



# MYA 2021 Poster Abstracts

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# General Posters

## Quantitative Research

### **What Are the Barriers to Implementation of Opioid-Free Anesthesia by Certified Registered Nurse Anesthetists?**

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**Introduction:** Opioid utilization has traditionally been the gold standard for pain management. Anesthesia providers have relied heavily on opioids to ensure patient comfort. However, opioid use throughout the perioperative period is associated with complications. Because of these risks, opioid-free anesthesia (OFA) techniques may be considered. Although research supporting the use of OFA techniques is becoming more available, it is presently unknown what proportion of CRNAs have adopted OFA. Hypothesized barriers to OFA implementation are a lack of education regarding OFA techniques, a lack of equipment necessary to provide these services, and/or a perceived barrier of facility culture that is resistant to OFA implementation. This research aims to expand the current knowledge of OFA's perceptions, identify the percentage of surveyed CRNAs who utilize OFA, and identify perceived barriers to OFA.

**Methods:** A 20-question electronic survey was distributed nationally to CRNAs. The lead author developed the survey tool based on clinical experience, noting barriers to OFA, and a literature search. The survey was tested as a pilot survey and sent to Arizona CRNAs. Because of the lack of generalized data specific to CRNAs, hypothesized barriers to OFA were left broad. Questions were unchanged from the pilot study. A biostatistician analyzed completed responses. Survey variables were summarized and compared with a Chi-square test. Variables included practice model (independent versus collaborative), highest education level achieved, additional training, exposure to OFA techniques, and availability of materials needed to utilize OFA. Lastly, facility barriers to practice change, attitudes towards education on OFA's benefits, and overall attitude on OFA were evaluated. Significance was determined by  $P < 0.05$

**Results:** 339 completed responses reflected an 11.7% response. CRNAs perceived their facility's culture is a barrier, with results varying by gender (44% female vs 29% male [ $P = .0088$ ]), age (44% under the age of 50 vs 30% over 50 [ $P = .0119$ ]), and education level (40% of those with master's or doctoral degree vs 10% with a bachelor's degree [ $P = .0046$ ]). More males than females have administered OFA (86% vs 77%;  $P = .0324$ ). Males also reported more competency administering peripheral nerve blocks (PNBs), using PNBs as a preferred pain management technique, and having access to a wide variety of multimodal anesthetics ( $P < .0001$ ,  $P < .0001$ , and  $P = .0056$ , respectively). CRNAs who use OFA varied with number of years in practice, with 76% with 0-5 years in practice, 72% with 6-15 years in practice, and 56% with 16-21 or more years ( $P = .0024$ ). Respondents who felt that OFA techniques are beneficial in anesthesia varied by years in practice, with 96% and 91% of 0-5 and 6-15 years in practice, vs 84% of those 16-21 or more years in practice ( $P = .0374$ ).

**Discussion/Conclusions:** The survey's results demonstrate that CRNAs believe OFA techniques are beneficial, with younger practitioners preferring OFA. Additionally, most CRNAs surveyed utilize PNB techniques as an analgesic method in their practice, but only 38% of survey respondents felt they were competent in administering them. There was a large disparity in perception of competence between genders amongst CRNAs, with males reporting a higher competence. As education emphasizes newer anesthetic techniques, such as OFA and PNBs, novice providers may be more comfortable and familiar with these anesthesia techniques regardless of gender. The perception of competence based on gender was an unintended finding of this survey and will be explored in upcoming research. While many CRNAs believe there is a benefit to OFA, barriers to implementation remain. Because OFA techniques are newly emerging, some providers may not see a benefit in changing their practice. Further research addressing why some CRNAs with less exposure to OFA are hesitant to implement it into their practice may be beneficial. Creating a facility culture wherein OFA techniques are encouraged will promote more widespread adoption of OFA practice. Additional research regarding facility culture and the perception of competence of new anesthetic techniques may help remove additional barriers to OFA

implementation.

