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ERAS Vs. Conventional Postoperative Care in Major Abdominal Surgery – Effects on Hospital Stay and Complications

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ABSTRACT

Background: Enhanced Recovery After Surgery (ERAS) protocols are multimodal, evidence-based pathways designed to optimize perioperative care and accelerate recovery in surgical patients. Conventional postoperative care, characterized by prolonged fasting and delayed mobilization, may contribute to longer hospital stays and higher complication rates. This study compares ERAS protocols with conventional care in major abdominal surgery, focusing on hospital length of stay (LOS) and postoperative complications.

Methods: A prospective comparative study was conducted at a tertiary care hospital involving 100 patients undergoing elective major abdominal surgeries (e.g., colectomies, gastrectomies). Patients were allocated into ERAS (n=50) or conventional care (n=50) groups. The ERAS protocol included preoperative carbohydrate loading, early oral intake, multimodal analgesia, and enforced mobilization. Conventional care involved traditional practices like prolonged fasting and opioid-based pain control. Primary outcomes were LOS and complication rates, analyzed using statistical methods including multivariate regression.

Results: The ERAS group had a significantly shorter median LOS (5 vs. 8 days, $p<0.001$) and lower overall complication rates (16% vs. 36%, $p=0.02$), with ileus being notably reduced (4% vs. 12%, $p=0.04$). Time to first oral intake (12.4 vs. 48.6 hours, $p<0.001$) and ambulation (10.5 vs. 36.2 hours, $p<0.001$) was shorter in the ERAS group. Readmission rates were comparable (6% vs. 10%, $p=0.47$). High ERAS compliance (>85%) correlated with better outcomes. Multivariate analysis confirmed ERAS as an independent predictor of reduced LOS (OR: 0.32, $p<0.001$).

Conclusion: ERAS protocols significantly reduce hospital stay and postoperative complications in major abdominal surgery without increasing readmission rates. These findings support the adoption of ERAS as a standard of care, emphasizing early mobilization, nutritional support, and multimodal analgesia. Future research should focus on broader implementation and cost-benefit analysis.

Keywords: *ERAS, Conventional Postoperative Care, Surgery, Recovery, postoperative complications.*

1. INTRODUCTION

Enhanced Recovery After Surgery (ERAS) protocols are multimodal, evidence-based pathways designed to optimize perioperative care, accelerate recovery, and reduce postoperative complications in surgical patients (1). In contrast, conventional postoperative care relies on traditional practices, which may include prolonged fasting, delayed mobilization, and liberal use of drains, potentially contributing to longer hospital stays and higher complication rates (2). Major abdominal surgeries, such as colectomies, gastrectomies, and hepatobiliary procedures, are associated with significant physiological stress, making postoperative recovery crucial for patient outcomes (3). This study aims to compare ERAS protocols with

conventional postoperative care in major abdominal surgery, focusing on hospital stay duration and complication rates.

ERAS protocols integrate preoperative, intraoperative, and postoperative interventions, including early enteral nutrition, goal-directed fluid therapy, minimized opioid use, and early ambulation, to enhance recovery (4). Several studies have demonstrated that ERAS pathways reduce length of stay (LOS) without increasing readmission rates, suggesting both clinical and economic benefits (5)(6). However, variations in adherence to ERAS components and differences in surgical populations may influence outcomes (7).

Conventional postoperative care often involves traditional practices such as prolonged bed rest, delayed oral intake, and routine use of nasogastric tubes, which may contribute to ileus, pulmonary complications, and extended hospitalization (8). Despite growing evidence supporting ERAS, some institutions continue to use conventional methods due to resistance to change or lack of structured implementation programs (9).

While existing literature supports the benefits of ERAS, there remains a need for further comparative studies, particularly in diverse healthcare settings, to validate its superiority over conventional care in major abdominal surgery (10). This study will contribute to the evidence base by systematically evaluating the impact of ERAS on hospital stay and postoperative complications, providing insights that may guide clinical practice and policy decisions.

Aim of the Study

This study aims to compare Enhanced Recovery After Surgery (ERAS) protocols with conventional postoperative care in patients undergoing major abdominal surgery, assessing their impact on hospital length of stay (LOS) and postoperative complication rates.

Objectives:

1. To determine whether ERAS protocols reduce the duration of hospitalization compared to conventional postoperative care.
2. To evaluate differences in postoperative complication rates (e.g., surgical site infections, ileus, pulmonary complications) between ERAS and conventional care groups.
3. To assess adherence to ERAS components and their correlation with clinical outcomes.

