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Breast milk production following Enhanced Recovery After Caesarean Section (ERACS) delivery: An evaluation study

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Abstract

C-section delivery using the ERACS method is suspected of affecting milk production. Some researchers show results with varied parameters and inconsistent results. This study aims to determine the effect of various combinations of anesthetic drugs on breast milk production. This research is a descriptive correlation study with a cross-sectional approach with medical record documents as the data source. The sample in this study was 60 mothers who delivered by C-section at Aisyiyah Muntilan Hospital in July-October 2022. A total of 30 patients received a combination of anesthetic drugs 1 in topical and morphine, and 30 received a mixture of anesthetic 2 in the form of vopicaïn, fentanyl, and dexmedetomidine. This study concluded a difference in milk production in patients who received the anesthetic combination of vopicaïn, fentanyl, and dexmedetomidine and the variety of vopicaïn and morphine.

Keywords: Maternity care; ERACS; child care; postpartum care; mother and child health

Introduction

Labor is the process of expelling a mature fetus through the birth canal with assistance or without assistance, which in a specific condition may lead to harm to the mother or fetus (Akyıldız, Çoban, Gör Uslu, & Taşpınar, 2021)—based on the global agreement (Millennium Development Goals) cases of maternal mortality decreased to 102 per 100.000 live births. A study highlighted three factors causing childbirth death: late pregnancy checks, late delivery services, and late arrival at the health service lead C-section (Mylonas & Friese, 2015). C-section is carried out because there are influencing factors such as work, education, age, emergency conditions, and co-morbidities. The World Health Organization (WHO) says that currently, deliveries using the C-section method have increased worldwide, even exceeding the recommended limit as an effort to save the lives of mothers and babies by 10% to 15% (Begum et al., 2017).

Problems often occur during the delivery process, especially with the C-section method of breast milk production (Hobbs, Mannion, McDonald, Brockway, & Tough, 2016). Breast milk production releases oxytocin hormone to flow breast milk produced within the breast. The problem of early releasing breast milk could happen to mothers who experience C-sections. Post-SC mothers will face difficulty in early breastfeeding initiation due to several factors, such as C-section wounds and weakness. Therefore, the patients could breastfeed their infant several hours after labor (Silawati & Murnita, 2020). Previous C-section deliveries caused several problems, one of which was the late mobilization. Thus, the Enhanced Recovery After Cesarean Section (ERACS) method has been developed to solve the issues. Patients who received ERACS can perform movements after two hours of surgery. This method is done by combining several anesthetic drugs, including hypnosis, analgesics, and relaxation (Wulan, Hasanul, & Dadik, 2016). C-section with the ERACS method is very helpful in accelerating the mobilization of patients immediately and in milk production. In addition, the surgery contributes to increasing optimal patient outcomes, reducing postoperative complications, and accelerating postoperative recovery (Patel & Zakowski, 2021). ERACS minimizes the risk of the impact of inadequate analgesia, dysfunctional bowel movement, delayed ambulation, and milk production (Ratnasari & Warmiyanti, 2022).

During ERACS, two types of drugs are used: combination one: vopicaïn 10 mg, morphine 0.01 mg, and combination two: vopicaïn 5 mg, fentanyl 12.5 mg, and dexmedetomidine 0.01 mg. Several kinds of literature presented inconsistent findings with varying parameters regarding the use of opioids on the quality of breastfeeding. A study highlighted that a multimodal regimen (morphine replacement) increased mothers' milk production in exclusive breastfeeding (Macias et al., 2022). Other studies have shown that the use of opioids increases serum prolactin, helping to release milk production (Tolis, Dent, & Guyda, 1978). Other studies have shown a difference between groups that receive morphine and those that do not work regarding breastfeeding rates (Mahomed, Wild, Brown, & Green, 2019). Another study conducted on women giving birth showed that using various analgesics slowed lactogenesis (Lind, Perrine, & Li, 2014) and delayed the onset of lactation (Lamvu et al., 2018). The studies above mention the different findings regarding the benefits of ERACS. All types of anesthetics of the opioid type work in a lock and basic manner on opioid receptors located in the periaqueductal in the gray matter of the corpus striatum brainstem, amygdala, hypothalamus, and substantia gelatinosa in the human spinal cord—plasma levels of prolactin, testosterone, and estrogen (Angkejaya, 2018). For these reasons, the authors are interested in studying the effect of various combinations of anesthetic drugs on breast milk production among mothers receiving C-sections. This study aimed to determine the impact of different anesthetic drugs on milk production in C-section patients using the ERACS method at Aisiyiah Muntilan Hospital.

