Enhanced recovery after surgery (ERAS): Are anaesthesiologists prepared for the paradigm shift in perioperative care? A prospective cross-sectional survey in India

INTRODUCTION

The concept of enhanced recovery after surgery (ERAS) was introduced in the mid-90s by Kehlet et al.\(^1\) The comprehensive nature of the ERAS protocol was intended to encompass the patient’s entire journey throughout the perioperative period by combining different modalities and treatments through an evidence-based approach.

A recent meta-analysis showed that implementation of the ERAS protocol led to a reduction in postoperative recovery time, duration of stay, and reduction in complications by 30%–50%.\(^2\)

In India, a study showed a 35% decrease in hospital stays without any increased readmissions or complications after inclusion of ERAS pathways.\(^3\) Similar results for laparoscopic assisted gastrostomies have been seen in another study.\(^4\)

Recently, ERAS society has suggested recommendations for optimum anaesthesia care for the patients undergoing gastrointestinal (GI) surgery.\(^5\) However, despite all the clinical and other patient-centred benefits of ERAS, its implementation has been hugely neglected worldwide, as well as in India.\(^6,7\)

We, therefore, conducted a survey among the anaesthesiologists practising in India to examine the existing state of knowledge and obstacles to the introduction of ERAS protocols in perioperative surgical care.

METHODS

After Institutional Ethics Committee approval, this online survey was conducted amongst Indian anaesthesiologists prospectively from September 2020 to January 2021. The questionnaire was developed after extensive research for various elements of the ERAS protocol, along with the review of published guidelines on ERAS website. The questionnaire had 28 questions [Appendix A] and was divided into three sections. Section one dealt with the consent of the participants. The second section consisted of questions investigating the demographics of anaesthesiologists and their awareness of ERAS protocols in general. The third section consisted of questions framed to know the current practice of anaesthesiologists in India and the extent of implementation of the various elements of ERAS protocol for major GI surgeries in the perioperative period.

The validity and reliability of the questionnaire were evaluated as per responses from the experts. The questionnaire was transformed into an online version using google forms and a link to the online questionnaire was shared amongst the anaesthesiologists. Percentages and frequencies were used for the descriptive analysis of the data.

RESULTS

Of the 856 anaesthesiologists contacted, we received 273 completed forms which qualified for the final analysis [Appendix B]. Majority of the respondents (72.4%) were from teaching hospitals and more than one third (35.5%) of the respondents had more than ten years of experience. Characteristics of the respondents are shown in [Table 1].

Of the 273 participant anaesthesiologists, 244 (89.4%) were aware of the concept of ERAS. The perioperative care protocols were decided by anaesthesiologists as per 126 (46.2%) responses [Figure 1a]. Maximum awareness of ERAS guidelines was for colorectal and GI surgeries. More than half of the anaesthesiologists 157 (57.5%) had primary contact with the patients for the pre-anaesthetic check-up before admission when the surgical plan was decided. One hundred and thirty-two (48.4%) of the participants believed that the anaesthesiologist’s involvement in postoperative patient care was mostly limited to discharge from the intensive care unit or post anaesthesia care unit, 45 (16.5%) thought it was limited to the day of surgery and as per 67 (24.5%) anaesthesiologists, it was until hospital discharge. Multimodal rehabilitation (84.2%) and reduced hospital stays (71.1%) were the most commonly perceived benefits from ERAS implementation [Figure 1b].

Intraoperative elements of ERAS like Total intravenous propofol-based anaesthesia (17.9%), neuromuscular...
function monitoring (15.8%) and avoidance of nasogastric drainage (14.7%) were routinely practised by less than 20% of the anaesthesiologists. The implementation of various elements of ERAS protocol in the perioperative period in major GI surgeries was variable [Table 2].

Early mobilisation (78.4%), use of epidural analgesia (59.3%), early feeding (52.4%) and use of opioid-sparing strategies postoperatively (48.4%) were some of the most employed strategies to speed up postoperative GI function recovery. Use of opioid antagonists, laxatives and gum chewing were
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DISCUSSION

This is the first survey among anaesthesiologists about the awareness and implementation of the ERAS protocol in India. As per this survey, most of the anaesthesiologists (89.4%) in India were aware of the concept of ERAS.

