

Feasibility and Application of Enhanced Recovery after Surgery (ERAS[®]) Protocol in Gastric Interventions: A Narrative Review

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ABSTRACT

Enhanced recovery after surgery (ERAS[®]) is a paradigm shift based on evidence showing reduced regeneration times and complications after the operation. In a range of surgical disciplines, ERAS' functions have been studied. In the field of gastric surgery, the ERAS protocol for gastrectomies was developed in 2014, with a subsequent meta-analysis demonstrating its efficacy. The use of ERAS in an emergency situation is feasible and effective; however, some improvements to the protocol may be needed. As a result, further research is necessary. There is also insufficient data to say whether ERAS improves patients' long-term results. As most of the centers have been using the ERAS protocol for less than 5 years, more data are required.

Keywords: Enhanced recovery after surgery, Gastrectomies, Length of stay, Perioperative care.

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INTRODUCTION

Globally, over 234 million surgical operations are performed each year.¹ A clinical mechanism for improving postoperative recovery, enhanced recovery after surgery (ERAS), has been developed to improve the quality of perioperative treatment, with the goal of reducing functional loss and speeding up the recovery process. The ultimate aim is to minimize perioperative morbidity, with ERAS protocols leading to shorter hospital stays.^{2,3} It fundamentally alters traditional surgical ward patient care by standardizing it based on published evidence.⁴

The ERAS protocol, inspired by Danish surgeon Henrik Kehlet, critically evaluated the traditional perioperative care, such as prolonged fasting, restricted ambulation, bowel preparation, use of drainage tubes, and a delayed return to normal after surgery.⁴ According to Kehlet, avoiding the traditional perioperative doctrine can shorten hospital stays by reducing metabolic stress, excess fluids, and insulin resistance.⁵ Professors Kenneth Fearon and Olle Ljungqvist established the ERAS study group in 2001. The international ERAS study group composed of surgeons and anesthesiologists studied the literature and evidence to determine the best perioperative care.⁴ They developed the ERAS protocol for 20 projects and a database to help realize these principles. This theory identifies, divides, and adapts each phase of the patient's perioperative journey to include preoperative evaluations, discharge, and as quick and safe a recovery as possible.⁶ The ERAS Association was established in 2010 with the goal of establishing an international network of regional and national expert centers to promote the use of the ERAS protocol.⁵ At present, more and more literature shows that ERAS is advantageous in a number of streams, including obesity, gastrointestinal, and nongastrointestinal diseases.⁷⁻¹⁰

METHODS

A literature search was conducted to identify a wide range of relevant publications. The databases searched include the PubMed, scopus, google books, and the ProQuest dissertation and cumulative index of nursing and related health literature.

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The following key words and medical subject heading (MeSH) phrases were used: enhanced postoperative recovery, rapid surgery, early postoperative eating, postoperative care, and postoperative clinical pathways. The search was limited to available articles, reviews, textbooks, books, and expert content in full-text English research. The search period was restricted from January 2010 to March 2016. Besides surgery, other disciplines were sought. Inclusion requirements included mention of a clinical route or enhanced recovery after surgery, as well as gastrointestinal surgical procedures (e.g. colorectal, gastric, and pancreaticoduodenectomy). The mention of pediatric surgical cases or pediatric surgery was one of the exclusion criteria. Data ranges were not used as exclusion criteria, and the abovementioned sources covered all the applicable literature.

Working Mechanism of ERAS

The body's physiological reaction to stress is catabolic. This is regulated by the central nervous system, which develops a number of stress hormones and inflammatory mediators.⁵ The idea behind ERAS is to reduce the metabolic response to surgical trauma thereby decreasing the catabolic state into which surgery puts the body. Reduced muscle function is caused by a loss of lean body mass associated with decreased substrate absorption and storage. This makes mobilization impossible. Noninsulin-sensitive

cells, however, increase their glucose uptake. This rise can result in a number of postoperative complications, including infections and cardiovascular issues.¹¹

Patients receive specific details prior to surgery, starting with preoperative therapy, which decreases anxiety, encourages postoperative rehabilitation and pain control, and increases adherence to treatment plans, allowing for a faster recovery and discharge.¹² The ERAS protocol advises against using mechanical bowel preparation, which has been shown to cause dehydration and fluid and electrolyte imbalances. It was intended as a method to empty the gastrointestinal tract, but it does the exact opposite by liquefying the stools and increasing the possibility of contamination intraoperatively.² Traditional surgery protocol has included fasting before surgery to prevent aspiration; however, there is no evidence to support this. Fasting before surgery, however, exacerbates the metabolic stress that arises after surgery.¹³ Before midnight and 2–3 hours before surgery, drink a clear carbohydrate-rich beverage to place the body in a metabolically fed condition. Preoperative thirst, appetite, anxiety, and postoperative insulin resistance are all decreased.⁸

