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Review Article

Optimizing gynecologic surgical outcomes: embracing enhanced recovery strategies

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ABSTRACT

The implementation of enhanced recovery after surgery (ERAS) pathways represents a concerted effort to optimize patient outcomes in the perioperative period while minimizing postoperative complications and readmissions. ERAS achieves these objectives through the integration of various elements into a comprehensive perioperative management program, aimed at reducing surgical stress and its associated repercussions. Key principles of ERAS encompass preoperative counselling, nutritional strategies, emphasis on regional anaesthesia and nonopioid analgesics, meticulous fluid balance, maintenance of normothermia, and promotion of postoperative recovery strategies such as early mobilization and thromboprophylaxis. The benefits of ERAS are manifold, including shorter hospital stays, diminished postoperative pain and analgesic requirements, expedited return of bowel function, reduced complication and readmission rates, and heightened patient satisfaction, all achieved without elevating readmission, mortality, or reoperation rates. Effective adoption of ERAS necessitates institutions to evaluate their infrastructure and patient flow to support its implementation adequately. Furthermore, sustainable ERAS programs should be seamlessly integrated as a standard model of care within healthcare delivery systems. The success of ERAS hinges upon the simultaneous implementation of its multiple components, underscoring its holistic approach. Institutions are urged to endorse the adoption of ERAS pathways emphatically as a means to enhance patient care and improve perioperative outcomes.

Keywords: Enhanced recovery, Gynaecological surgery, Length of stay, Complication, Perioperative care

INTRODUCTION

Enhanced recovery (ER) pathways, also known as fast-track or accelerated recovery, integrate evidence-based care elements to reduce physiological stress and organ dysfunction after surgery, promoting faster recovery and shorter hospital stays. Initially developed for colorectal surgery, these pathways have demonstrated significant benefits, challenging traditional surgical practices. Gynaecologic surgery, including hysterectomy, is a prevalent procedure with significant impact. By adopting evidence-based perioperative and postoperative care protocols, surgical stress can be minimized, healing can be optimized, and patient experience can be enhanced.[1] Traditional approaches often include interventions such as bowel preparation, fasting from midnight, and liberal use of narcotics, among others, yet many lack empirical support and may not aid in recovery. Enhanced Recovery After Surgery (ERAS) pathways have been developed to improve patient outcomes by introducing evidence-supported interventions that mitigate surgical stress and promote healing. These pathways aim to optimize recovery by implementing interventions that have been shown to reduce surgical stress or aid the body in managing its negative effects.[2]

The core principles of ERAS encompass several key aspects.

Preoperative counselling and nutritional strategies, with emphasis on avoiding prolonged fasting; perioperative considerations, such as prioritizing regional anaesthesia and non-opioid pain management, maintaining fluid balance, and ensuring normothermia; implementation of postoperative recovery strategies, including early mobilization and appropriate thromboprophylaxis.

This review article provided guidance on perioperative pathways for ERAS or fast track programs in gynecologic surgery. By following these principles, healthcare professionals can enhance patient outcomes and promote a more efficient recovery process.

BACKGROUND

Surgical stress induces a catabolic state, leading to various physiological disturbances including increased cardiac demand, tissue hypoxia, insulin resistance, impaired coagulation, and dysfunction in pulmonary and gastrointestinal systems. This response can result in organ dysfunction, heightened morbidity, and delayed recovery post-surgery. Such delays may lead to nosocomial infections, venous thromboembolism, diminished long-term quality of life, and increased healthcare costs. ERAS pathways aim to maintain normal physiology perioperatively, optimizing patient outcomes without raising postoperative complications or readmissions (Table 1). By reducing surgical stress and mitigating its consequences, ERAS pathways incorporate multiple elements bundled together to form a comprehensive perioperative management program.

The ERAS society published guidelines for perioperative care in gynecological procedures in 2016, updated in 2019. These guidelines comprise 12 pre- and intra-operative care items and 10 post-operative care items. Objectives include patient education and consultation pre-surgery, cessation of oral intake pre-surgery followed by early post-surgery nutrition, maintenance of normal physiology through temperature and fluid balance, enhanced mobilization, effective pain management, prophylaxis against nausea and vomiting, and minimizing unnecessary catheter use.[3]