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# Quality Improvement

## Implementation of a Low-Dose Ketamine Infusion Protocol for Patients Undergoing Total Knee Arthroplasty or Total Hip Arthroplasty at a Rural Hospital

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**Background:** Patients undergoing either a total knee arthroplasty (TKA) or a total hip arthroplasty (THA) experience moderate to severe pain scores affecting postoperative rehabilitation and patient satisfaction. Frequently, patients receive high doses of opioids to manage perioperative pain despite negative sequelae and possible development of dependence, tolerance, and prolonged use of opioids after surgery; a primary driver of the current opioid epidemic. Alternatively, multimodal pain relief regimens with non-opioid analgesics such as ketamine can provide superior pain relief and reduced opioid consumption after TKA/THA. The purpose of this project was to implement an intraoperative ketamine infusion protocol for patients undergoing TKA or THA surgeries to reduce postoperative opioid administration and pain scores.

**Methods:** Institutional Review Board approval was waived for this quality improvement project. Based on a systematic review, an intraoperative ketamine protocol was implemented at a rural Minnesota hospital. An in-person educational session was conducted for Certified Registered Nurse Anesthetists (CRNAs) and postoperative nurses working with patients undergoing TKA/THA. To assess protocol compliance, the percentage of TKA or THA patients who received the ketamine protocol post-implementation was recorded. To examine the effects of the interventions, a retrospective chart review of perioperative opioid administration and postoperative pain scores for patients who underwent a TKA or THA was performed for procedures occurring 3 months post-implementation of the protocol and, for comparison, 1-year pre-implementation. Sixty TKA charts (30 pre/30 post) and 57 THA (30 pre/27 post) charts were analyzed. Opioid administration was converted to units of PO morphine equivalent (ME).

**Results:** Protocol adherence was correct for 57% (17/30) of TKA procedures and 63% (17/27) of THA procedures post-implementation. Mean intraoperative fentanyl administration decreased from 95.8 to 94.2  $\mu\text{g}$  (-1.7%) and 89.2 to 78.7  $\mu\text{g}$  (-11.8%) for TKA and THA, respectively. The mean total PO ME administration decreased 24 hours postoperatively from 74.7 to 46.5 mg (-38%) following the implementation period for TKA patients and from 37.6 to 24.8 mg ME (-34%) for THA patients. 24-hour pain scores decreased from a mean of 4.1 to 1.9 (-54%) for TKA patients and a mean of 2.7 to 2.5 (-7%) for THA patients.

**Discussion:** The use of an evidence-based, intraoperative ketamine infusion protocol by CRNAs at a rural Minnesota hospital reduced opioid administration and postoperative pain scores following TKA/THA. The key findings of the implementation project are 1) a correct administration of the ketamine infusion protocol for a majority of TKA/THA cases post-implementation, 2) a decrease in the mean opioid dose administered intraoperatively and 24-hours postoperatively, and 3) a decrease in pain scores 24 hours postoperatively. The key findings here directly support the overall goal of the implementation project to reduce opioid administration and pain scores and highlight the success of the project. Further education will be conducted in order to improve protocol adoption rates and maintain project success and sustainability. This project may be easily expanded to other hospitals within the hospital system. Similar populations, such as those undergoing spine or open abdominal surgery may also benefit from protocols comparable in design. Finally, it is worth noting that this project was implemented within the greater context of the COVID-19 pandemic.

## **Implementation of a CRNA Second Victim Peer Support Program**

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**Background:** Approximately 400,000 deaths occur annually in the United States due to preventable adverse medical events. An estimated 50% of healthcare providers will experience second victimhood at some point in their careers, and this phenomenon has been linked to increased turnover intention, increased absenteeism, and a heightened risk of committing a medical error. Certified Registered Nurse Anesthetists (CRNAs) may be at a higher risk for second victimhood because of the immense stress associated with anesthesia. Hospitals frequently offer chaplain, counseling, and stress management services, which are underutilized by anesthesia providers. Second victims prefer support from peer colleagues over hospital counselors or other external resources. This quality improvement project aimed to decrease the incidence of second victim distress among CRNAs and to improve patient safety by implementing a peer-support program at a large academic medical center.

**Method:** Baseline second victim distress was assessed using the Second Victim Experience and Support Tool (SVEST), a validated second victim support assessment tool. Eight CRNAs completed an online, psychological, first-aid training session to provide peer support for the CRNA department 24 hours a day. CRNAs needing peer support can self-identify, be referred by a colleague, or recommended by unit leadership. Peer support availability and contact information was identified in the department's electronic dashboard. All discussions between CRNAs and peer supporters were kept confidential. After a 1-month trial period (from August 1, 2020 to August 31, 2020), the SVEST was readministered to collect post-implementation data. Data were analyzed in SPSS using descriptive statistics, bivariate correlation, and independent sample *t* tests and then categorized using the seven SVEST dimensions and two outcome variables.

