ADCE 2022
Poster Abstracts

General Posters
Qualitative Research

Patient Experiences of Cryoneurolysis with Total Knee Arthroplasty: A Qualitative Pilot Study

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Introduction: Inadequate pain control can alter patient perceptions about the surgical procedure and impact recovery. Cryoneurolysis has been shown to provide effective pain control both immediately, and up to 6 months after surgery. Long term effectiveness of this procedure cannot be determined by post-operative pain scores and opioid consumption during the immediate 24-to-48 hour period. An understanding of patient expectations for, and experiences of, return of normal function and sensation in the 6-month postoperative period can provide a better insight. A literature search produced inconsistent information about the actual timeline of nerve regeneration further implicating the need for this study. The purpose of this pilot study was to gain insight into the patient experience of cryoneurolysis as post-operative pain control for total knee arthroplasty (TKA).

Methods: Following IRB approval and written consent by the CEO of a critical access hospital, demographic information for potential participants was obtained. Demographic information included name, telephone number, and date of surgery. Inclusion criteria was patients undergoing TKA and pre-operative cryoneurolysis between July 1, 2020 and December 31, 2020. Exclusion criteria was previous diagnosis of peripheral neuropathy or those with chronic opioid use. Semi-structured interviews were conducted via telephone following the receipt of written consent. A telephone script was followed during all interviews. Interview questions sought perceptions on pain/discomfort, as well as return of normal sensation, and knowledge of the cryoneurolysis procedure. The interviews were audio recorded by the interviewer and pseudonyms were assigned to all participants. The interviews were transcribed and reviewed. A narrative analysis of the interview transcripts was utilized and a list of nonoverlapping significant statements were compiled.

Results: Ten potential participants were contacted in July, 2021, and 3 completed an interview. Pain perceptions in the immediate postoperative period, at 1 month, 3 months and 6 months were obtained. Two participants denied sudden onset of pain after surgery and one thought that happened “once or twice.” At 1 month two participants had “very little” and “very tolerable pain”, while the third reported a pain level of 3 on a 10 point scale. At 3 months John indicated he “was doing quite well”, Mark had no pain, while Michael rated his pain at 3. At 6 months John and Michael rated their pain at 1-2, while Mark had no pain. Return of sensation was discussed. According to John, numbness improved in 4-5 months. For Mark return of normal sensation was at 3 months. For Michael it happened at 1 month, with continued periodic residual numbness. John and Michael took 3-4 months to return to normal activity and Mark 2 months. All participants overwhelmingly indicated that despite the education received they “did not know what to expect.”

Discussion: Patients’ experiences with which to identify clear timelines for pain control and return of sensation are key to understating the usefulness of cryoneurolysis. The literature search alone produced varying timelines about nerve regeneration. The results of the study demonstrate reduced need for pain medications and similar experiences in all three participants. There was an overwhelming evidence of patient satisfaction with the procedure. Overall results showed return of normal sensation and to normal function after 3-4 months that in turn provide a clear picture of a nerve regeneration timeline.

Absence of sudden onset of pain in two, and short duration of it in one participant indicate the gradual and predictable nerve regeneration. Qualitative interviews are the most appropriate tool when in-depth information about the actual experiences are key to understanding the phenomenon. Detailed feedback received from those patients along with ability to expand on some topics make this methodology superior to others. Due to the nature of the study, it is evident that the results cannot be generalizable, but they can provide a foundation for more vigorous quantitative study in the future. Moreover, these findings can be used as a guideline for follow-up visits. The authors recommend further study with a larger sample.

Quantitative Research

Examination of a Nurse Anesthesia Program Teaching Assistant Model and Its Impact on Increasing Nurse Anesthesia Education Capacity

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Introduction: Popularity among nurses to pursue a graduate level nursing degree has grown in recent years leading schools to defer qualified applicants. A Certified Registered Nurse Anesthetist (CRNA) educator shortage exists, which may limit nurse anesthesia programs (NAPs) from producing CRNAs. Teaching assistant (TA) programs at the university level have been analyzed for benefits, challenges, and the impact on faculty capacity. Research on TA programs' impact on increasing CRNA faculty capacity is scarce. The purpose of this study is to examine a NAP's TA model and evaluate the impact on CRNA educator capacity. Research questions include the following: Do former TAs in a NAP pursue a career in nurse anesthesia education after graduation? Did the experience as a TA in a NAP influence the CRNAs' decision or intent to enter a career in nurse anesthesia education?

