

Impact of ERAS Protocol on the Post-Operative Complications in Colorectal Surgery

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1. Abstract

1.1. Introduction: The patient experiences post-operative complications after colorectal surgery. To reduce these complications, the ERAS protocol was developed. The current study assesses the impact of ERAS on the post-operative complications after colorectal surgery.

1.2. Method: The patients who were planned for elective colorectal surgery between February 2017 and January 2022 were recruited for the current study at Hayatabad Medical Complex, Peshawar, Pakistan. Each patient was informed about the ERAS protocol, and informed consent was obtained from each patient. The patients were divided into the non-ERAS group and the ERAS group. The data was analyzed using SPSS v25.

1.3. Results: In the ERAS group, there was a significant decrease in the CDC grades ($P > 0.0001$). In addition, there was a significant reduction in the post-operative complications ($p = 0.015$), except wound infection. The ERAS group's re-admission ($p = 0.001$) and re-operation ($p = 0.013$) rate within thirty days was significantly reduced. Moreover, the length of stay was significantly reduced in the ERAS group

1.4. Conclusion: The current study emphasizes the advantages of ERAS in colorectal surgery. The ERAS group had a considerably lower risk of post-operative complications, including CDC grading, surgical complications, re-admission, and re-operation within thirty days.

2. Introduction

Patients with Major colorectal surgery often needs extensive post-operative rehabilitation due to severe endocrine, metabolic,

neurological, and pulmonary function changes. After major elective open colorectal surgery was performed under routine perioperative care, the reported complication rate ranged from 15-20% to 45-48% [1]. This is not unexpected given that many standard therapies have been proved to be inadequate, if not detrimental, to patients. Return of bowel function is a key factor in post-operative recovery for patients who do not have complications. This is influenced by several perioperative factors such as preoperative fasting and bowel preparation, analgesic and anesthetic techniques, the magnitude and complications of the surgery, fluid overload, and the patient's co-morbidities [2].

ERAS programs are intended to reduce the stress response associated with surgery. Clinically, ERAS regimens result in improved physical performance, as measured by treadmill exercise, pulmonary function, and body composition, as measured by lean body mass [3]. The combination of many of these factors appears to have a positive synergistic effect on post-operative outcomes following colorectal surgery when compared to each individual parameter alone [4]. The ERAS program may be considered expensive in developing countries like Pakistan, with limited health resources. However, it decreases the post-operative complications, which directly affect the hospital stay and medication given to the patient. [5]. Therefore, the current study was conducted to assess the impact of ERAS on post-operative complications.

3. Method

The patients who were planned for elective colorectal surgery between February 2017 and January 2022 were recruited for the current study at Hayatabad Medical Complex, Peshawar, Paki-

stan. Each patient was informed about the ERAS protocol, and informed consent was obtained from each patient. The current study comprised patients having age ≥ 18 and undergoing elective open or laparoscopic colorectal surgery. The exclusion criteria included cognitive impairment, multiple organ resection, and failure to provide informed consent.

The ERAS team consisted of colorectal surgeons, anesthesiologists, physiotherapists, nutritionists, and nurses. Monthly meetings were scheduled for the ERAS team to report the work and assess the ERAS effective implementation. The eligible patients were grouped into the ERAS and non-ERAS categories.

The post-operative complications were graded based on Clavien–Dindo classification (CDC) [6]. The post-operative complications were divided into five grades ranging from Grade I to Grad V, as shown in supplementary table S2. Moreover, the primary outcomes of the current study were surgical complications, re-admission rate at 30-day, re-operation for any indication within 30 days, and length of stay in the hospital.

The statistical analysis was conducted using the statistical package for social sciences (SPSS v25). The categorical variable was pre-

sented as frequency and percentages, while the scale variable was tabulated as mean and standard deviation. The parametric test was applied to assess the impact of ERAS on post-operative complications. The P-value ≤ 0.05 was considered significant.

4. Results

The mean age of non-ERAS study participants was 63.50 ± 10.22 , whereas the mean age of the ERAS group was 60.27 ± 6.01 . The male proportion was high compared to females in the ERAS group. The mean BMI in the non-ERAS group was high compared to the ERAS group (25.65 ± 2.25 vs. 24.33 ± 1.92). In both groups, hypertension and diabetes were the most common co-morbidities, as shown in Table 1.

In the ERAS group, there was a significant decrease in the CDC grades ($P > 0.0001$). In addition, there was a significant reduction in the post-operative complication ($p = 0.015$), except for the wound infection. The ERAS group’s re-admission ($p = 0.001$) and re-operation ($p = 0.013$) rate within the thirty days was significantly reduced. Moreover, the length of stay was significantly reduced in the ERAS group. The detail can be seen in Table 2 and Figure 1.

