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Implementation of Enhanced Recovery After Surgery (ERAS) Protocols in Abdominal Surgery

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Abstract.
Enhanced Recovery After Surgery (ERAS) is a multidisciplinary, evidence-based perioperative care approach designed to minimize the stress response to surgery, preserve organ function, and improve clinical outcomes. A substantial body of evidence has demonstrated that implementing ERAS protocols in elective procedures not only accelerates patient recovery but also reduces healthcare costs. Surgery, one of the most commonly performed medical interventions worldwide particularly major procedures such as abdominal and colorectal surgery carries a high risk of postoperative complications. These complications contribute to increased morbidity, mortality, and economic burden for both patients and healthcare systems. This situation presents a particular challenge in the era of universal health coverage, which demands efficiency in terms of time, cost, and resource utilization. ERAS implementation has been proven to enhance postoperative recovery, shorten hospital stays, and expedite the return of normal physiological function compared to conventional surgical care, especially in lower abdominal surgeries and colorectal resections. A literature review was conducted by searching relevant articles through Google Scholar using inclusion criteria such as publications from 2018 onwards, focused on ERAS in abdominal surgery, full-text availability, and academic journal sources. The data were analyzed using a matrix table comparing research methods, study populations, research locations, and reported outcomes. ERAS protocols have shown to be effective in abdominal surgical procedures for improving patient recovery and reducing postoperative complications.

Keywords: *Abdominal surgery; Enhanced Recovery After Surgery (ERAS); Patient recovery; Perioperative care; Post surgery*

1. INTRODUCTION

Abdominal surgery in emergency cases is performed for various different pathologies and often causes significant systemic disturbances in patients. These patients are often elderly with multiple comorbidities and advanced disease processes that may not have been optimally treated (Pardede 2020). Therefore, this patient population poses unique challenges for everyone involved in their care. Emergency laparotomy is a common emergency procedure used in the approach to these patients, which is known to have a high global mortality rate, with significant mortality risks demonstrated in the United Kingdom, the United States, and Denmark. In 2010, the Emergency Laparotomy Network (ELN) reported a 30-day mortality rate in the UK of 14.9%. This mortality rate

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also shows significant variation between different hospitals, possibly reflecting differences in effective clinical management (Lohsiriwat 2014).

Enhanced Recovery After Surgery (ERAS) is a multidisciplinary, evidence-based, and standardized approach to minimize the stress response to surgery, improve organ function, and thereby enhance patient outcomes. Since it was pioneered in the 1990s, a substantial body of evidence is now available showing improved patient outcomes and cost savings in elective surgery (Quiney et al. 2016). This has subsequently been incorporated into many guidelines for the perioperative care of elective colorectal patients. More recently, evidence has emerged highlighting how similar care principles can be applied to patients undergoing emergency abdominal surgery. Enhanced Recovery After Surgery (ERAS), also known as fast-track surgery or the Enhanced Recovery Protocol (ERP), is a multimodal perioperative management strategy designed to reduce morbidity, shorten hospital stay, improve postoperative recovery time, and minimize postoperative complications. ERAS combines several perioperative techniques aimed at early postoperative mobilization and reducing the stress response during surgery. In general, ERAS aims to optimize preoperative preparation, prevent/avoid intraoperative iatrogenic injury, minimize the stress response after surgery, reduce or manage metabolic changes, accelerate healing and the return to normal function, detect abnormal healing processes as early as possible, and intervene as early as necessary if required (Shang, Guo, and Zhang 2018).

2. LITERATURE REVIEW

Enhanced Recovery After Surgery (ERAS) is a modern perioperative care approach developed to accelerate patient recovery after surgical procedures by reducing surgical stress, maintaining physiological function, and expediting return to normal activities. This concept was first introduced by Henrik Kehlet in the 1990s, emphasizing the need to reduce practice variability and promote evidence-based interventions in surgical care, particularly in colorectal surgery.

ERAS is multidisciplinary and multimodal, involving collaboration between surgeons, anesthesiologists, nurses, dietitians, and physiotherapists. The protocol consists of interventions across three main phases: preoperative, intraoperative, and postoperative. In the preoperative phase, patient education, optimization of nutritional status and

comorbidities, and reduced fasting duration through complex carbohydrate intake two hours before surgery are implemented. The intraoperative phase focuses on opioid-sparing anesthesia techniques, appropriate fluid management, prevention of hypothermia, and minimally invasive surgical techniques. The postoperative phase emphasizes multimodal pain control without opioids, early mobilization, early oral nutrition, and reduction in the use of invasive devices such as drains and catheters.

