

Southern Illinois University Edwardsville

SPARK

Doctor of Nursing Practice Projects

School of Nursing

Spring 5-2023

Adjuncts and Additives to Regional Anesthesia

Kaisi Dye

Kelcie Brunnert

Follow this and additional works at: <https://spark.siu.edu/dnpprojects>



Part of the [Anesthesiology Commons](#)

Recommended Citation

Dye, Kaisi and Brunnert, Kelcie, "Adjuncts and Additives to Regional Anesthesia" (2023). *Doctor of Nursing Practice Projects*. 281.

<https://spark.siu.edu/dnpprojects/281>

This DNP Project is brought to you for free and open access by the School of Nursing at SPARK. It has been accepted for inclusion in Doctor of Nursing Practice Projects by an authorized administrator of SPARK. For more information, please contact magraser@siue.edu.

Introduction of the Problem

Peripheral nerve blocks have been proven to be an extremely beneficial part of anesthetic care. Nerve blockade can decrease the amount of opioids required in the intraoperative and postoperative period, decrease the amount of anesthetic gases administered, and improve patient satisfaction. There is a lack of clear and concise guidelines for adjunct agents for the specific block types. Our project and research aimed to establish recommendations for additive agents to local anesthetics for breast, shoulder and knee surgeries. After a thorough literature review, we developed evidence based guidelines for the anesthesia providers at a community hospital in central Illinois. The purpose of the guideline was to provide a standardized reference to aid in the selection of the ideal PNB adjunct and nerve block with respect to the goals of analgesia and patient's medical history

Summary of Review of Literature

Magnesium, Epinephrine, Dexamethasone, Sodium Bicarbonate, and Dexmedetomidine are commonly added to nerve blocks for shoulder, breast and knee procedures. Magnesium is cost-effective, readily dissolvable in local anesthetics, easy to store, and is very effective in prolonging nerve blockade. However, it has shown increased incidence of postoperative nausea and vomiting (Swain et al., 2017). Epinephrine can increase the duration of a given local anesthetic two to three times therefore decreasing the amount of local anesthetic needed in turn lowering the risk of local anesthetic systemic toxicity (LAST) but is not very effective in the longer acting local anesthetics as it wears off before they do (Krishna et al, 2020).

Dexamethasone can also substantially prolong sensory blockade in peripheral nerve blocks, although it also increases motor blockade duration which can be detrimental for patients who have had a surgery that necessitates early postoperative mobility (Krishna et al., 2020). Sodium

bicarbonate has been found to speed onset of both motor and sensory blockade when added to local anesthetics for peripheral nerve blocks, however, it has shown no efficacy in prolongation of the block (Bailard et al., 2014). Therefore, it would be beneficial in certain circumstances for urgency of onset prior to surgery but is of no benefit for extended post-operative pain control. Dexmedetomidine has been shown to be a preferable choice as a local anesthetic additive. It prolongs blockade and is particularly useful in upper extremity nerve blocks (Vorobeichik et al., 2017). Although, while still useful in prolonging pain relief in lower extremity blocks, it may also prolong motor blockade which could result in increased risk for falls and a longer amount of time before postoperative therapy can be initiated. Dexmedetomidine also carries a higher risk of bradycardia and hypotension, potentially prolonging PACU time.

Project Methods

Our project was implemented at a rural community hospital setting in Jacksonville Illinois. Our review of literature focused on improvement of guidelines utilized and did not involve patient experimentation or the technical aspects for the procedural aspect of the block itself. Providers who attended were asked to complete a survey with Likert scale questions before and after the presented material as well as a short quiz gauging their prior knowledge of the information to be presented. Printed materials and a brief presentation was given, and the survey results were collected after the audience had time to ask specific questions.

Dr. Matt Bednarchik DNP, CRNA, NSPM-C serves as the Southern Illinois University Edwardsville faculty lead for the project, and also as a stakeholder at Passavant Hospital in Jacksonville, Illinois. Dr. Adam Schneider DNP, CRNA, NSPM-C is acting as the content expert for the project. Additionally, Joshua Newman MS, CRNA at Passavant Hospital was the main stakeholder at the facility aiding in project implementation. Our project was approved for

Institutional Review Board (IRB) exemption status with Southern Illinois University Edwardsville as it does not employ experiments on human subjects.

Evaluation

A SWOT analysis assessing strengths, weaknesses, opportunities, and threats to this project was conducted. The biggest strength identified was ease of implementation. The determined weakness was a small sample size and the largest threat seemed to be the lack of attendance at the educational meeting. Opportunities determined by the analysis were mainly focused on improving patient outcomes long term regarding duration of pain relief postoperatively.

After implementation, we found the SWOT analysis to hold true in respect to proposed strengths, weaknesses, and threats. This project was very easy to implement as we were able to meet with providers and perform in-person educational sessions. A questionnaire including Likert-scale items about the frequency of use of adjuncts and specific medications was administered as well as a quiz which was aimed at assessing prior knowledge of preferred peripheral nerve blocks for specific surgeries as well as side-effects of adjunctive medications amongst the providers. Only about half of the providers that participated (55.6%) were able to attend these in-person sessions the day of implementation. We were unable to reach everyone while we were on site and some providers were not working that day. The information, including the presentation board, a copy of the literature review, and remaining questionnaires, were left at the site for those who were unable to attend to review and complete on their own time if willing to do so. Majority of the providers we were unable to meet with, accounting for 44.4% of the overall participants, did complete and return the surveys. However, we were unavailable for immediate questions or discussion. We did leave contact information for them to reach out but

did not receive any correspondence after implementation day. The providers we spoke with were able to ask questions and discuss their willingness to change future practice based on the information provided to them. A frequency analysis was conducted on the information gathered from the questionnaire and the quiz. Our largest perceived limitation was being unable to communicate with the providers that were unable to attend to discuss any missed quiz questions after the presentation or determine whether they would be open to potentially changing their practice moving forward. Therefore, we have no evidence of knowledge gained from the participants who completed the questionnaire and quiz later.

Impact on Practice

Immediately after implementation, the providers that we were able to speak with did express that they were open to trying different blocks and additives. For instance, one provider always performed femoral nerve blocks over adductor canal blocks for knee surgeries. After reviewing our research, they stated they would start utilizing adductor canal blocks due to their motor sparing capabilities with equal pain relief compared to femoral nerve blocks. There was one provider that had not regularly utilized dexmedetomidine noted that they would like to “maybe try this additive” and follow up on their patient’s outcomes versus previous patient’s outcomes.

We foresee potential change in block selection for knee, breast, and shoulder surgeries at this facility based on our conversations and results, however, many of these providers already utilize a combination of the additives that were discussed. Therefore, we do not speculate much variation in selection of adjuncts to local anesthetics.

For ongoing implementation, along with utilizing the evidence-based preferred nerve blocks for knee, breast, and shoulder surgeries, we suggest reviewing the research provided to

include additives to local anesthetics that have been studied in respect to each block and proven effective.

Conclusions

Recommendations for future efforts related to this project include further research into epinephrine, dexamethasone, sodium bicarbonate, and dexmedetomidine in combination with local anesthetics for pectoralis nerve (PEC) block as well as a look into magnesium, epinephrine, and sodium bicarbonate as additives to local anesthetics for adductor canal blockade as there is little to no evidence currently proving them beneficial or non-beneficial when employed in these instances.

Author Contact Information

Kaisi Dye BSN RN SRNA

kdye@siue.edu

Kelcie Brunnert BSN RN SRNA

kbrunne@siue.edu