PRE-OPERATIVE ENHANCED RECOVERY AFTER SURGERY

Preoperative information, education, and counselling

Preoperative patient education and counselling are essential for informing patients about the surgical procedure and recovery process which may reduce fear, fatigue, and pain while increasing early discharge. Effective components include informed consent forms, online resources, and patient interviews with the surgical team. The surgeon will also discuss the postoperative follow-up schedule with the patient, which includes a phone call from the surgeon's office within two to three days after leaving the hospital, along with scheduled postoperative appointments. Patients following the ERAS pathway will undergo a 15-minute educational session led by a nurse practitioner. This session covers important aspects of the ERAS pathway, including dietary guidelines and preoperative preparation. Patients are advised to consume solid food until midnight before surgery and only clear liquids until two hours before the procedure. Additionally, they will receive chlorhexidine soap for cleansing the night before and the morning of surgery. Instructions on the use of an incentive spirometer will be provided, and if there are concerns about malnutrition, patients will be given preoperative nutritional supplements. Postoperatively, patients are typically expected to spend one night in the hospital and resume a regular diet and ambulation on the night of surgery. Subsequently, ambulation in the hallway three times a day is encouraged. Scheduled pain medications will be administered to manage pain and reduce reliance on opioids, while medications to promote bowel function will also be provided. Finally, the plan for discharge the morning after surgery will be discussed with the patient.

While the benefits may not be extensively documented in studies, these services are low-risk and are therefore recommended to ensure patient understanding and preparation before surgery.[4]

Preoperative optimization

Pre-operative health optimization involves addressing medical comorbidities like anaemia and hyperglycemia, as well as evaluating tobacco and alcohol use. Anaemia, prevalent in 25% of women undergoing elective hysterectomy or myomectomy, is associated with an increased risk of blood transfusion and adverse outcomes. Keeping pre-operative hemoglobin levels above 12 g/dl, minimizing intraoperative bleeding, and judiciously administering transfusions when hemoglobin falls below 7 g/dl are key goals in patient blood management. Oral iron supplementation is preferred over pre-operative transfusions. Addressing these factors before surgery has been shown to reduce perioperative morbidity and mortality.[5]

Smoking and alcohol use, common lifestyle risk factors, can significantly impact surgical outcomes by affecting various physiological systems. Smoking affects lung function, cardiovascular health, immune response, and tissue healing, while alcohol negatively impacts multiple organs and systems including the liver, pancreas, heart, and immune function. Both smoking and alcohol use are associated with increased postoperative morbidity, necessitating cessation at least four weeks before surgery.[6,7]

Preoperative fasting and carbohydrate treatment

According to guidelines established by the American Society of Anesthesiologists (ASA) Committee, patients undergoing elective surgery are advised to consume solid meals until 8 hours before the procedure. However, they

are permitted to have unlimited clear fluids up to 2 hours before surgery. The consumption of fluids before surgery has been shown to alleviate preoperative anxiety, thirst, and hunger, thereby enhancing patient comfort and well-being. Adequate hydration is crucial as dehydration before surgery is linked to an elevated risk of complications such as acute kidney injury and myocardial infarction.[8] Surgery induces metabolic stress, leading to peripheral insulin resistance, hyperglycemia, and prolonged recovery. Pre-operative carbohydrate loading, promoting rapid insulin response, halves postoperative insulin resistance and facilitates earlier discharge compared to fasting. Oral carbohydrate loading is recommended to reduce postoperative insulin resistance and improve preoperative health.[9]

Preoperative bowel preparation

Mechanical bowel preparation is not routinely advised, even for planned bowel resection, due to potential dehydration risks and lack of proven benefit. Studies indicate that intake of clear liquids up to 2 hours pre-surgery doesn't affect gastric fluid pH, increase complications, or raise stomach content levels.[10]

Preanesthetic medications

Avoid routine sedatives to reduce pre-operative anxiety and expedite postoperative recovery. Studies indicate that using these medications in elective surgeries with general anaesthesia doesn't improve the postoperative experience and prolongs anaesthesia duration compared to placebo.[11] Avoid administering long-acting sedatives within 12 hours of surgery to prevent negative impacts on postoperative recovery, such as delayed emergence from anaesthesia.

Thromboembolism prophylaxis

Patients at risk of venous thromboembolism (VTE) should receive prophylaxis with low-molecular-weight heparin (LMWH) or heparin initiated before surgery, along with mechanical methods. Patients using oral contraception should switch to another form before surgery due to continued thrombotic coagulation factor changes for up to 4-6 weeks after cessation. Discontinuation of oral contraceptives one month before surgery is recommended, but careful evaluation considering the risk of unwanted pregnancy is necessary.[12]

