



# Future direction of Enhanced Recovery After Surgery (ERAS) program in colorectal surgery

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Enhanced Recovery After Surgery (ERAS) program aims to reduce organ dysfunction and surgical stress and decrease morbidity [1, 2]. The Enhanced Recovery After Surgery Society suggested guidelines for perioperative care in elective colorectal surgery since 2005 and revised as the 4th edition recently [2]. It contains 17 evidence-based items using a multimodal stress-minimizing approach: preoperative counseling, optimal intraoperative epidural anesthesia, postoperative fluid limitation, early recovery mobilization, postoperative pain control, and early feeding. According to many studies, the ERAS program was reported to reduce morbidity rates, shorten the length of stay (LOS), and have functional recovery after major colorectal surgery [2].

Previous randomized controlled trials have proven that ERAS program is associated with shorter average LOS, improved postoperative morbidity, and faster gastrointestinal function recovery [2-4].

Toh et al. [5] studied compliance to each item of ERAS program and examined the impact of each ERAS item on LOS. There was good compliance with preoperative ERAS interventions, however, showed variable agreement with solid diet start, removal time of indwelling catheter, and nasogastric tube. In this study, 74.3% of patients received minimally invasive surgery (MIS), including 63.2% of laparoscopic surgery. This study reported items of ERAS program which associated with LOS as follows; laparoscopic surgery, early mobilization, early discontinuation of IV fluids,

up-grading to solid diet by postoperative day (POD) 0 to 2, removing the indwelling catheter by POD 0 to 2, avoiding nasogastric tube reinsertion, and removing drains early.

Although many ERAS items were considered standard care, adherence to each item was still variable. Compliance with the ERAS program has been associated with postoperative outcomes such as complications and LOS [6-8]. The Postoperative Outcomes Within Enhanced Recovery After Surgery Protocol (POWER) study which is a multicenter, prospective cohort study of 2,084 patients planned to receive elective colorectal surgery reported that the patients with the high adherence rates had fewer moderate to severe complications, overall complications, and mortality compared with those who had the lower adherence rates [1]. Therefore, how to develop and maintain ERAS program which can be widely accepted in clinical practice with more minor limitations. As Toh et al. [5] showed, some ERAS interventions had lower than 50% compliance. To make a more practical ERAS program for real-world clinical practice, we need to validate evidence of compliance for such items with low compliance such as diet progress, indwelling catheter, and pain control. In addition, an indication of ERAS program application was also important to fulfill the primary aim of ERAS program for colorectal surgery.

Koh et al. [9] considered the indication of ERAS program and evaluated the safety and feasibility of applying ERAS protocol in elderly colorectal cancer patients. With an increase in the aging population, the number of elderly colorectal cancer patients has increased. Because elderly patients are more vulnerable physiologically and had poor performance status and more comorbidities, they need more attention with multimodal approach to reduce postoperative morbidity and improve recovery. Therefore, evaluating whether ERAS program could be applied to the elderly with safety and its efficacy for the elderly is very timely. Authors categorized patients older than 70 years as the old group and compared perioperative outcome and LOS with the young group. The postoperative complications and LOS were similar between the old and young groups. Old age (>70 years) was not a risk factor for high postoperative complications. Therefore, the authors concluded that implementing the ERAS protocol in patients aged >70 years is safe and feasible. ERAS protocol could be applied

Received: Jan 19, 2022 • Accepted: Jan 19, 2022

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even for patients' specific conditions, for example, the elderly as the authors evaluated. Developing ERAS protocol considering cohort characteristics such as age, comorbidity, or preoperative performance status would be helpful to improve postoperative outcomes as well as compliance

The MIS is widely applied to colorectal surgery. The MIS would facilitate the ERAS program accepted in clinical practice because MIS had a common advantage with ERAS in improved postoperative pain and recovery. The ERAS would be easily spread based on the wide acceptance of MIS in colorectal surgery. Therefore, it is proper time to make a proposal regarding the future direction of ERAS program in colorectal surgery.

### CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

### REFERENCES

1. Ripollés-Melchor J, Ramírez-Rodríguez JM, Casans-Francés R, Aldecoa C, Abad-Motos A, Logroño-Egea M, et al. Association between use of enhanced recovery after surgery protocol and postoperative complications in colorectal surgery: The Postoperative Outcomes Within Enhanced Recovery After Surgery Protocol (POWER) study. *JAMA Surg* 2019;154:725-36.
2. Gustafsson UO, Scott MJ, Hubner M, Nygren J, Demartines N, Francis N, et al. Guidelines for perioperative care in elective colorectal surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018. *World J Surg* 2019;43:659-95.
3. Kehlet H. Fast-track colorectal surgery. *Lancet* 2008;371:791-3.
4. Khoo CK, Vickery CJ, Forsyth N, Vinall NS, Eyre-Brook IA. A prospective randomized controlled trial of multimodal perioperative management protocol in patients undergoing elective colorectal resection for cancer. *Ann Surg* 2007;245:867-72.
5. Toh JW, Cecire J, Hitos K, Shedden K, Gavegan F, Pathmanathan N, et al. The impact of variations in care and complications within a colorectal Enhanced Recovery After Surgery program on length of stay. *Ann Coloproctol* 2022;38:36-46.
6. ERAS Compliance Group. The impact of enhanced recovery protocol compliance on elective colorectal cancer resection: results from an international registry. *Ann Surg* 2015;261:1153-9.
7. Maessen J, Dejong CH, Hausel J, Nygren J, Lassen K, Andersen J, et al. A protocol is not enough to implement an enhanced recovery programme for colorectal resection. *Br J Surg* 2007;94:224-31.
8. Cakir H, van Stijn MF, Lopes Cardozo AM, Langenhorst BL, Schreurs WH, van der Ploeg TJ, et al. Adherence to Enhanced Recovery After Surgery and length of stay after colonic resection. *Colorectal Dis* 2013;15:1019-25.
9. Koh W, Lee CS, Bae JH, Al-Sawat A, Lee IK, Jin HY. Clinical validation of implementing Enhanced Recovery After Surgery protocol in elderly colorectal cancer patients. *Ann Coloproctol* 2022; 38:47-52.