Therefore, the application of ERAS in abdominal surgery represents an evidence-based approach that effectively improves patient clinical outcomes, reduces costs, and promotes overall efficiency in the healthcare system.

3. PROPOSED METHOD

This literature review was conducted through the search, analysis, and synthesis of relevant articles. Relevant articles were retrieved from electronic databases such as Google Scholar and PubMed using the keywords “Enhanced Recovery After Surgery (ERAS) Pada Operasi Abdomen” in Indonesian and “Enhanced Recovery After Surgery (ERAS) in Abdominal Surgery” in English. Four articles were selected based on the inclusion criteria: publication date from 2018 to the present, discussing Enhanced Recovery After Surgery (ERAS) in abdominal surgery, written in either Indonesian or English, full-text available, and categorized as academic journals. Content analysis was carried out using a matrix table by comparing research methods, study subjects and locations, as well as the variables examined, which included theoretical (Original Articles) and clinical articles.

4. RESULT AND DISCUSSION

No	Citation	Method	Sample/Place	Results and Conclusion
1	**Title:** Pre-Operative *Enhanced Recovery After Surgery* (ERAS) Protocol Compliance Towards Major Surgery Patients at Dr. Soetomo General Hospital, Surabaya **Author:** Ahmad Sabili Rifa'i, Vicky Sumarki Budipramana, Gadis Meinar Sari **Year:** 2020	*Original research*	**Sample:** Jumlah total pasien operasi yang diamati adalah 36 pasien. **Place:** Dr. Soetomo Hospital Surabaya.	**Results:** A total of 36 major surgery patients were included, comprising 7 (19.4%) digestive surgeries, 14 (38.9%) thoracic and cardiovascular surgeries, and 15 (41.7%) gynecological surgeries. Overall compliance with the ERAS protocol in the preoperative period for major surgery patients was 91%. ERAS protocol compliance in the preoperative phase for digestive surgery patients was 80%, for thoracic and cardiovascular surgery patients was 93.4%, and for gynecological surgery patients was 84.3%. Major surgery patients with ≥90% compliance accounted for 25%. Digestive surgery patients with ≥90% compliance were 0%. Thoracic and cardiovascular surgery patients with ≥90% compliance were 64.3%. Gynecological surgery patients with ≥90% compliance were 0%. **Conclusion:** The preoperative components of the ERAS protocol for major surgeries—including digestive, thoracic and cardiovascular, and gynecological procedures—at Dr. Soetomo Regional General Hospital, Surabaya, need to be improved.

No	Citation	Method	Sample/Place	Results and Conclusion
2	**Title:** *Enhanced Recovery After Surgery* (eras) Protocols: impact on patient outcomes and Hospital stay in gastrointesti nal surgeries. **Author:** Nadia Shahid, Mir Arsalan Ali, Summaya Saeed, Khurram Baqai, Muhammad Tahir, Rubab Nafees **Year:** 2020	*Original research*	**Sample:** 150 adult patients who underwent elective upper and lower gastrointestinal surgery.	**Results:** Patients treated under the ERAS protocol were discharged earlier, within **4.2 ± 1.3 days postoperatively**, compared to the traditional group, who were discharged in **6.1 ± 1.8 days**, $p < 0.01$. The overall postoperative complications were also fewer in the ERAS group (**15%**) than in the conventional group (**27%**), $p = 0.03$. **Conclusion:** With the implementation of the ERAS protocol, hospital length of stay and postoperative complications in patients undergoing gastrointestinal surgery were reduced. This has the effect of minimizing variability in patient recovery and improving the effectiveness of the protocol. It also provides additional benefits, including improved efficiency, enhanced patient satisfaction, and overall reduced healthcare costs if widely integrated as a standard ERAS system. Nevertheless, further investigations are necessary to achieve consistency in ERAS protocols across various surgical fields.

