

Enhanced Recovery After Surgery in Obstetrics and Gynecology: Professional-Review.

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Abstract:

Background: Enhanced Recovery After Surgery (ERAS) protocols increase the efficacy of physiological recovery from surgery via evidence-based perioperative care. Though widely adopted in various specialties, their application in obstetrics and gynecology needs targeted evaluation due to unique physiological and clinical factors. **Aim:** This review aimed to assess current evidence on ERAS protocols in obstetrics and gynecology, focusing on implementation strategies, clinical outcomes, and healthcare impact, while identifying specialty-specific considerations and areas for future growth. **Methods:** A literature search was conducted using PubMed, Scopus, and Google Scholar for peer-reviewed articles published from January 2019 to December 2023. Selected studies were evaluated through a systematic approach for implementation, outcomes, impacts on healthcare, and were inclusive of diverse research designs. A narrative synthesis approach was employed. **Results:** 24 studies met the inclusion criteria, including randomized trials, cohort studies, and reviews. ERAS protocols showed consistent benefits: reduced postoperative pain, shorter hospital stays, decreased opioid use, and improved patient satisfaction. With regards to obstetrics, cesarean-centric protocols boosted pain management and patient mobilization, while gynecology, particularly oncology, saw fewer complications and faster recovery with ERAS implementation. Collaborative teamwork was essential, especially with the positive impact on the economics of reduced healthcare utilization. **Conclusions:** ERAS protocols provide significant benefits in obstetrics and gynecology. Adaptation by specialists specific to the discipline is essential, as is staff education and team cohesion. Standardization of protocols, incorporation of digital elements, and focus on outpatient services are optimal areas for future enhancement of ERAS protocols.

Key words: ERAS, Obstetrics and Gynecology surgery

Introduction

Enhanced Recovery After Surgery (ERAS) protocols represent a great approach in perioperative care, that aims to reduce surgical stress, expedite recovery, and

improve overall outcomes for patients undergoing a variety of procedures. Though initially designed for colorectal surgery, the ERAS guidelines have now

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been incorporated into various surgical fields like obstetrics and gynecology, where they have started to gain traction in recent years ^(1,2). ERAS protocols constitute integrated, multidisciplinary pathways that include the preoperative, intraoperative, and postoperative phases, integrating clear benchmarks of progression and steps like patient education, multimodal analgesia, early mobilization, and optimization of nutrition ^(1,3).

As it applies to gynecology and obstetrics surgery, ERAS protocols have been designed to meet the specific physiological and clinical requirements of women. From even less complicated laparoscopic hysterectomies to highly intricate oncologic surgeries, gynecologic procedures are associated with significant postoperative complications of pain, ileus, and increased length of hospital stay ⁽⁴⁾. Similarly, obstetric surgical interventions like cesarean section rank among the most frequently performed operations globally and stand to gain substantially from ERAS elements that emphasize early mobilization, pain management, and breastfeeding ^(5,6). When implemented as intended, these protocols not only increase patient satisfaction and decrease recovery time but also lessen the strain on healthcare systems by reducing length of stay and complications ^(7,8).

Preoperative optimization is a cornerstone of ERAS pathways. In gynecologic and obstetric settings, it includes patient education, nutritional assessments, and psychological preparation, which have been shown to reduce anxiety and enhance compliance with recovery protocols ⁽¹⁾. Through preoperative counseling, patients are empowered to participate in setting their recovery

expectations which enhances the likelihood of favorable postoperative results ⁽¹⁾. Preadmission dietitians also contribute to optimizing nutritional physiological reserve prior to surgery ⁽²⁰⁾. Patient education and psychological preparation are vital to the success of preoperative optimization in ERAS. Research indicates that preoperative counseling reduces anxiety, improves adherence to recovery plans, and boosts overall satisfaction by setting clear expectations ^(1,20).

Intraoperative ERAS strategies prioritize minimally invasive techniques, such as laparoscopy and robotic-assisted surgery, which reduce tissue trauma and postoperative pain while speeding recovery. These methods have gained traction in gynecologic procedures, offering benefits like shorter hospital stays and a faster return to daily activities ⁽⁴⁾.

