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Research Article

Impact of Enhanced Recovery After Surgery (ERAS) Protocols On Postoperative Complications and Length of Hospital Stay.

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Abstract: ***Introduction:*** Enhanced Recovery After Surgery (ERAS) guidelines are evidence-based guidelines of perioperative care aimed at minimizing surgical stress and hastening recovery. Their use in all the surgical specialties has been linked with better outcomes, such as fewer postoperative complications and less time in hospital, as opposed to conventional care.**Objective:** to compare the effects of ERAS protocols on postoperative morbidity and hospital stay among patients who have received major surgery.**Methodology:**This prospective study involved 100 patients who were undergoing elective major surgery, with 50 patients in each ERAS (n=50) and the conventional care (n=50) group. Adults aged between 18 and 70 years were used, and emergency cases and patients with severe comorbidities were excluded. ERAS interventions were preoperative counseling, decreased fasting, multimodal analgesia, early mobilization, and early enteral nutrition. The results that were measured were post-operative complications, length of stay, and recovery parameters. The SPSS software version 25 was used to conduct statistical analysis, where $p<0.05$ was taken to be significant.**Results:**The mean age was 45.6 ± 12.3 years in the ERAS group and 47.2 ± 11.8 years in controls ($p=0.52$). Postoperative complications were significantly lower in the ERAS group (18%) compared to the conventional group (36%) ($p=0.04$). Postoperative ileus was reduced (4% vs 16%, $p=0.03$), while surgical site infections showed a non-significant reduction (6% vs 14%, $p=0.18$). The mean hospital stay was significantly shorter in the ERAS group (4.2 ± 1.1 days vs 6.8 ± 1.5 days, $p<0.001$). Early mobilization and oral intake were significantly improved ($p<0.001$), with no difference in readmission rates ($p=0.65$).**Conclusion:**ERAS protocols have a significant positive impact on postoperative outcomes in terms of the reduction of complications and the hospital stay, which does not lead to an increase in readmissions, which is why they should be used in surgical practice regularly.

Keywords: ERAS, complications, recovery, hospitalization

INTRODUCTION

The Enhanced Recovery After Surgery (ERAS) practices have transformed the world of perioperative care by incorporating evidence-based interventions to reduce surgical stress and ensure faster recovery [1]. Existing surgical practices are based on protracted starvation, delayed movement, and overdependence on opioid painkillers, all of which may lead to adverse aftercare results, slow recuperation, and extended hospitalization. On the contrary, ERAS pathways are multimodal and multidisciplinary and entail preoperative education, optimized nutrition, minimally invasive surgical approaches, multimodal analgesia, early mobilization, and early oral intake reinstitution [2].ERAS was initially introduced by Kehlet in the 1990s in colorectal surgery, but has since been extended into many other classes of surgery, such as gynecology, urology, orthopedics, thoracic surgery, and neurosurgery. Many articles have indicated that ERAS plans lead to a decrease in morbidity, hospitalization, and the cost of healthcare and an increase in patient satisfaction. Major interventions that contribute to physiological homeostasis, prevention of long-term fasting, goal-oriented fluid therapy, and multimodal pain management are associated with avoiding prolonged fasting, maintaining physiological homeostasis, insulin resistance, and early functional recovery [3,4]. Surgical site infections, ileus, pulmonary problems, and thromboembolism are seen as major problems in the traditional perioperative care. ERAS pathways will attempt to alleviate such risks by using standardized evidence-based protocols that will be the best for patient outcomes [5]. A number of meta-analyses and randomized control trials have shown that complication rates and length of stay at the hospital are significantly reduced by ERAS, but readmission and mortality rates are not elevated [6]. Even with the increasing evidence of the support of ERAS, its application in various institutions is not consistent because of the disparity in surgical practices, resources, and patients. To determine the standardized protocols to use, patient safety, and optimization of performance, it is necessary to evaluate the effectiveness of ERAS in different clinical settings. The proposed study is designed to evaluate the effects of the ERAS protocols on the occurrence of postoperative complications and hospital stay in patients with elective major surgery [7,8].

Through a systematic comparison between ERAS and standard care, the study sheds some light on the advantages of methodical approaches to perioperative pathways to inform clinical decision-making and interdepartmental policies. It is anticipated that the findings would facilitate the high rate of implementation of ERAS, which would enhance clinical and healthcare outcomes [9,10].