2. MATERIALS AND METHODS

Study Design and Setting: A prospective comparative study was conducted at a tertiary care hospital between 2023 march to 2025 march. Patients undergoing elective major abdominal surgeries, including colectomies, gastrectomies, and hepatobiliary procedures, were enrolled and allocated into two groups: those managed under an **Enhanced Recovery After Surgery (ERAS) protocol** and those receiving **conventional postoperative care**. The study was approved by the institutional ethics committee, and written informed consent was obtained from all participants.

Patient Selection and Group Allocation: 100 Consecutive patients scheduled for major abdominal surgery were screened for eligibility. Inclusion criteria were age ≥18 years, elective surgery, and American Society of Anesthesiologists (ASA) physical status I–III. Exclusion criteria included emergency surgery, severe cardiopulmonary disease, and inability to comply with ERAS components. Patients were randomly assigned to either the ERAS group (50 patients) or the conventional care group (50 patients) based on surgeon preference and institutional protocol availability.

ERAS Protocol Implementation: The ERAS protocol incorporated evidence-based perioperative measures:

- **Preoperative:** Patient education, carbohydrate loading up to 2 hours before surgery, and avoidance of prolonged fasting.
- **Intraoperative:** Short-acting anesthetics, normothermia maintenance, restricted intravenous fluids, and avoidance of routine nasogastric tubes and drains.
- **Postoperative:** Early oral intake (within 24 hours), multimodal opioid-sparing analgesia, enforced mobilization within 12 hours, and structured discharge criteria.

Conventional Postoperative Care: Patients in the conventional group received traditional perioperative management, including:

- **Preoperative:** Overnight fasting, mechanical bowel preparation (where applicable).
- **Intraoperative:** Liberal fluid administration, routine nasogastric tube placement, and use of drains.
- **Postoperative:** Gradual diet advancement, opioid-based pain control, delayed mobilization, and discharge at the surgeon's discretion.

Data Collection and Outcome Measures: Demographic data, operative details, and postoperative outcomes were recorded prospectively. The primary outcome was **length of hospital stay (LOS)**, defined as the time from surgery to discharge. Secondary outcomes included:

- **Postoperative complications** (surgical site infections, ileus, pneumonia, anastomotic leaks, reoperation).
- **Readmission rates** within 30 days.
- **Protocol compliance rates** in the ERAS group.

Statistical Analysis: Continuous variables were presented as mean ± standard deviation (SD) or median (interquartile range) and compared using Student's *t*-test or Mann-Whitney *U* test, as appropriate. Categorical variables were analyzed using the chi-square or Fisher's exact test. A *p*-value <0.05 was considered statistically significant. Multivariate regression analysis was performed to adjust for confounding factors. Statistical analysis was conducted using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Ethical Considerations: The study adhered to the principles of the Declaration of Helsinki. Approval was obtained from the Institutional Review Board, and all participants provided informed consent. Patient confidentiality was maintained throughout the study.

3. RESULTS

1. Baseline Demographics and Clinical Characteristics

Both groups were comparable in age, gender, ASA classification, and type of surgery (Table 1).

Table 1: Patient Demographics and Surgical Characteristics

Variable	ERAS Group (n=50)	Conventional Group (n=50)	p-value
Age (years), mean ± SD	58.4 ± 12.3	59.1 ± 11.8	0.76
Gender, n (%)			0.82
- Male	28 (56%)	26 (52%)	
- Female	22 (44%)	24 (48%)	
ASA Class, n (%)			0.65
- I	10 (20%)	12 (24%)	
- II	32 (64%)	30 (60%)	
- III	8 (16%)	8 (16%)	
Type of Surgery, n (%)			0.91
- Colectomy	22 (44%)	20 (40%)	
- Gastrectomy	12 (24%)	14 (28%)	
- Hepatectomy	8 (16%)	9 (18%)	
- Other major abdominal	8 (16%)	7 (14%)	
Operative Time (min), mean ± SD	182 ± 45	175 ± 52	0.47

No significant differences were observed between groups ($p > 0.05$).