Method

The study used a descriptive design with a cross-sectional approach, as the data will be collected once. The data source was the medical records of mothers who gave birth by C-section at Aisiyiah Muntilan Hospital (RSAM). Sixty medical records were used, and the breast pump observation instrument tool was tested for validity and reliability. The data analyzed were surgical data from July 2022 to October 2022. Data collection in this study by observing breast milk production after C-section mothers using observation sheets of breast milk production. The independent variable was the type of combination of anesthetic drugs given. Group 1 used Vopicaïn 10 mg and Morphine 0.01 mg. Group 2 used Vopicaïn 5 mg, Fentanyl 12.5 mg and Dexmedetomidine 0.01 mg. The dependent variable consists of the variable milk production. The data was not normally distributed, so the Mann-Whitney Test was also used. Before the study outset, ethical approval was obtained from the Ethical Board of RSAM (No. 01/EC-RSAM/IX/2022).

Results

The following is the result of this study, as mentioned in the two tables below. The characteristics of patients using the ERACS Method were shown (**Table 1**). Most of the respondents had multigravida pregnancies. Multigravida pregnancies dominated distribution based on pregnancy parity in both groups. Group 1 had the highest number of multigravida respondents, with 20 subjects (66.7%).

Table 1. Distribution of Respondent Characteristics Based on Total Parity

Number of Pregnancies	Group				Total	
	Group. 1		Group. 2		F	%
	F	%	F	%		
Primigraviada	10	33.3	14	46.7	24	40
Multigravida	20	66.7	16	53.3	36	60
Total	30	100	30	100	60	100

Variations in anesthetic drug combinations associated with breast milk production in patients with the ERACS method were also shown (**Table 2**). There were differences in milk production between groups. In both groups, most of the milk production was smooth. The condition of patients with breast milk not coming out was only one subject (3.3%) in group 2.

Discussion

The results showed 24 primigravida pregnancies, and 36 were patients with multigravida pregnancies. Patients with multigravida pregnancies were the largest group of patients who received a combination of anesthetic drugs vopicaïn, morphine (66.7%), as well as the group of patients who received a variety of anesthetic drugs vopicaïn, fentanyl, dexmedetomidine (53.3%). This data aligns with the results of Razali's study (2021). Here, the cesarean section procedure was dominated by the multigravida group. In a population study conducted by Tamala et al., multigravida

women known to have complications in previous pregnancies and difficulties with the fetus during delivery independently increase the risk of delivery, correlated with C-section procedures. In that study, a history of the last cesarean section was the main predictor of an increase in the percentage of cesarean sections (Razali et al., 2021).

Table 2. Distribution of Total Milk Production

Milk Production	Group				Total		p
	Group. 1		Group. 2		F	%	
	F	%	F	%			
No production	0	0	1	3.3	1	1.7	0.000
Mild production	5	16.7	0	0	5	8.3	
Adequate production	25	83.3	29	96.7	54	90	
Total	30	100	30	100	60	100	

Mothers who experience C-sections are influenced by factors from within the mother who is experiencing labor, such as age, parity, and history of the disease (Wahyuni & Rohani, 2019). There are four medical indications for the most part, namely mothers giving birth with a cesarean section, a history of a cesarean section, this is due to the mother's uterus experiencing abdominal injuries due to an incision during the previous cesarean section, which resulted in the mother experiencing uterine tears during vaginal delivery. Due to this, the Cephalopelvic disproportion (CPD) factor is a condition where the size of the pelvis does not match the size of the circumference of the fetal head, which can cause the mother to be unable to give birth vaginally; the last factor is non-advanced parturition caused by abnormalities in the location of the fetus, pelvic abnormalities, abnormalities his, the head of the wrong parturition, the fetus is large, or there are congenital abnormalities, hanging abdomen, grand multi and premature rupture of membranes.