Methods: This study was conducted using a mixed method survey that was descriptive and exploratory in nature. An 18-item electronic survey via QualtricsXM which included multiple-choice, fill in the blank, and select all that apply questions was emailed to former NAP TAs. The cover letter stated that the researchers were seeking volunteers to participate in a short semi-structured interview via Zoom and steps on how to proceed with volunteering. The study was supplemented with interviews. All responses were anonymous and were identified only with a random number sequence. The data were exported from the secure QualtricsXM servers directly to a Microsoft Excel spreadsheet and SPSS for statistical analysis. Enrollment, lack thereof, or withdrawal from the study did not affect their standing within their respective CRNA role. The interviews were transcribed by rev.com. The survey produced nominal and ordinal data, as well as one qualitative question. The interviews produced qualitative data, which was analyzed for emerging themes.

Results: Of the 44 former TAs, 20 responded to the survey. Sixteen respondents indicated participation in the education of student registered nurse anesthetists (SRNAs). All indicated they teach via the clinical preceptor/clinical faculty route, 6.3% reported a full-time faculty role and a part-time faculty role. The most chosen barriers to entering a CRNA academia role were "lack of financial incentives" and "limited opportunities" (30%, 30%), followed by "not enough CRNA experience" and "lack of doctoral degree" (25%, 25%). Five respondents said they intended to go into an CRNA academic role prior to entering school. 80% of respondents were positively influenced by the TA program. When asked about incentivization, 66.7% chose "intellectual stimulation" and "enjoyment." 58.3% indicated "interactions with students." Chi square tests showed those who were 31-35 years old were less likely to participate in education than other ages (P = .04). Those with MS degrees as well as 3 or more years of experience are significantly more likely to enter academia (P = .006; P = .003).

Discussion/Conclusion: In regard to TAs and their pursuit of education post-graduation, a majority currently teach SRNAs. The primary setting is clinical as preceptors or faculty. This calls into question whether the TAs felt they were more prepared to educate SRNAs clinically rather than didactically. The majority of TAs said the program positively influenced them to enter into a faculty role. Integrating a TA program may aid in the recruitment of nurse anesthesia faculty. Master's degree CRNAs were more likely to enter into a faculty role, but this finding may be attributed to the doctoral program only graduating one class. Those with at least 3 years' experience were more inclined to enter an educational

role, which may indicate value placed on experience prior to pursuing education. Lack of financial incentive is the largest barrier to entering into academia. Programs who are struggling with gaining/ retaining faculty members may need to improve salary. Only one NAP TA program with a small sample size was included in the assessment, which may limit the generalizability. The response rate to the survey was 20 out of 46, which is less than the indicated 40 to achieve a 90% confidence interval. Lack of diversity in respondents may question the external validity of the study. Further research is warranted to look at all graduates and compare non-TAs and TAs with their pursuit of education careers.

Team Perception of Interprofessional Collaboration: The Impact on Significant Practice Change in the Perioperative Setting

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Introduction: This study measured a perioperative team's perceived importance of interprofessional collaboration before the implementation of an opioid-free protocol using the Nebraska Interprofessional Education Attitude Scale. Perioperative patients are at risk for long-term opioid misuse. Reduction of opioid use among the perioperative patient population requires an interprofessional, collaborative approach. Team perception of the current level and understanding of interprofessional collaboration (IPEC) affects team participation. Researchers, in collaboration with interprofessional healthcare colleagues, developed and implemented an opioid-free protocol to reduce opioid consumption in patients undergoing total hip arthroplasty and hypothesize a positive correlation between IPEC and successful protocol implementation.

