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Development and Evaluation of Enhanced Recovery After Surgery protocols for General Abdominal and Orthopedic Surgery with Focus on Preoperative Hydration and Multimodal Management in Preoperative and Postoperative Phases

Authors

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Introduction of the Problem

Enhanced Recovery After Surgery (ERAS) describes an evidence-based, patient-centered, interdisciplinary team-developed protocol utilized to decrease the patient's stress response to surgery, maintain preoperative physiologic function, and expedite recovery (American Association of Nurse Anesthetists [AANA], 2017). Current evidence demonstrates that ERAS protocols lead to better patient outcomes, decrease postoperative complications, facilitate recovery, and allow for earlier discharge (AANA, 2017). In today's healthcare system, many hospitals do not use ERAS protocols, while others utilize these protocols but for only specific surgeries, individual surgeons, or use only parts of the protocol (Heathcote et al., 2019). Studies show that one must employ the preoperative, intraoperative, and postoperative components of the ERAS protocols to achieve maximum benefits. A rural hospital in eastern Illinois, Paris Community Hospital (PCH), utilizes some components of ERAS protocols, mainly the intraoperative portions, but lacks the full utilization.

Literature Review

The evidence illustrates that preoperative fasting guidelines are consistent for nearly all surgical procedures, allowing patients to drink clear liquids 2 hours prior to surgery. Patients should be allowed to eat a light meal until 6 hours before anesthesia induction and consume clear

liquids (including carbohydrate drinks) until 2 hours before induction (Gustafsson et al., 2019). Research has shown prolonged fasting leads to a catabolic state, which increases stress response resulting in insulin resistance and hyperglycemia (Kaye et al., 2019). However, many hospitals and surgery-centers traditional thinking of requiring patients to be NPO after midnight are significant barriers in implementing these fasting guidelines. The ERAS protocols for orthopedic and abdominal general surgical cases include consuming a carbohydrate drink 2-3 hours prior to surgery. Preoperative administration of oral complex carbohydrates has been shown to improve preoperative well-being, decrease insulin resistance, decrease protein breakdown, and maintain muscle strength (Gustafsson et al., 2019). However, more studies must be obtained on the morbidly obese population and preoperative carbohydrate consumption. Maintaining a zero-fluid balance is the goal, as fluid excesses and deficits are associated with increased postoperative complications and prolonged hospital stay (Gustafsson et al., 2019). With preoperative carbohydrate consumption being a newer implementation specifically in providing multiple benefits to abdominal cases as opposed to orthopedic cases, multiple facilities/surgeons are hesitant to change their current practice.

This literature review discussed multiple medication options that can be utilized as a part of multimodal pain management. Like many advances in medicine, the main barrier is resistance to change by facilities/providers. It is imperative for providers to stay up-to-date on best practice guidelines to optimize and individualize patient care. The American Society of Enhanced Recovery states that multimodal analgesic strategies should include a minimum of two nonopioid analgesics and an epidural or regional nerve block as appropriate (Marcotte et al., 2020). Utilizing a multimodal approach, including NSAIDs, acetaminophen, gabapentinoids, corticosteroids, lidocaine, NMDA antagonists, and dexmedetomidine, can significantly reduce

the opioid requirements of the patient (Kaye et al., 2019). Utilizing multimodal medications optimizes pain control for the patient, reduces the reliance on opioids, and reduces the length of stay (Frassanito et al., 2020). Limiting the amount of opioid administration decreases the negative side effects, including sedation, respiratory depression, nausea, ileus, and potential for addiction (Marcotte et al., 2020). Current evidence displays that acetaminophen plus an NSAID provides superior analgesia than either drug alone (Simpson et al., 2019). When comparing acetaminophen alone versus in combination with an NSAID, 85% of the studies showed that the combination was more effective than acetaminophen alone, as evidenced by lower pain scores and less supplemental analgesic requirements (Ong et al., 2010). This is one example of the tremendous benefit gained from multimodal therapy. This literature review's goals were to discuss preoperative hydration, preoperative and postoperative multimodal pain management for orthopedic and general abdominal surgery, with a focus on bariatrics and colorectal surgery.