No	Citation	Method	Sample/Place	Results and Conclusion
3.	**Title:** Penerapan Protokol Enhance Recovery After Surgery (ERAS) pada Pasien Operasi Elektif Digestif sebagai Upaya Menurunkan Length Of Stay Pasien Pasca Pembedahan di RSUD dr. Zainoel Abidin Banda Aceh Tahun 2019 **Author:** Muhammad Yusuf,Teuku Yasir, Rovy Pratama **Year:** 2021	*Original research*	**Sample:** This study is a clinical trial with a parallel design and a sample of 84 patients.	**Results:** Based on statistical testing using the alternative Mann-Whitney test, it can be statistically concluded that there is a significant difference in postoperative length of stay between digestive surgery patients with and without the ERAS protocol ($p < 0.05$). **Conclusion:** The conclusion of this study is that the implementation of the ERAS protocol is effective in reducing the length of stay for elective digestive surgery patients at Dr. Zainoel Abidin General Hospital, Banda Aceh.
4.	**Title:** Effect of *Enhanced Recovery After Surgery* (ERAS) protocol on maternal outcomes following emergency caesarean delivery: A randomized controlled trial **Author:** Rajlaxmi Mundhra, Dipesh Kumar Gupta, Anupama Bahadur, Ajit Kumar, Rakesh Kumar **Year:** 2021	*Original research*	**Sample:** A total of 142 women and the study was conducted in North India from May 2021 to October 2022).	**Results:** We randomized 142 women (71 in the ERAS group and 71 in the conventional group) undergoing emergency cesarean section. The incorporation of the ERAS protocol resulted in a shorter hospital stay (73.92 ± 8.96 in the conventional group vs. 53.87 ± 15.02 in the ERAS group; $p < .0001$). **Conclusion:** The incorporation of the ERAS protocol in emergency cesarean section clearly improved patient outcomes in terms of earlier resumption of activities and better quality of life.

No	Citation	Method	Sample/Place	Results and Conclusion
5.	**Title:** The awareness of enhanced recovery after surgery (ERAS) cesarean delivery guidelines among anesthesiology and reanimation assistants in Turkey; a questionnaire study. **Author:** Zeliha Dedebagı, Eyyüp Sabri Özden, Mustafa Soner Özcan, Filiz Alkaya Solmaz dan Pakize Kırdemir **Year:** 2024	*Original research*	**Sample:** Participants were 404 patients using a survey conducted in Isparta, Turkey in 2023.	**Results:** Among the 404 participants in our survey, 59.9% were affiliated with university hospitals and 65.8% had completed three years or more of education. A total of 87.9% of participants were familiar with ERAS; however, only 42.8% had received ERAS training. Although 93.8% of participants' institutions performed cesarean deliveries, ERAS recommendations were implemented in only 48%. This may be due to the absence of an ERAS team, which was identified at a high level of 66.6% in our survey. **Conclusion:** Awareness of ERAS was high among participants, but the implementation rate of several recommendations was low. This may be due to the inability to form a multidisciplinary team and insufficient training of participants.

Five articles were analyzed using the matrix table above to identify the variables studied in each research and to understand ERAS in abdominal surgery. All five articles were designed as original articles.

Enhanced Recovery After Surgery (ERAS) is a novel approach in perioperative care that is multimodal, multidisciplinary, and evidence-based. This approach is designed to improve clinical outcomes by reducing surgical stress, maintaining physiological body functions, and accelerating the recovery process. Unlike conventional methods, ERAS emphasizes the integration of various perioperative interventions to expedite the return of normal function through optimization before, during, and after surgery (Talhaoğlu and Ceyhan 2024).

This concept was introduced by Henrik Kehlet in the 1990s, who argued that many perioperative procedures lacked strong scientific evidence. As a result, the ERAS Society was established to develop evidence-based guidelines, test new protocols, and promote the global implementation of best practices. Initially focused on colorectal surgery, ERAS has since expanded to other types of surgery including gastrointestinal, pancreatic, hepatic, cardiothoracic, gynecologic, and bariatric procedures (Talhaoğlu and Ceyhan 2024).

The ERAS protocol is divided into three main phases: preoperative, intraoperative, and postoperative. In the preoperative phase, key elements include patient education, nutritional optimization, risk management, and reduced fasting duration. During the intraoperative phase, emphasis is placed on standardized anesthesia techniques, appropriate fluid management, and minimizing surgical trauma and hypothermia. The postoperative phase includes early nutrition, multimodal pain management without opioids, early mobilization, and reduction of unnecessary invasive interventions like drainage use (Pedziwiatr et al. 2015).