Methods: International Review Board approval was obtained and a convenience sample of perioperative and anesthesia personnel on the protocol implementation team was recruited. Informed consent was obtained before protocol implementation. Data were collected via electronic survey deployment of the Nebraska Interprofessional Education Attitudes Scale (NIEPAS) with additional demographic questions and assessed the target participant's understanding and level of participation in interprofessional practice before the implementation of an opioid-free protocol.

Results: Data were analyzed using Cramer's Chi-Square ($\chi 2$) using JASP software. The overall response rate was 74% (n = 37). All participants felt the team was capable of interprofessional collaboration ($\chi 2 = 20.97$, $P < .001$). Women were more likely than men to agree strongly that compromise is required for team unity ($\chi 2 = 19.99$, $P < .01$). Team members with formal interprofessional collaboration training regarded more highly communication as an essential component of all treatment plans ($\chi 2 = 4.734$, $P < .03$) and agreed team leadership should be a collaborative effort ($\chi 2 = 8.211$, $P < .042$). Women more than men felt leadership should be a team effort instead of there being a single team leader ($\chi 2 = 13.822$, $P < .032$).

Discussion/Conclusion: Formal interprofessional collaborative training, as required by many educational accreditors, improves staff perception of collaborative leadership and communication, both hallmarks of safe patient care. Improved patient outcomes occur when teams effectively collaborate and communicate between specialties and engage in teamwork through respectful interactions. Individual team member perceptions of interprofessional collaboration influence participation in the collaborative process and commitment to the shared goal. The perioperative team unanimously agreed they are capable of interprofessional collaboration, improving successful implementation of significant practice change in the perioperative environment.

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The Psychometric Analysis of the CRNA Workload Perception Scale (CWPS): Final Phase

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Introduction: The practice of Certified Registered Nurse Anesthetists (CRNAs) is unique in that only one patient is cared for at a time, and acuity varies with patient comorbidities and scheduled surgery and procedure(s). Therefore, workload instruments designed for others in nursing, ie, staff nurses, may not accurately measure perceived workload for CRNAs. In nursing research, workload is tied to staffing ratios, patient acuity, and tasks completed, and nursing workload and patient outcome data support that more manageable workload is associated with improved patient outcomes. Nursing workload consists of both objective and subjective factors, the latter being rated only by an individual. A measure of perceived workload for CRNAs is needed, and the CRNA Workload Perception Scale (CWPS) was developed to accurately measure perceived workload for CRNAs This abstract presents the final phase of instrument development process.

Methods: Following IRB and American Association of Nurse Anesthesiology Foundation approval, the previously developed 11-item CWPS 2 was tested in a population of 393 CRNAs recruited from the AANA database. Participants with at least 1 year of full-time clinical practice experience participated. The CRNAs received an email from the AANA with a link to the anonymous survey. Completion of the survey served as consent. The survey was closed after 4 weeks. Statistical analysis of the data was performed using R software. The classical psychometric analysis was performed systematically in three steps that included (a) descriptive/exploratory analysis, and data mining techniques, (b) both parametric and non-parametric methods for item level analysis, and (c) an exploratory factor analysis.

Results: Step 1. There was a total of 400 respondents, 62% females, average age 45 years, with 11 years' experience; 60% worked in academic medical centers/community hospitals, 80% hold a master's degree. Around 75% practiced in the anesthesia care teams, 25% independently. Cases with missing values were deleted; final data=393 surveys. Step 2. The item level analysis was performed for parametric (principal component analysis) and non-parametric (Mokken) model. Four out of 11 items indicated they were not good fit items. Based on parametric and non-parametric analyses 7 out of 11 items performed well in measuring CRNA workload. Original items #2, 3, 5, 6, 9, 10, and 11 were retained and #1, 4, 7, and 8 were eliminated. Step 3. Exploratory factor analysis was performed on the 7 well-performing items. The first factor accounted for 28% of the variance; both factors together accounted for 44% of the cumulative variance. The final 7-item CWPS instrument demonstrated good internal consistency reliability for a new instrument (Cronbach's alpha = .75).

