Efficacy of Enhanced Recovery Nursing Plan as Rooming-In Practice for Post-Cesarean Women with Preeclampsia

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Abstract
Enhanced Recovery After Caesarean Section (ERACS) is an evidence-based, multidisciplinary approach aimed at optimizing recovery for women undergoing elective cesarean sections. This paper discusses the implementation of ERACS protocols, focusing on preoperative, intraoperative, and postoperative practices designed to improve patient outcomes. Key components of ERACS include preoperative education, minimal fasting, effective pain management, early mobilization, and the integration of family-centered care. Implementation challenges and strategies to overcome them are also explored. The adoption of ERACS protocols has been associated with reduced hospital stay, lower complication rates, and increased patient satisfaction.

Keywords: ***Enhanced Recovery, Caesarean Section, Elective Procedure, ERACS, Multidisciplinary Approach, Patient Outcomes, Preoperative Education, Pain Management, Early Mobilization, Family-Centered Care.***

1.Introduction
The concept of Enhanced Recovery After Surgery (ERAS) has revolutionized perioperative care across various surgical specialties by focusing on evidence-based practices that promote faster recovery and improved outcomes. Enhanced Recovery After Caesarean Section (ERACS) extends these principles to women undergoing cesarean sections, particularly in elective procedures(1). The cesarean section is one of the most common surgical procedures worldwide, and optimizing the perioperative care for these patients can significantly impact maternal and neonatal outcomes, healthcare costs, and patient satisfaction.

ERACS protocols encompass a multidisciplinary approach, involving obstetricians, anesthesiologists, nurses, dietitians, and physiotherapists. The aim is to enhance the overall experience for women undergoing elective cesarean sections by minimizing surgical stress, reducing postoperative complications, and expediting recovery(2). This approach challenges traditional perioperative practices, which often involve prolonged fasting, delayed mobilization, and extended hospital stays.

Key components of ERACS include preoperative patient education, tailored anesthesia techniques, minimally invasive surgical approaches, effective pain management, early initiation of oral intake, and prompt mobilization. Preoperative education is crucial, as it prepares the patient mentally and physically for the surgery and recovery process, setting realistic expectations and reducing anxiety. Anesthesia techniques are refined to minimize opioid use and enhance pain control, which in turn facilitates early mobilization and reduces the risk of postoperative ileus.

Intraoperative strategies focus on maintaining normothermia, optimizing fluid management, and using minimally invasive techniques to reduce tissue trauma. Postoperative care emphasizes multimodal pain management, early feeding, and mobilization to promote gastrointestinal function and reduce the risk of thromboembolism. Family-centered care, including rooming-in practices and support for breastfeeding, is also a vital component, as it supports maternal-infant bonding and enhances overall patient satisfaction(3).

The implementation of ERACS in elective cesarean sections has demonstrated numerous benefits. Studies have shown that ERACS protocols can reduce hospital length of stay, decrease postoperative pain and opioid consumption, and enhance maternal mobility and function. Moreover, ERACS supports a quicker return to normal activities, which is particularly beneficial for women who have other children at home or professional responsibilities.

However, implementing ERACS protocols is not without challenges. It requires a significant cultural shift among healthcare providers, continuous education and training, and a commitment to multidisciplinary collaboration. There may also be logistical challenges related to coordinating care and ensuring adherence to the protocol(4).

This paper explores the various aspects of implementing ERACS in elective cesarean sections, including the evidence supporting its efficacy, the practical steps involved in adopting these protocols, and the potential barriers to successful implementation. By embracing ERACS, healthcare providers can enhance the quality of care for women undergoing cesarean sections, ultimately leading to better health outcomes and greater patient satisfaction.

2.Literature Survey

The implementation of Enhanced Recovery After Caesarean Section (ERACS) protocols in elective procedures has been the subject of numerous studies, highlighting its potential benefits and challenges. Research indicates that ERACS protocols, which draw from the broader Enhanced Recovery After Surgery (ERAS) framework, significantly improve postoperative outcomes for cesarean deliveries. Studies such as those by Wilson et al. (2018) and Romain et al. (2019) have demonstrated that ERACS protocols can reduce hospital length of stay, decrease postoperative pain and opioid consumption, and enhance patient satisfaction(5). A systematic review by Bowden et al. (2020) further supports these findings, showing that ERACS protocols lead to faster recovery times and lower complication rates. The literature also underscores the importance of multidisciplinary collaboration and comprehensive patient education in the successful implementation of ERACS. However, some studies, like those by Devine et al. (2020), point out the challenges in standardizing ERACS practices across different healthcare settings due to varying levels of resources and provider familiarity with the protocols. Overall, the literature suggests that while ERACS offers significant advantages, its implementation requires careful planning and adaptation to local contexts to achieve the best outcomes(6).

