

Enhanced recovery after surgery (ERAS)... still a distant speck on the horizon !

Submitted: 27-Jan-2021

Revised: 31-Jan-2021

Accepted: 02-Feb-2021

Published: 10-Feb-2021

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Access this article online
Website: www.ijaweb.org
DOI: 10.4103/ija.IJA_76_21
Quick response code


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Enhanced recovery after surgery (ERAS) is a protocolised scientific pathway consisting of multimodal evidence-based strategies at every step of perioperative care to reduce the surgical stress response by modifying the inflammatory and metabolic changes.^[1] Professor Henrik Kehlet first initiated the concept of ERAS in the late 1990s.^[2] ERAS is well established in specialities like colorectal, thoracic, vascular, urological, and being extended to many other surgeries. ERAS protocols (also called as ERAS care, ERAS pathway) primarily originated from modifications within the individual conventional perioperative care strategies in the hospital setting. In the year 2009, Lassen *et al.* published the first ERAS Group recommendations which was a comprehensive evidence-based, multimodal consensus review describing perioperative care for colorectal surgery.^[3] The updated review was last published in 2019 by Gustafsson *et al.*^[4] Various evidence-based protocols are being established for elective surgeries with limitations to patient with multiple comorbid conditions and emergency surgeries. Anaesthesia techniques primary involve opioid sparing anaesthesia, central neuraxial block, especially epidural anaesthesia, various ultrasonography (USG)-guided nerve blocks and non-opioid analgesics. Use of less sedative pre-anaesthetic drugs, shorter acting sedatives also help in early recovery from anaesthesia. The use of inhalational anaesthetics like sevoflurane, desflurane with depth of anaesthesia and neuromuscular monitoring is

now a part of standard care for ERAS protocol when general anaesthesia is instituted. Various nerve blocks commonly used are epidural, paravertebral block, transverse abdominis plane (TAP) block, rectus sheath block, spinal (anaesthesia), pectoral nerve (PECs) block, serratus plane blocks, erector spinae plane (ESP) block, and wound catheter for abdominal and thoracic operations. ERAS which started for colorectal surgeries now has applications in all surgeries including bariatric, neonatal, obstetric, cardiovascular and arthroplasties.^[5]

In 2016, Feldheiser *et al.* published a comprehensive consensus statement for anaesthesia practice for colorectal surgeries, which was based on the evidence available for each element of perioperative care pathways.^[6] The consensus statement described the importance of various preoperative, intraoperative and postoperative elements which are handled and managed by the anaesthesiologists and provided evidence level for each component (low, moderate, high) and recommendation (strong, weak). The various essential perioperative components can be divided into preoperative, intraoperative and postoperative components [Table 1]. Pain management is an important component and should be addressed in a multimodal, opioid-sparing manner. Anaesthesiologists can use a combination of analgesics like acetaminophen, non-steroidal anti-inflammatory drugs if not contraindicated, wound infiltration, epidural catheter

Table 1: Highlights of ERAS care from pre-admission to discharge and follow-up^[17-19]**Pre-admission and pre-operation Care**

Preadmission information, education and counselling
 Prehabilitation. (Methods for enhancing patient functional capacity to enable him or her to withstand a forthcoming stress of surgeries)
 Preoperative optimisation
 Smoking and alcohol consumption (alcohol abuse) should be stopped 4 weeks before surgery
 Anaemia should be actively identified, investigated and corrected preoperatively,
 Preoperative bowel preparation, preoperative fasting and carbohydrate treatment
 Preanaesthetic medication. Routine administration of sedatives to reduce anxiety preoperatively should be avoided
 Postoperative nausea and vomiting (PONV) prophylaxis; A multimodal approach to postoperative nausea and vomiting with consideration for >2 antiemetic agents should be used for patients undergoing certain surgeries-gynaecologic laparoscopy and onco-surgical procedures,
 Venous thromboembolism (VTE) prophylaxis, VTE prophylaxis during chemotherapy

