

Graduate Program in Nurse Anesthesia Newsletter

HAPPY NEW YEAR 2019!

STUDENT PAPER ABSTRACTS

Does Exposure to General Anesthesia in Early Childhood Lead to the Development of Attention Deficit Hyperactivity Disorder

Michael Indergaard, CRNA, M.S.

An increased incidence in the diagnosis of attention deficit hyperactivity disorder has lead researchers to question what the reason could be behind the increased diagnosis. Several animal studies have shown an increased degenerative effect of general anesthesia on the developing brain, and this degenerative effect has been linked to attention and learning problems. With this in mind, does exposure to general anesthesia in early childhood lead to the development of attention deficit hyperactivity disorder? The research method for this study was a formal literature review. The findings of this study were inconclusive as to whether general anesthesia exposure in early childhood causes attention deficit hyperactivity disorder, however, there was evidence that supports an increased incidence of ADHD in children exposed to general anesthesia during developmental age.

Inhaled Versus Intravenous Anesthesia for One-Lung Ventilation: A Formal Literature Review

Noelle Wallin-Sanchez, CRNA, M.S.

Many surgeries require one-lung ventilation (OLV) techniques to facilitate the procedure, but these techniques drastically alter ventilation and perfusion that can result in serious complications for patients. Pharmacological agents affect the changes in ventilation and perfusion, and recent research has been conducted to evaluate the effects of intravenous versus volatile anesthetic agents on oxygenation, inflammatory response, and patient outcomes. The research method for this study was a formal literature review via the Saint Mary's University of Minnesota Twin Cities Library SuperSearch system to answer the question: do patients undergoing lung surgery requiring OLV techniques have better oxygenation, inflammatory markers, and outcomes with propofol versus sevoflurane or desflurane as the primary anesthetic agent? Thirteen studies were selected, all of which compared the use of propofol to volatile agents in the clinical setting for thoracic surgeries requiring OLV. Propofol resulted in lower arterial partial pressure of oxygen levels and a greater inflammatory response than volatile agents. It remains unclear if this difference significantly affects postoperative outcomes and respiratory complications.

Comparing Transversus Abdominal Plane Block to Intrathecal Morphine in Pain Control Following Cesarean Section

Shanna Trennepohl, CRNA, M.S.

Cesarean section is associated with postoperative pain. Patients typically receive intrathecal morphine in addition to local anesthetic in their neuraxial anesthesia to help combat this pain postoperatively. However, transversus abdominal plane blocks have recently been studied as an alternative. The purpose of this literature review was to examine whether or not transversus abdominal plane blocks provide effective pain control compared to intrathecal morphine for postoperative pain associated with cesarean section. In regards to pain control and postoperative pain medication requirements, there were conflicting results across studies so further research is required before a clear conclusion can be reached.

GRADUATE SCHOOL OF HEALTH AND HUMAN SERVICES

Student Paper Abstracts

The Impact of Enhanced Recovery Pathways (ERP) on Perioperative Outcomes in Patients Undergoing Colorectal Surgery

Onikepo Omotoso, CRNA, M.S.

The unusually high postoperative complication rates after colorectal surgery in comparison to other surgeries have prompted healthcare providers to explore ways of reducing postoperative complications in colorectal surgery patients. Enhanced recovery pathways are evidenced-based care processes designed to improve patient outcomes, create a standard of medical care, and reduce healthcare costs. This paper discusses the impact of Enhanced Recovery Pathways (ERP) on perioperative outcomes in colorectal surgery patients. Despite benefits from ERP, there are limitations and barriers that may challenge the successful adoption and implementation of an ERP across healthcare facilities.

A Transverse Abdominis Plane Block Technique to Decrease Laparoscopic Cholecystectomy Postoperative Analgesic Requirements

Andrew Glomske, CRNA, M.S.