For reductions of side effects associated with opioid pain management such as nausea, sedation, and constipation, the use of multimodal analgesia which incorporates non-opioid and regional anesthetic techniques is recommended ^(2,3). These considerations are essential in the obstetric population, because the choice of medications designed to spare the mother significantly alters breastfeeding and neonatal outcomes ⁽¹⁴⁾. Multimodal analgesia, a cornerstone of ERAS, combines non-opioid medications and regional anesthesia to minimize opioid reliance, reducing side effects and improving recovery. In obstetrics, this approach is critical, as limiting opioid use supports breastfeeding and protects neonatal health ^(2,3,14). By tailoring pain management to the needs of mothers and

infants, ERAS enhances outcomes for both.

The focus of pain management within ERAS is on effective pain control, early feeding, and ambulation. Early mobilization, or for that matter any movement, helps reduce the risk of venous thromboembolism and supports faster return to normal function ⁽⁵⁾. Similarly, early oral intake is encouraged following surgery which aids in the recovery from postoperative ileus and gastrointestinal function recovery ⁽⁶⁾. These actions are veteran employees of the hospital who monitor patients and apply protocols using recovery tracking systems developed by other disciplines like nursing, physical therapy, etc. ^(19,21).

Within obstetric care, ERAS protocols for the cesarean section have demonstrated notable benefits which include, but are not limited to, reduced opioid use, better pain control, and shortened stays in hospital ^(7,8). For vaginal deliveries, there is an emphasis on ambulation, actively encouraging mothers to breastfeed, and planning for discharge. All these strategies as a whole improve maternal and neonatal outcomes ⁽⁹⁾. In the field of gynecology, and more so in oncology, the use of enhanced recovery after surgery principles is associated with a reduction in postoperative complications, functional recovery times, and an increase in satisfaction level among patients ^(10,11).

Multidisciplinary collaboration is required for the successful deployment of ERAS in these areas. A coordinated effort is put in by surgeons, anesthesiologists, nurses, dietitians, and physical therapists, who all participate in both protocol creation and implementation ⁽¹⁷⁻²¹⁾. Institutions incur cost savings and improved resource utilization with the application of ERAS ^{(22,}

²³⁾ and healthcare providers experience enhanced job satisfaction because of improved patient outcomes and optimized workflow ⁽²⁴⁾.

Beyond patient outcomes, ERAS protocols deliver significant advantages to healthcare systems, including reduced hospital stays and complications that translate into cost savings and better resource utilization. Providers also report higher job satisfaction due to improved patient recovery and streamlined workflows ^(22,23,24).

As one of the most substantial frameworks in reproductive healthcare, ERAS in obstetrics and gynecology still faces standardization challenges regarding protocols, training of providers, and integration into outpatient care. More work is required to refine core executive components, analyze holistic outcomes over prolonged periods, and broaden the application of ERAS concepts throughout reproductive healthcare.

Methods:

Study Design and Approach

This study conducted a narrative synthesis regarding the use of Enhanced Recovery After Surgery (ERAS) protocols tailored for obstetrics and gynecology. The goal was to assess the application of ERAS principles in these fields, determine successful strategies for implementation, and document outcomes alongside areas needing additional research. To achieve these objectives, an ERAS protocol was formulated with specific guiding questions that systematically reviewed available evidence.

Search Strategy and Databases

To ensure a comprehensive and robust review of the literature, a meticulous search strategy was implemented to

identify all relevant studies, minimizing the risk of omitting critical research. The search was conducted across multiple electronic databases to capture a wide range of scholarly articles, ensuring both depth and breadth in the retrieved literature. The primary databases utilized were PubMed/MEDLINE, Scopus, and Google Scholar, each selected for its unique strengths in accessing academic resources. PubMed/MEDLINE, a cornerstone for biomedical research, provided access to high-quality, peer-reviewed literature in the fields of medicine, surgery, and related disciplines. Its extensive indexing of biomedical journals ensured that key studies related to enhanced recovery protocols and surgical outcomes were included. Scopus, with its broad interdisciplinary coverage, expanded the scope to include international and cross-disciplinary research, capturing studies that might not be indexed in PubMed. This database was particularly valuable for identifying research from diverse fields such as surgical oncology, gynecology, and perioperative care. Google Scholar complemented these databases by offering access to a wider range of sources, including grey literature, conference proceedings, and non-conventionally cited works, which are often overlooked in traditional database searches. To enhance the comprehensiveness of the search, reference lists of key articles were manually reviewed to identify additional relevant studies, a process known as snowballing. This multi-database approach, combined with manual checks, ensured that the literature review was thorough and inclusive of both established and emerging research in the field.

