

# Journal of the IANA

*A Publication of the Illinois Association of Nurse Anesthetists*

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## ON THE COVER

On the cover is Kris Toribio, DNP, CRNA. At the time this picture was taken Kris was a student at the NorthShore University HealthSystem on his enrichment rotation at the Holy Family Surgery Center in Honduras. Kris can be seen performing a TAP block with the assistance of Dr. Jay Kent on a patient undergoing a laparoscopic hysterectomy and bilateral salpingo-oophorectomy. Kris spent a week at the surgery center in Honduras with NorthShore program director, Dr. Karen Kapanke, as well as 2 other students where they provided anesthesia for over 75 patients and performed over 60 regional blocks.

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As required by section 6033(e) of the Internal Revenue Code, we are required to inform you that \$58.13 (or 25%) of your state membership dues are allocated toward expenses incurred by the Illinois Association of Nurse Anesthetists for state lobbying activities. This amount is not deductible for federal income tax purposes. All IANA members are also members of the AANA.



I A N A

# PRESIDENT'S MESSAGE

**H**appy summer to all IANA members and their families! I hope you are enjoying some renewed freedom outside the hospital and some quieter times inside the hospital. I am happy to report that despite the fact that the world has remained relatively shuttered for the recent months, your IANA board has continued to make progress in the advancement of CRNA practice in Illinois.

The board held a strategic planning session early this year to ensure that our short term goals were aligned with member feedback as well as to arrange our collective efforts. Now that larger gatherings are permitted, the board will meet again in the next few months to work on longer term goals. It is essential that members share their feedback at the business meetings held at spring and fall meetings as well as on our private "Illinois CRNAs and SRNAs" Facebook group. We can better serve you when we know exactly what the majority needs and wants. Please also reach out directly to your region director or a board member if you have specific questions.

The 102nd general assembly proved to be more productive than originally anticipated. Your IANA leadership along with some key constituents met with over 25 house and senate legislators to push our bills. The general feedback was very positive and there is a sense that hearts and minds are shifting to the reality of healthcare delivery and the challenges that are being faced. It is clear that CRNAs are the answer! HB1820 was introduced by Rep Moller and co-sponsored by Rep Yingling. With some early momentum, we accumulated over 1,000 witness slips supporting our bill! We also faced some heavy opposition from the Dental Society and ISA. In the end, our bill sponsor knew that without a face-to-face meeting between all of the stakeholders, it wouldn't be wise to move forward with our bill to a vote. We are on hold in the house until next session. A legislative town hall was held on March 25th to update the membership on the progress in the house.

Then we turned our efforts to our bill in the senate, SB2566, sponsored by Senator Bush. A virtual lobby day was held on March 15th, during which our lobbyist team provided an update, and Senator Bush took a great deal of time to explain why she felt so strongly about supporting our bill. To gain some traction, we worked closely with our PR firm to get a pro-CRNA Op-Ed published in as many newspapers as possible. "Bill clarifies anesthetists' role, increases access to health care, and limits costs" was published in the Effingham Daily News, The News-Gazette (Champaign-Urbana area), and the Ford County Record. All of these publications helped to educate the public about CRNAs and the value that we add to the health care system. It also served to correct any misrepresentations that had been circulated by our opposition.

The big day came on April 28th when we were able to provide oral testimony to the Senate Licensed Activities Committee. Testimony was provided by myself, president-elect Jennifer Banek, and Joe Grazaitis who has extensive experience in pain management and independent practice in the rural setting. The hearing went very well and we did not face any direct opposition from any of the committee members. As expected, the ISA and dental society were there with their usual talking points, but their arguments fell flat. This was an historic day for IANA as we have never had the opportunity to provide oral testimony in support of one of our bills and we generated some great momentum moving in the next legislative session. We now know that the senators very much value the economic benefit that CRNAs can provide and the access to care for all patients in Illinois. We know that before they will listen to the scare tactics spewed by our opposition, they want proof! Senator Bush was able to specifically ask the ISA to have a meeting with the IANA to bring all of the stakeholders together. This is a huge win as we have been trying to get a meeting like this set up for years and now that a senator has demanded it, we have a good chance of actually moving

forward. And a meeting between all of the stakeholders has been something that house and senate members have wanted before supplying a vote.

On the national level, the Mid-Year Assembly was held virtually this year. Our Federal Political Director, Paul Pritts, organized meetings with Senators Durbin and Duckworth as well as Representatives Davis, Kinzinger, Lahood, Kelly, Schneider, Schakowsky, and Underwood. These meetings all went very well and there has been some positive recent follow up with regards to a "Dear Colleague" letter that will provide a guideline to congress on the promulgation of rule-making for the provider non-discrimination language that was passed in the No Surprise Act. These rules will ensure that services provided by a CRNA or an MD are reimbursed equally by insurers. Other talking points during the Mid-Year meetings included full practice authority in the VA system, permanent removal of supervision requirements that were placed under emergency order during COVID, and improving access to care in rural America.

The IANA is hoping to continue to make progress towards removal of practice barriers in Illinois, but we need your help! We have never seen member engagement as high as it is right now and we need to continue to recruit more CRNAs and SRNAs. We now have an AA taskforce and a robust point-of-contact list. The goal is to have a POC at every hospital that has CRNAs in the state, especially in rural areas and critical access hospitals. We can rapidly access practice information

from these POCs as well as supply information when actionable items occur. If you have interest in serving on the AA taskforce or being a POC, please email [ianapresident@gmail.com](mailto:ianapresident@gmail.com). We are also working to build effective coalitions within the state as well as with neighboring states.

Over the summer, the IANA board will be evaluating our lobbying team, editing and expanding our fact sheets in preparation for the next legislative session, continuing grass roots efforts with legislators in the form of in-district meetings, and improving member engagement with both CRNAs and SRNAs. You can help our efforts by working as your own personal PR firm every time you introduce yourself to your patient. Make sure they know who is at the head of the bed for every beat and every breath. If you are working with a SRNA, make sure you discuss how advocacy efforts are like insurance for our profession. If you are at the lunch table with your CRNA colleagues, make sure they are members of our Illinois CRNAs and SRNAs Facebook group, and show them how to set up monthly donations to the PAC. And if you are interested in sharing our value with your state Representative or Senator, let us know and we will be more than happy to lead a meeting with you as a constituent. It is through these small, consistent efforts that we will make the greatest impact.

We have a strong board with an eager pipeline of leadership to follow. As you can see, the IANA is hard at work to advance your practice. Join us!



Julia Feczko, DNP, CRNA Testifying Virtually



Joe Grazaitis, DNP, CRNA Testifying Virtually



I A N A

# LETTER FROM THE EDITOR

**W**elcome to our new editorial staff at the IANA Journal. Representatives from each of the five programs in Illinois will be working with me to produce an even better product. This edition highlights the fruits of this new collaboration. In this edition we are introducing a section called the CRNA spotlight. Here we plan to shine a light on special work that CRNAs in Illinois are doing. If you know someone that would be a candidate for this section, please reach out so we can work with you on writing up their story. Additionally, Leah Becht, CRNA, DNP is leading the charge to highlight students during their clinical training with the Student Vigilance Award. Of course we are all vigilant every day, but in this section we aim to highlight the actions of trainees and also tell you a little bit about them. Students highlighted in this section will receive an award from the association of complimentary admission to a fall or spring state meeting. If you know of a student vigilance situation that

you'd like to share with the members, please get in touch with Dr. Baecht to work on your submission.

As we come out of hibernation / isolation, there is an opportunity to learn from that season and emerge with a new sense of gratitude and hope. I read about and personally participated in many acts of community support over the last year that I would not have otherwise, and that provided a great deal of personal growth and self-reflection. The time not spent running kids around to activities allowed me to use those hours practicing mindfulness meditation and reading about attributes of resilience. There are many silver linings to be found. But the main lesson I took this year comes from J.M. Barrie, "Be kinder than necessary, because everyone you meet is fighting some kind of battle." This is a good word to reflect on in our interactions online and in person. Living this mantra, albeit not perfectly, has provided a great deal of peace. Wishing you all more peace in the coming, liberated year.

## THANK YOU TO OUR PLATINUM SPONSOR!



# Memorial Health

# MYOCARDIAL INFARCTION IN A PATIENT WITH NO KNOWN CARDIAC RISK FACTORS FOLLOWING INDUCTION OF GENERAL ANESTHESIA: A CASE REPORT

**Lisa Blacketter | MSN, CRNA | Leah Baecht | DNP, CRNA, APRN**

**Author Notes: Kelsey Park | DNP (c), SRNA**

## ABSTRACT

Myocardial infarctions (MIs) in the perioperative setting are rare but potentially lethal. Patients with multiple comorbidities or those undergoing high-risk or emergency surgery are usually more susceptible to anesthetic complications than healthy patients undergoing low-risk surgeries. This case report describes a 70-year-old, healthy female patient with no known history of cardiovascular disease presenting for elective gynecologic surgery, who experienced a myocardial infarction shortly after the induction of general anesthesia. Along with new ST-segment changes, the patient also had erythema covering her chest that was not present before induction. Diphenhydramine, intravenous fluids, and nebulized albuterol were administered to combat a potential allergic reaction. A 12-lead EKG performed in the operating room (OR) confirmed the ST-segment changes, the case was canceled. The patient was stabilized, extubated, and taken to the Post Anesthesia Care Unit (PACU), where cardiology was waiting for consultation. Upon emergence, the patient complained of chest tightness and was promptly escorted to the catheterization lab. An 80% blockage was identified in the right coronary artery (RCA), a stent was placed. The patient was admitted overnight, then discharged home the next day. Appropriate anesthesia monitoring allowed for prompt recognition and management of a myocardial infarction that may have otherwise gone undetected.

**Keywords:** Myocardial infarction (MI), perioperative, anesthesia, STEMI, NSTEMI

Myocardial infarction (MI) can be fundamentally defined as myocardial cell death resulting from prolonged ischemia.<sup>1</sup> However, the universal definition of MI is constantly evolving.