Consistent implementation of these protocols has been shown to reduce postoperative complications, shorten recovery time, decrease hospital length of stay, and lower healthcare costs. A systematic review demonstrated that patients undergoing colorectal surgery with ERAS protocols experienced fewer complications and shorter hospital stays compared to conventional approaches. Multimodal, opioid-sparing analgesia also reduced the incidence of postoperative ileus, a common complication in gastrointestinal surgery.

ERAS implementation requires close collaboration among healthcare professionals, including surgeons, anesthesiologists, nurses, nutritionists, and physiotherapists. Active patient involvement is also crucial through perioperative education that supports adherence and reduces anxiety. Despite its significant benefits, ERAS implementation demands systemic effort and interdisciplinary consensus, and may not be suitable for all patients particularly those with severe comorbidities or complex surgeries (Nelson et al. 2016).

The ERAS components have been systematically developed and include preoperative education, prehabilitation, nutritional management, anemia correction, and reduced fasting. In the intraoperative phase, techniques that minimize tissue injury,

maintain normothermia, and avoid unnecessary drains are preferred. Postoperatively, early mobilization, prompt oral intake, and gradual discontinuation of aids such as catheters or nasogastric tubes are recommended.

In healthcare systems such as Indonesia's National Health Insurance (JKN), ERAS implementation is particularly relevant due to its potential to improve service efficiency without compromising safety or care quality. Thus, ERAS focuses not only on clinical aspects but also supports the transformation of healthcare delivery toward efficiency, collaboration, and active patient engagement.

Preoperative Management in the ERAS Protocol

The preoperative approach in the ERAS protocol includes various preventive interventions aimed at reducing postoperative complications, accelerating recovery, and improving patient comfort. One of the key components is the prevention of postoperative nausea and vomiting (PONV), which, if unmanaged, can lead to dehydration, impaired nutritional intake, and prolonged hospital stay. PONV prevention is carried out using a multimodal strategy, taking into account the number of risk factors present; two antiemetic drugs are recommended for patients with 1–2 risk factors, while those with ≥2 risk factors may require 2–3 antiemetic combinations. If PONV occurs, a combination of drugs with different mechanisms of action is the preferred approach (Shang et al. 2018).

Pre-anesthetic medication also plays an important role. Anxiety before surgery can increase analgesic consumption and the risk of postoperative complications. Preoperative education has been shown to reduce anxiety without the need for sedative drugs. The administration of drugs such as paracetamol, NSAIDs, and gabapentinoids is intended to reduce the need for opioids. However, gabapentinoids should be used with caution to avoid excessive sedation, particularly in elderly patients or those with impaired renal function.

The administration of intravenous prophylactic antibiotics before colorectal surgery, ideally within 60 minutes prior to incision, is important to prevent surgical site infections. If mechanical bowel preparation (MBP) is performed, oral antibiotics are also recommended. For skin antisepsis, chlorhexidine-alcohol-based preparations are preferred over other methods with weaker scientific evidence, such as antiseptic bathing or the use of adhesive incise drapes (Peden et al. 2019).

Routine use of MBP is now being phased out because it often causes discomfort and dehydration without significantly reducing the risk of postoperative infection. However, in rectal procedures, MBP can still be selectively used, particularly when combined with oral antibiotics. To maintain hydration status, patients are encouraged to consume clear fluids (including complex carbohydrate drinks) up to two hours before surgery to prevent fluid deficits and improve perioperative metabolic status.

Intraoperative Management in the ERAS Protocol

During surgery, the ERAS protocol emphasizes the use of short-acting general anesthesia and the avoidance of benzodiazepines, which help accelerate consciousness recovery with minimal residual effects. Intraoperative brain function monitoring is highly recommended, particularly in elderly patients, to prevent awareness events and postoperative delirium. Nitrous oxide should be avoided as it increases the risk of PONV and delays bowel motility. Monitoring neuromuscular blockade and ensuring full recovery is essential to prevent residual muscle paralysis that may contribute to respiratory complications (Ebm et al. 2018).

Intraoperative fluid therapy must maintain homeostasis and prevent both overhydration and hypoperfusion. Patient body weight should not increase by more than 2.5 kg during the perioperative period. Goal-Directed Fluid Therapy (GDFT) is recommended for high-risk patients and major surgeries with significant fluid loss. The use of inotropes may be considered in patients with low cardiac contractility.