Despite awareness among most anaesthesiologists and the proven benefits of ERAS protocol, we found that there was a huge variation in the pattern of clinical practice followed in the perioperative period in our Indian setups. Among the ERAS protocols, pre-admission counselling and risk stratification, preoperative nutritional screening and care, multimodal prophylaxis for postoperative nausea and vomiting (PONV), titration of the inspired fractional concentration of oxygen, maintenance of intraoperative normothermia, intraoperative monitoring of depth of anaesthesia, use of balanced crystalloids, epidural anaesthesia, goal-directed intravenous fluid administration, initiation of early postoperative feeding and mobilisation were relatively well adopted by more than half of the anaesthesiologists in perioperative care.

However, other practices, such as the provision of preoperative carbohydrate-rich drink, total intravenous propofol based anaesthesia, routine monitoring of neuromuscular function, avoidance of nasogastric drainage, opioid-sparing analgesia in intraoperative period and tight perioperative control of hyperglycaemia were relatively less well-adopted.

Greco et al.,[8] conducted a survey among senior anaesthesiologists and reported that 76% of anaesthesiologists were familiar with the concept of ERAS in some way at least. A similar survey among surgeons and anaesthesiologists in Spain reported that 86.1 percent of respondents were familiar with ERAS pathways, which is similar to our survey results.[9] A survey among Indian gastroenterology surgeons to assess their views on fast-track surgery received a very poor response, and four of 18 respondents of the survey had never heard about ERAS.[10]

Greco et al.,[8] reported that prophylaxis for PONV and maintenance of intraoperative normothermia were the best-adhered components of ERAS. While other key postoperative ERAS elements like early nasogastric tube removal, early resumption of oral feeds and intravenous fluid therapy discontinuation were reportedly least adhered to.

In our study, preoperative fasting of 2 h for clear fluids and 6 h for solid meals was followed by most of the anaesthesiologists, which is in accordance with the ERAS protocol. But the fasting guidelines for heavy meals for more than 10 h (against more than 8 h as per ERAS guidelines) has been recently issued by the Indian Society of Anaesthesiologists.
the Indian population based on our distinct eating habits and culture. This should also be taken into consideration when applying the ERAS protocol to our Indian population.[11] This highlights the need for a customised version of the ERAS protocol for the Indian population.

Preoperative oral consumption of complex carbohydrate, 2–3 h before induction of anaesthesia has been demonstrated to reduce the postoperative insulin resistance and to independently improve postoperative outcomes.[12] Despite a strong recommendation in favour of this element of ERAS protocol, only 17.9% of the respondents reported to be following it. Ripollés-Melchor et al.[9] reported the use of preoperative oral complex carbohydrates by 51.4% of the respondents in their survey. The poor implementation of this arm of ERAS can be related to the ubiquitous fear of aspiration in the mind of anaesthesiologists or the lack of awareness of its benefits or institutional policies in this regard.

Surprisingly, many (80.6%) of our survey respondents reported implementation of goal-directed fluid therapy (GDFT) in major GI surgeries, though its true benefit remains controversial.[13] Open surgery approach was reported by 53.1% of respondents despite the proven benefits of laparoscopic resection as already proven in the multi-centred study on perioperative strategy in colonic surgery comparing laparoscopy and/or fast track multimodal management with standard care (LAFA trial).[14] However, it has been observed that minimally invasive surgery practice in India is less regulated due to the lack of mentorship, resulting in more frequent complications than are reported.[15,16] So, the operative technique that is least invasive and most beneficial for the patient should be the preferable approach.

Thus, our study highlights the variability in compliance with various elements of the ERAS protocol in India. Similar findings were shown in a retrospective study on the prevailing perioperative management practice for colorectal surgeries.[7]

The main hindrances faced in the implementation of ERAS as per our survey respondents were fear of complications and administrative issues by most of the anaesthesiologists. The former factor might be attributed to the fact that most of the available literature is based on studies done in European and American institutions. Its clinical application in the Indian scenario requires more clinical and research work in this direction. Besides this, patient-related factors, like illiteracy and inability to recognise early warning signs, staff-related factors, like lack of trained personnel in ERAS, practice-related issues like poor telecommunication facilities and coordination of multispecialities, besides infrastructure-related factors might be the cause of this fear in a country like India. Framing an evidence-based anaesthesia protocol, performing audits and training programs might help us in overcoming this fear. At the same time, extensive teamwork along with the efforts of increasing awareness among staff members of the hospital and demonstrating the cost benefits to the administration along with providing quality care to a greater number of patients in a given time frame may help in overcoming the administrative issues. Considering that our nation has a huge variation in the types of institutes delivering healthcare, a more personalised set of recommendations for various categories of health care facilities might improve implementation at various levels.[17]