The fourth and most recent, universal definition states that a MI is signified by the presence of acute myocardial injury, detected by cardiac biomarkers, in the setting of acute myocardial ischemia.<sup>1</sup> Acute myocardial infarction (AMI) is associated with significant short and long-term morbidity and mortality. AMI patients who survive the initial cardiac event have a substantial risk for future cardiovascular events, including recurrent MI, heart failure, cerebrovascular accident, and death.<sup>2</sup> Despite advanced in preoperative screening and testing, perioperative myocardial infarction (PMI) represents the most common cardiovascular complication following non-cardiac surgery.<sup>3</sup>

Her background is a little different than most CRNAs. She first worked as a Veterinary Anesthesia Technician at the University of Illinois Veterinary Teach Hospital before entering nursing school. She spent most of her time administering anesthetics to dogs, cats, and horses. A couple of times a year, she would have the opportunity to travel to Indiana to care for lions, tigers, and leopards. (Oh my!) She was also able to participate in research studies during her time at U of I. After a couple of years of working as a vet tech, Kelsey decided she wanted to further her education. She knew she loved anesthesia, so she decided to shadow a CRNA at Pekin Hospital. Kelsey remembers being convinced she should begin her journey to become a CRNA after that one experience, so she immediately applied to nursing school.

Kelsey's primary goal was always to get accepted into a nurse anesthesia school, but she also had other interests. She reports really enjoying population health and cultural studies. She organized a wellness event at a local homeless shelter that emphasized the importance of mental wellbeing, where they offered different types of coping strategy stations.

Kelsey also had the opportunity to travel to a Native American reservation in South Dakota in lieu of a traditional population health course. Before leaving for South Dakota, Kelsey and the group raised money to buy supplies for the community. As a result, they were able to give away shoes, clothes, car seats, and even health supplies such as pedometers and glucometers. They also performed free blood pressure and blood glucose checks in store parking lots.

Once Kelsey begins working as a CRNA, she plans to be active on hospital committees where she can incorporate her skills for organizing community wellness events.

Professionally, Kelsey is passionate about chronic pain management. Living in rural areas for most of her life has helped her recognize a multitude of hard-working people struggling with pain. Kelsey identifies farmers, construction workers, veterans, factory workers, large-animal veterinarians, and so many others must work through their pain on a daily basis to provide for their families and community. Kelsey states, "People deserve access to high-quality care, and CRNAs hold a special skill set that enables us to give back to our community."

As a SRNA, Kelsey has spent time furthering her knowledge of pain management by attending outside pain management conferences and by assisting the SIUE faculty with ultrasound guided regional anesthesia conferences at the school.

During her job search, she is exclusively looking to work in a rural area that allows her to use her full scope of practice and encourages professional growth. She accepted a position at Crawford Memorial Hospital, which is a critical access hospital with a CRNA-only anesthesia team. CMH also has chronic pain management clinic that is staffed by independent CRNAs. After a few months in the OR, Kelsey plans to work closely with CRNA pain specialists, Joe Grazaitis and Kyle Hardiman, until she is ready to begin a chronic pain management fellowship. She plans to become an interventional pain specialist as well as work in the OR.

Outside of work and clinical, this energetic student enjoys spending time with her family and dogs. In the summer, you can find her hiking or relaxing on a pontoon boat. Congratulations to Kelsey on being our first Vigilance Award recipient and welcome to the amazing world of anesthesia practice. You will contribute much to this profession while serving the people of Illinois.

## CASE SUMMARY

A 70-year-old female with no known history of cardiovascular disease presented for an elective gynecologic surgery. The patient weighed 71 kg and measured 163 cm, resulting in a BMI of 26.9 kg/m<sup>2</sup>. Her history included uterine prolapse, Vitamin D deficiency, and a penicillin allergy. The patient reported one prior anesthetic in the 1980s, denying any anesthetic issues. Approximately one week before surgery, the patient had an EKG that showed sinus rhythm at a rate of 59 beats/min with no evidence of myocardial ischemia or injury.

Additionally, she had a chemistry panel, a complete blood count, and a COVID-19 test, which were within normal limits for all values. The preoperative hemoglobin and hematocrit were 14.0 g/dl and 41.9 %, respectively. The patient reports taking a multivitamin and Vitamin D capsule daily. She denied chest pain, shortness of breath, smoking, diabetes, or recent upper respiratory infection symptoms during her exam. The patient reported engaging in aerobic exercise several times per week. The preoperative vitals were as follows: blood pressure 112/73 mmHg, heart rate 72 beats/min, SPO<sub>2</sub> 98%, respirations 16 beats/min, and temperature 37.0 degrees Celsius. After reviewing diagnostic tests, medical history, and the in-person preoperative evaluation, the patient was deemed a Physical Status I.

The patient was escorted via stretcher to the operating room where the following monitors were applied, including a 5-lead EKG, a non-invasive blood pressure cuff, a pulse oximeter (SPO<sub>2</sub>), end-tidal capnography, and a skin temperature probe. The patient was preoxygenated for 3 minutes prior to a standard intravenous induction for general anesthesia including, 50 mcg of fentanyl, 80 mg of lidocaine, 150 mg of propofol, and 50 mg of rocuronium. No antibiotics were administered. The first attempt at intubation was successful and atraumatic; however, the patient's systolic blood pressure reached 155 before returning to the patient's baseline systolic pressures ranging from 100 to 110 mmHg. Minutes later, while positioning the patient for surgery, the patient's EKG exhibited a run of ectopic beats followed quickly by sinus tachycardia at 130 beats per minute (bpm) with a blood pressure of 173/84 mmHg and pulse oximetry of 96%. At this time, erythema began to cover the patient's chest that was not present before induction. Concurrently, the patient started having ST-segment changes in Leads I, III, aVL, and aVF on the anesthesia monitor.

In Lead I, the ST-segment increased from 0.2 to 2.9 mm. Lead III demonstrated an ST-segment decrease from 0.1 to -3.0 mm. Additionally, Lead aVL climbed from 0 to 2.9 mm, while aVF decreased from 0.2 to -1.5 mm.

Upon recognition of the patient's change in status, a bolus of Lactated Ringers was initiated, and 25 mg of IV diphenhydramine administered to combat a potential allergic reaction. Shortly after the administration of diphenhydramine, the erythema on the patient's chest disappeared, and the blood pressure decreased to 149/75 mmHg. Within 15 minutes, her blood pressure came down to 122/68 mmHg, and her heart rate gradually reduced from 130 to 75 bpm. However, the ST segment still appeared to be elevated in Lead I. A 12-lead EKG was performed in the operating room upon the request of the anesthesia providers, and the cardiologist was immediately called with the results. Following the discussion with the cardiologist and the surgeon, the case was aborted. The patient vital signs were stable. An albuterol treatment was administered via the endotracheal tube prior to reversal with sugammadex and uneventful extubation. The patient emerged from anesthesia smoothly, the vitals remained stable and the patient denied any chest discomfort. She was then transported to the post anesthesia care unit (PACU), where the cardiologist was waiting to evaluate her.

Upon arrival to the PACU, the cardiologist interviewed the patient and admitted her for continued observation once she fully recovered from anesthesia. Another 12-lead EKG was performed, and cardiac blood tests were drawn in the PACU. ST changes were still present, and the initial Troponin-I level was 0.749 ng/ml. Approximately 20-30 minutes into her PACU course, she began to complain of mild chest tightness. The decision was promptly made to transfer her to the cardiac catheterization lab for further evaluation and treatment.

Once in the cardiac catheterization lab, an 80% blockage of the right coronary artery (RCA) was identified (figure 1), and her ejection fraction (EF) was 40%. The cardiologist placed a drug-eluting stent in the RCA and admitted the patient for overnight observation. Subsequent laboratory tests showed elevation of Troponin-I levels: 3.5 ng/ml, then 3.4 ng/ml, respectively. Cardiology also ordered a chest radiograph, which showed no effusions or infiltrates. Post-stent placement, the patient's EF was 48%.

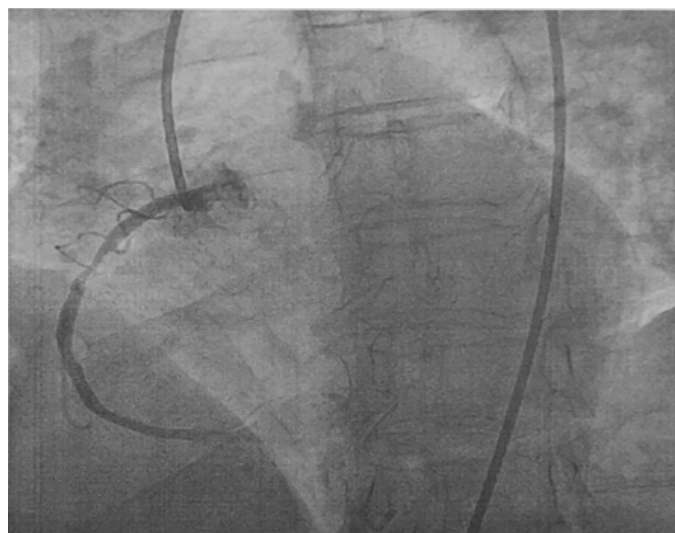


Figure 1-80% RCA Occlusion

The initial cardiac consultation indicated that the patient had an ST-segment elevation myocardial infarction (STEMI) based on the EKG changes. However, because the patient had ST elevations in the anterior leads and reciprocal depressions in the inferior leads, a lesion would have been expected in the left anterior descending (LAD). The cardiologist diagnosed this event a non-ST segment elevation myocardial infarction (NSTEMI) since the lesion was found to be in the RCA based on the cardiac catheterization.