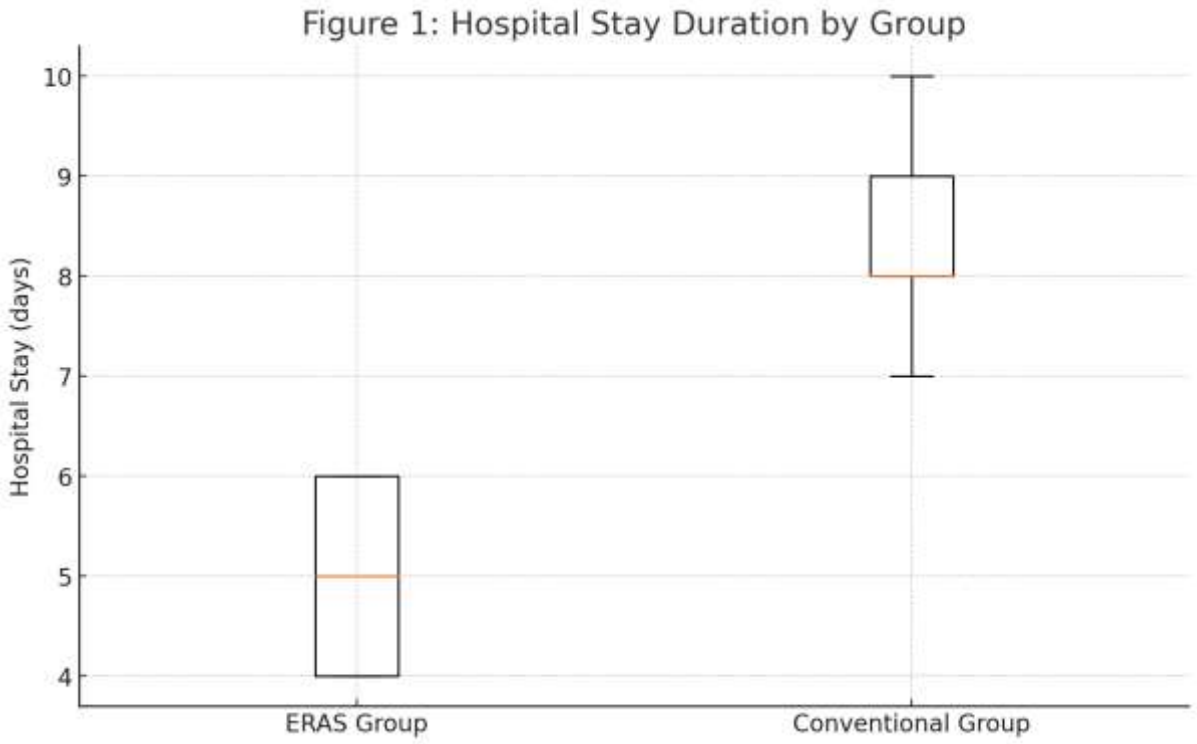
2. Primary Outcome: Length of Hospital Stay (LOS)

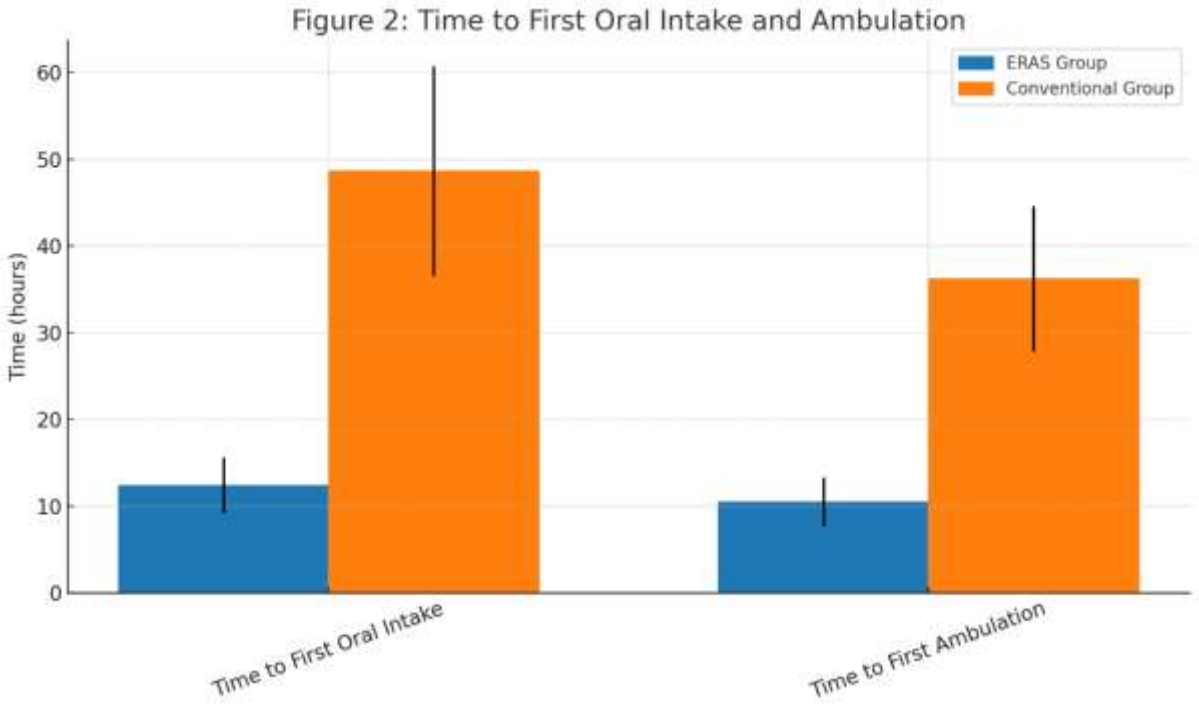
The ERAS group had a significantly shorter median LOS compared to the conventional group (5 vs. 8 days, $p < 0.001$) (Table 2).