To prevent hypothermia, temperature monitoring and active warming during surgery are crucial, as both general and spinal anesthesia impair the body's thermoregulation. Warming methods include forced-air warming, warmed intravenous fluids, and humidified anesthetic gases.

Minimally invasive surgical procedures are a core component of ERAS as they reduce tissue damage, thereby decreasing activation of the inflammatory response, accelerating recovery, and reducing wound-related complications. This also enables the effective implementation of other ERAS components, such as non-opioid analgesia and optimal fluid management.

Finally, the use of peritoneal or pelvic drains should be limited, as they have not been shown to significantly improve clinical outcomes. Drains should only be used

selectively when clearly indicated, such as in cases with a high risk of anastomotic leakage or active bleeding.

Postoperative Management in the ERAS Protocol

The postoperative phase of the ERAS protocol is designed to accelerate patient recovery, minimize complications, and reduce length of hospital stay. One of the key interventions is the avoidance of routine nasogastric tube (NGT) use. Although NGTs have traditionally been used to prevent gastric distention and vomiting, current evidence shows that routine placement increases the risk of respiratory infections, pharyngeal irritation, and delays the recovery of gastrointestinal function. Therefore, its use should be limited to specific indications and removed as soon as possible after surgery.

Effective postoperative analgesia is essential, with a focus on reducing or avoiding opioid use. A multimodal analgesia approach, including thoracic epidural analgesia for open surgeries and transversus abdominis plane (TAP) block for laparoscopic procedures, has been proven to reduce postoperative stress and facilitate early mobilization. Local anesthetics such as lidocaine infusions may also be utilized, though they require close monitoring for signs of toxicity.

To prevent thromboembolism, all patients undergoing major colorectal surgery should receive thromboprophylaxis, including compression stockings and/or intermittent pneumatic compression, along with pharmacological prophylaxis such as low molecular weight heparin for 28 days postoperatively, considering that the risk of deep vein thrombosis can reach up to 30% without prophylaxis.

Postoperative fluid and electrolyte therapy must be tightly regulated to maintain near-zero fluid balance. Large volumes of isotonic solutions like 0.9% NaCl should be avoided as they can cause hyperchloremic acidosis, renal hemodynamic disturbances, and fluid retention. Balanced crystalloid solutions are preferred alternatives.

Urinary drain management is also a key concern, with catheter use recommended for only 1–3 days postoperatively to reduce the risk of urinary tract infections. The duration should be adjusted based on the risk of urinary retention, considering factors such as gender, use of epidural analgesia, and the type of surgery performed.

To prevent postoperative ileus, a multimodal approach is employed: minimizing opioid use, avoiding routine NGT placement, using minimally invasive surgical techniques, and applying goal-directed fluid therapy. Both pharmacologic and non-

pharmacologic agents such as chewing gum or coffee can help expedite the return of bowel function.

Postoperative glycemic control is critical, as hyperglycemia is associated with increased risk of complications. Oral carbohydrate loading prior to surgery, epidural analgesia, and laparoscopic techniques have all been shown to reduce insulin resistance. Insulin should be administered as needed with close monitoring.

Nutritional care is also a central component. Early oral intake, even within 4 hours after surgery, is safe for most patients and helps reduce the risk of infection. Immunonutrition supplements containing arginine, omega-3 fatty acids, and nucleotides are highly recommended for malnourished patients undergoing gastrointestinal cancer surgery.

Lastly, early mobilization is strongly emphasized, as prolonged bed rest contributes to pulmonary complications, muscle weakness, thromboembolism, and metabolic disturbances. Patient education and support from the rehabilitation team are essential to ensure safe and progressive early ambulation.

Stress Response During Surgery

The stress response to surgical procedures includes complex metabolic, hormonal, hematological, and immunological reactions. The primary aim is to maintain homeostasis and support the patient's survival; however, this response can lead to adverse effects if not properly controlled.

As surgery begins, the body immediately activates the sympathetic nervous system, triggered by factors such as pain, hypotension, hypoxemia, and psychological stress. This activation stimulates the release of stress hormones including ACTH, cortisol, ADH, GH, and glucagon, while suppressing insulin secretion. These hormones increase gluconeogenesis, glycogenolysis, and lipolysis, while also causing fluid and sodium retention to maintain blood pressure and organ perfusion.