By the following day, the cardiac laboratory tests started to trend downward. The repeat troponin improved from 3.4 ng/ml to 1.9 ng/ml. The remainder of her metabolic panel was unremarkable. The patient was stable and denied chest discomfort. The patient was started on the following therapies, aspirin, ticagrelor, and atorvastatin. Lisinopril and metoprolol were discussed for heart failure; however, the patient's blood pressure was 98/56 mmHg; therefore, the cardiologist opted to hold these medications until the follow-up appointment. The patient was discharged to home and instructed to follow up with her primary care physician and the cardiologist.

## DISCUSSION

### *Identifying Risk Factors for myocardial infarction*

Identification of the patient's cardiac risk factors is vital to the preoperative assessment. According to Thanavaro<sup>4</sup>, significant patient-related risks are markers of active cardiac conditions. These risks include unstable angina, MI, coronary artery

bypass surgery within six weeks, ongoing ischemia, malignant arrhythmias, symptomatic bradycardia, or severe aortic stenosis. These risk factors warrant further cardiac testing before proceeding with elective surgery.<sup>4</sup> Intermediate patient-related risks include controlled coronary artery disease, prior MI between 6 weeks and three months prior, stable angina, low ejection fraction, diabetes mellitus, compensated congestive heart failure (CHF), or previous perioperative ischemic events and are evaluated by the Revised Cardiac Risk Index (RCRI).<sup>4</sup> Lastly, minor patient-related risks such as hypertension, left ventricular hypertrophy, and age greater than 70 are markers that signify an increased probability of developing coronary artery disease.<sup>4</sup> These minor risks do not require any further testing. Functional capacity and activities of daily living can also help provide a more comprehensive clinical picture.

Several risk stratification systems help streamline the provider's assessment and care of the preoperative patient. However, the RCRI tends to be one of the most popular, likely due to its ease of use. The RCRI allocates points for surgical risk and comorbidities, designates the patient as Class I-IV, and then quantifies the patient's surgical risk for a significant perioperative cardiac event. The categories in which points are assigned are high-risk surgeries, history of ischemic heart disease, history of cerebrovascular disease, CHF, preoperative use of insulin, and preoperative serum creatinine greater than 2.0 mg/dL.<sup>5</sup> Patients at intermediate or high-risk following risk identification warrant further non-invasive assessments, such as a stress echocardiogram, to detect myocardial ischemia.<sup>5</sup> Notably, as the patient in this case report was a healthy 70-year-old, she did not have any significant, intermediate, or minor risk factors for a cardiac event.

#### **RECOGNIZING A PERIOPERATIVE MI**

Every patient undergoing an anesthetic, regardless of individual risk factors, should be monitored according to the standards of care. Standardized monitoring should include continual evaluation of the patient's oxygenation, ventilation, circulation, and temperature as the patient's status can change rapidly.<sup>6</sup> During the case discussed above, the patient was monitored using a 5-lead EKG, which allowed the anesthesia providers to quickly detect ST-segment changes indicating possible myocardial injury in Leads I, III, and aVF. It is important to note that while a 3-lead system is capable of detecting arrhythmias,

its utility is limited when monitoring for myocardial ischemia compared to a 5-lead EKG.<sup>7</sup>

#### **UNDERSTANDING MI TYPES AND DIAGNOSES**

There are currently five types of MIs outlined in the literature, with three subsections of Type-4. Royo and Fleisher identify Type-1 and Type-2 MIs as the major PMI categories.<sup>3</sup> A type-1 PMI occurs when a spontaneous rupture of a plaque causes an acute coronary thrombosis, leading to ischemia and infarction.<sup>3</sup> In contrast, a type-2 PMI represents a prolonged imbalance of myocardial oxygen supply and demand, tends to present as a silent, heart rate-related ST-segment depression on an EKG, and may account for over 65% of all MIs in the perioperative setting.<sup>3</sup> The Type-2 MI more closely matches the clinical signs and symptoms seen in this patient.

The diagnosis of a Type-2 MI requires the detection of a rise and fall in cardiac troponin enzymes with a minimum of one value that is above the 99th percentile of the upper reference limit, an indication of an imbalance of myocardial oxygen supply and demand, in addition to acute onset clinical findings. The diagnosis parameter above must also accompany at least one of the following symptoms of acute myocardial ischemia, the development of Q waves, new ischemic EKG changes, or imaging suggestive of recent damage to the myocardium or new regional wall motion abnormality consistent with ischemic etiology.<sup>1</sup>

As noted above, the patient's signs and symptoms indicated an imbalance of myocardial oxygen supply and demand. Prior to induction, the patient was asymptomatic, but had an unknown occlusion of the RCA. The stress of induction and intubation may have exacerbated the patient's condition, leading to myocardial ischemia; however, her vitals quickly returned to baseline and then spiked again later.

Another possibility is the patient suffered an allergic reaction to an induction agent, causing increased stress to the heart, as the erythema on her chest disappeared after the administration of diphenhydramine. Epinephrine was avoided due to the patient's hyperdynamic state. Glucocorticoids were not administered due to the rapid disappearance of erythema from the patient's chest with diphenhydramine administration. Neuromuscular blocking agents (NMBAs) are the leading cause of IgE-mediated hypersensitivity reactions and may account for up to 60% of anaphylactic reactions in patients undergoing general anesthesia.<sup>8</sup> Succinylcholine and

rocuronium are the most frequently cited, however, all muscle relaxants exhibit either a tertiary or quaternary ammonium group which is likely the allergenic component.<sup>8</sup> For a reaction to be considered IgE-mediated, a previous exposure to the allergen must have occurred. Interestingly, several of the documented patients who experienced an anaphylactic reaction had no prior exposure to a NMBA, suggesting that there may be external or environmental exposure to these ammonium groups.<sup>8</sup> Substituted ammonium ions are present in a variety of chemical compounds including both over the counter and prescription medications, as well as common household disinfectants, and are hypothesized to play a role in cross-reactivity.<sup>8</sup>

A tryptase level was requested by the anesthesia providers to help determine whether an allergic reaction had occurred, however, the order was missed and was unable to be drawn in the appropriate time frame. Allergy testing after discharge may be indicated to determine the specific allergen, which can then be avoided in future anesthetic encounters.

#### **MI TREATMENT RECOMMENDATIONS**

When an MI is suspected, recommendations are to initiate EKG monitoring as soon as possible to detect malignant arrhythmias, myocardial ischemia, or ST-segment elevation. In this case, the anesthesia providers called for a more comprehensive, 12-lead EKG while in the OR. In the event of a STEMI, anesthesia providers should initiate reperfusion therapy as soon as possible. Primary percutaneous coronary intervention (PCI) is the preferred reperfusion strategy in patients with STEMI within 12 hours of symptom onset, provided it can be performed within two hours of STEMI diagnosis by an experienced team.<sup>9</sup> Cardiac biomarkers should be drawn but should not delay the PCI. Providing analgesia is also vitally crucial since pain increases sympathetic activation, leading to vasoconstriction and increased workload of the heart.<sup>9</sup> Intravenous opioids are commonly selected for this use; however, morphine should be used with caution because it can diminish the effects of oral anti-platelet medications.<sup>9</sup> Oxygen supplementation is advised in hypoxic patients with an arterial oxygen saturation of less than 90%.<sup>9</sup> Some evidence suggests that hyperoxia may be detrimental in patients with uncomplicated MI.<sup>9</sup> The patient may also need hemodynamic support, coronary vasodilation, or mechanical ventilation to

decrease myocardial oxygen consumption during an AMI.<sup>9</sup>

Once reperfusion is established, patients should have continuous EKG monitoring for at least 24 hours.<sup>9</sup> The patient may require more prolonged monitoring if she is at increased risk for cardiac arrhythmias, has an ejection fraction less than 40%, has other critical coronary stenoses, or is hemodynamically unstable. In most patients, triple therapy, utilizing aspirin, clopidogrel, and an oral anticoagulant, should be considered for the first six months.<sup>9</sup> After the first six months, either the aspirin or clopidogrel may be eliminated from the regimen, and after one year, only the anticoagulant is necessary.<sup>9</sup> This regimen may need to be tailored in patients with an unusually high risk of bleeding.

#### **CONCLUSION**

Myocardial infarctions can occur unexpectedly, even in seemingly healthy patients. Continuous EKG monitoring during anesthesia is a standard of care for all patients, independent of risk factors. It is generally understood that a 5-lead EKG is significantly more likely to detect myocardial ischemia than a 3-lead EKG. Also, it is essential to note that without the use of a 5-lead EKG, this MI may have gone undetected. Timely recognition and management of a perioperative MI may decrease myocardial damage and improve patient outcomes overall.

#### **REFERENCES**

1. Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction. *European Heart Journal*. 2018;40(3):237-269.
2. Jneid H, Addison D, Bhatt, DL, et al. AHA/ACC Clinical Performance and Quality Measures for Adults With ST-Elevation and Non-ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. *Journal of the American College of Cardiology*. 2018;70(16):2048-2090.
3. Royo MB, Fleisher LA. Chasing myocardial outcomes: perioperative myocardial infarction and cardiac troponin. *Canadian Journal of Anesthesia*. 2016;63(2):227-232.

4. Thanavaro JL. Cardiac Risk Assessment: Decreased Postoperative Complications. *AORN Journal*. 2015;101(2):201-212.

5. Pannell LM, Reyes EM, Underwood SR. Cardiac risk assessment before non-cardiac surgery. *European Heart Journal - Cardiovascular Imaging*. 2013;14(4):316-322.

6. American Society of Anesthesiologists. Standards for Basic Anesthetic Monitoring. <https://www.asahq.org/standards-and-guidelines/standards-for-basic-anesthetic-monitoring>. Published 2020. Accessed April 19, 2021.

7. Atchabahan A, Gupta R. Intraoperative EKG. In: Bingham AE, Kachulis B, ed. *The Anesthesia Guide*. New York: McGraw-Hill Medical; 2013.