Discussion/Conclusion: Following extensive psychometric analysis, a final 7-item version of the CWPS was developed. Interestingly, the four items that were ultimately eliminated also performed poorly in the original psychometric analysis. Despite refinement of the items in the previous study, analysis indicates these four items are not a good fit for the concept of CRNA perceived workload. The final seven items will be scored such that a high score on the CWPS indicates a higher perceived workload. As such, items 1, 2, and 5 will require reverse scoring. The scoring is recommended as follows: 1 = strongly disagree, 2 = strongly agree, 3 = neutral, 4 = agree, 5 = strongly agree. Scores range from 7 to 35. Scores closer to 7 are low perception, close to 21 is neutral, and close to 35 is high. Some limitations of the study include the low response rate (13%) for the survey. However, the age, gender, and years' experience of the respondents closely mirror the demographics of both the initial psychometric analysis, as well as the 55,000 certified CRNAs. Additionally, having 393 responses for the original 11-item instrument provides more than adequate sample size for psychometric analysis. The instrument is ready

for use in nursing research to evaluate relationships between CRNA workload and patient care. It may also be used to evaluate the effects of CRNA workload on patient safety performance measures.
Funding Sources: This study was funded by the AANA Foundation General Grant.

Evidence Based Practice

Lung Protective Ventilation During Anesthesia: Implications for General and At-Risk Patients

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Background/Purpose/Question: The surgical patient undergoing general anesthesia is exposed to changes that can negatively impact homeostatic function in multiple body systems. One of the most significantly altered is the pulmonary system when the patient must be paralyzed and anesthetized. Any lung parenchymal damage that occurs intraoperatively will increase the likelihood of postoperative pulmonary complications (PPCs) which are associated with increased mortality and intensive care unit (ICU) admissions, as well as increased hospital length of stay and healthcare costs. The purpose of this project is to improve awareness and knowledge of lung protective ventilation (LPV) strategies for CRNAs. An education session tailored to the adult learner can lead to improved knowledge and use of LPV in the operating room.

Methods/Evidence Search: Research included a thorough search on the database PubMed. Inclusion criteria were: articles within 10 years, clinical trials, full text samples, written in English, human research subjects, and patients over eighteen. Terms used were: PEEP, positive end-expiratory pressure, alveolar recruitment maneuver (ARM), obese, bariatric, high BMI, body mass index, gas exchange, alveolar gas exchange, oxygenation, arterial oxygenation, saturation, hypoxemia, abdominal surgery, laparoscopic, intraoperative, perioperative, and atelectasis. The initial search yielded 219 results. With filters active, abstracts were reviewed for relevance, and the results were decreased to 23 for use. This evidence was utilized to develop an education session for practicing CRNAs that included a video modality featuring high-fidelity simulation. Objectives included mastery of LPV content and recognition of role to use LPV for best practice. Outcomes were examined with pre- and post-education surveys.

Synthesis of Literature/Results/Discussion: The research conducted on LPV showed that tidal volume, PEEP, and ARMs are the main components to consider. These can be manipulated to optimize lung mechanics and reduce PPCs. The most common factor linked to PPCs is long periods of atelectasis, leading to ventilator-induced lung injury (VILI) because of cyclic opening and collapse of alveoli. Because nearly 100% of patients experience atelectasis during anesthesia, interventions to combat pulmonary function loss must be integrated. Research shows that tidal volume is most important aspect of LPV. In most cases, tidal volumes should be 6-8 mL/kg of predicted body weight (PBW). PEEP titration or adjusted PEEP per patient is beneficial. PEEP of 5-12 cm H_2O reduces chance of PPC development. ARMs are best utilized with other LPV techniques, and not as a stand-alone. Because of the large increase in peak inspiratory pressures, hemodynamic shifts are common with ARMs. Research on ARMs is more variable compared to tidal volume and PEEP. Ideally, ARMs should be used on patients with suspicion of atelectasis not responsive to other LPV techniques. Participants in the education session missed 36% of pre-survey questions versus 10% on post-survey. Simulation video integration enhanced knowledge absorption a perceived 75%. LPV use pre-survey was 63%, while 94% of CRNAs reported they would use LPV going forwards in daily practice.