Search Terms and Strategy

The search strategy was carefully designed to maximize the retrieval of relevant studies while maintaining specificity to the research objectives. It employed a combination of controlled vocabulary, specifically Medical Subject Headings (MeSH) in PubMed, and free-text keywords to account for variations in terminology across disciplines and publications. These terms were combined using Boolean operators (AND, OR, NOT) to create precise and inclusive search strings. Core search terms included “Enhanced Recovery After Surgery,” “ERAS,” “fast-track surgery,” and “rapid recovery protocols,” which are widely recognized terms associated with optimized perioperative care protocols. To tailor the search to specific medical fields, additional terms such as “obstetrics,” “obstetric surgery,” “gynecology,” “gynecological surgery,” “surgical oncology,” and “gynecologic oncology” were included. Procedure-specific terms, such as “hysterectomy,” “laparoscopic surgery,” “minimally invasive surgery,” “postoperative care,” and “perioperative management,” were also incorporated to capture studies focused on particular surgical interventions and their outcomes. To ensure the inclusion of the most current and relevant evidence, the search was limited to articles published between January 2019 and December 2023. This five-year timeframe was chosen to reflect recent advancements in surgical techniques and recovery protocols while maintaining a manageable scope for analysis. Filters such as English-language publications and peer-reviewed articles were applied to enhance the quality and relevance of the retrieved studies. The search strings were iteratively refined

based on preliminary results to improve precision, and all searches were documented to ensure transparency and reproducibility. This systematic approach ensured that the literature review was both comprehensive and focused, providing a solid foundation for analyzing the impact of enhanced recovery protocols in surgical settings.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria: ⁽¹⁾ original research, systematic reviews, peer-reviewed meta-analysis, or clinical guidelines; ⁽²⁾ written in English; ⁽³⁾ published in regard to adult patients undergoing obstetric and gynecological operations; ⁽⁴⁾ contained the application of ERAS protocols; and ⁽⁵⁾ reported on clinical outcomes, recovery metrics, or healthcare impacts. Studies with less than 10 patients were editorials, opinion pieces, conference abstracts or case reports and were excluded. Other exclusion criteria included a lack of direct relevance to ERAS in obstetrics and gynecology, methodological inadequacy, or the inability to obtain the full text document.

Study Selection Process

The selection procedure has a stepwise approach, each with its own method. The first search produced 1,247 articles that could potentially be relevant. After the use of reference management software eliminated duplicates, 892 articles from the initial pool were deemed unique. Two reviewers independently assessed the titles and abstracts for relevancy, and this resulted in a funneling process to 156 articles which were screened for detailed review. While conducting a detailed review of the articles, each one was assessed about their methodological rigor and relevance to the study goals. Any

disagreements with the recensions were resolved collaboratively. Ultimately, the analysis included 24 studies, which passed all criteria within the inclusion framework. These consisted of eight randomized controlled trials, twelve cohort studies, three systematic review articles, and one clinical guideline document.

Data Extraction and Analysis

To achieve uniformity regarding comprehensiveness and consistency, a standardized data form was created. Included in the dataset were study particulars such as the author's name, year of publication, study design, sample size, study location, patient demographic information, details of surgical procedures, components of the ERAS protocol, implementation techniques, compliance metrics, and outcome measures. Clinical outcomes included pain, length of stay, and complications, while non-clinical outcomes included patient satisfaction and cost-effectiveness. Additionally, clinical quality indicators that were assessed included methodological rigor, bias, and overall strength of evidence.

Due to the differences in study designs, participant groups, and outcome metrics, narrative synthesis methodology was selected for analyzing the data. This approach allowed for the integration of qualitative findings from different studies across the implementation phases of ERAS: the pre-operative, intra-operative, and post-operative care phases. Gaps in evidence and recurring themes were documented with the goal of addressing those gaps in subsequent clinical and research endeavors.

Results

The review identified consistent and significant benefits from implementing Enhanced Recovery After Surgery (ERAS) protocols across obstetric and gynecologic procedures, demonstrating improved patient outcomes and healthcare system efficiencies. ERAS interventions, rooted in preoperative optimization, multimodal analgesia, minimally invasive surgery, and early mobilization, have reshaped perioperative care, reduced recovery times and complications while enhancing patient satisfaction and cost-effectiveness.