8. Brusch AM, Clarke RC, Platt PR, Phillips EJ. Exploring the link between pholcodine exposure and neuromuscular blocking agent anaphylaxis. *British Journal of Clinical Pharmacology*. 2014;78(1):14-23. doi:10.1111/bcp.12290

9. Ibanez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). *European Heart Journal*. 2017;39(2):119-177.

# NORTHSHORE SCHOOL OF NURSE ANESTHESIA PROGRAM UPDATE

**Karen Kapanke | DNP, CRNA. Administrative Director**

**T**his year the School underwent a leadership transition as Administrative Director Dr. Pamela Schwartz DNP, CRNA, retired after 26 years. Dr. Karen Kapanke DNP, CRNA assumed the role of Administrative Director and Dr. Julia Feczko, current IANA President, became the Assistant Director. The School is most grateful to Dr. Schwartz for her years of dedicated service. NorthShore also welcomed alumni Dr. Jeff Matson PhD, CRNA. Dr. Matson joins Dr. Veronica Drantz PhD, Dr. Katie Coletto DNP, CRNA, Dr. Susan Krawczyk DNP, CRNA, and Dr. Anne Sauri DNP, CRNA as faculty at NorthShore.

The Class of 2021 presented the results of their DNP Projects in May during NorthShore's DNP Dissemination Day. Dissemination Day marked the culmination and completion of the DNP projects for the Class of 2021 in collaboration with DePaul University. This year's DNP projects included two Systematic Reviews- a first since NorthShore's first DNP cohort in 2016.

Nurse Anesthesia Trainees of the Class of 2021 will participate in the DePaul Spring Commencement ceremony in June, and complete their entire program of study with NorthShore in late August. As the Class of 2021 prepares for graduation, the School is busy welcoming and interviewing applicants of what will be the Class of 2025.

After a year-long hiatus, NorthShore is thrilled to resume it's Honduras Surgical Brigade trips in July 2021. Dr. Kapanke and former Administrative Director Dr. Bernadette Roche EdD, CRNA will travel with 3 senior Nurse Anesthesia Trainees to provide anesthesia services over the course of a week in a surgery center outside of the capital city of Tegucigalpa, Honduras. Over the past year, Dr. Kapanke and Dr. Roche developed and implemented online continuing education modules for Honduran anesthesia providers. The first module launched in May and the second module is due to launch in July. This project has allowed the school to maintain our connection to our colleagues in Honduras during the past year when we could not be there in person.

NorthShore looks forward to welcoming the 25 members of the Class of 2024, who matriculate in September.

Finally, NorthShore has a major anniversary right around the corner. The Program will turn 100 years old in 2025, and plans are already underway to celebrate this centennial milestone. Look for more information about the events we have planned to mark this occasion!

# LOBBYIST UPDATE

**Taylor Uhe and Capitol Edge Consulting**

**W**hat an interesting legislative session. Due to Covid, the work of the General Assembly and thus lobbying was done remotely until the final week of session. Access to the Capitol was denied unless the chamber allowed and even then testing had to be done within 24 hours of entering the building.

Despite the limited physical presence in the capitol, there were nearly 7,000 bills introduced in January. By the end of May, 648 had passed. On behalf of nursing, we tracked hundreds of bills, some of which did not see any action at all. We also opposed several onerous bills dealing with nursing scope of practice that did not pass.

## **Bills of interest to IANA:**

**SB 2566:** An IANA initiative amending the NPA to treat all APRNs the same, and thus removing the onerous language requiring the personal presence of a physician, dentist, podiatrist, or anesthesiologist. Though the bill did not pass, for the first time the Senate Licensed Activities Committee got to hear testimony from CRNAs.

It was compelling testimony by the IANA team. During the question and answer period of the testimony, the anesthesiologists were asked by one Senator, first if she had data to support what she said regarding patient safety. She did not. That senator then asked if anesthesiologists were willing to negotiate with IANA, with the answer given in the affirmative. We have been asking for that cooperation for years, so hopefully it will happen now. Senator Bush (bill sponsor) is determined to work toward passage of this issue, as is the House sponsor Rep. Moeller. Sen Bush will schedule the meetings to take place over the summer/fall with both anesthesiologists and dentists and the IANA.

The dentists testified they oppose the language in this bill because of the belief this APRN issue would somehow open the door to increasing the scope of practice of dental hygienists! Their testimony was argumentative with a suggestion this language would allow CRNAs to solicit physicians and dentists to hire them to provide anesthesia. This was not well accepted

by the Senators on the committee.

While your bill did not pass, CRNAs were heard. We have since heard positive things about your testimony and legislators telling us they support the bill! Watch for plans to keep the grassroots active, opportunities to participate in fundraisers (in person), and other plans to showcase the work you do!

## **Other bills of interest to IANA:**

**HB 158:** The fourth pillar of the Black Caucus and pertains to healthcare. The Governor has signed this bill, so it is now Public Act 102-0004. Recall it is within this bill that requires all licensed healthcare professionals to take 1 hour of CE regarding diversity.

**HB 711:** Establishes standards for prior authorization done by insurers. An ISMS initiative, nursing was a coalition member.

**HB 3498/HB 3308:** Telehealth. Originally HB 3498 (Conroy) the language was amended onto HB 3308 prior to passage. Nursing was part of a large coalition of stakeholders convened by IHA. The coalition determined specific things needing to be in a final bill after negotiations. The coalition stayed together on this strategy and overall, most key issues were in the final bill. Important is that insurers must pay the same for telehealth care as for in-person care.

**HB 3596:** Requires a prescription for a substance classified in Schedule II, III, IV, or V must be sent electronically. Provides that notwithstanding any other provision of law, a prescriber shall not be required to issue prescriptions electronically if he or she certifies to the Department of Financial and Professional Regulation that he or she will not issue more than 25 prescriptions during a 12-month period.

**SB 677:** Dementia education. This is one of those bills mandating licensed professionals to do CE on a specific topic. In this case it requires licensed professionals, caring for patients 26 years or older to take one CE/ licensure cycle in recognizing the characteristics of dementia. There was much opposition about this by stakeholders, but to no avail. The bill was put forward by the Lt. Governor and the Alzheimer's Association.

**SB 1908:** Requires hospitals organized under the University of

Illinois Hospital Act or licensed under the Hospital Licensing Act and ambulatory surgical treatment centers licensed under the Ambulatory Surgical Treatment Center Act to adopt policies to ensure the elimination of surgical smoke plume.

**SB 2068:** Nurse Licensure Compact. We encountered the same nurse union barriers as we have in other years. Meaning, the Compact remains elusive to Illinois despite the Covid related Executive Order from last year that allowed nurses and others from other states to practice without first obtaining an Illinois license.

### Budget

As required by the Illinois Constitution, the General Assembly did pass the budget and the budget implementation plan (BIMP). The following monetary appropriations were 'given' to nursing for the 2021-22 budget:

- Secretary of State: ANA Nurses Foundation-\$25,000

(percentage of 'nurse' license plates.

- IL State Board of Education: \$73,900 for competitive nursing grants to increase the number of graduating nurses; \$ 197,400 for nurse educator fellowship grants to augment faculty salaries.
- ISAC: \$264,000 for nurse educator loan repayments.
- IDFPR: \$500,000 for the Center for Nursing Workforce.
- \$2,667,000 for nursing scholarships transferred from the Nursing Dedicated and Professional Fund to the Department of Public Health, Center for Rural Health.

It is an honor and privilege to represent IANA to the legislature. Thank you for your partnership and advocacy.

### Your Lobbying Team-

*Taylor Uhe and Capitol Edge Consulting*

## 2021 VIRTUAL IANA ANNUAL SPRING MEETING

**P**rogram Chair, Christine Salvatore, worked very closely with the Indiana Association of Nurse Anesthetists to host our first-ever joint meeting with another state. The event was held virtually on May 15th, and was very well attended with 179 CRNAs and SRNAs registered from Illinois and 136 from Indiana. AANA region 3, Peter Strube, CRNA, provided an AANA update and also spoke on the forensics of anesthesia science. Jennifer Krough, CRNA provided practice considerations for the patient with methamphetamine substance use disorder. SIUE student rep, Emily Lester discussed anesthetic management of the infant with gastroschisis. Zain Rehman, CRNA provided an extensive regional anesthesia update. Betty Mestousis, a CRNA at Northwestern Memorial Hospital, discussed the utilization of CRNAs as advanced practice nurses in the COVID ICU. Both IANA and INANA were honored to have Dr. Sallie Poepsel speak about rural anesthesia practice and the value of CRNA services. Finally, Angela Mund, CRNA and the incoming AANA

Vice President, finished off the meeting with a comprehensive review of perioperative assessment.

Not only did the meeting offer high quality pharmacology and opioid CEs for the membership, it also provided access to nationally recognized speakers through a joint effort between Indiana and Illinois. Partnerships with other Region 3 states is something the Program Chair will be looking to foster for future meetings.



# STUDENT VIGILANCE AWARD

**T**he recipient of our first Student Vigilance Award is presented to Kelsey Park, a senior SRNA in the SIUE program. Kelsey provided general anesthesia for a healthy female patient with no known history of cardiovascular disease who presented for elective gynecologic surgery. The patient experienced a myocardial infarction shortly after the induction of general anesthesia. Kelsey was able to identify the change immediately and swiftly consulted with her CRNA preceptor, Lisa Blacketter. Kelsey and Lisa acted quickly to rule out several differential diagnoses, consulted with the appropriate specialties, and ordered the necessary tests. Their quick actions led to a positive outcome for the patient.

Kelsey Park is a third-year student registered nurse anesthetist at Southern Illinois University Edwardsville, on course to graduate May 7th, 2021. She originally grew up in Pekin, IL, with her parents and younger sister. Kelsey also met her husband, Reese Park, there. She earned a BSN at Methodist College in Peoria, IL. However, she has lived in southern Illinois for most of her adult life, and she currently resides in Nashville, IL.