Immunologically, tissue injury triggers the release of pro-inflammatory cytokines such as IL-6 and TNF-α from leukocytes and endothelial cells. These cytokines initiate systemic and local inflammatory responses. Additionally, leukocytes migrate to the wound site to support healing and prevent infection. Hematological changes, such as increased coagulation and fibrinolytic activity, also occur, raising the risk of thrombosis.

Elevated cortisol levels suppress the immune system, increase the risk of infection, and delay wound healing.

Although this stress response is protective in nature, an imbalance between pro-inflammatory and anti-inflammatory responses can lead to serious complications. A dominant pro-inflammatory response may trigger Systemic Inflammatory Response Syndrome (SIRS), while a dominant anti-inflammatory response may result in immunosuppression and opportunistic infections.

Some clinical consequences of this stress response include: increased myocardial oxygen demand (raising the risk of ischemia), hypoxemia, splanchnic vasoconstriction (which hinders gastrointestinal healing), muscle mass loss, impaired wound healing, hypercoagulability, and fluid retention. Multimodal strategies such as the Enhanced Recovery After Surgery (ERAS) approach have been shown to effectively reduce these responses and improve postoperative recovery by lowering cytokine and stress hormone levels (S.M. et al. 2009).

Discharge Criteria in the ERAS Program

The primary goal of ERAS is to accelerate patient recovery and return them to normal activities. However, patient discharge also considers the readiness of home support systems as well as the preparedness of the patient and their family. Discharge criteria include: adequate mobilization, sufficient oral intake, normal gastrointestinal and urinary function, a problem-free surgical wound, good pain control, absence of fever, and education regarding postoperative warning signs (Ljungqvist, Scott, and Fearon 2017).

Implementation of ERAS in Cesarean Surgery

ERAS has been adapted for cesarean section surgery with the aim of accelerating recovery, reducing complications, and enhancing mother–infant interaction. The protocol includes preoperative, intraoperative, and postoperative phases (Talhaoğlu and Ceyhan 2024).

Optimization of Maternal Comorbidities

Managing conditions such as obesity, hypertension, gestational diabetes, and anemia is essential, as these are associated with increased risks of maternal and neonatal complications. For example, obesity increases the risk of infection and hemorrhage, while anemia is associated with preterm birth and the need for transfusion (Obeagu 2025).

Preoperative Nutrition

Patients are advised to consume clear fluids up to 2 hours and light meals up to 6 hours before surgery. This helps reduce the risk of hypoglycemia and gastrointestinal complications. However, preoperative carbohydrate loading is not recommended for patients with gestational diabetes(Scott et al. 2015).

Intraoperative Management

This includes administration of antibiotics 60 minutes prior to incision to prevent infection, efficient anesthesia management, prevention of hypothermia, and safe surgical techniques, including delayed cord clamping for the newborn (Bratzler et al. 2013).

Postoperative Management

Focuses on the use of multimodal analgesia, prevention of nausea and vomiting, thromboprophylaxis, early nutrition and mobilization, early removal of urinary catheter, and discharge counseling (Patel and Zakowski 2021).

ERAS in Emergency Abdominal Surgery

The application of ERAS principles in emergency abdominal surgery has also shown positive outcomes, although adjustments are necessary due to the more critical condition of the patients. Evidence-based approaches remain the foundation, but they must be tailored according to the patient's condition and the time available (Özçelik 2024; Skinner and Huddart 2019).

Future focus involves the development of customized care pathways, identification of key components of ERAS that can be safely and effectively implemented in emergencies, and continuous monitoring of its application (Quiney et al. 2016).

5. CONCLUSION

Several studies have shown that the ERAS (Enhanced Recovery After Surgery) method in abdominal surgery is associated with faster postoperative recovery, as overall postoperative complications are fewer in the ERAS group. Enhanced Recovery After Surgery represents a paradigm shift in perioperative care through a multimodal, multidisciplinary, and evidence-based approach aimed at improving clinical outcomes and perioperative care efficiency. Unlike conventional perioperative care, ERAS emphasizes a care process consisting of various interventions that reduce surgical stress, maintain physiological function, and accelerate the recovery process to baseline. The

prevention and minimization of the stress response are key mechanisms and the foundation of the ERAS concept. ERAS is a multidisciplinary, evidence-based, and standardized approach designed to minimize the physiological stress response to surgery, improve organ function, and ultimately enhance patient outcomes.

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