



## Enhanced Recovery after Surgery (ERAS) Versus Conventional Postoperative Care in Elective Lower Gastrointestinal Surgeries – A Randomized Controlled Trial

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### KEYWORDS

Enhanced Recovery After Surgery, Conventional postoperative care, Lower Gastrointestinal surgeries, Recovery, Elective, India

### ABSTRACT:

**Background:** The Enhanced Recovery After Surgery (ERAS) protocol has been shown to improve the quality of postoperative care by reducing surgical stress and promoting faster recovery.

**Objectives:** The aim of this study was to compare the effectiveness of the ERAS protocol with conventional postoperative care in patients undergoing elective lower gastrointestinal surgeries.

**Methods:** This hospital-based prospective randomized controlled study was conducted among patients admitted for elective lower gastrointestinal surgeries. Patients were randomly assigned to Group A (ERAS protocol) or Group B (conventional postoperative care). Both groups were monitored and compared with respect to hospital stay duration, return of bowel function, complications, early ambulation, and postoperative nausea and vomiting.

**Results:** A total of 56 patients participated in the study. The ERAS group experienced a slightly shorter hospital stay compared to the conventional care group, and a higher incidence of complications was observed in the conventional care group compared to the ERAS group.



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Conclusion: The ERAS protocol is effective in reducing hospital stay and postoperative complications in patients undergoing lower gastrointestinal surgeries.

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## Introduction

Even in the modern era of surgery, elective lower gastrointestinal surgeries are still associated with a high rate of postoperative complications and prolonged hospitalization.(1, 2) Optimizing perioperative care is a potential approach to improve surgical outcomes. The Enhanced Recovery After Surgery (ERAS) program is specifically designed to minimize perioperative and intraoperative stress responses, and to support the recovery of organ function, facilitating enhanced postoperative recovery.(3) Two recent systematic reviews and meta-analyses have demonstrated that the ERAS program is associated with a reduction in both hospital stay duration and postoperative complications after elective lower gastrointestinal surgeries, without affecting readmission or mortality rates.(4-7) Furthermore, evidence-based guidelines for perioperative care in elective colorectal surgeries have recently been published by the ERAS Society.(8-10)

The present study aims to explore a new dimension in major elective open lower abdominal surgeries by modifying perioperative preparation, reducing postoperative hospital stay for patients undergoing elective lower gastrointestinal surgeries, minimizing the use of drains and tubes, encouraging minimally invasive surgery, and applying multimodal pain and nausea management techniques. Specifically, the objective is to compare the clinical outcomes between the ERAS protocol and conventional postoperative care in patients undergoing elective lower gastrointestinal surgeries.

## Materials and Methods

A hospital-based, prospective, randomized controlled study was conducted among patients admitted to the Department of General Surgery for elective lower gastrointestinal surgeries, aged 20 to 70 years, at Aarupadai Veedu Medical College, Puducherry, India, between November 2022 and April 2024. The study received approval from the Institutional Human Ethics Committee (AV/IHEC/2022/102) and was registered with the Clinical Trials Registry of India (CTRI/066409).

The nature and purpose of the study, as well as the participants' roles, were thoroughly explained to them. Participants were informed that their decision not to participate would not affect the quality of the treatment they received, and they were free to withdraw from the study at any time. Confidentiality of their responses was assured, and informed written consent was obtained from all participants.

Data were collected using a pre-tested, semi-structured proforma to gather sociodemographic details of the patients. Patients who were immunocompromised or undergoing re-laparotomy were excluded from the study. The study assessed hospital stay duration, return of bowel function, anastomotic leakage, pulmonary atelectasis, surgical site infections, postoperative urinary tract infections (UTI), ambulation, and postoperative nausea and vomiting. The sample size was calculated to be 56 based on effect sizes from a previously published study (Keane C et al., ANZ J Surg. 2012). Patients were enrolled using non-probability sampling and randomly assigned to either Group A (ERAS group) or Group B (conventional group) using simple randomization via computer-generated random numbers.

A comprehensive history, clinical examination, and investigations, including baseline and imaging studies, were performed to confirm diagnoses, and patients were prepared for surgery. Pre-admission counselling was provided to patients in the ERAS group. No bowel preparation was given, and preoperative antibiotic prophylaxis was administered to those in the ERAS group. Informed written consent for surgery was obtained from all 56 patients. Sterile aseptic precautions were maintained during surgery. Preoperative, intraoperative, and postoperative factors were evaluated and compared between the two groups to determine which protocol was superior in terms of morbidity, complications, and hospital stay duration. Regular wound dressings were performed, and complications such as surgical site infections and anastomotic leaks with enterocutaneous fistulae were managed conservatively. All patients were followed up for one-



month post-discharge with weekly reviews. The primary outcomes assessed included hospital stay duration, return of bowel function, anastomotic leakage, pulmonary atelectasis, surgical site infections, early ambulation, urinary tract infections, and postoperative nausea and vomiting.

