anesthesia care nurse.

Results: Findings suggest that decreasing the cuff pressure to below 60 cmH2O was not effective in decreasing the incidence of postoperative sore throat at this facility. Data indicates a 40% incidence of postoperative sore throat in patients who had the cuff pressure monitored and adjusted with a manometer.

Conclusion: This quality improvement project faced significant limitations due to site restriction related to the COVID 19 pandemic. No outside personnel or students were allowed on campus during the implementation. These restrictions caused implementation to be decreased to one anesthesia provider in one operating room, causing the scale of implementation to be significantly reduced. Conclusions indicate that the intervention has not been successful at decreasing the incidence of postoperative sore throat. These results may be the result of the overall shortage of data points. More data will be needed to affirm this conclusion.
Improving Sleep Quality in the Adult Intensive Care Unit

Crystal Lubis

Abstract

Problem: Intensive care unit patients are at increased risk for poor sleep quality due to high incidences of night time nursing interventions, leaving little time for restorative sleep. Poor sleep can arise from stress, pain, and misaligned circadian rhythms as well. Sleep deprivation is harmful and can cause cognitive, ventilatory, cardiovascular, hormonal, and immune problems. The prevalence of perceived poor sleep quality was determined in the adult intensive care unit over a 3-month period. Most patients (54%) rated their sleep quality as less than average.

Purpose: The purpose of this quality improvement project is to improve sleep quality for stable adult intensive care unit patients by placing them on a multi-component sleep protocol that provides a 4-hour window of uninterrupted sleep.

Methods: A multi-component sleep protocol was implemented over a 12-week timeframe which prioritized a disturbance free 4-hour sleep window between midnight and 4 a.m. Staff were educated through a poster board presentation and by email. Protocol components included offering sleep masks and ear plugs to the patient, hanging a sleep protocol sign on room doors, re-timing routine medication and blood draws, and nurses serving as gatekeepers to prevent in-room disturbances. Patient’s self-reported sleep quality was charted afterwards in the electronic medical record. Ancillary departments (phlebotomy, pharmacy, and respiratory care) were notified of the new practice change as well. Weekly run charts were used to analyze and track data on percent of staff educated, patient’s sleep quality, and nursing staff compliance rates.

Results: Results show that 100% of night shift nurses were educated on the protocol, 84% of nurses documented patient’s stated sleep quality in the electronic health record, and of the 106 sleep observations performed, 70% were rated as good or excellent. Fifty-eight patients total were placed on the sleep protocol during the 12-week project.

Conclusions: Sleep disturbances are multifactorial. A multi-component sleep protocol was shown to improve sleep quality for adult intensive care unit patients. Therefore, a sleep protocol that diminishes or eliminates preventable disturbances is beneficial to the overall health of critically ill patients and should be a part of standard practice.
Implementing Routine Depression Screenings on a Cardiac Surgery Stepdown Unit

Amanda Nevin

Abstract

Problem: Depression is a common problem among patients with cardiac illness and is an independent risk factor for subsequent cardiac events. Unidentified and unmanaged depression in cardiac patients can manifest into persistent post-operative pain, increased mortality, and decreased quality of life. On a cardiac surgery stepdown (CSSD) unit, there was lack of routine depression screening on admission for pre-operative patients, despite overwhelming evidence and voiced leadership support for this intervention given the presence of cardiac illness among this patient population.

Purpose: The purpose of this quality improvement (QI) project was to implement and evaluate the feasibility of completing an evidence-based depression screening tool on admission for pre-operative patients on the CSSD. It was anticipated that this practice change will promote the identification and management of depression, and bedside registered nurses (RNs) will perceive this intervention to be feasible and beneficial for this vulnerable patient population.

Methods: The project leader designated change champions to assist in education and project training during the 2-week pre-implementation period. The 11-week implementation period consisted of screening all newly admitted pre-operative patients by the RN utilizing the Patient Health Questionnaire (PHQ-9) depression screening via EPIC Portfolio. All positive screens were then to be followed up by a provider, social work, or psychiatry. Weekly audits were used to monitor compliance of these measures. A post-implementation survey was distributed to RNs to complete to assess the perceived benefit and feasibility of the screening.

Results: A total of 62 patients were screened during the implementation period. RN screening compliance averaged 94%. Using the cut-off score of ≥10, 16% of those patients screened positive (n=10). Provider positive screen follow-up was 100%. The post-implementation survey indicated overwhelmingly positive responses on the convenience (70%), ease (90%), and importance (85%) of PHQ-9 screening on the unit as well as support to continue screening on the unit (100%) and expand screening to hospital-wide (95%).