Her background is a little different than most CRNAs. She first worked as a Veterinary Anesthesia Technician at the University of Illinois Veterinary Teach Hospital before entering nursing school. She spent most of her time administering anesthetics to dogs, cats, and horses. A couple of times a year, she would have the opportunity to travel to Indiana to care for lions, tigers, and leopards. (Oh my!) She was also able to participate in research studies during her time at U of I. After a couple of years of working as a vet tech, Kelsey decided she wanted to further her education. She knew she loved anesthesia, so she decided to shadow a CRNA at Pekin Hospital. Kelsey remembers being convinced she should begin her journey to become a CRNA after that one experience, so she immediately applied to nursing school.

Kelsey's primary goal was always to get accepted into a nurse anesthesia school, but she also had other interests. She reports really enjoying population health and cultural studies. She organized a wellness event at a local homeless shelter that emphasized the importance of mental wellbeing,

where they offered different types of coping strategy stations. Kelsey also had the opportunity to travel to a Native American reservation in South Dakota in lieu of a traditional population health course. Before leaving for South Dakota, Kelsey and the group raised money to buy supplies for the community. As a result, they were able to give away shoes, clothes, car seats, and even health supplies such as pedometers and glucometers. They also performed free blood pressure and blood glucose checks in store parking lots.

Once Kelsey begins working as a CRNA, she plans to be active on hospital committees where she can incorporate her skills for organizing community wellness events.

Professionally, Kelsey is passionate about chronic pain management. Living in rural areas for most of her life has helped her recognize a multitude of hard-working people struggling with pain. Kelsey identifies farmers, construction workers, veterans, factory workers, large-animal veterinarians, and so many others must work through their pain on a daily basis to provide for their families and community. Kelsey states, "People deserve access to high-quality care, and CRNAs hold a special skill set that enables us to give back to our community."

As a SRNA, Kelsey has spent time furthering her knowledge of pain management by attending outside pain management conferences and by assisting the SIUE faculty with ultrasound guided regional anesthesia conferences at the school.

During her job search, she is exclusively looking to work in a rural area that allows her to use her full scope of practice and encourages professional growth. She accepted a position at Crawford Memorial Hospital, which is a critical access hospital with a CRNA-only anesthesia team. CMH also has chronic pain management clinic that is staffed by independent CRNAs. After a few months in the OR, Kelsey plans to work closely with CRNA pain specialists, Joe Grazaitis and Kyle Hardiman, until she is ready to begin a chronic pain management fellowship. She plans to become an interventional pain specialist as well as work in the OR.

Outside of work and clinical, this energetic student enjoys spending time with her family and dogs. In the summer, you can

find her hiking or relaxing on a pontoon boat. Congratulations to Kelsey on being our first Vigilance Award recipient and

welcome to the amazing world of anesthesia practice. You will contribute much to this profession while serving the people of Illinois.

## CRNA SPOTLIGHT

In this edition, the IANA is pleased to present a new feature area called CRNA Spotlight, which recognizes CRNAs who have a unique story of innovation and dedication to professional excellence. Dr. Nadie Akileh, DNP, CRNA and Dr. Dan Bermea, MBA, DNP, CRNA run the IVitalize Wellness and Therapeutics clinic in Tinley Park. Dr. Bermea began his nursing career in the Neuro ICU at the University of Illinois at Chicago Medical Center. He later completed his CRNA training at Union University in Tennessee in 2018 where he also obtained his MBA in 2019. Dr. Akileh completed his anesthesia training at Millikin University in 2016.

After anesthesia school, Dr. Akileh met a lot of independent CRNAs, some who owned their own anesthesia groups and clinics. He tapped into their knowledge, asked a lot of questions, and utilized them as a resource because of their wealth of knowledge. IVitalize Wellness & Therapeutics started as a conversation between himself and Dr. Bermea quite some time ago. He could have never imagined at the time what they would accomplish together.

IVitalize Wellness & Therapeutics is an infusion center in Tinley Park that offers ketamine, NAD+ (Nicotinamide Adenine Dinucleotide), and vitamin infusions, as well as aesthetics services. The benefits of ketamine infusions are endless. Current research is still suggesting benefits never thought possible in the past. Drs. Akileh and Bermea see patients suffering from a variety of mental health and chronic pain conditions. And say something about their success?? What are they seeing.

Due to the pandemic, there has been an increase in patients diagnosed with anxiety, and their state-of-the-art infusions have made patients feel comfortable again in their own skin. They also see patients who suffer from treatment resistant depression and those looking for a last resort effort to gain

back control of their life after long term opioid use/abuse. Most importantly, they are seeing incredible results. Dr. Akileh said that "When you meet someone at one of the lowest points in their lives and within 4-weeks see them smiling and hopeful, it truly is a feeling like no other."

Dr. Akileh enjoys that his job requires him to habitually learn, engage himself, grow, and collaborate with others. He noted that "I have yet to encounter a CRNA who isn't willing to share knowledge and offer guidance. We truly have a great community!" He still works nearly full-time in the OR. Balancing both can be difficult at times, but it's possible because of an incredibly supportive wife who works behind the scenes to make it all possible! Being an independent contractor provides the flexibility his schedule needs.

Dr. Akileh also enjoys teaching and inspiring other CRNAs to do the same. He enjoys the growth that has occurred through his journey to owning IVitalize and says that, "I face challenges regularly and I believe I will always face challenges. Challenges are motivating and produce a sense of fulfillment for me." His advice to new graduates or anyone who is thinking about starting their own business is to, "Meet people, build relationships and build confidence. Trust yourself and the path you decide to take. Don't be afraid to make mistakes and always admit your failures. Grow from them, do it different next time, and move forward. Life is too short for 'what ifs.'" If you'd like to learn more about starting what it takes to start your own infusion center or even just start your own business... Can people contact them? What contact info can we provide?

# SIUE PROGRAM UPDATE

**Kevin Stein | CRNA, DNAP; Program Director**

**G**reetings from the program faculty and students at SIUE! I'm happy to report the program has remained quite productive this past year despite the challenges we have faced due to COVID-19. We could not be prouder of our faculty and students during these extraordinary and exceptionally demanding times.

I am happy to announce the Council on Accreditation granted SIUE Nurse Anesthesia Specialization continued accreditation for 10 years effective June 3, 2020. The program was found in full compliance with the Standards for Accreditation of Nurse Anesthesia Programs – Practice Doctorate.

SIUE has continued to see a strong interest in our programs from across the region and the country. To align the needs of our communities and health systems with the high number of qualified applicants received, the program has received approval from the COA to increase our program enrollment. In anticipation for this growth, the program has been hard at work to add experientially diverse faculty and clinical sites, in addition to procuring additional simulation lab resources.

The SIUE Nurse Anesthesia Program has traditionally been included within the Department of Primary Care and Health Systems Nursing. However, after application review and University approval, the nurse anesthesia program will transition to The Department of Nurse Anesthesiology within the School on Nursing, effective July 1, 2021. This is an exciting change for us. With these transitions underway, three additional CRNA educators recently joined our team. Welcome to Justin Baecht, Wes Gallagher, and Sara Franco. One of our faculty members, Matt Bednarchik, completed his doctorate this year, so over 80% of our program faculty now hold a terminal degree.

SIUE continues to add clinical affiliate partners to provide rich clinical experiences for our nurse anesthesia students. Our latest additions include HSHS St. Joseph's Hospital – Breese, IL; HSHS St. Mary's Hospital – Decatur, IL; Champaign Surgery Center at the Fields, Champaign, IL; and SSM Health Cardinal Glennon Children's Hospital – St. Louis, MO. Our program now provides a diverse clinical experience to our students at 44 clinical facilities including hospitals, surgery centers, and

office-based anesthesia locations.

The Center for Simulated Learning at SIUE provides our students access to practice clinical skills in a safe environment. To meet the School of Nursing's immediate needs to support rapid enrollment growth, an additional simulation lab was completed just in time for the fall semester. The new lab provides students in the nurse anesthesia program with an environment that mimics an operating room suite. Through high-fidelity simulations designed by our faculty, students are able to transfer the theoretical knowledge they learn in the classroom into clinical practice in a safe and controlled environment. High-fidelity simulations will enhance student confidence and prepare them for hands-on patient care throughout central and southern Illinois communities.

Illinois Governor J.B. Pritzker announced in January the release of planning funds to create preliminary designs for a \$10.5 million Health Science Building (HSB) on the SIUE campus. At approximately 221,000 square feet, the HSB will facilitate more simulation training, research and growth in programs within nursing, pharmacy and related health science areas. It will be the largest building on the SIUE campus.

Laura Bernaix is retiring as dean of the Southern Illinois University Edwardsville School of Nursing (SON), effective May 31. Dean Bernaix's service to the University, the community and healthcare field have made a tremendous impact. The SON has experienced significant expansion, developed innovative programs, and provided an exemplary model for creative partnerships. With record enrollment and exciting new initiatives, the School thrived during her tenure. Also retiring at the end of May is the SON's associate dean for academic programs and community/global partnerships, Roberta Harrison. Both Dean Bernaix and Associate Dean Harrison will be missed, and we wish them the best in the next chapter of their lives.

The program graduated 25 students in May. We are very proud of the accomplishments of our class of 2021 and are excited for them as they transition from student to novice practitioner. Their high level of training has resulted in the aggressive recruitment by area hospitals, and over 90% of our 2020 graduating class accepted positions within our network of clinical affiliates.

The passion, innovation, and enthusiasm of our program faculty, clinical coordinators, and alumni have positioned SIUE to be a national leader in nurse anesthesia education. Producing top notch practitioners through a diverse and high-level educational experience is our top priority. Gifts made

through the SIUE Foundation help meet the needs of the Nurse Anesthesia Program and provide our students with additional opportunities. We welcome the opportunity to discuss how your gift can impact our program and our students. Please contact Patricia McDonald at [pmcdona@siue.edu](mailto:pmcdona@siue.edu) for additional information.