Postoperative pain management is focal to expediting the recovery and facilitating an early discharge of the laparoscopic cholecystectomy (LC) surgical patient. This literature review will examine if the utilization of a transverse abdominis plane (TAP) block on patients requiring LC will decrease total analgesic requirements 24 hour following block placement compared to not using a TAP block. A total of nine clinical trials and one meta-analysis were examined. After review, the implementation of a TAP block to decrease total analgesic requirements following a LC did not achieve statistical significance, nor is it the most effective intervention for postoperative pain management. Although it cannot be said with statistical significance that a TAP block is the best modality to decrease 24-hour analgesic consumption, it could be an advantageous intervention to reduce acute postoperative pain and intraoperative analgesic necessity.

How Useful is Bispectral Index Monitoring in Predicting Anesthetic Depth and Reducing the Incidence of Postoperative Cognitive Deficits in the Elderly After Undergoing General Anesthesia?

Eric Meyer, CRNA, M.S.

Elderly patients undergoing general anesthesia are at an increased risk for the development of issues related to anesthesia, particularly the development of postoperative cognitive deficits (POCD). The bispectral index (BIS™) monitor is now available for use in the anesthesia setting, and it may have benefits related to controlling depth of anesthesia. With postoperative cognitive changes in the elderly receiving general anesthesia being a serious issue, there was a need to explore how depth of anesthesia, as determined by BIS™ monitoring, affects POCD incidence in the elderly after receiving general anesthesia. A formal literature review was conducted to explore how BIS™ monitoring may affect depth of anesthesia, which may affect the development of POCD in the elderly patient population undergoing general anesthesia using inhaled and intravenous anesthetics. A total of 10 studies were included in this literature review which resulted in 13,874 elderly patients, age 55 or older, who were considered in this literature review. Clinically, justification for the use of the BIS™ monitor in guiding anesthetics to prevent POCD development is supported by data that shows a decrease in POCD postoperatively probably related to a reduction in the amount of anesthetic patients are exposed to and the ability to more accurately gauge anesthetic depth. Interestingly, the research considered in this literature review was supportive of a deeper level of anesthetic or a reading of 40 to 50 on the BIS™ monitor in improving information processing and reducing POCD postoperatively. Due to cost, workflow, and lack of education, the BIS™ monitor is not widely used. The research considered in this literature review shows the economic benefits related to the use of BIS™ monitoring in elderly patients receiving general anesthesia. When considering how useful BIS™ monitoring is in controlling the depth of anesthesia, which may reduce the incidence of POCD in the elderly after receiving general anesthesia, the findings of this literature review support BIS™ monitoring use to reduce the incidence of POCD in the elderly after receiving general anesthesia.

NEWS

Preventing Intrathecal Anesthesia Related Hypotension in Patients Undergoing an Elective Caesarean Section

James Alt, CRNA, M.S

In 2015, 1,272,503 babies were delivered using the caesarean delivery method in the United States of America (Martin et al., 2017). Intrathecal anesthesia is the preferred anesthetic for patients undergoing a caesarean delivery but can cause significant hypotension which is dangerous for both the mother and the baby (Lucy & Naugler, 1991). A formal literature review was conducted to address whether the timing of fluid bolus administration and addition of adjunct agents influence intrathecal anesthesia related hypotension in patients undergoing an elective caesarean section. From the assessment of ten current research studies, which included 6,468 adult patients, the timing of the fluid bolus administration and the addition of intravascular phenylephrine and intravascular ondansetron significantly reduced the presence and severity of intrathecal anesthesia related hypotension in patients undergoing an elective caesarean section.

Anesthesia Considerations for Antifibrinolytic Therapy in Cardiac Surgery: Is there a Difference in Efficacy or Safety when Comparing Epsilon-Aminocaproic Acid versus Tranexamic Acid?

Lindsey Wachendorf, CRNA, M.S

Antifibrinolytic agents are an established pharmacological agent used in blood conservation strategies to reduce perioperative blood loss and blood product transfusion requirements in cardiac surgery. The purpose of this study was to answer the question: is there a difference in efficacy or safety when comparing epsilon-aminocaproic acid versus tranexamic acid in adults undergoing cardiac surgery? The research methods used in this study were a formal literature review. The studies included in the literature review were analyzed for primary efficacy outcomes and secondary safety outcomes. The findings from this literature were inconclusive in establishing the superiority of one antifibrinolytic agent over the other for either efficacy or safety outcomes.

