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Standardization of Perioperative Management of the Breastfeeding Women

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Executive Summary

Introduction of the Problem

Human milk is the optimal nutrition for term and preterm neonates. Preterm neonates are reliant on their mother's breast milk or donated breast milk for their nutrients because they are incapable, depending on their term age, of metabolizing cow's milk protein found in formula (Granger et al., 2021). Exclusively breastfeeding mothers, especially first-time mothers, are anxious in the preoperative period due to the time apart from their newborn and the ambiguity surrounding a safe timeframe for resuming breastfeeding postoperatively. Psychological factors such as anxiety and physiological factors such as preoperative restriction of fluid intake can also further decrease breast milk supply. Anesthesia providers are in key positions to reassure lactating patients that breastfeeding right after surgery, when the mother is awake enough to hold the baby safely, is the best practice because the crossover of medications provided in the perioperative phase into breast milk is minimal. The host facility's anesthesia providers were receptive to streamlining resources to aid in rapid decision-making that enables safe medication administration to lactating patients.

Literature Review

For the first six months of life, the World Health Organization recommends breast milk as the sole preferred source of nutrition (WHO). Same-day surgeries may be necessary for a breastfeeding woman for several reasons, and general anesthesia may be unavoidable due to the nature of the surgery. There is a lot of ambiguity and misinformation regarding discarding breast milk after general anesthesia not supported by evidence. The lack of scientific evidence stems from medication effects not being tested on vulnerable populations, such as breastfeeding mothers and newborns, by pharmaceutical companies (Smather et al., 2016).

Promptly after birth, the lobules in the breast widen to allow passage of the antibodies with breast milk to protect the infant (Mitchell et al., 2020). A few days after delivery, the permeability of the lobules decreases. This physiological process also reduces the amount of anesthesia drugs that pass through to breast milk (Mitchell et al., 2020). The bioavailability of the non-ionized alkaline medications that pass into breast milk diminishes as the drugs go through the infant's acidic stomach and first-pass metabolism before being absorbed by the infant (Lobkova & Wolf, 2014). The effect on the infant depends on the infant's age and the quantity and rate of occurrence of feedings while the drug is in the mother's system (Dalal et al., 2013).

Most medications used during the intraoperative setting are short-acting, will not linger within the maternal plasma, and are considered safe for lactating patients. The poor tissue solubility and oral bioavailability make inhalational anesthetics safe for breastfeeding patients (Dalal et al., 2013). The rapid redistribution and metabolization of common intravenous anesthetics such as propofol, etomidate, and dexmedetomidine leads to low bioavailability in breast milk for the infant and has been determined to be safe for breastfeeding mothers (Mitchell et al., 2020). The adverse effects of opioids, such as sedation, can hinder a mother from breastfeeding after general anesthesia, so alternatives such as regional anesthesia and other non-opioid adjuvants should be considered and used when appropriate (Reece-Stremtan et al., 2017). Providers should also be aware of the variability in managing acute versus chronic pain in lactating mothers. Repeated opioid use as needed for acute pain management of lactating patients should be less than three days due to the inability to monitor a breastfeeding infant in the out-of-hospital setting for sedation or apnea (Ito, 2018). The most common non-opioid analgesics used in the perioperative setting, such as nonsteroidal anti-inflammatory drugs (NSAIDs), gabapentin, aspirin, and acetaminophen, are considered safe for breastfeeding patients (LactMed, 2006).

Midazolam is the preferred benzodiazepine due to its short duration of action and poor oral bioavailability (Mitchell et al., 2020). It is considered safe to breastfeed right after midazolam administration (Rieth et al., 2018). Most cephalosporins, penicillin, and metronidazole are safe for breastfeeding infants (Chu et al., 2013). The most common side effect of breastfed infants exposed to maternal antibiotics is gastrointestinal irritability (Allegaert & van den Anker, 2015). Diazepam, codeine, tramadol, droperidol, oxycodone, and hydrocodone should be avoided for lactating patients due to the lingering adverse effects (Dalal et al., 2013). Caution should be exercised in using hydromorphone due to its long half-life, and more studies are needed to assess ketamine's safety (Mitchell et al., 2020). Even though propofol has been deemed safe by numerous studies, there have been reports of green discoloration of breast milk after general anesthesia, which should be discussed during the preoperative interview (Rainone et al., 2018).

The primary factor influencing the pathway of preoperative discussion with lactating women is the willingness to continue breastfeeding after surgery. There should be a multidisciplinary approach with the lactation consulting services of the hospital to facilitate equipment and services to support the lactating mother's wish to continue breastfeeding postoperatively. In addition to using short-acting safe medications, best practice perioperative guidelines are to schedule the lactating mother as the first case of the day to decrease fasting time, and after peripheral intravenous access placement, breastfeeding patients should be provided adequate hydration in the preoperative setting (Reece-Stremtan et al., 2017). Postoperatively, lactating patients should be encouraged to breastfeed as soon as they can safely hold the baby (Dalal et al., 2013). Preoperatively, mothers unable to or do not feel comfortable bringing the infant or child into the hospital to breastfeed should be encouraged to express their

milk using a mechanical pump and use refrigerated storage available to conveniently and adequately store breast milk (Reece-Stremtan et al., 2017).

