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Evaluation and Education of Enhanced Recovery After Surgery Protocols for Total Knee Arthroplasty

Lauren Hunt

Jessica Prost

Southern Illinois University Edwardsville

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Introduction of the Problem

Enhanced recovery after surgery (ERAS) utilizes a multimodal, multidisciplinary perioperative protocol to minimize hospital length of stay, surgical complications, readmissions, and patient hospital costs (Frassanito et al., 2020). ERAS protocols uniquely engage the patient throughout the entire perioperative surgical course. They limit variation based on provider preference and insist on an evidence-based approach for all patients to experience (American Association of Nurse Anesthetists [AANA], 2017). In the healthcare system today, many hospitals do not utilize ERAS protocols, while others only use them for certain surgeries or only use portions of the protocols (Kaye et al., 2019). A rural critical access hospital in Eastern Illinois, Crawford Memorial Hospital, serves numerous patients requiring total knee arthroplasties (TKA). While the providers utilize some aspects of ERAS protocols for these surgeries, they lack a formal ERAS protocol and full utilization.

Literature Review

The evidence illustrated the importance of beginning an ERAS protocol weeks before the total knee arthroplasty to optimize the patient's condition. Optimizing the patient included educating and setting realistic expectations for the surgery and postoperative pain (AANA, 2017). Utilizing joint classes for education showed a reduction in hospital costs by 27% demonstrating the class's benefits (Gadsen, 2017). Screening a patient early for smoking, anemia, and nutritional status was shown to aid in patient recovery as all three qualities increase the patient's risk for a delay in recovery (Hansen et al., 2012).

Utilization of multimodal analgesia is imperative for a successful pain control regimen employed in ERAS protocols, especially for painful surgery like TKA. Opioids have been commonly used for pain control; however, they carry dangerous side effects and increase the use

of opioids long-term (Gadsen, 2017). The goal of multimodal analgesia is to ensure optimal pain control while minimizing the unwanted and potentially harmful effects of opioids (Beverly et al., 2017). The most common multimodal analgesic drug classes utilized in a total joint arthroplasty (TJA) protocol include gabapentin, acetaminophen, NSAIDs, and COX-2 inhibitors (Gadsden, 2017). Other medication adjuncts used in ERAS protocols for TKAs include tranexamic acid (TXA), corticosteroids, and ketamine. The use of TXA decreases surgical blood loss and reduces the incidence of allogenic blood transfusions in total joint arthroplasties (Gadsden, 2017). Corticosteroids, such as dexamethasone, both reduce postoperative nausea and vomiting and reduce pain through their anti-inflammatory effects. Ketamine works well in treating acute pain and preventing the development of chronic pain and has been shown to reduce postoperative use of morphine by 25-40% (Gadsden, 2017).

During the postoperative phase of TKAs, pain control through peripheral nerve blocks is the standard for ERAS protocols. The adductor canal block, the interspace between the popliteal artery and capsule of the posterior knee block (iPACK), and the genicular block are all utilized to achieve pain control while maintaining optimal postoperative mobility (Gadsen, 2017). Although not one regional nerve block has been identified as superior, they all provide pain relief postoperatively, reduce opioid consumption, and positively impact cognitive function and sleep (Oseka & Pecka, 2018).

Project Methods

The goal of the project was to educate the staff at Crawford Memorial Hospital about evidenced-based ERAS protocols for patients receiving total knee arthroplasties (TKA). This project assessed the provider's knowledge of the current literature regarding ERAS protocols and provided education through a PowerPoint presentation. The primary stakeholders included

certified registered nurse anesthetists and orthopedic surgeons involved in the perioperative period at Crawford Memorial Hospital. The external stakeholders involved in developing and implementing this project included Joseph Grazaitis, CRNA DNP, external stakeholder, and Linda Sharpless, CRNA DNP, served as project leader from Southern Illinois University Edwardsville. In addition, Lauren Douglass, CRNA DNP, served as a faculty member and mentor from Southern Illinois University Edwardsville.

Evaluation

The implementation of the project involved an educational PowerPoint containing the current evidenced-based information and benefits of ERAS protocols for TKAs. The PowerPoint was both emailed and presented in person to all pertinent providers at Crawford Memorial Hospital. The design is a non-experimental quality improvement project. To evaluate the project, a pre-test and post-test were utilized to assess providers' current use and knowledge of ERAS protocols and willingness to incorporate a TKA ERAS protocol in their anesthetic plan. Seventeen staff members completed the pre-survey, listened to the PowerPoint presentation, and completed the post-survey. The same nine questions were asked in each survey to assess the knowledge gained by the staff. Four of the nine questions showed significant improvement from pre- to post-survey. Three questions were answered 100% correctly by all participants in both the pre- and post-survey and two saw a decrease in correctness. There was a 64% increase in understanding the prevalence of total joint procedures by 2030. A 23% increase was noted in understanding that ERAS protocols focus on minimizing narcotics and utilizing a multimodal approach to pain management. Interestingly, there was also a 23% increase in understanding the significance of IV acetaminophen administration compared to PO. Lastly, there was a 53% increase in knowledge about the adductor canal block. The significant increase in the correctness

of the questions from the pre-survey to the post-survey implied an increase in staff knowledge regarding ERAS protocols for total knee arthroplasties following the PowerPoint presentation. The final question asked in the post-survey was a Likert scale question asking about the likelihood of supporting the implementation of a total knee arthroplasty ERAS protocol after participating in our project. 82% of the participants strongly agreed, while 18% agreed they would support an ERAS protocol. The limitations of this project included a limited number of staff participation and sampling bias. Responses initially were exceptionally low on our first attempts. We increased participation by attending the hospital and promoting responses. Unfortunately, most of our sample comprised registered nurses and two CRNAs. This small sample of participants does not allow for generalization to a larger population, nor does it allow for the number of practitioners directly involved in the utilization of ERAS.

Impact on Practice

The number of joint procedures in the United States is exponentially increasing. Approximately one million total joint procedures occur yearly, with numbers expected to increase to 4 million by 2030 (Etkin & Springer, 2017). Crawford Memorial Hospital performs many TKAs every year, and an ERAS protocol will benefit these patients. Educating the staff at Crawford Memorial Hospital about ERAS protocols was an essential beginning step to implementing an ERAS protocol. The project immediately impacted the staff's education and increased their desire to adopt and utilize an ERAS protocol. ERAS protocols are essential to the surgical process and will only increase as the population ages. The long-term impact of this project, including a successful implementation of an ERAS protocol, is essential for the aging population to flourish after TKAs.

ERAS protocols have minimized hospital length of stay, surgical complications, readmissions, and patient hospital costs. These benefits are essential for the aging population and the increasing number of total joint procedures for the healthcare system to continue to accommodate all patients and demonstrate successful outcomes for these surgeries.

Conclusion

This project was implemented at a small rural critical-access hospital. Although small, the number of total knee arthroplasties is significant. For patients undergoing total knee arthroplasties, an ERAS protocol will be beneficial. Educating the staff at the hospital about ERAS protocols for TKAs was the goal of this project and was accomplished. Education is vital to implementing an ERAS protocol; however, ongoing education and periodic implementation reviews should be conducted. The continuation of this project would be to create a formal protocol for the staff at Crawford Memorial Hospital and analyzing the benefits is the next step in the ERAS protocol journey.