Intraoperative Managements

Surgical site infection (SSI) reduction bundles (includes antimicrobial prophylaxis, skin preparation, prevention of hypothermia, titration of inspired oxygen concentration, avoidance of drains/tubes, control of perioperative hyperglycemia).
 Use of short acting intravenous and inhalational anaesthetic agents, Depth of anaesthesia and neuromuscular monitoring under general anaesthesia, avoid routine use of nitrous oxide.
 Multimodal analgesia, regional anaesthesia and analgesia, opioid sparing analgesia
 Lung recruitment and protective strategy (bariatric, laparoscopy and thoracic surgery)
 Perioperative fluid management/Goal Directed Fluid Therapy (GDFT)
 Perioperative nutrition and immunonutrition.
 Intraoperative strategy for prevention of postoperative ileus.

Postoperative protocol

Patient Reported Outcomes (PROs) including functional recovery, discharge pathways, audit and ERAS reporting system
 Urinary drainage, urinary catheters should be used for postoperative bladder drainage for a short period preferably <24 h postoperatively
 Early mobilisation, Patients should be encouraged to mobilise within 24 hours of surgery
 Multilevel ERAS care compliance, feedback and audit system: One of the team members must be assigned to follow up the patient post-discharge to evaluate the system's efficiency for long-term outcomes.

based local anaesthetic infusion whenever indicated, peripheral nerve blocks and the recent fascial plane blocks as for indication and feasibility. Intravenous lidocaine infusion also has been advocated as it improves postoperative analgesia, reduces opioid consumption and speeds surgical recovery. The inspired fractional concentration of oxygen should be titrated to produce normal arterial oxygen levels and saturations.

ERAS care includes the procedures from pre-admission to discharge to follow-up of the patient. Meticulous planning at pre-admission, preoperative evaluation and optimisation along with protocol-based intraoperative and postoperative management can fasten recovery and discharge of the patients.

Perioperative surgical home (PSH) is defined by the American Society of Anesthesiologists (ASA) as a patient-centred and physician-led multidisciplinary and team-based system of coordinated care that guides the patient throughout the entire surgical experience.^[7,8] PSH extends ERAS care beyond the immediate perioperative period as an external outpatient setting. Anaesthesiologist and intensivist together with a nurse practitioner provide and integrate perioperative care including post-discharge plans (outpatient medical home). This concept is new to developed countries and is still not much known in developing nations. The question now arises as to how practical would it be to implement PSH as a component of ERAS in the Indian setup. One method that can be adopted at present is to shift the patient post-discharge to a step-down recovery or outpatient medical home. This can be followed by transporting the patient home with a caregiver and doing follow-up by telecommunication (phone, messages, telemedicine).

In this issue of the Indian Journal of Anaesthesia (IJA), there are several research articles which describe several key elements of ERAS in perioperative care. Sriramka *et al.* compared the effectiveness of physical interventions like hand-holding and conversation alone or with midazolam in relieving preoperative anxiety in adult patients undergoing laparoscopic abdominal surgeries.^[9] They found that hand-holding and conversation alone or with midazolam were more effective in relieving preoperative anxiety than midazolam alone. Such results are promising for the ERAS programme's success as it achieves both the targets, that is, reducing stress and avoidance of sedatives. In the original article by Sinha *et al.*, the authors have compared deep with superficial erector spinae plane block for providing opioid sparing analgesia after mastectomy.^[10] Postoperative pain management and early mobilisation play a vital role in a successful ERAS programme, and opioid-free analgesia has been strongly recommended. Ahmed Elsakka *et al.* used intraperitoneal hydrocortisone and pulmonary recruitment manoeuvre to reduce postoperative pain after gynaecological laparoscopic surgeries.^[11] Intraoperative