Conclusion/Recommendations for Practice: This project showed that an education session tailored for the adult learner can increase awareness and practice knowledge of LPV for CRNAs. Integration of high-fidelity simulation video enhanced knowledge absorption and effectively demonstrated LPV techniques. Utilizing high-fidelity simulation with continuing education for practicing CRNAs is useful and impacted outcomes positively for this project. With PPCs continuing to contribute to ICU admissions, hospital

length of stay, and healthcare costs, the need for effective education on this issue is imperative for improving patient outcomes and strengthening the CRNA role in this pursuit. The research on LPV is ongoing, and more clarity is needed for ARMs integration intraoperatively. Future research should be aligned with this endeavor.

Quality Improvement

Creating an Evidence-Based, High-Fidelity, Simulation Crisis Scenario for the Anesthesia Provider

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Background: Crisis events during anesthesia are low-frequency, high-mortality situations that present management challenges for all anesthesia providers. These life-threatening stressful situations are difficult to train and prepare for in clinical practice. High-fidelity simulation (HFS) can be used to experience realistic and complex scenarios in a safe environment. Pre-programmed anesthesia-based scenarios are not available from Laerdal Medical, the manufacturer of the SimMan 3G high-fidelity mannequin. This quality improvement project aims to create realistic and valid HFS crisis scenarios to promote the education and training of anesthesia providers. The purpose of this project is to utilize a structured process to create and vet crisis HFS scenarios for an intraoperative cerebral aneurysm rupture, intraoperative cardiac arrest, and intraoperative tension pneumothorax.

Method: This was a blind quality improvement project. A literature review determined the benefit of using HFS in anesthesia education and the best methods to construct high-fidelity crisis scenarios. Training needs dictated the development of the specific crisis scenarios: an intraoperative cerebral aneurysm rupture (ICAR), intraoperative cardiac arrest (ICA), and intraoperative tension pneumothorax (ITPX). The Modified Delphi process was used to gather and refine expert opinion to confirm the validity of the simulation scenarios and determine learner critical actions. Each HFS scenario was vetted for fidelity and validity with senior student registered nurse anesthetists (SRNAs) in a simulated operating room. Participants provided feedback immediately following each 30-minute scenario via qualitative and quantitative surveys.

Results: Seven SRNAs within 1 week of graduation participated in the vetting process. Participants evaluated each scenario's ability to meet the stated learning objectives. The mean scores for whether the individual scenarios provided the learner the opportunity to diagnose, demonstrate, and perform critical actions were ICAR = 99.3%, ICA = 100%, ITPX = 92.9%. The mean realism scores for each crisis on a scale of 0-100 were ICAR = 88%, ICA = 93%, ITPX = 81%. All participants considered each scenario 100% useful as a tool to both teach and evaluate anesthesia providers.

Discussion: Prior to the start of the project, HFS scenarios for these three crisis events were unavailable for simulation practice. The HFS scenarios were created to offer anesthesia providers a tool to practice these rare crisis events in a controlled and safe setting. The data collected from the participants post-simulation surveys indicated that the HFS scenarios are realistic tools that can be used for education and practice. The results also indicated that the process used to create the scenarios was successful and effective. Converting the written scenarios into programmed software would promote the reliability of the scenarios and allow for publication, purchasing, and implementation for enhanced anesthesia crisis training. Limitations included a small number of participants, varying levels of fidelity across the three scenarios, and the constraints of manual operation. Because minimal data exist for simulation evaluation, further research in the vetting process can improve the quality of the simulation scenarios for more-effective simulation construction. Implications for practice were within anesthesia education and improved crisis management skills. In conclusion, the structured process created crisis scenarios that were realistic to the clinical setting and beneficial to anesthesia education and training.