## PODCAST

A couple of hard-working and innovative nurse anesthesia students at Millikin University and Decatur Memorial Hospital have created a podcast called the "Student Nurse Anesthesia Podcast". The goal of the podcast is to provide a condensed narrative discussion about anesthesia topics from an educational standpoint. The podcast began with Cole Dill and Tanner Hulin getting together as study partners. They would discuss assigned anesthesia content prior to each test. They found the narrative discussions about the topic rather than listing off facts seemed to work well for better understanding the concepts and they were seeing success in passing exams. One of the things they found, however, was due to the extensive amount of detailed information required to pass anesthesia school, they forgot half of the information by the time they reached the final exam. They wished they could "freeze time". Since they knew the most detailed information on the topic on the day of the test, they decided to record their discussion. This way, they could refresh their brains for the final exam and then boards after graduation. Once their classmates heard about the recordings, they wanted to listen. After listening to the information, their classmates were benefitting from the information and encouraged Cole and Tanner to publish their content.

In February 2020, the first episode was published through a platform called "Buzzsprout". Buzzsprout distributes the audio recordings to multiple podcast media such as "Apple Podcasts" "Spotify" "Google Podcasts". Each episode includes a comprehensive review of an anesthesia topic correlated with a test in the anesthesia curriculum. Due to most anesthesia programs having the same curriculum, their content proved

relevant to many students. In the first year of publishing the podcast, they have received roughly 75,000 downloads with listeners in all 50 U.S. states and 80 countries! They estimate approximately 1/3rd of the anesthesia students in the U.S. listen to the podcast. In addition, their listeners include CRNAs wanting to refresh on information they haven't used in a while along with ICU nurses who are applying to anesthesia school.

When asked about the future of the podcast, Cole and Tanner state they are still in the rapidly growing phase of the business and continue to be amazed at how the listener count climbs at an exponential pace. They began marketing the podcast to anesthesia schools and awarded their first annual scholarship in December 2020. This scholarship provides financial support to current anesthesia students. Cole and Tanner state the primary goal with the podcast has always been to provide quality academic information for anesthesia providers to listen to while they drive, exercise, or do mundane tasks. From this experience, Tanner and Cole note they have built a solid foundation of anesthesia knowledge as they have used this podcast as our main form of studying while going through our anesthesia program. It provided the incentive for us to dig deeper in our studies to provide quality information to our listeners. They state "we have learned how to dream big and strive to accomplish our goals. Often, we are prone to dismiss our ideas and never turn them into reality. It has been incredible to see what started as a small idea and dream turn into fruition. We are grateful for the opportunity to attend a program which has provided us the academic foundation to start this podcast and are excited to see where it leads us as we graduate at the end of 2021".



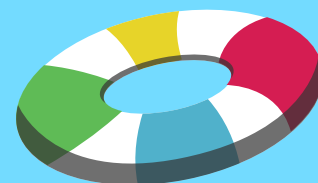
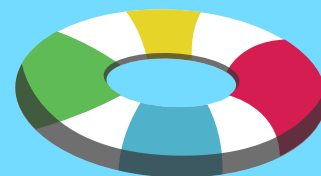
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GROUPS & MEETINGS



**2021 IANA  
FALL CONFERENCE  
October 23-24**



# WHAT WE SAY MATTERS: A SURVEY OF ANESTHESIA PROVIDERS' KNOWLEDGE AND BELIEFS

Stefanie Glasgow | DNP, CRNA | Lindsey Harris | DNP, CRNA

Julia Feczko | DNP, CRNA | Karen Kapanke | DNP, CRNA

## ACKNOWLEDGEMENTS

DePaul University DNP Research Professor: Joseph D. Tariman, Ph.D., ANP-BC, FAAN

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## ABSTRACT

**Background:** Pain is a serious concern and fear of patients. Those requiring anesthesia are vulnerable, so the words that are used, and how they are said, matters. Emerging research has demonstrated that the use of positive language can positively influence a patient's perception of pain.

**Purpose:** This study surveyed Illinois Association of Nurse Anesthetists (IANA) members' current knowledge and beliefs on Positive Language and the Nocebo Effect related to patient outcomes.

**Methods:** Participants were supplied with an evidence-based fact sheet which provided information on positive language and examples in anesthesia practice. Participants then completed a survey regarding their knowledge and beliefs before and after the survey as well as open-ended questions to assess barriers.

**Results:** The mean knowledge and belief score increased from 2.76 before reading the fact sheet to 3.39 after. The Cronbach's alpha indicated reliability of the questionnaire (0.784 before, 0.794 after). Knowledge acquisition was best in the age group of 30-49, >20 years of experience, an urban practice setting, and a master's degree.

**Conclusions:** This study is the first to report anesthesia providers' knowledge toward Positive Language and the Nocebo Effect and lead the way to the creation of a comfort scale.

**Keywords:** positive language, negative language, nocebo effect, opioid crisis, anesthesia

## INTRODUCTION

Positive Language is a powerful tool healthcare providers can use, even subconsciously, to improve patient outcomes by decreasing patients' perceived level of pain. It encompasses words and phrases associated with a pleasant connotation.<sup>1</sup> It can be as simple as asking about a patients' comfort level instead of pain. Negative language correlates directly with increased reports of pain.<sup>2,3</sup> Even when the provider has good intentions, negative language is associated with unpleasant emotional content.<sup>1</sup> Examples of negative language include phrases such as "sting and a burn," or the use of the word "pain" with medical procedures.<sup>4</sup> While having pure intentions, using negative language to warn patients about potentially painful or uncomfortable stimuli can increase their level of discomfort.<sup>2</sup>

The nocebo effect occurs when negative expectations produce a detrimental effect, which is a self-fulfilling prophecy of negative expectations.<sup>2</sup> Nocebo-induced hyperalgesia during local anesthetic injection was demonstrated in a study in which patients presenting for scheduled cesarean section were randomized into two groups. When the lidocaine skin wheal was injected before neuraxial anesthesia placement, the nocebo group received language such as "big bee sting" while the placebo group received language such as "numb the area" to make you "comfortable."<sup>2</sup> The participants in the nocebo group reported significantly higher pain scores than those in the placebo group ( $p < 0.001$ ).<sup>2</sup> The same effect on the patient experience was found when studying positive versus negative language prior to an intravenous catheter insertion.<sup>4</sup>

Negative stimuli or language not only elicit negative experiences but induce physiological changes as well. Functional MRI (fMRI) found that as expected pain increased, so did activation of the thalamus, insula, prefrontal cortex, and anterior cingulate cortex.<sup>5</sup> Assessing pain is a necessary form

of communication in clinical practice, however providers must be cognizant of jargon that elicits the nocebo effect. Studies assessing pain via a comfort scale versus a pain scale have found that more pain was reported in the group that was assessed with the pain scale versus the comfort scale.<sup>3,6</sup>

Research involved in the nocebo effect often have drawbacks and limitations due to ethical constraints.<sup>7</sup> There are no known studies to date that focus on the use of positive language for anesthesia providers, and only one article was found to offer sample language for anesthetists. A potential knowledge gap exists in the communication skills of the anesthetist. Communication with patients is an important contributor to patient satisfaction, anxiety, and comfort, yet anesthetists frequently communicate with patients in ways research has considered suboptimal.<sup>8</sup> Certified Registered Nurse Anesthetists (CRNAs) are present throughout the entire perioperative course, and therefore have the potential to be influential forces on patients and their comfort levels.

The goal of this study was to assess current use and understanding of positive language by anesthesia providers in Illinois as well as potential barriers to use. The following clinical questions were answered during this research study: 1) What are anesthesia providers' knowledge and beliefs on positive language and patient's perceptions of pain? 2) What are anesthesia providers' knowledge and beliefs towards incorporating the use of positive language and phrases into their practice? 3) Is there a knowledge

## What We Say Matters: The Power of Positive Language

### 5 Fast Facts:

#### 1 Positive Language

↓ Reported pain

**EVIDENCE**  
Positive language= descriptive words that encourage favorable outcomes

- Patients assessed postoperatively about comfort reported less pain than those assessed for pain (She, White, Tan, Dowling & Cyna, 2013)

**SIGNIFICANCE**

- Asking a patient directly about pain can lead to more reported pain

#### 2 Negative Language

↑ Reported pain

**EVIDENCE**  
Negative language triggers nocebo effect = increased pain and anxiety

- Warning a patient before an invasive procedure (i.e. IV start) → leads to more reports of pain (Dix & Gupta, Brown & Cyna, 2007)

**Nocebo effect: self-fulfilling prophecy of negative expectations**

- patients can be influenced by suggestions of pain

**SIGNIFICANCE**

- Do not use negative language to warn a patient ("pinch and a burn") prior to a procedure perceived as painful

#### 3 Positive words to incorporate:

Comfort, numb

#### 4 Negative words to avoid:

Pinch, burn, sting, poke

#### 5 Sample positive phrases to incorporate into your practice:

**IV start:** "I'm going to inject local anesthetic to numb the site"

**Propofol Administration:** "This medicine is going to send you off to sleep"

**Pre-Op:** "The goal is for you to wake up comfortable"

**PACU:** "How are you feeling? Are you comfortable?"

**C-Section SAB/Epidural Localization:** "This medicine will numb the area to keep you comfortable during the procedure"

References  
Choo, C.S.L., White, A.M., Tan, S.G.M., Dowling, K., & Cyna, A.M. (2013). Pain vs comfort scores after Caesarean section: a randomized trial. *British Journal of Anaesthesia*, 110(5), 780-783.  
Cyna, A.M., Andrew, M.J. & Tan, S.G.M. (2009). Communication skills for the anesthetist. *Journal of the Association of Anesthetists of Great Britain and Ireland*, 64, 658-665.  
Dix-Gupta, J., Brown, T., & Cyna, A. (2007). Effect of communication on pain during intravenous cannulation: a randomized controlled trial. *British Journal of Anaesthesia*, 99 (6), 871-875.