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 23.0 on Windows 10. Data were summarized using means, standard deviations, frequencies, and percentages, and presented in tables. Mean differences between continuous data were analysed using the Chi-square test or Fisher's exact test for categorical variables and independent t-tests or Mann-Whitney U tests for continuous variables. Pre- and post-treatment comparisons were made using repeated measures ANOVA. A p-value of less than 0.05 was considered statistically significant.

## Results

The study included a total of 56 patients, with 28 patients in each group. The overall mean age of the patients was  $56.17 \pm 9.9$  years, and the age difference between the groups was comparable. Group A, consisting of 28 patients, received care under the ERAS protocol, while Group B, also comprising 28 patients, received conventional care. The mean age of patients was  $56.17 \pm 9.9$  years, with an equal distribution of males and females (50% each) across the study population. There was no statistically significant difference in mean age or other demographic characteristics between the two groups ( $p > 0.05$ ).

Furthermore, the conventional care group exhibited a higher incidence of complications, including anastomotic leaks, burst abdomen, enterocutaneous fistula, lower respiratory infections, urinary tract infections, and wound infections, compared to the ERAS group.

## Discussion

Multimodal interventions such as preoperative counselling, early initiation of oral meal intake, reduction of preoperative fasting, avoidance of mechanical bowel preparation, early mobilisation, and shorter hospital stays are used in the ERAS protocol.(11)

In this study, tertiary care hospital patients undergoing major gastrointestinal procedures were compared between ERAS and standard care regimens. Previous studies have provided evidence regarding single perioperative intervention showing improved surgical morbidity. To optimize the surgical outcome and reduce the undesirable events followed by surgery these interventions were combined in a multimodal perioperative care program. Enhanced and accelerated recovery reduced perioperative complications and decreased overall health care cost are the advantages of this program.(12) Enhanced recovery after surgery is the protocol used in tertiary centres as a perioperative protocol for the patients' undergoing surgeries. This perioperative management protocol is also known as "Early recovery program" or "Fast Track Surgery". Several key elements are included in ERAS, principle of this is to modulate surgical stress response to ensure faster recovery and reduce post operative stress.

Similar to present study, Dhiman et al., documented with duration of hospital stay, postoperative drain removal, incidence of postoperative complications and infections at surgical site were significantly different.(13) A study by Lohsiriwat et al.(14) noticed significantly shorter duration of hospital stay and fewer re-admission rates in the ERAS care group than non-ERAS care group. Another study by Sharma et al.(15) documented with 5.56 days duration of hospital stay in ERAS group while in conventional group it was 8.75 days. Abdelrazik et al.(16) discovered that the laparotomy group that adhered to the ERAS care regimen experienced fewer postoperative problems, a shorter hospital stay, and an earlier start to oral nutritional intake.(9, 17-19)

While the study suggests the effectiveness of Enhanced Recovery After Surgery (ERAS) compared to conventional postoperative care in elective lower gastrointestinal surgeries, several limitations must be considered that could affect the interpretation and generalizability of the findings. First, the study was conducted at a single tertiary healthcare center, which may restrict the applicability of the results to broader patient populations with different demographic characteristics, treatment responses, and complications. Additionally, the cost of preoperative carbohydrate loading, an integral part of the ERAS protocol, may be prohibitive for some patients. Moreover, the relatively



short follow-up period limited the analysis of long-term complications, which could impact the understanding of the full scope of ERAS protocol benefits.

### Conclusion

The present study demonstrated that the ERAS care protocol is effective in reducing hospital stay, postoperative complications, and facilitating earlier oral dietary intake among patients. Implementing ERAS protocols in institutional settings could enhance patient care, safety, and overall healthcare system efficiency. However, the findings of this study could be further validated by conducting research on a larger population.

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**Conflict of interest:** Nil

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Table 1: Difference between the conventional and ERAS approach

	<b>Conventional</b>	<b>ERAS</b>
Pre-operative preparation	Liquid diet for 3 days	Oral Purgatives
	Mechanical Enema	No mechanical enema
	Fasting for 8 hrs before surgery	Normal meal until 6 hrs before surgery
	Drink deprivation 4 hrs before Surgery	Normal carbohydrate drink (clear liquid) until 2 hrs before surgery
	Nasogastric tube Insertion	No nasogastric tube Insertion
	No preoperative Antibiotics	Prophylactic antibiotics administration for 3 days
Anaesthesia and pain control	General anaesthesia and IV/IM Analgesia upon patient request.	Thoracic epidural and catheter based intermittent boluses
Post-operative management	Routine drains tube placement	No routine drainage tube Placement
	Liquid diet intake after recovery of bowel movement	Water allowed 6 hrs postoperative period and liquid diet followed by transitional diet the next day
Pain management	Opioid centric pain management which may lead to delayed recovery	Multimodal analgesia with a focus on non-opioid medications
Nutritional support	Cautions approach to diet advancement and post operative nutrition	Encourage early oral intake for maintaining nutritional status
Patients' education	Limited focus on patients' engagement in the recovery process	Emphasis on educating patients about active participation in recovery
Length of stay	LOS may be prolonged due to traditional care practices	Aims for a shorter LOS.
Complication rates	Complications may be higher due to delayed mobilization and other factors	Associated with reduced postoperative complications
Patients' satisfaction	Patients' satisfaction may vary due to longer recovery period	Often leads to higher patients' satisfaction due to faster recovery