Cultural and Anesthesia Considerations for a Nurse Anesthesia Partnership with a French Nurse Anesthesia Program

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Background: Cultural competence education aims to ensure that all people receive equitable, effective healthcare, particularly those from culturally and linguistically diverse (CALD) backgrounds. This has emerged as a strategy in response to evidence of health disparities, structural inequalities, and poorer quality healthcare and outcomes among people from minority CALD backgrounds. Some literature states that students who participate in international experiences can increase their cultural competency. The purpose of this project is for student registered nurse anesthetists to gain an expanded worldview and increased anesthetic knowledge through an educational partnership and international exchange with an accredited French nurse anesthesia program. The goals align with the University's mission to increase international experience opportunities for students to grow in worldview and cultural sensitivity.

Method: A literature review was conducted using PubMed, CINAHL, and Embase databases searching for the terms: "cultural awareness," "international education," and "cultural competency." Thirteen were included for review. Thematic analysis of qualitative studies and comparative analysis for quantitative studies revealed the literature as broad and non-specific to nurse anesthesia education. A pre/post questionnaire was given, comprising 12 items, evaluating understanding of French culture and anesthetic practices to prepare students for an international experience at a French nurse anesthesia program. Cultural awareness was measured with items utilizing a 7-point Likert scale. Data analysis included a paired *t* test to measure pre-/post-intervention mean evaluation and cultural awareness scores.

Results: A convenience sample of 31 pre/post assessments were obtained and analyzed. Pre-test mean score of cultural and anesthetic knowledge was 46%. The post-education score was 76%, with a *P*-value of <.05. Cultural awareness Likert average score pre-education was 25.97 and post average score was 29.35. The *P*-value was .003.

Discussion: There is a paucity of direct focused literature on cultural competence for graduate nurse anesthesia students, which substantiates the need for this project and subsequent educational interventions. Targeted educational interventions can serve as a starting point for improving cultural awareness and competency along with anesthesia practice and knowledge for students interested in participating in an educational exchange program. This preparation should enhance their time abroad as education is used to contextualize their new experience.

12-Lead ECG Monitoring with the EASITM System in the OR: An Educational Intervention

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Background: A 12-lead ECG is the gold standard for identifying myocardial ischemia and arrhythmias. However, it is often not feasible to place 10 leads on a patient during surgery. A derived 12-lead ECG using the EASITM system has been found to produce an accurate 12-lead ECG with any subtle differences being clinically irrelevant. The Philips IntelliVue MX 800 monitor has the capability to produce a derived 12-lead ECG at any time if the 5 leads are placed using the EASITM system. The intent of the project was to assess current use and knowledge of the EASITM system, educate anesthesia providers about the EASITM system, and re-assess knowledge and use of this system in clinical practice.
Method: This project was conducted at a mid-sized community hospital which had the Phillips monitor with the EASITM system available for current use. Seventy-four Certified Registered Nurse Anesthetists and physician anesthesiologists were invited to participate. The pre-intervention online survey consisted of 9 closed-ended questions to assess the knowledge and use of the EASITM system in the operating room. Administration of an education intervention was conducted following the initial survey. The intervention was a 12-minute PowerPoint presentation that consisted of current research on the topic and a demonstration of use. A video of the educational intervention was distributed to all members of the department, regardless of completion of the pre-intervention survey. A post-test survey was sent 2 months later to assess changes in knowledge and use of the EASITM system in the operating room. Statistical analysis consisted of frequency distributions and Chi-Square tests.
Results: Of the 74 possible participants, 45 (61%) completed the pre-intervention survey and 28 (38%) the post-intervention survey. Awareness of the EASITM system significantly increased from 40% (N =18) in the pre-intervention survey to 93% (N=26) post-intervention ($P < .00001$). Knowledge of how to activate the system significantly increased from 9% (N=4) pre-intervention to 89% (N=25) post-intervention ($P < .00001$). The reported use of the EASITM system increased from 13% (N=6) pre-intervention to 25% (N=7) post-intervention, which was not a significant change (P=.205187). In the post-intervention survey, the reason for not using the EASITM was cited as 'Not necessary' by 8 (29%), 'Too time consuming' by 2 (7%), 'Did not know it was available' by 11 (39%), and 'Did not know how…' by 7 (25%). Participants agreed in both surveys that the most likely patient population for this monitoring included those with coronary artery disease. Participants also agreed the EASITM system was applicable to any type of surgical procedure.
Discussion: The majority of providers were not aware of, and did not know how to utilize, the EASITM monitoring system before the education intervention. The Phillips monitors had been in daily use for more than a year prior to the pre-intervention survey. After the education intervention, knowledge of the EASITM system has significantly increased. Provider use of EASITM monitoring has also increased to 25% (N=7), which although not statistically significant may be clinically significant. A key limitation of this study was the short time between the educational intervention and post-survey. In conclusion, the educational intervention did increase the knowledge and use of the EASITM system in the operating room. With more time the use of the EASITM system could continue to increase and prove to be useful in selected patient populations.