INTRAOPERATIVE ENHANCED RECOVERY AFTER SURGERY

Antimicrobial prophylaxis and skin preparation

In pelvic surgeries, typically categorized as clean-contaminated wounds, surgical site infections may involve skin flora, vaginal flora, or enteric bacteria. Intravenous antibiotics (1st generation cephalosporin or amoxicillin-clavulanic acid) should be administered within 60 minutes before skin incision, with additional doses during prolonged operations, severe blood loss, or in obese patients. Clindamycin and gentamicin or quinolone are alternatives for patients with penicillin/cephalosporin allergy. Laparoscopic surgeries not involving genitourinary or digestive tracts do not require antimicrobial prophylaxis. Epilation before surgery does not reduce wound infection risk, so it should be avoided in favour of hair cutting if necessary. Chlorhexidine-alcohol is preferred over aqueous povidone-iodine for skin cleansing before surgery.[13] Although the individual impact of preoperative showering with 4% chlorhexidine gluconate on infection risk before gynecologic surgery hasn't been specifically studied, a perioperative bundle incorporating this practice showed a reduction in surgical site infections from 6% to 1.1%. This bundle included patient education, preoperative skin preparation with 2% chlorhexidine gluconate and 70% isopropyl alcohol, antibiotic re-dosing post-incision, sterile closing procedures, glove changes for abdominal wall closure, dressing removal within 24 to 48 hours post-surgery, and postoperative home showering with 4% chlorhexidine gluconate.[14]

Standard anaesthesia protocol

Patients in ERAS pathways typically receive preoperative oral acetaminophen, gabapentin, and celecoxib to reduce postoperative pain. Additional analgesic options include local anesthetic infiltration, transversus abdominis plane (TAP) blocks, or neuraxial anesthesia (spinal or thoracic epidural anesthesia). A systematic review showed that women undergoing hysterectomy who received preoperative acetaminophen, gabapentin, bupivacaine (either regional or local infiltration), and phenothiazine used less opioid compared to those treated with placebo. While various nonopioid medications and combinations exist, the optimal treatment combination remains uncertain, with multiple combinations potentially proving effective.[15]

The intraoperative aspects of ERAS protocols involve collaboration between anesthesia and surgical teams. Multimodal perioperative analgesia, a key ERAS intervention, is determined jointly by surgeons and anesthesiologists before surgery. ERAS pathways will continue to evolve with emerging evidence. The liposomal bupivacaine, not previously included in ERAS protocols, has shown promise in perioperative pain control, particularly when used for surgical site infiltration or TAP blocks. While direct comparisons between its use in surgical site infiltration versus TAP blocks are limited, surgical site infiltration with liposomal bupivacaine appears to complement ERAS pathways, reducing the need for opioid analgesics. Neuraxial anesthesia, though effective in improving pain control and reducing opioid consumption in open gynecologic surgery, presents potential risks such as delayed ambulation and voiding, and increased hospital stay, which must be carefully considered.

Short-acting anaesthetic agents are preferred for rapid awakening during surgery. Adding regional anaesthesia to general anaesthesia reduces postoperative nausea and vomiting while facilitating faster awakening. Regarding tidal volume (TV) and ventilator-induced lung damage, no systematic advice can be given at this time.[3]

Table 1: Levels of enhanced recovery pathway.

Levels	Management
Referral from primary care	Optimize preoperative haemoglobin levels Manage pre-existing co-morbidities
Pre-operative	Optimise health Informed decision making Preoperative risk assessment Patient information Discharge planning
Admission	Admission on the same day Optimised fluid hydration Carbohydrate loading Reduce starvation No or reduced oral bowel preparation
Intraoperative	Minimally invasive surgery Use of transverse abdominal incision No nasogastric tube Use of regional blocks Epidural management Individual goal directed fluid therapy
Follow up	Discharge when appropriate physiotherapy support

Interventions specific to surgical team

Surgeons are advised to opt for the least invasive surgical approach, prioritizing the vaginal route for hysterectomy, followed by laparoscopy, and resorting to abdominal surgery only when other routes are not feasible. Minimization of bladder catheterization duration is recommended. When bladder catheters are retained, a voiding trial should be conducted on postoperative day 0 or 1, depending on the type of gynecologic surgery, for a non-radical hysterectomy. Routine use of nasogastric tubes is discouraged, but if necessary, they should be removed after the operation. Similarly, routine placement of intraperitoneal drainage tubes should be avoided.

Interventions specific to the anaesthesia team

Anaesthesia-specific interventions include using short-acting anaesthetic agents, employing lung-protective ventilation strategies, maintaining normothermia, and implementing standardized prophylaxis for postoperative nausea and vomiting. Perioperative normovolemia/ euvolemia is advocated to avoid excessive fluid administration, which can lead to complications such as cardiopulmonary issues, impaired gut motility, and delayed wound healing.