Upcoming Events

- ◇ Jan. 2 Spring Semester Begins
- ◇ Feb. 13 -16 AANA Assembly of School Faculty
- ◇ April 19-22, Easter Break, Campus Closed
- ◇ April 27, Spring Semester Ends
- ◇ May 6 Class of 2021 New Student Orientation

This Semester's Classes

Juniors

- ◇ Principles of Anesthesia II
- ◇ Pharmacology
- ◇ Advanced Physiology and Pathophysiology II
- ◇ Clinical Practicum I

Seniors

- ◇ Portfolio III
- ◇ Clinical Practicum IV

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Student Paper Abstracts

How Does Subanesthetic Perioperative Intravenous Ketamine Administration Affect Postoperative Pain Scores and Total Perioperative Opioid Consumption in Patients Undergoing Spinal Surgery With General Anesthesia?

Rebecca L. Grumdahl, CRNA, M.S.

Ketamine, a *N*-methyl-D-aspartate (NMDA) receptor antagonist, has analgesic properties without causing respiratory depression. Ketamine seems to be an ideal adjunct to anesthesia and analgesia to decrease postoperative pain and decrease postoperative opioid consumption. Postoperative pain and postoperative opioid consumption can lead to decreased patient satisfaction, longer hospital stays, increased costs, exacerbate other illnesses, develop into chronic pain, or increase risk of opioid addiction. It is important to determine if the use of ketamine as an adjunct to anesthesia and analgesia will decrease postoperative pain and decrease postoperative opioid consumption, especially in major, painful surgical procedures, such as spinal surgery. A formal literature review was completed using Saint Mary's University of Minnesota SuperSearch database and Sciencedirect database. Based on the literature reviewed, perioperative low-dose ketamine, when administered as a bolus followed by infusion, decreases postoperative pain or postoperative opioid consumption in patients undergoing spinal surgery.

What is the Efficacy of a Single Intrathecal Morphine Injection as an Adjunct To General Anesthesia for Reducing Postoperative Pain and Opioid Consumption in the First 24 Hours After Major Abdominal Surgery?

Pang Thao, CRNA, M.S.

Acute postoperative pain remains a common problem after major abdominal surgery. Epidural analgesia has been the preferred analgesic technique to provide continuous pain relief in major abdominal surgery, but intrathecal morphine has become a feasible alternative approach. Google's scholarly article database was used to find research articles. Several studies have suggested that a single intrathecal morphine injection as an adjunct to general anesthesia is effective in reducing postoperative pain and opioid consumption in the first 24 hours. Future research studies are needed to assess the role of various factors that may have affected the results, such as opioid selection for patient-controlled analgesia pumps, scheduled preoperative and postoperative medications, the choice of rescue medications, and the transition into oral narcotics.

Efficacy of Tranexamic Acid for the Reducing Blood Loss in Cesarean Section Patients: A literature Review of Randomized Controlled Trials

Josh Falk, CRNA, M.S

Postpartum hemorrhage continues to be one of the leading causes of maternal death. Increasing uterine contractility with uterotonic agents has been the only proven method in decreasing intraoperative blood loss in these patients. However, this does not oppose the potential fibrinolytic activation that can still occur. This literature review examines whether or not the preoperative administration of tranexamic acid, as an adjunct to uterotonic agents, significantly reduces the amount of perioperative blood loss in parturients undergoing cesarean section compared to the parturient receiving uterotonic agents alone. The benefit of tranexamic acid administration will be evidenced by a decreased volume of intraoperative blood loss and the lack of increase in adverse effects. Studies were identified using SuperSearch through Saint Mary's University of Minnesota and narrowed down to randomized controlled trials that evaluated the efficacy of tranexamic acid for decreasing blood loss in parturients undergoing cesarean section. The conclusion of this review is that tranexamic acid administration significantly reduces perioperative blood loss in the cesarean section patient and is evidenced by consistently lower volumes of total blood loss without increasing adverse effects. It is recommended that larger, multi-centered, double blinded, placebo controlled, randomized controlled trials be done to further verify the safety and efficacy of tranexamic acid administration for the parturient undergoing cesarean section.



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