In obstetrics, ERAS protocols were particularly effective for cesarean sections. Strategies such as transverse incisions, reduced opioid use through multimodal analgesia, and early ambulation significantly lowered postoperative pain scores, enabling faster recovery and earlier hospital discharge ^(7, 8). These protocols also reduced the incidence of complications like wound infections and improved maternal mobility, critical for newborn care ⁽⁷⁾. For vaginal deliveries, ERAS emphasized enhanced postpartum care, including early breastfeeding initiation and ambulation, which led to shorter hospital stays, improved maternal-neonatal bonding, and higher rates of breastfeeding success ⁽⁹⁾.

In gynecology, ERAS protocols yielded substantial benefits for both oncology and benign surgical cases. In gynecologic oncology, preoperative nutritional planning and minimally invasive techniques, such as laparoscopic or robotic surgery, were associated with reduced complication rates, including infections and thromboembolism, and improved functional recovery ^(10, 11).

Patients undergoing procedures like hysterectomies for endometrial cancer benefited from shorter hospital stays and faster return to adjuvant therapies, improving overall treatment timelines ⁽¹⁰⁾. For benign gynecologic surgeries, such as those for fibroids or endometriosis, ERAS strategies including early mobilization and optimized pain management resulted in quicker return to daily activities, fewer readmissions, and higher patient satisfaction scores ^(12, 13). Notably, patient-reported outcomes highlighted improved quality of life post-surgery, with reduced fatigue and better emotional well-being ⁽¹³⁾.

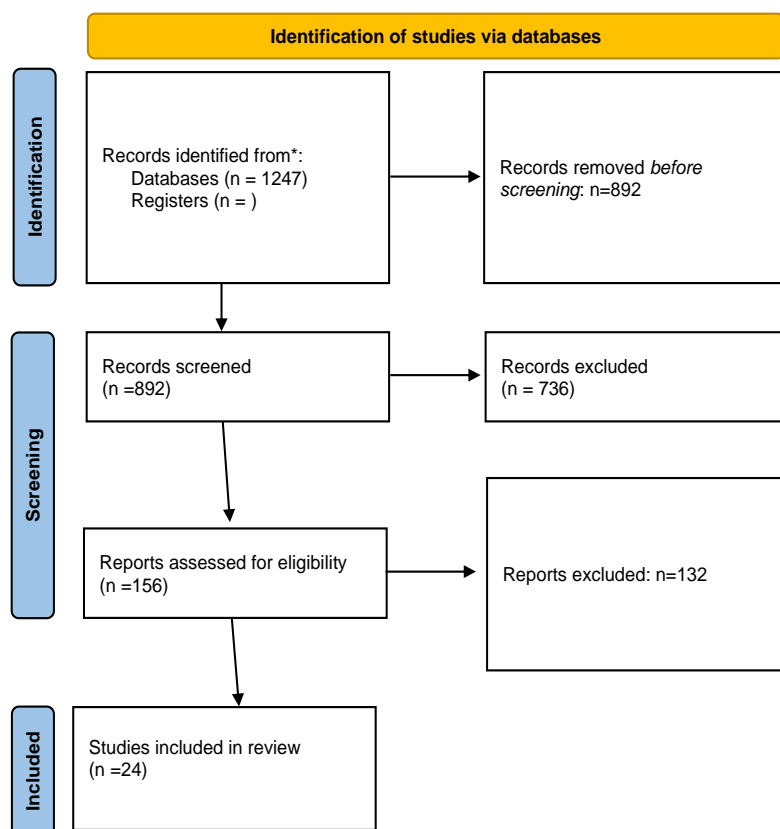
Pain management protocols were tailored to the unique needs of each specialty. In obstetrics, opioid-sparing techniques were prioritized to ensure safety for breastfeeding mothers, utilizing non-opioid analgesics and regional anesthesia to achieve adequate pain control with minimal neonatal impact ⁽¹⁴⁾. In contrast, gynecologic patients, particularly those undergoing oncology procedures, often required more aggressive pain management due to extensive surgical interventions, with multimodal regimens incorporating nerve blocks and patient-controlled analgesia ⁽¹⁵⁾.

Across both specialties, ERAS protocols consistently reduced hospital length of stay. In obstetrics, cesarean section patients often achieved discharge within 24–48 hours, while vaginal delivery patients frequently left within 24 hours ⁽¹⁶⁾. In gynecology, length of stay varied by procedure complexity, with benign cases showing shorter stays (1–2 days) compared to oncology cases (3–5 days), reflecting the extent of surgical intervention ⁽¹⁶⁾. Reduced stays translated

into significant cost savings and improved hospital bed turnover⁽²²⁾.