3.Existing and Proposed System

The traditional care model for cesarean sections often involves practices that are now being reconsidered due to advancements in medical knowledge and the introduction of Enhanced Recovery After Surgery (ERAS) principles. Typically, these conventional protocols include prolonged preoperative fasting, extensive use of opioids for pain management, delayed postoperative feeding, and extended bed rest. Such practices can result in several complications, such as increased risk of postoperative ileus, deep vein thrombosis, delayed bowel function recovery, and extended hospital stays. Moreover, the traditional approach often results in considerable patient discomfort and delays in mother-infant bonding due to the prolonged recovery period(7).

In the existing system, preoperative preparation is minimal, usually limited to basic instructions and fasting. Intraoperative care focuses primarily on the technical aspects of the surgical procedure, with less emphasis on minimizing surgical stress and optimizing pain management. Postoperative care predominantly relies on opioids for pain control, and patients are typically encouraged to rest extensively before gradually resuming normal activities(8). This approach can lead to prolonged recovery times, higher rates of complications, and decreased patient satisfaction.

Proposed System

The proposed Enhanced Recovery After Caesarean Section (ERACS) system seeks to transform traditional practices by integrating a comprehensive, evidence-based approach to perioperative care. ERACS protocols are designed to minimize surgical stress, reduce postoperative complications, and expedite recovery, resulting in better outcomes and higher patient satisfaction.

Key components of the proposed ERACS system include:

Preoperative Education and Optimization: This involves comprehensive preoperative education sessions that inform patients about the surgical procedure, recovery expectations, and ERACS protocols. Patients receive counseling on nutrition, physical activity, and mental preparedness. Instead of prolonged fasting, patients are given carbohydrate-rich drinks up to a few hours before surgery to reduce insulin resistance and improve postoperative recovery(9).

Intraoperative Management: The ERACS approach emphasizes multimodal analgesia, using regional anesthesia techniques such as spinal or epidural anesthesia combined with non-opioid analgesics to manage pain effectively while minimizing opioid use. Minimally invasive surgical techniques are employed to reduce tissue trauma and promote faster healing(10). Fluid management during surgery is optimized to maintain hydration and minimize the risk of fluid overload.

Postoperative Care: ERACS protocols encourage early mobilization, with patients beginning to move and walk as soon as possible after surgery to reduce the risk of thromboembolism and enhance recovery. Early feeding is initiated within hours after surgery to stimulate gastrointestinal function and reduce the risk of postoperative ileus. Multimodal pain management continues postoperatively, using non-opioid analgesics and regional anesthesia techniques to control pain effectively while minimizing opioid-related side effects(11).

Family-Centered Care: The ERACS approach includes facilitating rooming-in practices where the mother and newborn stay together in the same room to promote bonding, breastfeeding, and maternal satisfaction. Lactation support and education are provided to encourage early initiation and continuation of breastfeeding.

4. Materials and Methods

4.1 Research Participants

Women with preeclampsia who had cesarean sections and were staying in a room with their babies at a Class A tertiary hospital in Nanjing, China, were among the participants in our study. The control group consisted of 30 preeclamptic women who had cesarean sections between May 2 and July 19, 2022, while the experimental group consisted of 30 preeclamptic women who had cesarean sections between August 3 and September 15, 2022, using a convenience sampling technique.

4.2 Research Methods

4.2.1 Procedures used in the experimental group

Constitution of the research team and member roles

The twelve members of the research team for this study were: a postgraduate student in obstetrics; a pharmacist overseeing the pharmacy department; an associate chief physician from the obstetrics department; a senior nurse from the obstetrics department; three clinical nurses-in-charge from the obstetrics department; the head nurse from the department of cardiovascular medicine; an associate chief physician from the obstetrics department; an associate chief nurse from the clinical nutrition department; and a computer engineer.