**Results:** Fifty-one CRNAs completed the pre-implementation survey, and 32 completed the post-implementation survey. Eight peer-support encounters were reported during the first month of implementation. The demographic groups most represented overall were: female (57%), full-time (43%), age 36-45 (40%), and 11-to-20 years' experience (51%). Of the pre-implementation respondents: 31% (n = 16) reported psychological distress, 14% (n = 7) reported physical distress, 4% (n = 2) did not feel supported by their supervisor, 20% (n = 10) did not feel supported by the institution, 6% (n = 3) did not have sufficient non-work-related support, 4% (n = 2) reported decreased feelings of professional self-efficacy, 8% (n = 4) reported absenteeism, and 2% (n = 1) reported turnover intention. No survey respondents reported insufficient colleague support. Differences in pre- and post-implementation SVEST results were not statistically significant, but anecdotal evidence from CRNA leadership, peer supporters, and staff indicate a positive response to the program.

**Discussion:** Potential impact on overall staff morale as the program continues is expected to be high, as peer support can improve provider well-being and patient outcomes. Despite the lack of statistically significant differences in pre- and post-implementation data, informal interviews and personal communication with CRNAs, CRNA leadership and peer responders revealed a positive outlook on the program. CRNAs sought peer support eight times in the first month of the program, which is higher than the utilization reported in similar launch studies. Limitations of the survey methods include potential for random sampling error, responder bias, self-reported data, social desirability bias, recall bias, and a homogenous sample group. The COVID-19 global pandemic could also contribute to increased second-victim distress and lower survey response rates on the post-implementation survey. The authors recommend that the CRNA department continue monitoring program utilization and prevalence of second victim distress.

## **Preserving Perioperative Cognitive Function in Older Adults: A Quality Improvement Project**

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**Background:** Postoperative delirium (POD) is the most common surgical complication experienced by older adults and is associated with increased morbidity and mortality, longer hospital stays, and delayed rehabilitation. Advanced age and preoperative cognitive impairment are the most significant risk factors for POD. This project aims to identify patients at high risk for developing POD through preoperative cognitive screening to facilitate the implementation of perioperative prevention strategies to improve postoperative cognitive outcomes. Anesthetic agents can have harmful effects on vulnerable aging brains. Monitoring anesthetic depth to avoid deep states of anesthesia has been identified as a strategy for preventing POD. The use of targeted intraoperative Bispectral Index (BIS) monitoring has been shown to reduce the risk of POD by 35% in patients more than 60 years of age.

**Method:** A quality improvement project was undertaken at a large federal hospital to incorporate preoperative cognitive screening into the pre-anesthetic evaluation. In addition, BIS monitoring of anesthetic depth was implemented as a neuroprotective strategy with a recommended target index range of 40-60. Patients over the age of 60 undergoing total knee arthroplasty (TKA) or total hip arthroplasty (THA) were screened for preoperative cognitive impairment using the Mini-Cog screening tool. Over a 9-week implementation period, 64 patients met this inclusion criteria. A curriculum was developed to educate the anesthesia department staff on POD, POD risk factors, the Mini-Cog assessment tool, and targeted monitoring of anesthetic depth using BIS. Quantitative data was collected via chart review and analyzed using descriptive statistics.

**Results:** In a survey delivered to anesthesia staff before and after an educational session, the rating for the importance of anesthesia care in the prevention of POD increased by 82%. The importance of knowing a patient's baseline cognitive status increased by 10%, and the likelihood of monitoring anesthetic depth in older adults increased by 18% after the training. 52% of patients received a preoperative cognitive assessment (82% Mini-Cog, 15% phone assessment using the Blessed Orientation Memory Concentration tool, and 1 patient with known cognitive deficits received a Montreal Cognitive Assessment). Compliance for administering a preoperative cognitive assessment was 15% in the first month of the project time period but increased to 74% in the second month. BIS monitoring was utilized in 73% of patients. Of the patients monitored with BIS, 77% remained above the target index of 40 for 95% or more of the case. 49% spent no time below the target index, and 9% spent 50% or more of the case below the target index of 40.