Beyond clinical benefits, ERAS implementation led to systemic advantages, including reduced healthcare

costs through fewer complications and readmissions, as well as improved care team efficiency due to streamlined workflows⁽²²⁻²⁴⁾.



PRISMA flow diagram for included searches of databases

Discussion

The strength of ERAS lies in its holistic framework, encompassing preoperative, intraoperative, and postoperative phases. Preoperative education and nutritional optimization are critical, empowering patients and preparing them both physiologically and psychologically for surgery⁽¹⁾. For obstetric and gynecologic patients, preoperative counseling reduces anxiety and improves adherence to postoperative instructions, which is particularly vital for cesarean section

patients who must care for newborns immediately after surgery^(1,7). Nutritional optimization, such as carbohydrate loading, bolsters resilience to surgical stress, benefiting gynecologic oncology patients with potentially compromised health statuses^(20, 10). Intraoperative strategies, including regional anesthesia and minimally invasive techniques, minimize surgical stress and complications⁽²⁻⁴⁾. In gynecologic oncology, minimally invasive approaches like laparoscopy reduce blood loss and accelerate recovery, enabling earlier adjuvant therapy initiation

(4, 10). Similarly, in cesarean sections, regional anesthesia and transverse incisions support faster recovery while minimizing maternal trauma^(7, 8).

Postoperative elements, such as early mobilization and feeding, further enhance recovery by reducing morbidity^(5, 6). Early mobilization prevents complications like venous thromboembolism and ileus significant risks in both obstetric and gynecologic surgeries⁽⁵⁾. For obstetric patients, this facilitates maternal-infant bonding and breastfeeding initiation post-cesarean^(7, 9). Early feeding supports gut function, shortening hospital stays and reducing costs, as evidenced across specialties^(6, 22). These strategies collectively contribute to the reduced length of stay and improved patient satisfaction highlighted in the results^(16, 12). In obstetric care, ERAS protocols excel in cesarean deliveries by employing opioid-sparing pain management and early ambulation, improving maternal recovery and bonding^(7, 8). However, unique challenges arise, such as balancing pain control with breastfeeding safety, necessitating milder analgesics⁽¹⁴⁾. For vaginal deliveries, ERAS supports early discharge and breastfeeding success, though adaptations are needed for high-risk pregnancies like those with preeclampsia to ensure maternal and neonatal safety⁽⁹⁾. In gynecology, ERAS complexity increases with procedure diversity, especially in oncology. Studies report reduced complications, shorter stays, and better pain control^(10, 11), critical given the prolonged recovery and higher risks in gynecologic oncology. For benign procedures, such as hysterectomies for fibroids, ERAS accelerates return to daily life and boosts satisfaction^(12, 13). Recovery needs vary, with benign cases requiring

less intensive pain management than oncology surgeries, underscoring the need for tailored protocols⁽¹⁵⁾.

Healthcare providers are pivotal to ERAS success, with interdisciplinary collaboration ensuring effective execution⁽¹⁷⁻²¹⁾. Surgeons adopt minimally invasive techniques⁽¹⁷⁾, anesthesiologists optimize analgesia⁽¹⁸⁾, nurses drive education and mobilization⁽¹⁹⁾, dietitians address nutrition⁽²⁰⁾, and physical therapists enhance rehabilitation⁽²¹⁾. Education and training across these roles are essential for protocol adherence and optimal outcomes.

Despite ERAS's benefits, challenges persist. Variability in implementation due to differences in resources, training, or patient demographics limits consistency across institutions. The absence of standardized protocols for specific procedures and underutilization of digital health technologies, such as apps for monitoring, further hinder adoption. Barriers to digital tools include cost, accessibility, and data privacy concerns. Future research should refine ERAS elements for obstetric and gynecologic contexts, explore digital innovations, and assess outpatient ERAS efficacy.

Conclusion:

- ERAS protocols offer substantial benefits across various types of surgeries in obstetrics and gynecology.
- By focusing on preoperative optimization, minimally invasive techniques, and early postoperative mobilization, these protocols improve patient outcomes and provide advantages for healthcare providers and hospitals.
- Tailoring ERAS protocols to the specific needs of obstetrics and gynecologic

patients is crucial for maximizing recovery and minimizing complications.

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