Figure 1: Fact sheet

deficit on the use of positive language in anesthesia practice?

## METHODS

A pre-test/post-test survey design was used in which participants were given seventeen questions in a Likert-type scale format before and after viewing a positive language fact sheet (Figure 1). The fact sheet explained positive language and included sample phrases to implement into anesthesia practice, all developed from current literature. It

underwent extensive review for content validity by a panel of five anesthesia experts. The sample population included practicing CRNAs and nurse anesthesia trainees in Illinois and was distributed via email through the Illinois Association of Nurse Anesthetists (IANA) member database. Inclusion criteria for survey participation included English-speaking, IANA membership, current and unrestricted licensure, and those directly communicating with awake

patients. Exclusion criteria included anesthesia providers not currently in practice. The recruitment email contained information regarding the study, the fact sheet, and a link to the survey which used the Qualtrics program.

Approval from DePaul University's Institutional Review Board under exempt status was received prior to implementation. The survey was developed to measure anesthesia providers' knowledge and beliefs of positive language. Five demographic questions were posed, followed by five questions reflective of participants' knowledge of positive language before reading the fact sheet, and finally, five regarding their knowledge after reading the fact sheet. Survey results were coded according to Likert Scale responses, ranging from 1 (deficient knowledge of positive language) to 4 (greater knowledge of positive language). SPSS version 26 was used to perform statistical analysis. The final survey question was open-ended and asked participants to identify potential barriers and was manually interpreted.

## RESULTS

The survey was distributed to 1,795 IANA members. 121 members accessed the survey but 14 responses were excluded due to incomplete data for a total of 107 survey responses and a response rate of 6%. Demographic data of the respondents is presented in Table 1. The majority of respondents had been in practice for greater than 20 years (30.8%) or were students (15%). 50% had obtained a Master's degree, the majority of participants (72%) were female, and most (45.8%) practiced in an urban setting.

The mean knowledge score before reading the fact sheet was 2.76, while the mean score after reading the fact sheet was 3.39 (Figure 2). Cronbach's alpha for responses before reading the fact sheet was 0.784, and after reading the fact sheet was 0.794 indicating reliability of the items in the questionnaire in delivering consistent results.

Because of the ordinal data collected, a nonparametric Kruskal-Wallis test was used to compare median scores. The medians of before and after reading the fact sheet and the standard deviation were used to determine the critical value for H statistic for all demographic groups. Most groups did not demonstrate significant differences, however the anesthesia practice setting resulted in a p-value of 0.005, thus concluding that a knowledge deficit did exist among providers in different practice settings. Statistically significant differences were also noted between demographic groups between urban

DEMOGRAPHIC DATA		
	Frequency	Percent
<b>1. How many years have you been a practicing CRNA?</b>		
I am a student	16	15%
1-3 years	14	13.1%
4-6 years	7	6.5%
7-10 years	13	12.1%
11-15 years	15	14.0%
16-20 years	9	8.4%
>20 years	33	30.8%
Total	N=107	100%
<b>2. Highest level of education completed</b>		
Associate's degree	1	0.9%
Bachelor's degree	22	20.8%
Master's degree	53	50%
Doctorate degree	30	28.3%
Total	N=107	100%
<b>3. What is your age category?</b>		
24-29 years	9	8.4%
30-39 years	30	28%
40-49 years	27	25.2%
50-59 years	17	15.9%
60-69 years	23	21.5%
70+ years	1	0.9%
Total	N=107	100%
<b>4. Which best describes your practice setting?</b>		
Urban	49	45.8%
Suburban	35	32.7%
Rural	16	15%
Other	7	6.5%
Total	N=107	100%

Table 1: Summary of demographic data

and rural ( $p=0.029$ ), age categories 60-69 years vs. 30-39 years ( $p=0.003$ ), years of practice comparing >20 years to 1-3 years in practice ( $p=0.021$ ), and highest level of education, masters compared to doctorate ( $p=0.005$ ). When participants were asked if they anticipated barriers to implementation of positive language into their anesthetic practice, nearly 88% ( $n=50$ ) either agreed or strongly agreed.

The final survey question was open-ended to help identify these potential barriers, was manually interpreted. The three most cited barriers to the use of positive language (in order of most common appearance) were resistance from colleagues, pressure to use the verbal numeric pain scale, and resistance to change.

## DISCUSSION

This study is the first to report Illinois anesthesia providers'

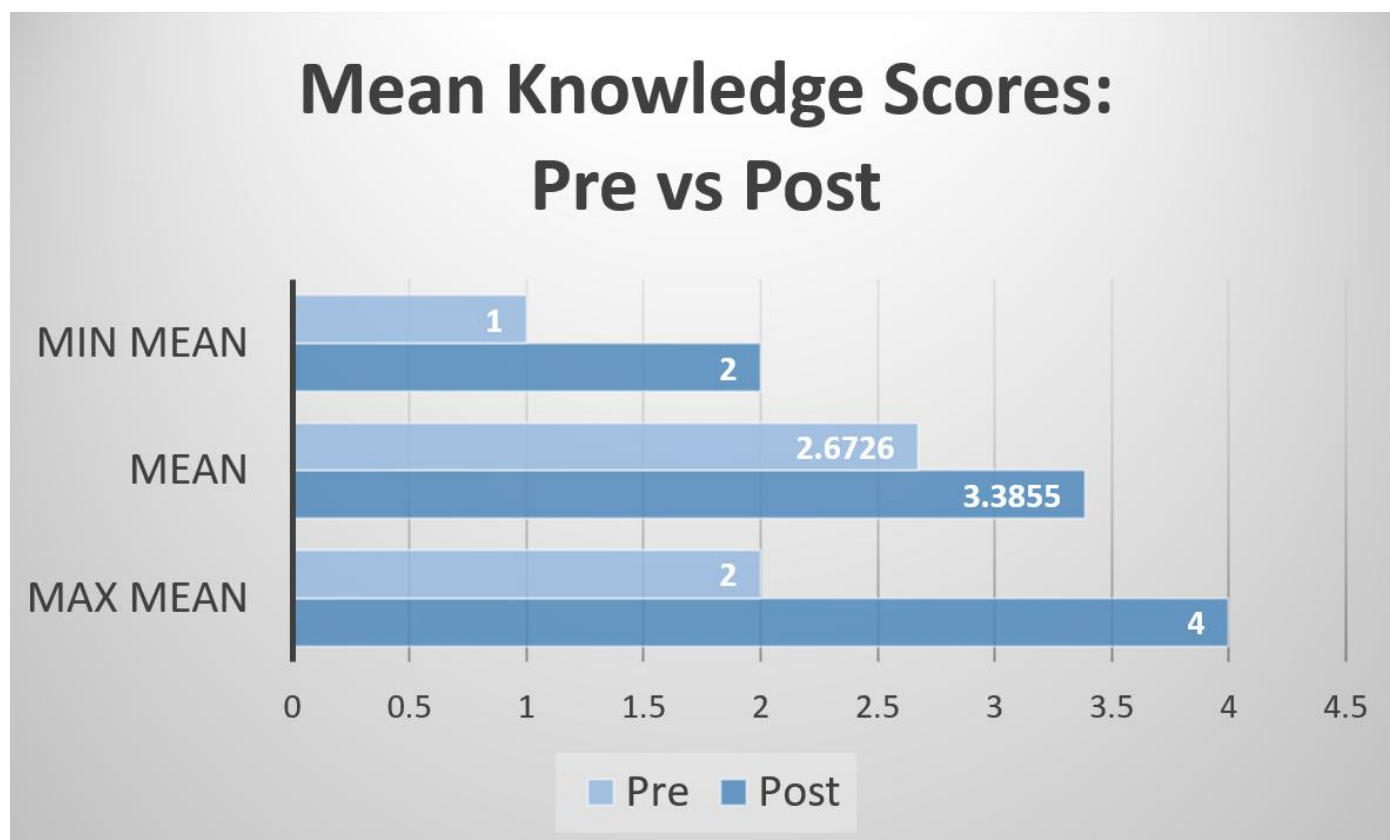


Figure 2: Mean Knowledge Scores: Pre vs Post

knowledge and beliefs regarding positive language and the nocebo effect. The statistical analysis demonstrated that knowledge was gained from the fact sheet and that it was effective as a method of facilitating learning. The positive language presented in the fact sheet should be used by anesthesia providers as examples of phrases that can be easily incorporated into one's practice when discussing procedures and activities that may be perceived as painful.

When examining demographics of the study participants in correlation with the results of the study, the Kruskal-Wallis test was used to determine if there was a statistically significant difference between groups when comparing median scores before and after viewing the fact sheet. The

independent variables of age, years of practice, type of degree, and practice setting did demonstrate statistically significant differences in anesthesia providers' knowledge and beliefs of positive language. The age groups that had the most statistically significant difference were the 30-39 years old and the 40-49 years old. Perhaps this can be attributed to the more confident practitioner versus a novice, younger provider, more continuing education including knowledge of publications, attendance at anesthesia conferences, and more hands-on experience.

The participants with greater than 20 years of experience made up the largest percentage (30.8%) of the study participants and demonstrated the

most statistical significance. This trend could be explained by the fact that, like age, an increase in years of practice may allow veteran practitioners to have exposure to a greater volume of continuing education, and be more confident in using that knowledge in their practice.

The highest level of education achieved by the majority of participants was the master's degree (49.5%). As compared to other categories of education, results showed that the master's prepared anesthesia providers had the best education related to this topic. Because more recent CRNA graduates have earned a doctoral degree, CRNAs in the master's degree category may represent a slightly older and more experienced demographic. This is consistent with the previously described statistical significance

of age and experience, however this is only an inferential correlation.