Table 2: Comparison of gender and location between the groups

		ERAS		Conventional		Chi-square (p-value)
		Count	N %	Count	N %	
Gender	Female	14	50.0%	14	50.0%	-
	Male	14	50.0%	14	50.0%	
Location	Rural	18	64.3%	13	46.4%	1.80 (0.179)
	Urban	10	35.7%	15	53.6%	



Table 3: Comparison of the protocol between the groups

		ERAS		Conventional	
		Count	%	Count	%
Pre-op counselling	No	0	0.0	28	100.0
	Yes	28	100.0	0	0.0
Pre-op bowel preparation	No	28	100.0	0	0.0
	Yes	0	0.0	28	100.0
Carbohydrate Loading	No	0	0.0	28	100.0
	Yes	28	100.0	0	0.0
Antibiotic prophylaxis	No	0	0.0	28	100.0
	Yes	28	100.0	0	0.0
DVT prophylaxis	No	0	0.0	28	100.0
	Yes	28	100.0	0	0.0
Intra-op Drain	No	28	100.0	0	0.0
	Yes	0	0.0	28	100.0
Epidural Analgesia	No	0	0.0	28	100.0
	Yes	28	100.0	0	0.0
Postop Mobilization	DOS	28	100.0	0	0.0
	POD 2	0	0.0	28	100.0
NG tube and foleys removal	POD	28	100.0	0	0.0
	POD 5	0	0.0	28	100.0
Post-op soft diet	POD	28	100.0	0	0.0
	POD6	0	0.0	28	100.0
Post Op passing flatus/feces	NO	1	3.6	0	0.0
	POD	27	96.4	26	92.9
	POD 5	0	0.0	1	3.6
	POD 6	0	0.0	1	3.6

Table 4: Comparison of the hospital stay between the groups

		ERAS		Conventional		Chi-square (p-value)
		Count	%	Count	%	
Hospital stays (days)	<7	25	89.3	12	42.9	13.49 (0.01)*
	>7	3	10.7	16	57.1	

Table 5: Comparison of the complications between the groups

Complications	ERAS		Conventional		Chi-square (p-value)
	Count	%	Count	%	
NIL	25	89.3	12	42.9	15.70 (0.01)*
Anastomotic leak	0	0.0	1	3.6	
Burst Abdomen	0	0.0	1	3.6	



EC Fistula	0	0.0	1	3.6
ILEUS	1	3.6	2	7.1
LRI	0	0.0	3	10.7
Stoma prolapse	1	3.6	1	3.6
UTI	0	0.0	3	10.7
Wound infection	1	3.6	4	14.3

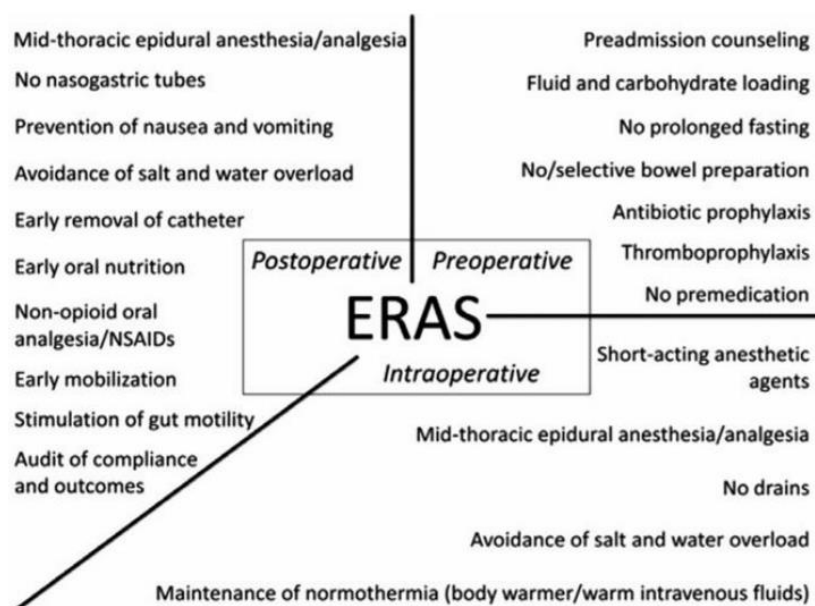


Figure 1: Function of ERAS and types