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ERAS Protocol for Lower Extremity Orthopedic Procedures

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Executive Summary

Introduction of the Problem

The implementation of ERAS protocols has become standard for a multitude of gastrointestinal procedures; however, many facilities have yet to utilize them for orthopedic procedures. A small hospital in the St. Louis metropolitan area was identified as a candidate for ERAS protocol implementation. In 2019, the facility did not have any standardized anesthetic plans for lower extremity total arthroplasty procedures or any existing ERAS protocols. The perioperative management for those procedures was merely tailored toward surgeon's preferences, which varied and were not based on best practice. Thus, the purpose of this project was to increase understanding of lower extremity ERAS protocols among members of the perioperative team and promote the adoption of such a protocol.

Literature Review

The literature demonstrated that orthopedic ERAS protocols were broken down into the three phases of perioperative care. The preoperative period focuses on patient education, nutrition management, and initiation of perioperative pain management. The purpose of preoperative education is to aim for achievable goals involving postoperative pain management, mobilization, and physiotherapy. Nutritional status is an important factor in ERAS and should be addressed during the preoperative assessment. Malnutrition is linked to delayed healing, wound infection, sepsis, and increased mortality (Noba & Wakefield, 2018). Lastly, the initiation of multimodal pain management is crucial during the preoperative period. In order to facilitate ERAS protocol goals, providers should utilize strategies that reduce the patient's opioid requirements. Alternative agents, such as NSAIDs, acetaminophen, gabapentinoids, and corticosteroids may be effective treatment options to reduce opioid requirements. In conjunction

with these multimodal adjuncts, peripheral nerve blocks (PNB) establish analgesia and decrease recovery times for TKA and THA.

In regard to the intraoperative period, if no contraindications exist to a subarachnoid block, a spinal is the preferred anesthetic. The review found spinal anesthesia decreased the risks for all-cause mortality, pulmonary complications, pneumonia, acute renal failure, thrombotic events, infections, blood transfusion requirements, and postoperative falls (Mementsoudis et al., 2019). Periarticular injections by surgeons have been used in conjunction with or in place of peripheral nerve blocks during lower extremity arthroplasty. Cocktails often include long acting local anesthetics, epinephrine, opioids, ketorolac, steroids, and sometimes antibiotics (Dalury, 2016). Additionally, intraoperative fluid management and blood management is a key component of ERAS; however, lower extremity arthroplasty is not typically associated with large fluid shifts and blood loss.

In the postoperative period, orthopedic ERAS protocols encourage early mobility and continuation of multimodal pain management. Prolonged immobility following surgery has been associated with increased thromboembolic events, pulmonary complications, insulin resistance, and delayed wound healing (Kaye et al., 2019a). The goal of multimodal opioid-sparing analgesia should be to reduce discomfort to an acceptable level rather than eliminate pain completely. Heavy opioid use during the perioperative setting can lead to postoperative ileus and increase length of stay.

Project Methods

The intent of this project was to create and introduce an ERAS protocol for TKA and THA at a small hospital in the St. Louis metropolitan area. Objectives were to research prevailing evidence-based literature on ERAS protocols, develop a facility specific protocol, and

introduce the customized ERAS protocol to members of the perioperative team. Due to COVID-19 restrictions during the time of implementation, an online pre-recorded PowerPoint presentation served as the educational module. The presentation encompassed the framework and key components of ERAS, estimated benefits of adoption, and facility specific goals following implementation. The educational material comprised of evidence-based literature with a primary focus on lower extremity orthopedic procedures. Inclusion criteria for participation included members of the perioperative team. This included certified registered nurse anesthetists, anesthesiologists, surgeons, preoperative registered nurses, circulatory registered nurses, and postoperative registered nurses.

As expected, this quality improvement project was deemed exempt by the Institutional Review Board (IRB) at Southern Illinois University Edwardsville. After IRB exemption was achieved, the host facility granted approval of the project, and the virtual implementation was scheduled.

Evaluation

On September 13, 2020, the presentation, infographic, and survey link were sent to the external stakeholder at the host facility. As previously mentioned, COVID-19 restrictions limited the project to a virtual implementation. Perioperative members were allotted two weeks for content viewing. The educational presentation took participants approximately 20 minutes to view. The follow-up survey took approximately 10 minutes to complete. The 13-question educational survey consisted of four demographic questions, three Likert scales, three questions on implementation, and three knowledge assessment questions. The surveys were administered online via Qualtrics. The questions assessed the understanding of pertinent PNBs, the goals of

ERAS protocols, and relevant pharmacology. The three 10-point Likert scale questions were utilized to assess the participants subjective understanding of ERAS protocols.

The data was compiled following the allotted two week period. Eleven CRNAs completed the survey, and results indicated participants had a strong foundation of ERAS knowledge, with a mean Likert score of 8.82. Participants also indicated thorough knowledge of ERAS specific to LE orthopedic procedures. The CRNAs scored an average of 79% on the knowledge assessment. Two questions scored very high, and one question scored poorly indicating the topic should have been covered in greater detail.

Limitations of this project include COVID-19 restrictions, limited sample size, lack of participation, and a brief study timeframe. With a sample size of only 11, the results are not generalizable. Unfortunately, due to the COVID-19 pandemic and restrictions placed by the host facility, we were unable to present our project in person. To meet our facility's requirement for social distancing, our implementation was done virtually utilizing a YouTube video and a infographic. The link for the presentation was distributed by the external stakeholder. This greatly decreased the number of staff reached, overall sample size, variety of staff, and survey completion. Lastly, the allotted two week time period may not have been long enough to produce an adequate sample size. If the time period was longer, more individuals of the perioperative team may have participated.

Impact on Practice

The project design had a dual purpose of elevating the knowledge of the perioperative team and encouraging the implementation of the aforementioned protocol. Due to the small sample size, there is little evidence showing whether the protocol made a significant impact on practice. However, among the involved participants, a strong understanding of ERAS was

identified. Additionally, the majority of CRNAs indicated *extremely likely* or *somewhat likely* the protocol would be implemented into practice. Barriers to protocol adoption make the long-term impact of the project unpredictable. Currently, the host facility does not allow the adoption of protocols created outside the hospital system. Additionally, only physicians sit on committees that develop protocols. According to survey responses, despite current barriers, participants were optimistic of ongoing buy-in. In the future, an in-person meeting and educational presentation may encourage greater participation. Outreach to other members of the perioperative team, specifically those that sit on protocol development committees, may assist with the buy-in and adoption of the LE ERAS protocol.

Conclusion

Despite low levels of project participation, the overall desire for ERAS protocol adoption was indisputable. The survey participants understood the benefits ERAS and were hopeful for protocol adoption. In order to promote greater buy-in in the future, the project duration should be longer to increase sample size and focus on recruiting more members of the perioperative team to vary sample population. The adoption of the proposed LE ERAS protocol by the host facility may improve patient outcomes and decrease length of stay.

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