ERAS protocol elements include multimodal analgesia, antibiotic and postoperative nausea and vomiting (PONV) prophylaxis, glycaemic control, lung-protective ventilation and appropriate fluid management. A minimally invasive approach should be opted whenever feasible, as this can help in early mobilisation and recovery. Algarra *et al.* tried regional anaesthesia as a sole anaesthetic technique for complex laparoscopic gynaecological surgery to avoid general anaesthesia and postoperative cognitive dysfunction.^[12] Elnakera *et al.* compared the efficacy of preoperative gabapentin (1200 mg) with preoperative 2.5 mg bisoprolol in achieving stable intraoperative haemodynamics and better surgical field visibility in patients undergoing endoscopic sinus surgery.^[13] Implementation of ERAS pathways in gynaecological surgeries was found to have encouraging results. To embrace the enhanced recovery concept in obstetrics, the Society of Obstetric Anaesthesia and Perinatology (SOAP), the American College of Obstetricians and Gynaecologists (ACOG) and the ERAS society have come together to release the guidelines on Enhanced Recovery After Caesarean (ERAC).^[14] Patient satisfaction about the surgery and anaesthesia plays a vital role in motivating the patient for early mobilisation and recovery. Singariya *et al.*^[15] compared the analgesic efficacy of intrathecal 1% 2-chloroprocaine with or without fentanyl in parturients undergoing elective caesarean section. The authors found that the addition of fentanyl prolonged the duration of sensory block and postoperative analgesia but, there was no significant difference in the onset of sensory and motor block, the highest level achieved, and incidence of adverse events. Though 0.5% bupivacaine heavy is one of the commonly used drugs for spinal anaesthesia, preservative-free 1% 2-chloroprocaine can be an attractive alternative option as it has got rapid onset and shorter duration of sensory block. When used for the caesarean section, it was also found to reduce hospital stay duration and improve maternal satisfaction. Such interventions should be considered for the success of enhanced recovery after caesarean section.

ERAS pathways involve a team effort between surgeons and anaesthesiologists. Both teams have to adhere to ERAS care bundles to successfully implement them and have favourable outcomes following various surgeries. Just having a protocol and standard operating practices (SOP) is not enough. Every member involved including anaesthesiologists, surgeon, nursing staff, hospital administration are the key players and play an important role in the success of the ERAS pathways so as to have enhanced recovery,

early discharge and thus better patient outcomes. Such situations can be handled by having a checklist for the entire perioperative period which can be referred to by the surgical and the anaesthesia team. The importance of adhering to and implementing a checklist has been emphasised by Suresh *et al.* in this issue.^[16]

Though ERAS was successful globally, many challenges lie ahead for developing countries where the most critical challenge is implementing the existing scientific evidence. One should also understand that ERAS is a dynamic process and prone to change, based on new developments in understanding the pathophysiology of perioperative complications and recovery. Moreover, data on ERAS in high-risk emergency procedures shows that they are less beneficial than elective procedures.^[17] Thus, future progress should focus on the development of essential procedure-specific ERAS components.^[18-21]

The data from the Indian subcontinent are awaited but knowing the heterogeneity in the country, that is, a considerable mix of teaching institutes, corporate hospitals, non-teaching hospitals, etc., it is going to be a herculean task to expect one and all to implement the recommendations from international societies. The Indian Society of Anaesthesiologists (ISA) in liaison with various other societies can formulate and develop tailored recommendations for hospitals of various categories in India.

To conclude, dedicated team effort towards mutual goals and shared information is the key to success of enhancing patient outcomes postoperatively. Regional anaesthesia, opioid-sparing anaesthesia and minimal invasive or less invasive surgical procedure enhances recovery. A comprehensive ERAS protocol common to all surgical specialities should be primary focused along with specific care strategies for individual specialities. There is a dearth of studies focusing particularly on emergency surgeries and on critically ill surgical patients owing to ethical issues. Rigorous implementation of protocol for emergency and critically ill patients in the intensive care unit (ICU) can result in a reduced overall ICU period and discharge of these patients. The journey has started but there is a long way to go in establishing enhanced recovery pathways in various surgical disciplines in India. We can only reach the finishing line by adhering to established protocols and by adopting a multidisciplinary approach in the care of the surgical patient.

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How to cite this article: Mehdiratta L, Mishra SK, Vinayagam S, Nair A. Enhanced recovery after surgery (ERAS)... still a distant speck on the horizon! *Indian J Anaesth* 2021;65:93-6.

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