Case Report

Safe Practice of Medication Administration by Anesthesia Practitioners

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Introduction: "The error of one moment becomes the sorrow of whole life," is a Chinese proverb. Medication errors rank as the seventh most common cause of death and are unfortunately common in healthcare. The landmark work, "To Err is Human" states that at least 44,000 and as many as 98,000 Americans die as a result of medication errors every year. It is estimated that the total cost of medication errors is between $37.6 and 50 billion annually. Certified Registered Nurse Anesthetists have the responsibility of selecting, preparing, and administering the correct medications at the correct time in appropriate dosages. They are the only fail-safe before medication administration to the patient. With this knowledge, this case study will investigate the question for anesthesia practitioners administering medications in the operating room, does the implementation of a formal final medication reconciliation safety system prior to administration decrease medication errors?

Case Presentation: A 74-year-old female presented for a coronary artery bypass grafting procedure after a recent acute myocardial. Past medical history included end stage renal disease, coronary artery disease, and hypertension. She denied drug allergies, and personal or family history of anesthetic problems. Transesophageal echocardiography revealed an ejection fraction of 30%-35%. Regularly utilized medications were prepared prior to the patient's arrival. One, four-channel medication pump was labeled epinephrine, dobutamine, aminocaproic acid, and vasopressin respectively. A line with saline, a port for cell salvaged blood administration, as well as albumin and nitroglycerin were prepared for imminent administration and were also hanging on the crowded pole. Each medication was prepared, diluted, and labeled appropriately by the CRNA. The CRNA discussed the set up and each medication's use to a student registered nurse anesthetist (SRNA). The SRNA saw that the aminocaproic acid and vasopressin tubing lines were switched. Meaning the vasopressin channel was primed to infuse aminocaproic acid and vice versa. The error was corrected prior to infusion to the patient. No harm was done; however, this was a near miss.

Discussion: Many suggestions to decrease errors have been made throughout research. The administration stage is the most critical. Decreasing the time from preparation and administration minimizes errors. Recommended safeguards include color-coded labels, prefilled syringes, barcode scanning system, or single medication drawer system. Each has shown efficacy in improving medication administration. Multimodal interventions decrease medication errors by 37%-41%. Prevention is the best method of treating medication errors. Inclusion of drug history, allergy status, and weight in the time out or use of a standardized checklist creating a consistent administration process have also been recommended. This yielded a positive result as it addressed critical steps of medication administration and a culture of safety. Practitioners frequently do not report errors when they occur. Errors need to be reported for proper adjustments to be implemented so it does not occur again. Human error is inevitable but instilling a "just culture" where it is encouraged to report errors with the understanding that individual's error requires a system solution and accountability for violation. This creates a less judgmental space to share mistakes and works to improve upon them. Suggestions such as in-service trainings help bring a mistake to everyone's attention yet does not fault or embarrass the practitioner. In summary, the CRNA is the final barrier prior to medication administration, this responsibility should be taken with diligence and attentiveness. The near miss medication errors presented in the case report

could have resulted in major consequences, if not corrected in time. Medication errors are not intentional, but they can be preventable.