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Improving Perioperative Pain Management: Development of an Adult Lidocaine Infusion Protocol

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Introduction of the Problem

Postoperative pain is a challenge in healthcare, especially after a complex surgery, with more than 50% of patients reporting inadequate pain control (Zengin, Saracoglu, Eti, Umuroglu, & Gogus, 2015). Inadequately controlled pain can negatively impact a patient's quality of life, function, recovery, and cause postsurgical complications (Chou et al., 2016). Anesthesia providers intervene daily to manage pain and are encountering more opioid-tolerant patients further complicating this task. Aims for acute pain management focus on reducing the incidence and severity of pain in order to improve patient function, minimize side effects, and prevent further complications after surgery (Gordon et al, 2016). Implementing a multimodal approach to pain control can help providers reach these goals. The purpose of this doctoral project was to improve acute pain management in the perioperative arena by formulating an adult lidocaine infusion protocol for a tertiary care center in central Illinois. This tertiary care center had no protocol in place and was interested in developing a new lidocaine infusion protocol for managing pain.

Literature Review

The American Pain Society (APS) partnered with the American Society of Anesthesiologist (ASA) and the American Society of Regional Anesthesia (ASRA) to develop guidelines in 2016 for postoperative pain management formulated by evidence-based recommendations (Chou et al., 2016). Consensus guidelines addressed the use of multimodal therapies, such as a lidocaine infusion, for treatment of postoperative pain in adults (Chou et al.,

2016). Lidocaine is an amide local anesthetic that interrupts neuronal transmission by blocking sodium channels in neural tissue (Eipe, Gupta, & Penning, 2016; Grady et al., 2012; Samimi, Taheri, & Davari Tanha 2015). The analgesic, anti-hyperalgesic, and anti-inflammatory properties all play apart in the reduction of pain when lidocaine infusions are utilized (Eipe et al., 2016). Multiple research studies have demonstrated a lidocaine bolus followed by a continuous infusion for at least one hour postoperatively resulted in a reduction of opioid consumption, fewer adverse side effects, and lower pain scores postoperatively (Chang et at., 2017; Kim et al., 2014; McCarthy, Megalla, & Habib, 2010; Samimi et al, 2015; Vigneault et al., 2011; Weibel et al., 2016).

Project Methods

This project utilized a non-experimental design in order to develop and introduce an evidence-based lidocaine infusion protocol at a tertiary care center in central Illinois. The project's goals were to increase the knowledge of the anesthesia providers after an educational presentation and encourage use of the protocol to serve as an option for managing surgical pain. The long-term objective for the project was utilization of the lidocaine infusion protocol by hospital staff in order to better manage perioperative pain and improve patient outcomes.

The project was implemented at a tertiary care center in central Illinois. Ten staff members attended the verbal educational PowerPoint presentation and completed the twelve-question survey to evaluate the presentation. The questions were in multiple-choice and true/false format addressing pharmacology and benefits of a multimodal approach to pain management. The last questions utilized a five-point Likert scale to assess the likelihood of utilizing the lidocaine infusion protocol.

The project received exempt status from the Institutional Review Board at Southern Illinois University Edwardsville and was approved by the Research Review Committee at the hospital. There were minimal risks to participants that complete the survey including inconvenience of time and or emotional distress. Participation was completely voluntary.

Evaluation

Results from the study implied that there was an increase in staff knowledge following the verbal presentation on implementation of an adult lidocaine infusion protocol. The majority of members in attendance (90%) identified that lidocaine is an amide local anesthetic that works by blocking active sodium gated channels. All staff (100%) recognized that lidocaine not only provides analgesia but also has anti-hyperalgesia and anti-inflammatory properties. All staff members (100%) identified that guidelines on the Management of Postoperative Pain written by the American Pain Society recommended the use of multimodal therapies for treatment of postoperative pain. All participants (100%) identified that lidocaine infusions have shown to reduce opioid consumption and lower pain scores with fewer adverse side effects. All participants (100%) correctly answered that over 80% of patients undergoing surgery experience postoperative pain. Prior to this presentation, the majority of participants (90%) indicated that they were not routinely administering lidocaine infusions as part of a multimodal approach in managing pain. The final question of the survey utilized a five-point Likert scale to assess staff member support for the implementation of an adult lidocaine infusion protocol. The mean score was 4.3 suggesting staff support for the implementation of an intraoperative lidocaine infusion protocol. Additional comments on the presentation included the following statements: great information and great presentation. There were no unforeseen complications during this presentation. Limitations for this project was sampling size and sampling bias. Due to time

constraints and staff availability, a convenience sample was utilized. A total of ten participants completed the posttest following the educational presentation. These results may not be generalizable to a larger population.

Impact on Practice

The goal of this project was to improve perioperative pain management for surgical patients by employing a multimodal approach to help minimize side effects from opioids and improve patient outcomes after surgery. The objectives of this project included researching current evidence-based literature to determine the importance of lidocaine in pain management, noting common themes among infusions that have had successful patient outcomes in the perioperative period, and developing an adult lidocaine infusion protocol for a tertiary care center in central Illinois. Prior to this project, none of the participants indicated they were routinely using lidocaine as a multimodal approach in managing pain. Results from the survey indicated staff support for the implementation of an intraoperative lidocaine infusion protocol. Currently, there is a discussion among anesthesia providers and pharmacy about the potential to adopt this protocol. An improvement to the project in the future would be to implement during an anesthesia meeting or to implement the project at more than one facility in order to sample from a larger group.

Conclusions

Patient outcomes after surgery may be improved by educating hospital staff about the use of an intraoperative lidocaine infusion protocol. The evidence-based research review indicated lidocaine can be used as part of a multimodal pain regimen in both the intraoperative and postoperative settings. Multiple research studies supported that a lidocaine bolus of 1-2 mg/kg followed by a continuous infusion of 1-3 mg/kg/hr for at least one hour postoperatively resulted

in decreased opioid consumption, fewer adverse side effects, and lower pain scores (Chang et at., 2017; Kim et al., 2014; McCarthy, Megalla, & Habib, 2010; Samimi et al, 2015; Vigneault et al., 2011; Weibel et al., 2016). Results from the survey indicated staff at the hospital were in support of utilizing a lidocaine infusion protocol. Making the lidocaine infusion protocol available to staff has the potential to greatly impact the anesthesia practice by providing an additional method to incorporate a multimodal approach to managing pain and improve patient satisfaction by reducing pain.

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