Enhanced recovery after surgery

Enhanced recovery after surgery (ERAS) is a multimodal, multidisciplinary approach to the care of surgical patients which was inspired by Dr. Henrik Kehlet with the main aim of improving outcomes by modifying the endocrine and metabolic response to surgery rather than focusing solely on early discharge. In 2001, the ERAS group consisting of members from United Kingdom, Sweden, Denmark, Norway, and The Netherlands met to devise a protocol that would optimize outcomes based on published evidence and in 2010, the ERAS Society was formulated. The ERAS Society guidelines have given procedure-specific recommendations for scheduled elective major surgeries like colonic resection, rectal resection, pancreaticoduodenectomy, cystectomy, gastric resection, anesthesia protocols, anesthesia pathophysiology, major gynecology, bariatric surgery, liver resection, head and neck cancer surgery, breast reconstruction, hip and knee replacement, thoracic noncardiac surgery, and esophageal resection.[1] There are 24 core elements of ERAS care based on scientific knowledge and it is postulated that no single element alone will improve the outcome after surgery. Since the various elements required for starting ERAS protocol are provided by different medical facilities, a multidisciplinary approach is an essential core aspect of this protocol.

At present, the ERAS protocol is relevant to adult patients undergoing elective surgery. Whether similar advantages of ERAS module can be replicated for geriatric patients, pediatric patients, and in situations of trauma and emergency remains less explored.[2] Studies in elderly patients undergoing colonic resection and pancreaticoduodenectomy when compared with younger patients did not find any difference in outcome.[3-5] Patients undergoing emergency surgery and trauma may have prolonged hospital stay due to the inherent nature of the disease/injury or requiring multiple, repeated surgical interventions. In addition, many preoperative and intraoperative ERAS considerations may not be entirely feasible for implementation in this patient population like preadmission education, early discharge planning, carbohydrate loading, reducing duration of fasting or nothing by mouth, incorporating minimally invasive surgery, and avoidance of drains.[2] It is unclear to what extent these ERAS principles are applicable to paediatric surgery and whether similar benefits could be accomplished in children. Children do not have prolonged periods of recovery and rehabilitation after even major surgery, likely due to minimal comorbidities and better physiology.[6] Also, the number of elements of ERAS protocol used in these diverse situations is less than those recommended and incorporated in the original ERAS.

Adoption of ERAS protocol has conferred many advantages to patient care in terms of outcome, length of hospital stay, and complications as well as long-term benefit of reduced mortality in orthopedic and colorectal surgery. The focus of these protocols is on avoiding prolonged preoperative fasting, avoiding empirical intravenous fluid loading, minimizing systemic opioid use and early postoperative mobilization. However, since these ERAS protocols include bundled interventions, the role of individual elements like perioperative fluid management, pain management, etc., in the outcome cannot be defined.

ERAS protocols till now have been utilized in high income countries. The implementation of these protocols in middle- and low-income countries would be beneficial and efforts should be made for their implementation.[7] This will be an opportunity to standardize care, improve outcomes, reduce complications and length of stay, and will be cost-effective in times to come. The focus of these protocols will be on on preoperative evaluation and optimization, use of cost-effective medications including antibiotics, regional blockade, multimodal pain management, and early mobilization postoperatively. It has the potential to improve the surgical pathway processes, create preoperative and postoperative plans and standards, limit costs, and improve outcomes for all patients.[8]

As anesthesiologists, our focus should be on opioid free, multimodal pain management. Opioids have a side-effect profile which delays discharge and return to early ambulation. Opioids are known to cause constipation, decreased bowel motility, create ileus, increase postoperative nausea and vomiting, sedation, and delirium.[9] Recent studies have also shown an association between opioid administration and cancer recurrence especially in breast and prostate cancer. As a specialty, we are in position to influence and have tools (regional anaesthesia) to provide opioid-sparing pain management during the perioperative period. Certain nonopioid pain agents which can be utilized for pain management are infiltration and/or intravenous infusions of local anesthetics, acetaminophen, nonsteroidal analgesics, N-Methyl-D-aspartate antagonists (i.e., ketamine, magnesium sulphate), α-2 agonists (i.e., clonidine and dexmedetomidine), anticonvulsants (gabapentin and pregabalin), glucocorticoids, and β-blockers. Multimodal pain management without opioids spares the use of mu-receptors for immediate postoperative period and utilizes other receptors for taking care of patient's pain. This will benefit people by reducing incidence of PONV,

ileus and delirium, allowing early feeding, ambulation, and discharge from hospital.

In spite of the program's existence for the last 15 years, the concept is still not adopted worldwide.[10] This may probably be related to the requirement of collaboration from multidisciplinary departments including psychological and organizational issues. Also, inclusion of more than 20 elements in the ERAS protocol might have contributed to its slow acceptance. In addition, some elements of the protocol may not have a scientific basis for its inclusion. Therefore, it is important to test the scientific validity of the trials conducted and the future should focus on the combined effect of regional anesthetic techniques, minimally invasive surgery, and pharmacological modification of the inflammatory responses.

This special issue of Journal of Anaesthesiology and Clinical Pharmacology gives us an insight into the concept of ERAS. Moningi *et al*. discuss the important role of anesthesiologists in facilitating this protocol as some of the key elements such as preoperative patient preparation and assessment, perioperative fluid management, and perioperative pain relief are handled by them. Goal-directed fluid therapy maximizes tissue oxygen delivery without fluid overload by achieving measurable optimal hemodynamic indices. The article by Kendrick *et al*. encourages clinicians to manage fluid/volume administration on evidence-based objective goals of hemodynamic parameters. Elective hip and knee replacement surgeries can also be performed on the basis of ERAS protocol. Kaye *et al*. elaborate on the multimodal approach to the management of patients undergoing orthopedic procedures. ERAS management includes assessment of preoperative, intraoperative, and postoperative management strategies which are discussed in this issue devoted to ERAS protocol.

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