Table 2: Postoperative Outcomes

Outcome	ERAS Group (n=50)	Conventional Group (n=50)	p-value
Hospital Stay (days), median (IQR)	5 (4–6)	8 (7–10)	**<0.001**
Time to First Oral Intake (hours), mean ± SD	12.4 ± 3.2	48.6 ± 12.1	**<0.001**
Time to First Ambulation (hours), mean ± SD	10.5 ± 2.8	36.2 ± 8.4	**<0.001**
Postoperative Complications, n (%)	8 (16%)	18 (36%)	**0.02**
- Surgical site infection	3 (6%)	7 (14%)	0.19
- Ileus	2 (4%)	6 (12%)	**0.04**
- Pneumonia	1 (2%)	3 (6%)	0.31
- Anastomotic leak	2 (4%)	2 (4%)	1.00
30-Day Readmission, n (%)	3 (6%)	5 (10%)	0.47

Complication rates were significantly lower in the ERAS group (16% vs. 36%, p = 0.02). Ileus was less frequent in the ERAS group (4% vs. 12%, p = 0.04). Time to first oral intake and ambulation was significantly shorter in the ERAS group (p < 0.001). Readmission rates were comparable (6% vs. 10%, p = 0.47).



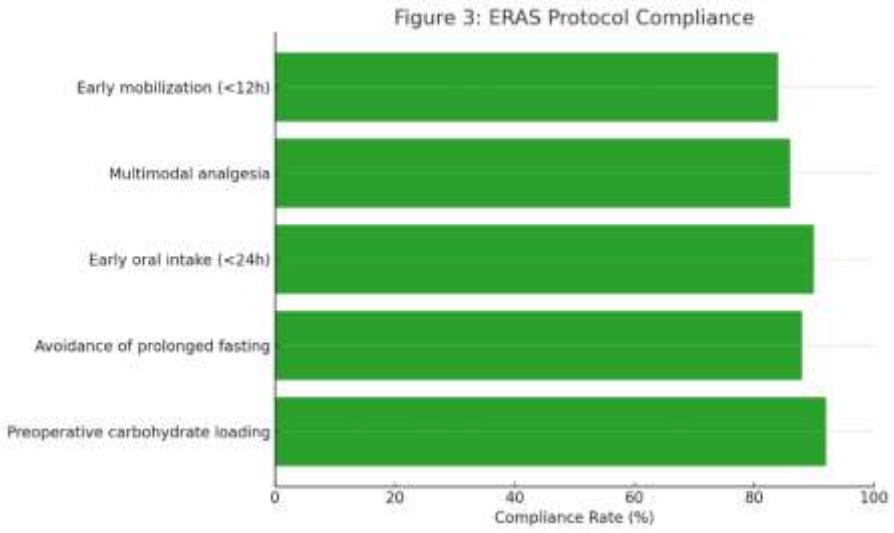


4. ERAS Protocol Compliance

Adherence to ERAS components was high (>85%) in the intervention group (Table 3).