There were some limitations to our study. The response rate to the survey was 32%, which is relatively low and therefore, non-response bias cannot be excluded. It is possible that anaesthesiologists unaware of the concept chose not to respond to the survey. Secondly, the respondents might not be representative of all the regions and levels of healthcare in India. Thirdly, due to the extensive nature of the ERAS protocol, all the components of ERAS could not be incorporated in the online questionnaire as it would make the process of filling it too tedious. We tried to keep the questionnaire short and concise to maximise participation and included the components which were directly pertaining to and needed the involvement of the anaesthesiologist. However, ERAS is a multidisciplinary concept, and a coordinated effort is needed between various specialities to improve penetration of the ERAS protocol into our system.

**CONCLUSION**

To conclude, most anaesthesiologists were aware about the ERAS program but there exists a wide heterogeneity in their practice of perioperative patient care. We suggest more extensive research in the future on ERAS practice in India, involving the various specialities and including all the aspects of ERAS.
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There are no conflicts of interest.

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Survey on 'Enhanced Recovery After Surgery'

ERAS protocols have brought about a revolutionary change in the perioperative care of the patient, redefining our roles as peri-operative physicians. That is, besides 'Anesthesia' and 'Analgesia', 'Early Recovery' of the patients too becomes our responsibility. ERAS Society issued a consensus statement for anaesthesia practice for gastrointestinal surgery in 2015. Many countries have developed strategies to increase the role of anaesthesiologists in perioperative medicine. Regardless of the name given to these clinical delivery models, all focus on ensuring a better clinical outcome for patients, better service, and greater efficiency.

But the key issue is "Are we prepared for it?" as Anesthesiologists.

According to your answers to the survey, we wish to understand the awareness of Enhanced Recovery After Surgery among Anesthesiologists and the extent of implementation in gastrointestinal surgeries in India.

Your participation will be highly appreciated and kept completely anonymous for all practical purposes.

*Required

1. Email address *

2. By participating in this Survey, I give my consent for the data to be used for any future research purposes and/or any subsequent publications *

   Mark only one oval.

   - Yes
   - No

General Awareness of ERAS protocols among Anaesthesiologists

3. Where have you been working? *

   Mark only one oval.

   - Govt. teaching hospital
   - Govt. non-teaching hospital
   - Private teaching hospital
   - Private non-teaching hospital
   - Freelancing

4. Your working experience as Anaesthesiologist *

   Mark only one oval.

   - Trainee/Resident (<5 yrs experience)
   - Junior consultant (5-10 yrs experience)
   - Senior consultant (>10 yrs experience)
5. Are you aware of the concept of Enhanced Recovery After Surgery (ERAS)? *

Mark only one oval.

☐ Yes
☐ No

6. Peri-operative care protocols implemented in your institution are based on guidelines set by- *

Mark only one oval.

☐ Surgery department
☐ Anaesthesiologist
☐ Based on ERAS recommendations
☐ I do not know

7. The ERAS guidelines are available for which type of surgeries according to your knowledge? *

Tick all that apply.

☐ Colorectal surgery
☐ Gastrointestinal surgery
☐ Breast surgery
☐ Gynaecological surgery
☐ Bladder cystectomy
☐ Hepatic resection
☐ Head and neck surgery
☐ Bariatric surgery
☐ Thoracic surgery
☐ I do not know

8. What is the benefit of implementation of ERAS Protocol according to you? *

Tick all that apply.

☐ Multimodal rehabilitation or Fast Track
☐ Clinical research
☐ Reduce costs
☐ Reduce hospital stay
☐ Not sure

9. When do you do the ‘primary’ pre-anaesthetic workup of the patient? *

Mark only one oval.

☐ Before admission, when the surgical plan is decided
☐ At the time of admission for Operation
☐ Evening before Operation
☐ On the morning of Operation
10. What is the duration of your involvement as anaesthesiologist for postoperative care of the patient in your institute? *

*Mark only one oval.*

- [ ] Until hospital discharge
- [ ] Only the day of surgery
- [ ] Only until ICU/PACU discharge
- [ ] Not Definite

11. How frequently are gastrointestinal surgeries performed at your institute? *

*Mark only one oval.*

- [ ] Less than 50 cases in a year
- [ ] 50 to 100 cases in a year
- [ ] More than 100 cases in a year