Methodology

This project aimed to educate the healthcare providers in the knowledge deficit areas to improve ERAS implementation. The deficit areas, and therefore the focus areas of this project, included perioperative goal-directed fluid management, preoperative and postoperative multimodal analgesia management, and the contraindications to the medications utilized in ERAS protocols. The primary stakeholders for this project include the general and orthopedic surgeons and the certified registered nurse anesthetists (CRNAs) at PCH. Nurses, patients, and their families are also stakeholders, as the educational handout can improve surgical outcomes. These providers practice evidence-based medicine to provide the best anesthetic and surgical care to each patient. The external stakeholder of this project is Scott Williamson, chief CRNA at PCH. Adam Schneider, DNP, CRNA, is a CRNA at PCH and a faculty member at Southern

Illinois University Edwardsville (SIUE) and is serving as a mentor for this project. Mary Zerlan, DNP, CRNA, is the SIUE faculty project leader and mentor.

Evaluation

The implementation of the project involved an educational voiceover PowerPoint (Appendix A) and protocol (Appendix B) regarding the management of hydration status and analgesic control for general abdominal and orthopedic surgeries. The design of the project is a non-experimental quality improvement project. The PowerPoint and protocol serve as a guide for the surgeons and anesthesia providers to optimize preoperative fluid status and perioperative pain management. The implementation also included an in-person presentation at the monthly surgical meeting, giving the providers another opportunity to receive the material and ask questions. Evaluation of this project consisted of a post-presentation anonymous survey available to the anesthesia staff and the general and orthopedic surgeons following the viewing of the presentation.

The post-implementation survey was completed by three anesthesia providers, two surgeons, and two other surgical healthcare workers. When asked how fully this facility currently utilizes ERAS protocols, one participant said complete utilization, while six participants stated interventions are utilized throughout perioperative care but not fully utilized. All participants agreed that the presentation improved their knowledge regarding perioperative goal-directed fluid management, preoperative and postoperative multi-modal analgesic management, and the contraindications to the medications utilized in ERAS protocols. Six out of seven participants stated the knowledge gained from the presentation would affect their practice.

One limitation of this project was the small number of participants. This project included anesthesia providers, orthopedic surgeons, and general surgeons. PCH is a small critical access

hospital with only five full-time anesthesia providers, one primary orthopedic surgeon, and one general surgeon. The small number of healthcare providers poses a limitation in this project. The small sample size affects the reliability of the post-implementation survey's results and increases the risk of bias. Another limitation of this project was using a convenience sample of participants.

Impact on Practice

The number of patients requiring general abdominal and orthopedic procedures continues to grow. ERAS protocols aid in improving patient satisfaction, decreasing surgical complications and decreasing costs and hospital length of stay. Proper preoperative hydration improves patient satisfaction along with having metabolic and clinical benefits. Multimodal analgesia management is a key focus of ERAS protocols, as this decreases the stress response to surgery and decreases opioid use. With the current opioid epidemic and the multiple adverse effects of opioids, limiting their use has numerous benefits for the patient. Implementation of this evidence-based educational PowerPoint and handout will improve patient care throughout the perioperative period. The project can be sustained by continued use of the protocols and the providers' ability to update the protocol as evidence continues to evolve.

Conclusion

This project was implemented at a small critical access community hospital with a small patient population. Utilizing the research methods of this project at facilities across the country would lead to increased utilization of ERAS protocols. Facilities that do not utilize ERAS protocols must have complete education on what ERAS is and how to utilize ERAS protocols. Facilities that partially utilize ERAS protocols, such as PCH, would benefit from assessing

current practices, then education directed at the deficits at that facility. Increasing the use of ERAS protocols has the potential to have a powerful impact on current practice.

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