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## Promoting the Incorporation of Regional Anesthesia to Improve Pain Management for Lower Extremity Surgeries

Kendra Knaga

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## **Executive Summary**

### **Introduction of the Problem**

One in ten Americans 65 or older report falling, leading to foot and ankle surgeries (Haddad et al., 2018). The total population of 65 and older is increasing and will continue to rise by 2060 (Mather et al., 2019). Due to the increase in older adults and falls, specialists such as orthopedic surgeons and podiatrists perform more lower extremity surgeries. Many foot and ankle interventions are conducted in an outpatient setting and rely on a multimodal approach to pain management (Vadivelu et al., 2015). Opioid-only pain management strategies should be considered outdated. Incorporating regional anesthesia by rethinking pain management for foot and ankle surgeries can improve patient care outcomes. Peripheral nerve blocks have been proven to be a beneficial part of anesthetic care, reducing the amount of opioids necessary for pain control.

### **Summary of Review of Literature**

Lower extremity regional anesthesia has demonstrated a reduced amount of opioid administration both intraoperatively and postoperatively (Gupta et al., 2017). Due to anatomical limitations, regional anesthesia as the primary anesthetic is not always possible. However, as an adjunct, peripheral nerve blocks (PNB) allow the anesthesia provider to achieve optimal surgical conditions (Kamel et al., 2022). Cardiovascular and pulmonary stress on the body are reduced with PNB use (Vadivelu et al., 2015). The literature review identified and discussed the diverse types of PNB used for lower extremity surgeries, positioning of the patient for the diverse kinds of PNB, techniques for locating nerve bundles, local anesthetics and adjuncts used for extending the effectiveness of the block, and complications related to PNB.

The types of PNB used for foot and ankle surgeries include the sciatic popliteal block, ankle block, and saphenous nerve block. The type of block used is determined by the planned surgical procedure, such as metatarsophalangeal joint fusion, bunionectomy, hallux rigidus procedures, amputation, etc., and what nerve bundle needs to be blocked. Patient positioning is the most critical factor influencing block success (Chan et al., 2021). The nerve bundle can be located using anatomical landmarks, palpation, nerve stimulation, ultrasound guidance, or a combination of all techniques (Blair et al., 2022). Local anesthetics (LA) used in PNBs include lidocaine, mepivacaine, ropivacaine, and bupivacaine. Factors influencing which LA to consider include the speed of onset, duration of action, toxicity, and degree of motor blockade desired (Jeng & Rosenblatt, 2022). Adjuvants to consider most commonly include dexmedetomidine and dexamethasone. Others, such as sodium bicarbonate and alpha-2 agonists, are considered off-label and have not been approved by the US Food and Drug Administration (Rao & Rajan, 2021). Although rare, potential complications with using PNB include falls, local toxicity, allergic reactions, and neurogenic injury (Blair et al., 2022; Jarrell et al., 2018; Ma et al., 2019).

## **Project Methods**

This project was implemented at a rural community hospital in Hillsboro, Illinois. The review of the literature focused on improving pain control for foot and ankle surgeries by reducing opioid use and implementing PNB for a multimodal approach. Providers who attended included anesthesia and the surgical team. Attendees were asked to complete a survey with Likert scale questions gauging the knowledge of PNBs pre- (Appendix A) and post- (Appendix B) educational PowerPoint presentation. Printed materials and a brief presentation were given, and the survey results were collected after the audience had ample time for a question-and-answer session. Dr. Linda Sharpless, DNP, CRNA, APN, serves as the Southern Illinois University

faculty lead for the project. Dr. Matthew Bednarchik, DNP, CRNA, NSPM-C, is the project's content expert. Additionally, Bridget Peek, MS, CRNA at Hillsboro Area Hospital, was the primary stakeholder at the facility, assisting with project implementation. There is no Institutional Review Board (IRB) requirement through Hillsboro Area Hospital per hospital administration. The project was approved for IRB exemption status with Southern Illinois University Edwardsville as it does not employ experiments on human subjects.

## **Evaluation**

After the PowerPoint presentation, a question-and-answer session was conducted, followed by a post-survey to assess the knowledge gained from the educational presentation on PNB and the likelihood of adopting the protocol in practice. A total of thirteen participants' surveys were analyzed. The data was calculated as a group to determine the knowledge of the perioperative staff. The sum of the mean scores improved, suggesting that the educational lunch and question session improved the staff's knowledge of implementing popliteal blocks for pain management in foot and ankle surgeries at Hillsboro Area Hospital.

This project was straightforward to implement. However, the most significant limitation was gathering the perioperative staff for the educational in-service. Everyone was not able to be reached while on site, and some providers were not working that day. The printed PowerPoint presentation, literature review, and remaining questionnaires were left at the site for those who could not attend to review independently. Contact information for questions was left at the facility, but no correspondence was received after implementation day.

## **Impact on Practice**

Immediately after implementation, the providers showed interest in incorporating popliteal blocks for pain control in their foot and ankle surgery patients. The administration of the popliteal blocks can impact patient outcomes by reducing the duration and intensity of pain and reducing narcotic use. These outcomes directly improve patient satisfaction, reduce length of stay, and help minimize undesirable side effects with an opioid-only approach.

## **Conclusion**

Implementing a policy and protocol for using popliteal blocks for patients undergoing foot and ankle procedures can improve patient satisfaction and decrease opioid use in the perioperative period. Practitioners at Hillsboro Area Hospital benefitted from knowledge gained from an educational PowerPoint presentation on the utilization of PNB. Recommendations for future efforts related to this project include further investigation into the use of adjuncts such as alpha-2 agonists with current local anesthetics for popliteal blocks. In addition, adding a combined popliteal block with a saphenous block for more complete coverage should be considered.

## **Author Contact Information**

Kendra Knaga, BSN RN SRNA

kknaga@siue.edu