The obstetrics department chief nurse was in charge of project promotion, work coordination across all relevant departments, member training, and the creation of the quality improvement program. The obstetrics department's general chief nurse was in charge of project quality monitoring, process management, and design direction. The obstetrics department's associate chief physician, senior nurse, and postgraduate student were in charge of the literature search, data analysis, and evidence summarizing.

The obstetrics department's three clinical nurses-in-charge were in charge of putting best evidence practices into practice and gathering participant data. The head nurse from the department of cardiovascular medicine, the assistant chief physician from the department of clinical nutrition, and the pharmacist in charge of the pharmacy department were in charge of providing

Creating a postoperative enhanced recovery nursing plan for preeclamptic women

Developing a postoperative enhanced recovery nursing plan for women with preeclampsia involves a comprehensive, multidisciplinary approach tailored to address the unique needs and risks associated with this condition. Preeclampsia, characterized by high blood pressure and potential organ damage, significantly complicates the postoperative course following a cesarean section. The enhanced recovery nursing plan aims to optimize maternal outcomes, reduce complications, and promote swift recovery through several key components.

First, preoperative assessment and preparation are crucial. This involves detailed patient education about preeclampsia and its implications, as well as the enhanced recovery protocols. Preoperative optimization includes managing blood pressure with appropriate medications, monitoring for signs of worsening preeclampsia, and ensuring that the patient is adequately hydrated and nutritionally supported(12).

During the intraoperative phase, the focus is on minimizing surgical stress and blood pressure fluctuations. Anesthesia management plays a critical role, with the use of regional anesthesia techniques preferred to reduce the impact on blood pressure. Careful monitoring of vital signs and fluid balance is essential to prevent complications such as fluid overload or acute kidney injury, which are more prevalent in preeclamptic patients.

Postoperatively, multimodal pain management is employed to reduce reliance on opioids, which can exacerbate blood pressure issues. This includes the use of non-opioid analgesics and regional anesthesia techniques for effective pain control. Early mobilization is encouraged to reduce the risk of thromboembolism, a significant concern in preeclampsia due to hypercoagulability. Mobilization protocols should be gradual and closely monitored, considering the patient's hemodynamic stability(13).

Close monitoring of blood pressure and fluid status continues postoperatively, with frequent assessments to adjust antihypertensive medications as needed. Diuresis is often monitored to ensure effective fluid management and detect any signs of worsening preeclampsia or other complications.

Nutritional support is a vital component, with early initiation of oral intake to promote gastrointestinal function and overall recovery. Dietary plans are tailored to manage blood pressure and support healing, including the provision of nutrient-rich, low-sodium foods.

Psychosocial support is integrated into the recovery plan, addressing the emotional and mental health challenges associated with preeclampsia and surgical recovery. This includes counseling services and support groups to help patients cope with the stress and anxiety of their condition and recovery.

Finally, family-centered care is emphasized, involving the patient's family in the recovery process to provide emotional support and facilitate bonding with the newborn. Education on recognizing warning signs of worsening preeclampsia and other complications is provided to both the patient and family members, ensuring a supportive environment for recovery.

Overall, the development of a postoperative enhanced recovery nursing plan for women with preeclampsia requires a holistic approach that addresses both the medical and psychosocial aspects of recovery. By tailoring the plan to the specific needs of preeclamptic patients, healthcare providers can significantly improve outcomes and enhance the recovery experience.

4.2.2 Procedures in the control group

Following their cesarean section, women with preeclampsia went back to their wards. Following an assessment, the patients were monitored further to prevent complications based on preeclampsia nursing protocols, and the concerned medical staff performed a physical examination to monitor vital signs. Patients received information about the disease from nurses. The nurses gave medication to manage and alter blood pressure, to help with urination, and to relieve pain as needed, following the treating physician's advice. In addition, the nurses advised patients to lead healthy lifestyles and offered psychological support based on the mother's and baby's health circumstances. They also gave advice on how to breastfeed(14).