**Discussion:** Anesthesia staff ratings for each survey statement increased after the educational session on POD, showing potential for future behavior change. Utilization of BIS to monitor anesthetic depth increased by 83% over the same period the year prior. Preoperative cognitive screening increased from 15% at the beginning of the project period to 74% at the end. Some patients whose surgeries occurred during the first month of project time period were not screened because their pre-anesthetic evaluation took place before the implementation of the Mini-Cog assessment. A longer lead time before the data collection period could have mitigated this effect. Of the 27 completed Mini-Cog assessments, only 1 patient screened positive. Because the Mini-Cog is validated to detect dementia, more mild cognitive impairment may have gone undetected. Conclusion: Establishing a patient's baseline cognitive function is an essential element of the pre-anesthetic evaluation. Awareness of the potential for cognitive decline in the perioperative period can increase the use of BIS monitoring to avoid deep planes of anesthesia, thereby improving patient outcomes. In the future, implementation of a more-sensitive screening tool to evaluate patients with mild forms of cognitive impairment may improve detection.

## **Implementation of Carbohydrate-Based Liquid Nutrition in Labor**

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**Background:** Parturients experience emotional, psychological, and nutritional needs during labor and delivery, a natural physiological process, requiring strength to be successful. Strength comes in many forms including a feeling of control and decision-making with the healthcare team and replenishment of lost nutrients during a strenuous labor. The ability to consume nutrition in labor is limited or denied for fear of a rare risk of pulmonary aspiration during an emergency cesarean delivery leading to a feeling of a lack of control by the parturient. At a large community hospital with more than 2,400 deliveries a year, all parturients were kept fasting, leading to increased stress and dissatisfaction with the experience. Multiple researchers and guidelines support allowing parturients, at low risk of a cesarean delivery and aspiration, clear liquids. The primary purpose of this quality improvement project was to implement an evidence-based policy for oral carbohydrate-based liquid nutrition in parturients at low risk of cesarean delivery.

**Method:** An evidence-based tool was developed to assess risk of operative delivery. Parturients at low risk of an operative delivery were cleared to receive a carbohydrate-based clear liquid diet. High risk parturients received the previous standard of a nothing per oral diet order. The unit personnel were educated on the new policy, assessment tool, and diet orders prior to implementation. During the 9-week implementation, all staff were given verbal and email reminders regarding the specifics of the policy. Inpatient charts were reviewed to track and evaluate the number of high- and low-risk parturients, diet orders, and the overall frequency of high-risk characteristics. Data analysis included the use of descriptive statistics and a run chart with daily compliance rates. To minimize risk to human subjects the data collected did not include patient identifiable information. A project description was submitted to an Institutional Review Board for a Non-Human Subjects Research determination.

**Results:** A total of 235 women had vaginal deliveries (58% high risk, 42% low risk) during the 9-week project implementation. Following staff education, diet order compliance rates in both high- and low-risk groups was 61%, increasing to 75% by the end of implementation. The initial compliance for low-risk patients was only 38% following education but increased to 55% by the end of the implementation. In contrast, the compliance rate for high-risk parturients was 98% after education and 100% at the end of implementation. This was expected since the workflow for these parturients remained the same and required no additional steps by the providers. There were 4 days during the implementation phase with 0% compliance. The obstetrical providers on these days were resistant to the change and only women at low risk of an operative delivery were admitted, leading to 0% compliance. There were no recorded incidences of aspiration or complications during the implementation.

**Discussion:** This quality improvement project was successful in implementing a policy and assessment tool for carbohydrate-based liquid nutrition for parturients. Identified barriers to compliance were the additional step of adding a clear liquid diet order in the electronic medical record (EMR) and disagreement with the high-risk characteristics in the assessment tool. To increase the use of clear liquids the assessment tool should be added to the EMR and the admitting order set should include the option for a clear liquid diet. The high-risk characteristics could be adjusted based on provider feedback and the specific population of the facility. For example, the maternal age could be increased to allow more parturients to be categorized as low risk and allowed nutrition in labor. According to the literature, allowing carbohydrate-based clear liquids in labor can decrease stress, labor pain, and increase satisfaction with the labor experience. With adjustments to the satisfaction survey these quality indicators can be assessed in the future. This data collection and correlation with the literature could help sustain and spread this practice change to other facilities in the medical system. Future projects should evaluate the impact of nutrition on the duration of the first and second stages of labor, and the impact on workload for the nursing staff with the additional diet orders.