Conclusions: Routine depression screening on the CSSD using the PHQ-9 is feasible to implement without unnecessarily increasing burden on RNs, augments in-patient follow-up for positively screened patients, and is supported by RNs for continued use and expansion to other units.
Implementation of an Algorithm for Fall Risk Screening and Assessment

Melonie Owusu

Abstract

Problem: In the United States, one in four adults over the age of 65 suffer at least one fall per year in and around their homes. Falls lead to high-cost complications such as hospitalizations and fractures. At the time of this quality improvement project, twenty-five percent of elderly adults at the chosen practice suffered at least one fall per year. Evidence recommends annual screening for fall risk amongst this population to identify and decrease the risk of falls.

Purpose: The purpose of this Doctor of Nursing Practice quality improvement project is to implement the routine screening and assessment of fall risk in a primary care office using a modified version of the CDC’s algorithm for fall risk screening, assessment and intervention among all adult patients sixty-five years and older to reduce the risk of falls in and around the home.

Methods: Data collection occurred using the following tools: the modified fall risk algorithm, run charts, a data collection tool, and a vitamin D assessment audit tool. Following the hands-on training of all providers, the fall risk algorithm was implemented. Three questions from the algorithm were used to screen the elderly. Providers considered the patient’s presentation at the time of the visit and their underlying health conditions to select which assessments to apply. Algorithms were hand-marked with provider choices and transferred to the data collection sheet. The data from this sheet was then transferred to a run chart to establish trends in the usage of the algorithm. An audit tool was used to ensure the proper use of the algorithm by looking at the assessment of vitamin D intake in both the screening and assessment portions of the algorithm.

Results: Results found during the implementation phase suggest the utilization of the algorithm decreased the fall risk among elderly adults. Only one fall was recorded during the implementation phase of this quality improvement project.

Conclusions: Utilization of the algorithm for fall risk aided in identifying the risk of falls among adults over 65 years of age. This decreased the occurrence of falls and its costly consequences such as hospitalization and injury.
Train-of-Four Monitoring Protocol to Guide Administration and Reversal of Neuromuscular Blockading Agents

Alex Valencik

Abstract

**Problem:** Evidence supports qualitative and quantitative measurement of neuromuscular blockade results in a lower incidence of residual blockade in the postoperative care unit as compared to clinical assessment only. In a suburban community hospital, neuromuscular blockade monitoring has not been used consistently. This resulted in avoidable PACU complications including prolonged ventilation and emergent reintubation.

**Purpose:** This quality improvement project was implemented to address issues of respiratory distress in the postoperative care unit that could be attributed to residual neuromuscular blockade and inadequate monitoring/reversal of neuromuscular blockading agents.

**Methods:** All scheduled adult surgeries where neuromuscular blockade was used were included in the study. An educational plan was implemented to improve TOF (train-of-four) monitoring throughout surgery and compliance measured through chart audits of TOF documentation at any point during the case, before reversal (but after last dose of neuromuscular blockade), and after reversal.

**Results:** There was a single adverse PACU event during the PI study period. Chart audits comparing the first three weeks (n=11) to the last three weeks (n=35) revealed that TOF documentation before reversal increased from 18.2% (n=2) to 81.1% (n=30). Documentation after reversal increased from 0% (n=0) to 46% (n=17). Documentation at any point during the case increased from 54.6% (n=6) to 81.1% (n=30).

**Conclusions:** Implementation of guidelines regarding appropriate neuromuscular blockade monitoring and reversal of neuromuscular blockade were effective in increasing TOF monitoring compliance.
Improving Consistent Use of Sucrose with Comfort Measures during Minor Painful Procedures

Victoria Vykol

Abstract

Problem: Underutilization of pain management resources occurs despite the availability of evidence-based pain management interventions. Low rates of oral sucrose use with comfort measures for pain management during peripheral intravenous catheter (PIV) insertions were identified in a neonatal intensive care unit (NICU).

Purpose: The purpose of this quality improvement project was to improve consistent use of sucrose with comfort measures during PIV insertion attempts in neonates greater than or equal to 32 0/7th weeks postmenstrual age.

Methods: The MAP-IT model for evidence-based practice was used to implement an evidence-based procedural pain algorithm for minor painful procedures over 15 weeks in a 26-bed, Level III NICU. Changes to electronic documentation and sucrose ordering processes were made to support the implementation. Implementation strategies included staff education, reminders through e-mail, huddles and visual aids, change champions, and feedback sessions.

Results: There was an increase in the average percentage of documented use of sucrose with comfort measures during peripheral intravenous catheter insertion attempts from 20% to 27%. There was a 41% increase in the average presence of a sucrose order, but the practice of overriding sucrose from the medication storage unit remained the same. There was an average of 2% documented overuse of sucrose. Staff knowledge of sucrose improved following education.

Conclusion: Introducing a procedural pain algorithm can increase pain management practices during peripheral intravenous catheter insertion procedures. Procedural pain management should be included as a quality indicator, and guidelines should be established in neonatal intensive care settings. Future projects should address barriers related to workflow and accessibility of sucrose, include other common procedures, and expand the role of parent participation in pain management practices.