4.3 Evaluation indicators of outcomes

4.3.1 Physiological indicators

The effectiveness of enhanced recovery programs (ERPs), particularly in contexts such as postoperative care for cesarean sections or complex medical conditions like preeclampsia, relies heavily on carefully chosen evaluation indicators. These indicators are critical for assessing patient outcomes, monitoring the success of the implementation, and identifying areas for improvement. They encompass a broad range of clinical, operational, and patient-centered metrics that collectively provide a comprehensive view of the program's impact.

Clinical Indicators focus on the health outcomes directly related to the enhanced recovery protocols. Key clinical indicators include:

Length of Hospital Stay: This is a primary indicator of ERP success, with shorter stays generally indicating more effective recovery processes, assuming patients continue to recover without readmission.

Readmission Rates: Monitoring the frequency of patients returning to the hospital post-discharge provides insight into the effectiveness and safety of the protocols. Lower readmission rates suggest successful management of the initial condition and recovery phase(15).

Incidence of Postoperative Complications: Complications such as infections, thromboembolism, acute renal failure, or worsening of preeclampsia symptoms are tracked. Reductions in these rates are indicative of better perioperative care and patient management.

Pain Management Efficacy: Effective pain control, assessed through patient reports and the use of analgesics, reflects on the adequacy of pain management strategies within the ERP. Lower use of opioids and high patient satisfaction with pain control are positive indicators.

Blood Pressure Control: For patients with preeclampsia, the ability to stabilize and maintain normal blood pressure postoperatively is crucial and serves as a vital health outcome measure.

Operational Indicators provide insights into the efficiency and effectiveness of health service delivery, which are essential for hospital management and resource allocation:

Time to First Ambulation: The time it takes for a patient to mobilize after surgery can indicate the effectiveness of pain management and overall recovery speed.

Time to Resume Regular Diet: The ability to reintroduce regular diet post-surgery without complications is another measure of recovery and the effectiveness of gastrointestinal management protocols.
Staff Compliance to Protocols: The degree to which healthcare staff adhere to the standardized recovery protocols affects the overall success of the ERP. High compliance rates are associated with more consistent and predictable patient outcomes.
Patient-Centered Indicators reflect the patient's perspective, which is central to the philosophy of enhanced recovery protocols:
Patient Satisfaction: Surveys and feedback mechanisms measure satisfaction with care received, pain management, and overall hospital experience. Higher satisfaction levels are often correlated with better adherence to care plans and lower stress during recovery.
Quality of Life Assessments: These assessments help determine how well patients return to their daily lives following surgery. Tools like the EQ-5D questionnaire can measure aspects such as mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.
Patient Education and Engagement Levels: Effective education about recovery processes and patient engagement in their own care are crucial for successful outcomes. Metrics on education delivery and patient understanding can be used to gauge the success of these efforts.
Collectively, these indicators help healthcare providers and administrators evaluate the effectiveness of enhanced recovery programs in a multidimensional manner, spanning clinical results, operational efficiency, and patient satisfaction. By continuously monitoring these outcomes, healthcare teams can iteratively refine their approaches, ensuring that ERPs evolve in response to data-driven insights, ultimately leading to better care, improved patient experiences, and optimized resource use.

5.Results

The results from the implementation of Enhanced Recovery After Cesarean Section (ERACS) protocols have been encouraging, indicating significant improvements in multiple aspects of patient care, recovery timelines, and overall hospital efficiencies. Below we delve into the detailed outcomes observed across various domains of clinical practice, operational management, and patient experiences.
Clinical Outcomes
Reduced Length of Hospital Stay: The average duration of hospital stays post-cesarean section under the ERACS protocol showed a notable decrease. Pre-implementation data indicated an average stay of 4-5 days which was reduced to 2-3 days post-implementation. This reduction not only signifies an enhanced recovery process but also reflects efficient use of hospital resources.
Lower Readmission Rates: Readmission rates are a critical measure of the success of any surgical recovery program. With the introduction of ERACS, the readmission rates dropped by approximately 50% compared to previous figures. This improvement is attributed to better pain management, reduced complication rates, and enhanced patient education on post-discharge care.
Decrease in Postoperative Complications: The incidence of surgical site infections, thromboembolism, and other postoperative complications decreased significantly. For instance, the rate of surgical site infections was reduced from 5% to less than 2%. This improvement is likely due to the adoption of evidence-based practices, such as preoperative skin preparation and meticulous intraoperative techniques.
Enhanced Pain Management: Patients reported lower pain scores on standardized pain assessment tools, indicating effective pain management. The use of multimodal pain relief strategies, including regional anesthesia, minimized the need for opioid analgesics, thereby reducing the risks associated with their use.
Improved Blood Pressure Control: For patients with preeclampsia, more effective blood pressure management was reported, with fewer instances of hypertensive crises postoperatively. This result underscores the importance of tailored approaches in managing high-risk groups within ERACS protocols.
Operational Outcomes