The results showed that in most respondents who were given combined spinal anesthesia (vopicain, morphine), as many as 25 mothers could produce milk smoothly. While the majority of respondents were given combined spinal anesthesia (vopicain, fentanyl, dexmedetomidine), as many as 29 mothers were able to produce milk smoothly. This is because spinal anesthesia combined with vopicain, fentanyl, and dexmedetomidine mothers can mobilize earlier than spinal anesthesia combined with vopicain and morphine. Morphine, fentanyl, and dexmedetomidine are anesthetics that contain opioid hormones that can activate the prolactin hormone as a trigger for breast milk production. The study results found that combining two drugs (fentanyl and dexmedetomidine) with an opioid hormone is more effective in the milk production of Post C-section patients. Fentanyl is a chemical compound C₂₂H₂₈N₂O that works by combining opioid receptors with G-proteins to make GTP exchange with GDP, which functions to regulate adenylate cyclase and reduces the concentration of cAMP into cells, which makes calcium ions enter cells; this exchange results in cell hyperpolarization and inhibition of activity cells (DePriest, 2017). Fentanyl is a synthetic opioid with a structure similar to meperidine, where this anesthetic has more strength than morphine anesthesia, which is 75-125 times (Angkejaya, 2018).

Dexmedetomidine is a drug with the element C₁₃H₁₆N₂; this drug will activate alpha-2 adrenoceptors, which will inhibit the spread of pain signals, and postsynaptic 2-adrenoceptors will inhibit sympathetic activity so that it will reduce blood pressure and heart (Zhang, 2016). Dexmedetomidine is a selective α₂-adrenergic receptor agonist with an opioid-sparing effect and faster recovery from anesthesia (Angkejaya, 2018). Morphine is a potent analgesic drug with the chemical compound C₁₇H₁₉HO₃; the drug works by blocking nociceptive signals, thus providing pain modulation neuron signals in the spinal cord and inhibiting primary afferent nociceptors to sensory projection cells (Klimas & Mikus, 2014). Meanwhile, according to research from Angkejaya (2018), morphine anesthesia is an anesthetic with an opioid prototype that can help produce breast milk. All types of opioids work in a lock-and-key manner on opioid receptors located in the periaqueductal in the brainstem gray matter of the corpus striatum, amygdala, hypothalamus, and substantia gelatinosa in the human spinal cord. In addition, opioids can increase prolactin, testosterone, and estrogen levels in plasma (Angkejaya, 2018). According to Abdul (Abdul et al., 2020), prolactin is a hormone that can increase milk production in addition to other hormones. The prolactin hormone works to secrete breast milk, which is stimulated by neuroendocrine reflexes.

In addition to the anesthetic factor used, there are other factors, namely early mobility, lack of frequency of breastfeeding, low birth weight (LBW), premature birth, presence of acute/chronic illness, and absence of breast care which can affect milk production, according to a study that early mobilization can speed up the time for expressing breast milk in C-section mothers (Johar, Mohamad, Saddki, Ismail, & Sulaiman, 2021). This shows that breastfeeding

is faster in C-section mothers who carry out active mobilization than in mothers who do passive mobilization. In postpartum mothers, the possibility of experiencing non-smooth milk production can occur due to several factors that have a direct effect, such as the mother's food intake, which is less nutritious and nutritious, the baby's sucking is not correct, the frequency of spending milk is lacking, the mother's psychological factors (anxiety, stress), nursing Incorrect breasts, improper breastfeeding position, postoperative pain, lack of mobilization (Post C-section), mother and child separation.

Conclusion

The study concluded that there was a significant difference in milk production between group 1 and group 2 due to variations in the combination of anesthetic drugs. Clinical nurses and healthcare professionals should work together to achieve the standard care of milk production after ERACS. Future studies are needed to evaluate the infant's growth after receiving ERACS.

Author's declaration

The authors made substantial contributions to the conception and design of the study and took responsibility for data analysis, interpretation, and discussion of results. For manuscript preparation, all the authors read and approved the final version of the paper.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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