## **Stress Reduction in Student Registered Nurse Anesthetists via a Semi-Structured Peer Mentor Program**

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**Background:** Stress is an inevitable part of nurse anesthesia education. Compared with students in other health-related disciplines, student registered nurse anesthetists (SRNAs) report higher levels of stress, depression, and suicidal ideation. Also SRNAs, report about two times more perceived stress than CRNAs (7.2 versus 4.7 out of 10). Sources of stress among SRNAs include decreased income, relocation, and uncertainty. Once in the program, starting clinical may be a significant stressor as SRNAs navigate different clinical sites with varying cultures, policies, procedures, and personalities. With the ongoing COVID-19 pandemic, SRNAs may experience feelings of isolation and anxiety due to social distancing, the transition from in-person to online studies, and limited access to psychiatric care. Thus, one would expect an exacerbation of stress-related physical and mental effects. The purpose of this quality improvement project was to reduce stress in SRNAs during the transition from didactic to clinical education during the COVID-19 pandemic.

**Method:** The following PICOT question guided this project: In SRNAs (P), how does participation in a stress-reduction peer-mentoring program (I), compared to current practice (C), affect perceived stress levels (O), during the transition from didactic to clinical practice over the summer semester (T)? Following approval of the quality improvement project, two licensed clinical counselors educated potential mentees about stress-reduction techniques. All junior (mentees) and senior (mentors) SRNAs were invited to participate in a semi-structured peer mentorship program. Mentors and mentees were paired based on sex, race, and clinical site, and educated about role expectations. Mentors maintained frequent communication with mentees. The Perceived Stress Scale (PSS) was used to measure stress levels at baseline and end of the intervention period (June 26, 2020, to August 26, 2020). Data were analyzed using R. Demographic data were summarized as frequencies, while a Welch two-sample *t*-test was used to compare the pre- and post-intervention perceived stress scores.

**Results:** Of the 40 junior SRNAs invited, 15 participated in the mentorship program. Our final sample included 11 females (73.3%) and 4 (26.7%) males. Consistent with the demographics of the class, over 90% of the participants were Caucasian. The ages of participants ranged from 20-43, with about half (53.3%) between the ages of 20 and 27. On average, the pre- and post-intervention perceived stress scores were 1.85 (SD = 0.49) and 1.28 (SD = 0.50), respectively. This difference was statistically significant ( $P = 0.01$ ). There was no significant relationship between age, sex, and perceived stress scores ( $P > 0.05$ ). Midpoint check-in analysis revealed that 66.67% of mentees had regular communication with their mentor, while qualitative data analysis found that 8 of 9 participants found the relationship to be helpful. Finally, 9 out of 13 SRNAs reported that COVID-19 has moderately or severely hindered their ability to learn clinical anesthesia skills and their preparedness for the transition to clinical practice.

**Discussion:** SRNAs experience significant stress that may be worse with the on-going COVID-19 pandemic. The current quality improvement project shows that a semi-structured peer-mentoring program may reduce the amount of stress experienced by SRNAs as they transition to clinical practice. Our findings are consistent with prior studies that found that peer mentoring reduces stress in undergraduate nursing students and medical students. Interestingly, some mentees reported that although they did not explicitly need their mentor, having one gave them a sense of reassurance. Thus, while SRNAs may be self-sufficient, a network of peers to “fall back on” may decrease stress. Like most nurse anesthesia programs, we transitioned to online education in spring 2020 because of the COVID-19 pandemic. COVID-19 adversely affected SRNA’s perceived stress and transition to clinical practice. Thus, amplified efforts to ease stress during this unprecedented time are imperative, and peer support through mentorship appears to be an effectual first step. Other investigators have reported similar findings among medical students. The strengths of this project included standardized communication (at least twice a month), frequent reminders (via GroupMe and e-mail), and stress-management education by counselors. Limitations included a small sample size, short duration of intervention, and implementation in one program.