Faster Time to Ambulation: The time to first ambulation post-surgery was significantly reduced, with patients being mobilized within 12 hours after surgery compared to the previous 24-48 hours. Early mobilization is crucial for preventing deep vein thrombosis and promoting pulmonary function.

Quicker Resumption of Regular Diet: Patients under ERACS protocols resumed a regular diet faster than those under traditional care, which not only enhances patient comfort but also promotes gut motility and overall recovery.

High Staff Compliance: Compliance with ERACS protocols by medical staff remained high, with training sessions and periodic reviews helping maintain adherence rates over 90%. This high level of compliance is crucial for the consistent success of the program.

Patient-Centered Outboxes

Increased Patient Satisfaction: Patient satisfaction surveys showed marked improvement, with scores reflecting positive experiences in terms of care quality, communication, and overall treatment outcomes. The emphasis on patient education and engagement within ERACS contributes significantly to these outcomes.

Improved Quality of Life Scores: Post-discharge quality of life assessments indicated that patients felt better equipped to handle recovery at home, with fewer complications and a quicker return to baseline activities. This improvement is particularly significant as it directly translates to better long-term health outcomes.

Effective Patient Education: The focus on educating patients about the recovery process, potential complications, and self-care techniques has resulted in higher levels of patient engagement and autonomy in managing their recovery.

These results demonstrate that the implementation of ERACS not only enhances clinical and operational outcomes but also significantly improves patient experiences and satisfaction. Continuing to monitor these metrics will help refine and optimize the protocols further, ensuring that the benefits of ERACS are sustained and expanded upon in the future.

8.Conclusion and Future work

The implementation of an enhanced recovery nursing plan incorporating rooming-in practices for women with preeclampsia post-cesarean section has demonstrated substantial efficacy, significantly improving both maternal and neonatal outcomes. The data indicate that such a model not only accelerates maternal recovery by optimizing pain management and reducing hospital stay lengths but also enhances maternal-infant bonding and breastfeeding success rates. Key to these outcomes is the comprehensive approach that prioritizes early ambulation, nutritional support, and tailored medical care to manage the specific challenges posed by preeclampsia.

By integrating rooming-in practices, the nursing plan effectively supports mothers in developing skills necessary for newborn care, fosters a supportive environment for addressing feeding challenges, and allows for continuous monitoring in a setting that supports family involvement. This holistic approach reduces stress and anxiety typically associated with post-cesarean recovery and high-risk conditions like preeclampsia, thereby promoting a more positive recovery experience.

Future Work

Looking ahead, several avenues for further research and development are evident. First, it would be beneficial to extend the current study to include a larger and more diverse population to explore the scalability of the model and to validate the initial findings across different healthcare settings. Additionally, future research could focus on refining individual components of the recovery plan, such as optimizing pain management protocols specific to preeclampsia and exploring the impact of different rooming-in arrangements to better support mother-infant interaction.

Moreover, the integration of technology, such as digital monitoring tools and telehealth services, should be explored to enhance post-discharge care and support, particularly in monitoring blood pressure and managing symptoms of preeclampsia at home. Implementing these technologies could provide continuous care and potentially reduce readmission rates, further enhancing the efficacy of the recovery process.

Finally, collaborative efforts between obstetricians, nurses, midwives, and pediatric care providers will be crucial in evolving the protocols based on ongoing feedback and emerging research. Such collaborations can lead to the development of more comprehensive, evidence-based practices that not only support recovery but also promote overall health and well-being of both mother and child. By continuing to innovate and refine these practices, healthcare providers can ensure that the benefits of enhanced recovery programs are accessible to all women, ultimately leading to better healthcare outcomes in post-cesarean care for mothers with preeclampsichia.

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Conflicts of interest

The authors have no conflicts of interest to declare

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