Project Methods

The best practice perioperative guidelines were developed in this evidenced-based project to provide resources to streamline anesthesia providers' rapid clinical decision-making when caring for breastfeeding patients. These guidelines provide the best preoperative and postoperative practices to support a lactating mother's perioperative care. A best-practice guideline incorporating a stoplight color-coding chart and categories such as "safe," "caution," and "consider avoidance" that corresponded with the chart coloring was used to group medications according to the evidence-based findings of their safety for anesthesia providers. This project was declared exempt by the Southern Illinois University Edwardsville Institutional Review Board and the University of Pennsylvania Institutional Review Board. After authorization, the literature review results and the created best practice guidelines were presented to the host facility's clinical operations committee. According to the committee's recommendations, the guidelines were revised. The educational presentation at the host facility included key stakeholders via virtual Microsoft Teams meeting to accommodate participants from multiple clinical sites. The presentation lasted approximately 30 minutes. After the presentation, the guidelines were emailed to the department and shared on the organizational team collaboration website for easy access.

Evaluation

The software platform, Qualtrics was used to send a pre-implementation survey via email to the certified registered nurse anesthesia providers and perioperative registered nurses in

attendance at the virtual presentation to assess their knowledge regarding the topic. After conducting the presentation, the members in attendance were emailed a post-implementation survey. The post-implementation survey results were analyzed to determine feedback from project stakeholders. The survey results suggested that the PowerPoint presentation improved provider confidence in supporting the perioperative care of breastfeeding mothers.

Sixty-four CRNAs and two registered nurses attended the Teams meeting that provided the PowerPoint presentation. Fifty-four participants (82% response rate) completed the pre-implementation survey, and fifty-three (83% response rate) completed the post-implementation survey. A Wilcoxon Rank Sum Test was used for all significance testing because this non-parametric method works well when the distributions are abnormal. There was a significant improvement in correct responses to post-implementation questions that assessed knowledge about how soon mothers can resume breastfeeding after surgery (p-value:0.0061) and discarding breast milk as an unnecessary practice (p-value: 0.0014). The average scores increased from 68% on the pre-survey to 88% on the post-survey, and the standard deviation decreased by about 10%, showing improvement in scores. There was a significant improvement in score from the pre-and post-survey, with a significant increase in confidence after the presentation. The respondents also supported having a resource in the organization's intranet. Limitations of this project include that most of the studies used in this evidence-based project were over five years old. There was also a lack of diversity of anesthesia department staff that participated in the presentation and the usefulness of the "stoplight" color chart for providers that are color-blind. Most of the participants in the presentation were CRNAs with pre-survey (96.3%) and post-survey (98.11%). The presentation was completed on a Thursday morning, and the participation of other providers within the anesthesia department was not possible due to scheduling conflicts

with grand rounds and other inter-departmental meetings. During the clinical operations committee meeting within the host site, the issue of color-blind providers was discussed; however, the committee supported moving forward with the "stoplight" color-coded medication safety table. Dr. Valentine's tremendous support in navigating the protocol implementation process in an academic center was invaluable in completing the project.

Impact on Practice

This project was implemented because there needed to be more guidance for anesthesia providers in the host facility while caring for breastfeeding patients. The short-term impact achieved by this project was that the developed best practice guidelines and resourceful links to LactMed would serve as a quick reference tool for providers to assess the safety of medications commonly used in the perioperative setting. The guidelines were uploaded for easy reference for anesthesia providers on the CRNA department channels and emailed to all the Department of Anesthesia and Critical Care staff. Increased accessibility, the direct link to the hospital's internal lactation policy, and the low maintenance cost make these guidelines sustainable. The long-term impact of this project may lead to preoperative education for breastfeeding patients regarding the safety of resuming breastfeeding as soon as they can safely hold their infant and appropriate storage facilities for patients' expressed milk within the perioperative care units.

Conclusions

When caring for a breastfeeding mother, the anesthetic plan should consider the optimal anesthetic choices for the mother and the baby to minimize interruption in breastfeeding. The best practice guidelines implemented by this evidence-based project can aid in streamlining practices to provide optimal care for breastfeeding patients. The effectiveness of this guideline's

application over the long term will be evaluated through repeated assessments of staff knowledge and improvement in patient satisfaction. Future projects could focus on reassessing staff knowledge and confidence level continuously. Also, studies that compare staff recommendations and the resumption of breastfeeding while evaluating patient satisfaction can assess the effectiveness of this project and build future projects.

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