Low-molecular-weight heparin prevents postoperative complications of immobilization without increasing the risk of thrombocytopenia according to meta-analyses. Due to its 24-hour dosing and decreased risk of thrombocytopenia, low-molecular-weight heparin is favored.¹² According to research, prophylactic antibiotics are effective in preventing anaerobic and aerobic infections.¹⁴ Studies show that maintaining normothermia decreases wound infections, adverse cardiac events, bleeding, and the need for blood transfusions. Forced heating of the upper body with warmer, intravenous (IV) fluids, and extending heating to 2 hours before and after surgery may be followed.¹³ The use of IV fluids to compensate for the losses during surgery was common in conventional surgery protocols. Such methods lengthened hospital stays by preventing the return of normal gastrointestinal function, hindering wound and anastomosis healing, and affecting tissue oxygenation. Evidence suggests that reducing sodium-rich IV fluid administration after surgery by avoiding IV infusions and beginning oral fluids as soon as possible after surgery will reduce hospitalization and postoperative complications including ileus.¹²

Epidural analgesia in open interventions, discouraging opioid use and overzealous fluid replenishment, and the use of oral laxatives early after surgery are all techniques to reduce the risk of ileus. The patient should be discharged as soon as he or she has a solid food diet, regular bowel movements, orally managed pain, sufficient self-care independence, and no complications that require hospitalization.¹² The most critical feature of ERAS is not to discharge a patient from the hospital as soon as possible. Rather, it is intended to prepare him for an early release by ensuring that he or she is completely capable of returning home.

ERAS in Gastric Surgeries

Although the ERAS protocol has been proposed for gastric surgeries, it is still being researched.^{15–17} Yu et al. found that postoperative inpatient care, time to first relief of flatulence, and expenditure were all substantially reduced in patients who received ERAS perioperative treatment in a meta-analysis of 400 patients reported in 2014.¹⁸ In addition, a 25-item evidence-based checklist for gastrectomy patients was compiled by an international committee within the ERAS society in 2014.¹⁹ A 2015 meta-analysis of seven randomized controlled trials and 524 patients found that ERAS care can shorten postoperative hospital stays, reduce hospital

costs, reduce discomfort, and improve quality of life.²⁰ A subsequent meta-analysis published in 2018 found that ERAS decreased the time to relief of gas, overall hospital stay, postoperative inflammatory markers, and expenditure, but needs to be taken with a pinch of salt in view of the need for bigger studies.²¹ A Cochrane review of gastrectomies performed in an 18-year time period from 1996 concluded that there was no adverse correlation in not using drains and did not aid in identifying and managing leaks.²² Finally, as compared with conventional or late postoperative oral feeding, early postoperative oral feeding is associated with a shorter hospital stay and no increase in clinically related complications.²³

Impact on Clinical Outcome

More studies are required on how ERAS implementation helps patients in the long run.⁵ Literature points toward enhanced survival in the long run; however, these are emerging trends and require additional studies.²⁴ Curtis et al. evaluated the application of ERAS protocol in patients undergoing laparoscopic or open surgeries; the additional variables made the findings more complex and less explicit.²⁵ A research by Gustafsson et al., however, has more definitive results. Gustafsson et al. looked at five-year survival in various adherence cohorts.²⁶ Patients with a higher degree of regimen (70%) have a lower risk of cancer-specific death after 5 years [higher risk (HR) = 0.58, 95% confidence interval CI: (0.39–0.88)]. Restrictive perioperative fluid therapy (another part of ERAS treatment) was also associated with improved five-year survival (cancer-specific death, HR = 0.45, 95% CI: (0.25–0.81)).²⁷

CONCLUSION

There is international consensus that ERAS results in faster, safe, and reproducible recovery and this is propagating the adoption of these guidelines. In the majority of surgical disciplines, including gastrointestinal surgeries, ERAS eliminates risks, shortens length of stay, and thereby contributes to cost savings. However, ensuring adherence to ERAS guidelines and implementing ERAS to emergency surgery appears well-nigh impossible. It makes it clear that modifying surgical indoctrination is more complicated than one would expect. As a result, new implementation techniques are required to increase the popularity and usage of this evolution.

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