Minimally invasive surgery

While minimally invasive surgery contributes to shorter hospital stays and faster patient recovery, it's not considered a core component of ERAS. The ERAS protocol emphasizes minimizing surgical trauma by using smaller incisions, preferably transverse rather than sub-umbilical median incisions.[3]

Nasogastric intubation

While planning the operation within the scope of ERAS, the surgical team should pay attention to choosing the least invasive surgical method, determining the necessity and duration of bladder catheterization, avoiding nasogastric tubes, and minimizing the use of other drainage tubes.[16]

Preventing intraoperative hypothermia

Anaesthesia protocols aligned with ERAS prioritize maintaining normothermia and perioperative euvolemia. Intraoperative hypothermia lengthens recovery time while maintaining normothermia can reduce post-anaesthesia care unit time and lower maintenance costs.[17]

Perioperative fluid management

Recent studies challenge the traditional notion of replacing fluid losses during surgery, suggesting that these losses are not as significant as previously believed. Excessive fluid therapy can elevate intravascular pressure, increase atrial natriuretic peptide levels, and damage vascular endothelium. Therefore, intraoperative fluid balance aims to maintain pre-surgery body weight, with fluid therapy targeting zero balance to ensure euvolemia.[18]

POST-OPERATIVE ENHANCED RECOVERY AFTER SURGERY

Postoperative ERAS components emphasize pain management, rapid bowel function recovery, dietary adjustments, and patient mobilization. Patients undergoing gynaecological surgery for benign indications typically aim for discharge within one to two days post-surgery. However, recommendations for postoperative care in gynaecologic/oncology surgery, particularly regarding early mobilization, analgesia, and urinary drainage, have weaker evidence compared to other surgical disciplines. Some recommendations are based on findings from major abdominal surgeries. These factors should be considered when evaluating ERAS society recommendations for postoperative care in gynaecologic/oncology surgery.

Early mobilization

Patients should be encouraged to be mobilized within 24 hours.

Prophylaxis against thromboembolism

Postoperative venous thromboembolism prophylaxis includes wearing appropriate pressure stockings and utilizing intermittent pneumatic compression. For patients undergoing laparotomy for abdominal or pelvic malignancies, extended prophylaxis should be provided for 28 days.[19]

Postoperative fluid therapy

Intravenous fluids should be discontinued within 24 hours post-surgery, with a preference for balanced crystalloid solutions. Excessive fluid can lead to complications like oedema and electrolyte imbalances, while overly restrictive fluid regimens may hinder healing and cause organ dysfunction. Instead of rigid quantitative targets, clinically relevant goals should be considered, including replacing insensible losses, ensuring perfusion, and limiting boluses. This approach accommodates normal hormonal responses to surgery and prevents long-term fluid overload.

Perioperative nutritional care

The standard diet should be recommended within 24 hours after surgery.

Prevention of postoperative ileus and glucose control

Postoperative recovery of intestinal function can be expedited by using laxatives and chewing gum. Additionally, maintaining blood glucose levels between 180-200 mg/dl before, during, and after surgery can reduce insulin resistance, mitigate metabolic stress, and ultimately improve perioperative outcomes.[19]

Postoperative analgesia, nausea and vomiting

A multimodal analgesia approach is recommended to minimize postoperative opioid use and manage pain effectively. Oral administration of opioids should be initiated promptly after surgery. Postoperative nausea and vomiting (PONV) is a common issue that can prolong hospital stays, particularly in women undergoing laparoscopic and gynaecological procedures. Drugs like acetaminophen, NSAIDs, or dexamethasone can be administered as pain relief options, provided there are no contraindications.[20]

Peritoneal and urinary drainage

Urine catheters should be promptly removed postoperatively, ideally within 24 hours, while patients should be encouraged to mobilize within the same timeframe. Peritoneal drainage has traditionally been employed to prevent fluid accumulation, blood or serous collections, and infection rates, and to mitigate anastomotic leakage in colorectal surgery. However, routine drainage is not recommended after colon and rectal procedures. A Cochrane review highlighted that drains following pelvic lymphadenectomy may inhibit lymphocysts, yet they've also been associated with increased lymphocyst rates.[21]

CONCLUSION

ERAS principles revolutionize surgical management by challenging traditional paradigms. Their adoption leads to swifter recovery, shorter hospital stays, higher patient satisfaction, and reduced costs compared to conventional methods. These benefits are evident across gynecologic surgeries, spanning open and minimally invasive procedures, and addressing both benign and oncologic conditions. Implementing ERAS programs demands collaboration from all surgical team members. Successfully integrating ERAS pathways throughout gynecologic care holds promise for enhancing patient outcomes and healthcare delivery systems. Institutions should strongly endorse the adoption of ERAS pathways to optimize patient care.

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