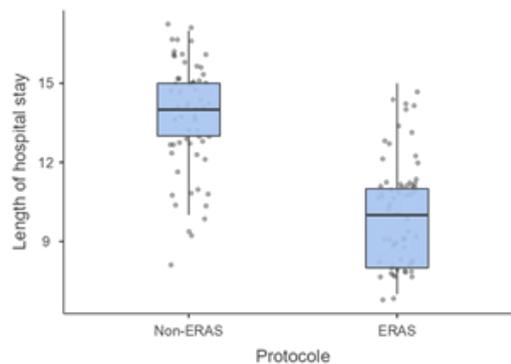


Figure 1: Impact of ERAS on the length of hospital stay

Table 1: Patient's demographic characteristics

		Protocol			
		Non-ERAS		ERAS	
		N	%	N	%
Age (Mean±SD)		63.50±10.22		60.27±6.01	
Gender	Male	32	40.50%	47	59.50%
	Female	28	63.60%	16	36.40%
BMI (Mean±SD)		25.65±2.25		24.33±1.92	
Co-morbidities	Hypertension	19	55.90%	15	44.10%
	Diabetes Mellites	14	42.40%	19	57.60%
	CHD	9	50.00%	9	50.00%
	COPD	10	43.50%	13	56.50%
	Other	8	53.30%	7	46.70%
Anesthesia	General anesthesia	41	64.10%	23	35.90%
	combined TAP block	19	32.20%	40	67.80%
Site	rectal	36	65.50%	19	34.50%
	Colon	24	35.30%	44	64.70%
Length of operation (Mean±SD)		13.88±2.24		12.30±2.10	

Table 2: Impact of ERAS on the post-operative surgical complications

		Protocol				P-value
		Non-ERAS		ERAS		
		N	%	N	%	
CDC	Grade I	2	6.30%	30	93.80%	<0.0001
	Grade II	8	38.10%	13	61.90%	
	Grade III	23	67.60%	11	32.40%	
	Grade IV	16	72.70%	6	27.30%	
	Grade V	11	78.60%	3	21.40%	
Surgical complication	Paralytic ileus	14	63.60%	8	36.40%	0.015
	Surgical wound infection	10	27.00%	27	73.00%	
	Abdominal abscess	8	40.00%	12	60.00%	
	Intestinal fistula	12	66.70%	6	33.30%	
	Anastomotic dehiscence	9	56.30%	7	43.80%	
	Mortality	7	70.00%	3	30.00%	
Re-admission rate at 30 day all cause	Yes	42	62.70%	25	37.30%	0.001
	No	18	32.10%	38	67.90%	
Re-operation for any indication within 30 days	Yes	16	72.70%	6	27.30%	0.013
	No	44	43.60%	57	56.40%	

5. Discussion

The current study highlights the superiority of the ERAS in colorectal surgery. The post-operative complication, including CDC grading, surgical complications, re-admission, and re-operation rate within thirty days, was significantly reduced in the ERAS group.

The current study highlighted that ERAS significantly contributed to a favorable outcome after colorectal surgery. Mortality was high in the non-ERAS group. This high number of deaths in the non-ERAS group may be due to post-operative complications. Moreover, our result showed a significant reduction in a hospital stays. This finding indicates to the cost-effectiveness of the ERAS protocol, as reported previously. Previously it has been reported that ERAS considerably decreased main LOS, resulting in cost savings for health care. In terms of return on investment, each dollar invested in ERAS would yield \$3.80 [7]. This conclusion is consistent with the findings reported by Stowers and colleagues [8] and Lee and colleagues [9]. Teeuwen et al., stated that patients treated according to the ERAS program spent significantly less time in the hospital. This did not result in more re-admissions which reflects early recovery, probably due to a more favorable post-operative course. Besides, this implies a benefit for hospital resources because, with the implementation of the ERAS program, a higher level of cost-effectiveness can be reached [10]. These results have generated significant economic data to justify a plan for extending the synchronously organized deployment of ERAS across numerous surgical specialties across the country.

Although the overall length of stay may not be the most important long-term outcome for patients and clinicians, it is an excellent substitute for post-operative complications and re-admissions [11, 12]. The concern with using duration of hospital stay as an outcome measure is that it may be affected by factors such as patients' desire to be released home, the presence of services at home, or the organization of patient placement upon discharge [13]. Although these variables may impact the total length of stay, these should be

reduced to a good ERAS program that provides proper preoperative counseling and has a plan for the patient to be discharged 2–4 days following surgery [14, 15]. This study is limited in reducing the influence of days spent in the hospital awaiting transfer to an alternative level of care or rehabilitation, palliative patients, and more invasive procedures, such as pelvic exenterations.

6. Conclusion

The current study emphasizes the advantages of ERAS in colorectal surgery. The ERAS group had a considerably lower risk of post-operative complications, including CDC grading, surgical complications, re-admission, and re-operation within thirty days.

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