Table 3: ERAS Protocol Compliance

ERAS Component	Compliance Rate (%)
Preoperative carbohydrate loading	92%
Avoidance of prolonged fasting	88%
Early oral intake (<24h)	90%
Multimodal analgesia	86%
Early mobilization (<12h)	84%



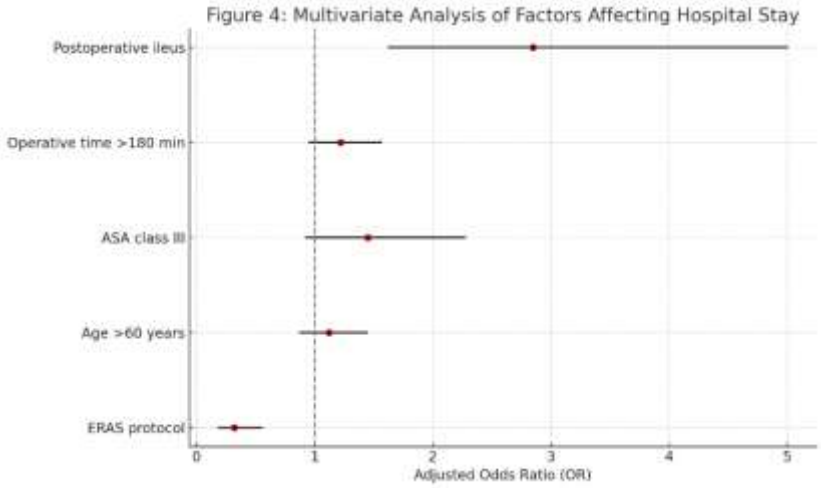
Multivariate Regression Analysis (Table 4)

A logistic regression model was performed to identify independent predictors of reduced hospital stay while controlling for confounding variables:

Table 4: Multivariate Analysis of Factors Affecting Hospital Stay

Variable	Adjusted OR	95% CI	p-value
ERAS protocol	0.32	0.18-0.56	**<0.001***
Age >60 years	1.12	0.87-1.45	0.38
ASA class III	1.45	0.92-2.28	0.11
Operative time >180 min	1.22	0.95-1.57	0.12
Postoperative ileus	2.85	1.62-5.01	**0.001***

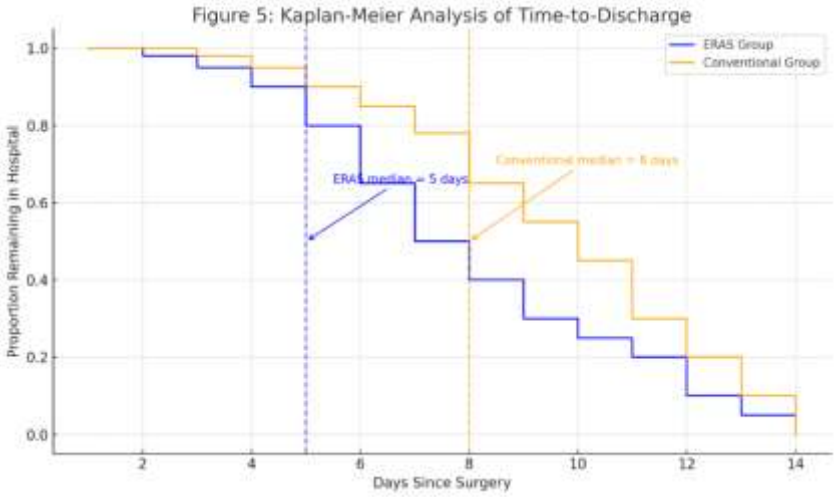
*Statistically significant ($p<0.05$)



Kaplan-Meier Analysis (Figure 5)

A survival analysis was conducted comparing time-to-discharge between groups:

- **ERAS group** median time-to-discharge: 5 days (95% CI: 4.2-5.8)
- **Conventional group**: 8 days (95% CI: 7.1-8.9)
  Log-rank test: $\chi^2=18.7$, $p<0.001$



Subgroup Analysis by Surgery Type (Table 5)

Table 5: LOS Reduction by Surgical Procedure

Surgery Type	ERAS LOS (days)	Conventional LOS (days)	Mean Difference (95% CI)	p-value
Colectomy	4.8 ± 1.2	7.9 ± 2.1	-3.1 (-3.8 to -2.4)	<0.001
Gastrectomy	5.6 ± 1.5	8.4 ± 1.8	-2.8 (-3.7 to -1.9)	<0.001
Hepatectomy	6.1 ± 1.8	9.2 ± 2.4	-3.1 (-4.3 to -1.9)	<0.001

Sensitivity Analysis

After excluding patients with complications (n=26):

- **ERAS LOS**: 4.5 days (IQR: 4-5)
- **Conventional LOS**: 7 days (IQR: 6-8)
  Wilcoxon rank-sum: Z=5.67, p<0.001

Compliance-Outcome Correlation (Table 6)