Most participants (48%) worked in an urban setting and results indicated that there was a difference in median scores before vs after reading the fact sheet in the urban demographic versus rural. Most urban hospital settings in Illinois are academic settings which focus heavily on updating practice to meet the most current evidence. Even though this topic is not widely published in anesthesia literature, it can be hypothesized that CRNAs in academic centers may be more likely to incorporate new practices that are evidence-based.

Limitations of this study included the small number of participants, largely female population, and the fact that this reached only anesthesia providers in Illinois. This means that the results cannot be widely extrapolated. A power analysis was not formally conducted, so the overall strength of the reported statistics cannot be generalized beyond this study population. Furthermore, this study population may not be representative of the greater Illinois CRNA population as a comparison between demographic characteristics was not performed. Because of these limitations, perhaps the greatest strength of this study is in its potential for affecting future change by addressing some of the barriers identified.

The final open-ended survey question offered insight into how this future change can be implemented. Participants identified resistance from colleagues and the lack of sample language and phrases to incorporate when interacting with patients as major barriers to the use of positive language in their anesthesia practice. The disseminated fact sheet with sample language and phrases can serve as a valuable resource for those wishing to use positive language. Resistance from colleagues may include anesthesia colleagues as well as other members of the perioperative team. Preoperative, operating room, and recovery room staff also have interactions with the patient, and can potentially counteract the positive language used by CRNAs. For positive language to truly be effective, every member of the team must be educated and on board with the concept.

## CONCLUSION

It is essential for CRNAs to understand how their language can impact patient outcomes and satisfaction regarding their patients' pain. The Nocebo effect has detrimental consequences and health care professionals should be aware

of their influential role, taking every measure to avoid and reduce nocebo influences.<sup>9</sup> The use of positive language in a CRNA's interactions with patients can be part of a multimodal approach to improve pain scores, enhance patient satisfaction, and potentially reduce opioid use. The results of this study demonstrated that simply providing CRNAs with examples of ways to communicate using positive language can improve their knowledge. The next step is for CRNAs to incorporate the positive language into their daily practice and overcome some of the barriers identified in this study.

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## REFERENCES

1. Lang EV, Hatsiopoulou O, Koch T, et al. Can words hurt? Patient-provider interactions during invasive procedures. *Pain*. 2005;114(1):303-309. doi:10.1016/j.pain.2004.12.028.
2. Varelmann D, Pancaro C, Cappiello E, Camann W. Nocebo-induced Hyperalgesia During Local Anesthetic Injection. *Anesthes Analg*. 2010; 110(3): 868-870. doi:10.1097/01.aoa.0000397164.02159.09.
3. Chooi C, White A, Tan S, Dowling K, Cyna A. Pain vs comfort scores after Caesarean section: a randomized trial. *Br J Anaesth*. 2013;110(5):780-787. doi:10.1093/bja/aes517.
4. Dutt-Gupta J, Bown T, Cyna A. Effect of communication on pain during intravenous cannulation: A randomized controlled trial. *Br J Anaesth*. 2007; 99(6): 871-875.
5. Koyama, T, McHaffie, JG, Laurienti, PJ, Coghill, RC. (2005). The subjective experience of pain: where expectations become reality. *Proc Natl Acad Sci of U S A*. 2005;102(36):12950-12955.
6. Jain R, Grewal A. A randomized comparative study assessing efficacy of pain versus comfort scores. *Saudi J Anaesth*. 2017;11(4):396-401.
7. Colloca L, Benedetti F. Nocebo hyperalgesia: how anxiety is turned into pain. *Curr Opin Anaesthesiol*. 2007;20(5):435-439.
8. Cyna, AM, Andrew, MI, Tan, SGM. Communication skills for the anaesthetist. *Anaesthesia*. 2009;64:658-665.
9. Bingel U. Avoiding Nocebo Effects to Optimize Treatment Outcome. *JAMA*. 2014;312(7):693. doi:10.1001/jama.2014.8342.

# ABSTRACTS OF PUBLICATIONS BY ILLINOIS CRNAS

**C**ongratulations to these CRNAs for their recent publications in the international journal, JBI Evidence Synthesis.

Larson, Sandra; Anderson, Lori; Thomson, Scott. Effect of phenylephrine on cerebral oxygen saturation and cardiac output in adults when used to treat intraoperative hypotension: a systematic review. JBI Evidence Synthesis: January 2021. 19(1). p:34-58. doi: 10.11124/JBISRIR-D-19-00352

## OBJECTIVE

The objective of this review was to examine the effect of phenylephrine on cerebral oxygen saturation, cardiac output, and middle cerebral artery blood flow velocity when used to treat intraoperative hypotension.

## INTRODUCTION

While the etiology of postoperative cognitive dysfunction in adults following surgery is likely multifactorial, intraoperative cerebral hypoperfusion is a commonly proposed mechanism. Research evidence and expert opinion are emerging that suggest phenylephrine adversely affects cerebral oxygen saturation and may also adversely affect cerebral perfusion via a reduction in cardiac output or cerebral vascular vasoconstriction. The administration of phenylephrine to treat intraoperative hypotension is common anesthesia practice, despite a lack of evidence to show it improves cerebral perfusion. Therefore, a systematic review of the effect of phenylephrine on cerebral hemodynamics has significant implications for anesthesia practice and future research.

## INCLUSION CRITERIA

Studies of adults 18 years and over undergoing elective, non-neurosurgical procedures involving anesthesia were included. In these studies, participants received phenylephrine to treat intraoperative hypotension. The effect of phenylephrine on cerebral oxygen saturation, cardiac output, or middle cerebral artery blood flow velocity was measured.

## METHODS

Key information sources searched included MEDLINE (Ovid), Embase, CINAHL (EBSCO), and Google Scholar. The scope of the search was limited to English-language studies published from 1999 through 2017.

The recommended JBI approach to critical appraisal, study selection, data extraction, and data synthesis were used.

## RESULTS

This systematic review found that phenylephrine consistently decreased cerebral oxygen saturation values despite simultaneously increasing mean arterial pressure to normal range. Results also found that ephedrine and dopamine were superior to phenylephrine in maintaining or increasing values. Phenylephrine was found to be similar to vasopressin in the extent to which both decreased cerebral oxygen saturation values. Results also showed that phenylephrine resulted in statistically significant declines in cardiac output, or failed to improve abnormally low preintervention values. The effect of phenylephrine on middle cerebral artery blood flow velocity was only measured in one study and showed that phenylephrine increased flow velocity by about 20%. Statistical pooling of the study results was not possible due to the gross variation in how the intervention was administered and how effect was measured.

## CONCLUSIONS

This review found that phenylephrine administration resulted in declines in cerebral oxygen saturation and cardiac output. However, the research studies were ineffective in informing phenylephrine's mechanism of action or its impact on postoperative cognitive function.

Greenwood, Jennifer; Nygard, Brian; Brickey, Doug. Effectiveness of intravenous magnesium sulfate to attenuate hemodynamic changes in laparoscopic surgery: a systematic review and meta-analysis. JBI Evidence Synthesis: March 2021. 19(3). p: 578-603. doi: 10.11124/JBISRIR-D-19-00414

## OBJECTIVE

The purpose of this systematic review and meta-analysis was to determine the effectiveness of intravenous magnesium sulfate when used to attenuate hemodynamic fluctuations associated with the creation of pneumoperitoneum in adults undergoing laparoscopic surgery.

## INTRODUCTION

Laparoscopic surgery has gained popularity as a result

of improved patient outcomes postoperatively, but pneumoperitoneum alters the patient's physiology and hemodynamic profile during the intraoperative period. Magnesium sulfate is a nonopioid agent known for its ability to blunt the physiologic sympathetic response associated with exposure to noxious stimuli. Magnesium sulfate may be efficacious in promoting anesthetic management that optimizes a patient's cardiopulmonary function while minimizing opioid use.

#### INCLUSION CRITERIA

Studies with participants at least 18 years old undergoing any elective laparoscopic surgery using pneumoperitoneum with CO<sub>2</sub> insufflation were included. Studies were excluded if patients were being treated for pheochromocytoma. Studies eligible for inclusion employed any intravenous dosing strategy of magnesium sulfate, administered at any point in the perioperative period for the purpose of blunting the sympathetic response to creation of a pneumoperitoneum. The comparator utilized was normal saline.

#### METHODS

A systematic search of MEDLINE, CINAHL, Cochrane Library, Google Scholar, Trip Database, MedNar, Grey Literature Report, ClinicalTrials.gov, and ProQuest Dissertations and Theses was conducted to identify both published and unpublished studies. The search was limited to studies written in the English language and performed on human subjects. Studies were selected for review based on inclusion criteria and were appraised by two reviewers using the appropriate JBI standardized appraisal tool. Data extraction was performed for all outcome variables. Data were pooled using the JBI System for the Unified Management, Assessment and

Review of Information. Mean differences (95% confidence interval) were calculated for all continuous variables. Meta-analysis using a fixed effects model was performed at various time points for heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure. Standard GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) evidence assessment was also reported.

#### RESULTS

A total of six randomized controlled trials were included in the review. Meta-analysis of data for biophysical parameters (heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure) at five minutes, 10 to 15 minutes, 30 minutes after pneumoperitoneum, and at the end of surgery showed a consistent reduction in the magnesium groups compared to placebo. Support for all outcome variables was determined to be high using the GRADE criteria.

#### CONCLUSION

The administration of magnesium sulfate consistently demonstrated improved hemodynamic measurements during laparoscopic surgery. All doses administered in the included studies proved beneficial compared to placebo. Magnesium sulfate should be considered as an adjunct agent in laparoscopic surgery to blunt the sympathetic nervous system response to surgical stimulation. The quality of the included studies was high, but small sample sizes and selection of healthy participants may limit the generalizability of the results. The use of magnesium sulfate may have improved effects on patients with significant health comorbidities, but the limitations of the included studies related to sample demographics make the evidence inconclusive.

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