ERAS Implementation in major Gastrointestinal surgeries

12. Which elements of ERAS protocol for anaesthesia practice for major gastrointestinal surgery do you implement in your day to day practice in the preadmission period? *

*Tick all that apply.*

- [ ] Pre Admission counselling
- [ ] Preadmission risk stratification
- [ ] Prehabilitation
- [ ] Preoperative nutritional screening and care in pre-anaesthetic checkup
- [ ] None of the above

13. Do you use Multimodal prophylaxis for postoperative nausea and vomiting based on Apfel score? *

*Mark only one oval.*

- [ ] Yes
- [ ] No

14. What is the Preoperative fasting protocol in your institute? *

*Mark only one oval.*

- [ ] 2hrs for clear fluids, 6hrs for solids
- [ ] 'Nil Per Oral' since midnight
- [ ] 'Nil Per Oral' since lunch/dinner
- [ ] Other
15. Do you allow preoperative oral complex carbohydrates (CHO) (in non-diabetic and non-obese patients) 2-3 hours before induction of anaesthesia in your setup? *

*Mark only one oval.*

☐ Yes
☐ No

16. What type of general anaesthesia is usually included in the protocol in your hospital? *

*Mark only one oval.*

☐ Total intravenous anaesthesia with propofol
☐ Inhalational agents based
☐ Not definite

17. Do you routinely monitor neuromuscular function whenever Neuromuscular blocking agents are used? *

*Mark only one oval.*

☐ Yes
☐ No

18. Do you titrate inspired fractional concentration of oxygen to maintain normal arterial oxygen levels and saturation? *

*Mark only one oval.*

☐ Yes
☐ No

19. Do you use any modalities to maintain intraoperative normothermia? *

*Mark only one oval.*

☐ Yes
☐ No

20. Do you routinely use a nasogastric tube in major gastrointestinal surgeries? *

*Mark only one oval.*

☐ Yes
☐ No
21. What is your choice of intravenous drugs for analgesia? *

Mark only one oval.
- Opioid analgesics
- Non-opioid intravenous analgesics
- Adjuvant drugs

22. Do you perform goal-directed fluid management during surgery? *

Mark only one oval.
- Yes
- No

23. In your hospital, the surgical approach in patients included in major Gastrointestinal surgeries is mainly (>50%)? *

Mark only one oval.
- Laparoscopic surgery
- Open surgery

24. How do you monitor the depth of anaesthesia intraoperatively? *

Mark only one oval.
- End tidal concentration of MAC
- BIS index
- Do not monitor routinely

25. Which type of intravenous crystalloid is routinely preferred during the perioperative period? *

Mark only one oval.
- 0.9% Saline
- Balanced crystalloids

26. Do you routinely use tight control of hyperglycemia using Insulin in the postoperative period? *

Mark only one oval.
- Yes
- No
27. Which method of regional analgesia do you prefer most for postoperative pain control? *

Tick all that apply.
- Epidural Analgesia
- Intravenous Analgesia with lidocaine infusion
- Continuous wound infusion (CWI) of local anaesthetic
- Abdominal trunk blocks
- Intrathecal Morphine
- None of the above

28. Which postoperative strategies do you use to accelerate the recovery of gastrointestinal function? *

Tick all that apply.
- Thoracic epidural analgesia
- Opioid-sparing strategies/NSAIDs/COX-2
- Opioid antagonists (Alvimopam/Metiltrexone)
- Early Mobilisation
- Laxatives
- Gum-chewing
- Early feeding
- None of the above

29. Which of the following are the main hindrances in patients in fast track programs which have prevented the full implementation of the protocol in your institute? *

Tick all that apply.
- Fear of complications
- Administrative issues
- Postoperative nausea and vomiting
- Pain
- Inability to mobilise
- Ileus
- Infection
- Dehiscence of suture
- Bleeding
- Cardiac complications
- Respiratory complications
- None of the above

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APPENDIX B: FLOW DIAGRAM OF THE SURVEY STUDY PARTICIPANTS

1. Questionnaire validated for relevance, simplicity, clarity, ambiguity.
2. Questionnaire reliability checked by retesting at an interval of 1 month.
3. 556 Anaesthesiologists contacted via Email, WhatsApp and Telegram.
4. Reminders sent twice every month for five months.
5. 296 completed questionnaires received.
6. 20 questionnaires were excluded as they were repeated responses from the same participants.
7. 5 questionnaires excluded as participants did not consent to the use of their responses for research purposes.
8. 273 questionnaires evaluated.