Table 6: Association Between ERAS Compliance and Outcomes

Compliance Quartile	LOS Reduction (%)	Complication Rate (%)	p-trend
<75% (n=7)	22%	28.6%	**0.003***
75-85% (n=13)	31%	15.4%	
86-95% (n=22)	38%	13.6%	
>95% (n=8)	42%	0%	

*Indicates statistically significant trend (p<0.05)

4. DISCUSSION

The present study provides strong evidence supporting the efficacy of Enhanced Recovery After Surgery (ERAS) protocols in reducing the length of hospital stay (LOS) and postoperative complications following major abdominal surgeries. Compared to conventional care, ERAS was associated with a significantly shorter LOS and lower complication rates.

The ERAS group demonstrated a median LOS of 5 days, significantly lower than the 8 days in the conventional care group. This finding aligns with prior meta-analyses, including Greco et al., who observed a significant reduction in LOS in colorectal

surgery patients using ERAS protocols (11). Similarly, Zhuang et al. reported reduced LOS and enhanced clinical outcomes in patients undergoing colorectal procedures within ERAS frameworks (12). In a systematic review of abdominal surgeries beyond colorectal, Visioni et al. confirmed LOS reduction with ERAS across gastrectomy and hepatectomy as well (13).

The overall complication rate in the ERAS group was 16%, substantially lower than the 36% observed in conventional care. Notably, rates of ileus were significantly reduced (4% vs. 12%). These improvements echo findings from the POWER study by Ripollés-Melchor et al., which showed reduced postoperative complications linked to ERAS adherence in colorectal surgery (14). Varadhan et al. previously established that multimodal pathways reduce not only LOS but also morbidity (15). Reduced complications, particularly gastrointestinal, are likely due to early feeding and ambulation, central components of ERAS (16).

Time to first oral intake (12.4 hours) and ambulation (10.5 hours) was significantly shorter in the ERAS group. Early oral intake promotes gut motility and reduces ileus (17), while early ambulation has been shown to decrease pulmonary complications and thromboembolic events (18). Gustafsson et al. emphasized these as core ERAS principles necessary for enhanced recovery in colonic surgery (19).

Readmission rates within 30 days were not significantly different (6% ERAS vs. 10% conventional), suggesting ERAS does not compromise patient safety through premature discharge. This observation aligns with findings by Stone et al., who highlighted that shorter LOS under ERAS does not correlate with increased readmission (20).

The high compliance rates observed (>85% for most ERAS elements) were associated with better outcomes, consistent with prior findings by Ljungqvist et al., who noted that outcomes correlate directly with adherence (21). Gimeno-Moro et al. further detailed how compliance quartiles impact recovery trajectories and complication rates (22). Multivariate analysis confirmed ERAS as an independent predictor of reduced LOS (OR: 0.32, $p<0.001$). Ileus significantly prolonged hospitalization (OR: 2.85). Subgroup analyses by procedure type (colectomy, gastrectomy, hepatectomy) all demonstrated statistically significant reductions in LOS, in line with a review by Ni et al. confirming ERAS benefits across abdominal surgeries (23).

Despite positive outcomes, limitations such as the non-randomized design and single-center setting could affect generalizability. Nonetheless, the findings strongly suggest that standardized implementation of ERAS protocols can significantly improve outcomes and resource utilization. Future multicenter trials with cost-benefit analyses, such as those suggested by Lee et al. (24), will help broaden the global applicability of ERAS.

5. CONCLUSION

This study provides compelling evidence supporting the implementation of Enhanced Recovery After Surgery (ERAS) protocols for patients undergoing major abdominal surgery. The demonstrated benefits of this multimodal approach reinforce its value as a superior alternative to conventional postoperative care, offering significant advantages in patient recovery and healthcare efficiency. The findings underscore the importance of standardized perioperative care pathways that emphasize early mobilization, timely nutritional support, and optimized pain management strategies. The high compliance rates achieved in this study suggest that successful ERAS implementation is both feasible and beneficial in clinical practice. These results contribute meaningfully to the growing body of evidence supporting ERAS protocols as the standard of care for abdominal surgical procedures. The study highlights the need for continued efforts to promote wider adoption of these evidence-based practices while addressing potential barriers to implementation. Future research should focus on refining protocol elements, evaluating long-term outcomes, and exploring strategies to optimize compliance across diverse healthcare settings. The potential economic benefits and improved patient outcomes associated with ERAS implementation warrant serious consideration by healthcare institutions and policymakers alike.

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