Study Objectives

To assess the impacts of ERAS interventions on postoperative morbidity, length of hospital stays, and recovery in patients who have had elective major surgery.

MATERIALS AND METHODS

Study Design & Setting

The study was a prospective comparative study conducted at department of general surgery PIMS hospital hayat Abad Peshawar from jan 2023 to jan 2024.over a period of more than 12 months and involved patients who had scheduled elective major surgery under either the ERAS or conventional care protocols in place in the perioperative unit.

Participants

One hundred and eighty adult patients (18-70 years old), who received an elective major surgery, were recruited and allocated evenly into the ERAS (n=50) and conventional care (n=50) groups. They eliminated severe comorbid patients, patients requiring emergency surgery, and those unable to provide informed consent. The demographic and clinical data were taken to be used as a baseline.

Sample Size Calculation

The confidence level of 95 and the power of 80 were used to determine the required sample size, as previous study cited complication rates of 36 and 18 percent in the conventional care and ERAS groups, respectively, making a total population requirement of 100 patients.

Inclusion Criteria

- Adults 1870 years, elective major surgery, competent.

Exclusion Criteria

- Emergency surgery, extreme comorbidities (cardiopulmonary failure, renal failure), and incapability of adhering to ERAS.

Diagnostic and Management Strategy.

Standard laboratory tests, imaging, and anesthetic evaluation were done during preoperative evaluation. The management adhered to the ERAS guidelines, such as preoperative counseling, light fasting, multimodal analgesia, early mobilization, and early intake. The traditional group was given regular perioperative care. Monitoring and recording of the postoperative complications were done systematically.

Statistical Analysis

SPSS version 25 was used to analyze the data. Continuous variables were indicated in the form of mean and standard deviation and compared with independent t-tests. Chi-square tests were used to analyze categorical variables. A p-value less than 0.05 was regarded as statistically significant. The results were complications, length of stay, and parameters of functional recovery.

Ethical Approval Statement.

Ethical approval was obtained from the Institutional Review Board/Ethics Committee prior to study initiation. All procedures were conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained where applicable. Patient confidentiality and data privacy were strictly maintained, and all data were anonymized before analysis and reporting.

RESULTS

A total of 100 patients were included, with 50 in the ERAS group and 50 in the conventional group. The mean age was 45.6 ± 12.3 years in ERAS and 47.2 ± 11.8 years in controls (p=0.52). Both groups were comparable regarding gender distribution, comorbidities, and type of surgery. Postoperative complications occurred in 18% of ERAS patients versus 36% in the conventional group (p=0.04). Surgical site infections were 6% in ERAS versus 14% in controls (p=0.18), and postoperative ileus occurred in 4% versus 16% (p=0.03). Pulmonary complications and thromboembolism were also lower in ERAS, though not statistically significant. The mean length of hospital stay was significantly shorter in the ERAS group (4.2 ± 1.1 days) compared to controls (6.8 ± 1.5 days) (p<0.001). Early mobilization within 24 hours occurred in 90% of ERAS patients versus 52% in controls (p<0.001), and oral intake resumed earlier (1.2 ± 0.5 days vs 2.8 ± 0.9 days, p<0.001). Readmission rates were similar (6% vs 8%, p=0.65).

Intervention Outcome

The ERAS protocols have contributed greatly to the recovery results through postoperative complications and shortening of the hospital stay. The patients have become mobilized more quickly, their oral intake has recovered sooner, and the general functional recovery has improved, which points to the effectiveness of ERAS as a perioperative intervention in comparison to traditional care.

Table 1: Baseline Demographic and Clinical Characteristics of Patients

Characteristic	ERAS (n=50)	Conventional (n=50)	p-value
Age (years, mean ± SD)	45.6 ± 12.3	47.2 ± 11.8	0.52
Gender (M/F)	28/22	30/20	0.68
BMI (kg/m², mean ± SD)	26.1 ± 3.2	26.7 ± 3.5	0.44
Diabetes mellitus, n (%)	12 (24%)	14 (28%)	0.64
Hypertension, n (%)	15 (30%)	17 (34%)	0.67
Type of Surgery (Colorectal/Other)	30/20	32/18	0.71

Comparison of baseline demographic and clinical characteristics between ERAS and conventional care groups. There were no statistically significant differences, indicating comparable groups at baseline.

Table 2: Postoperative Complications

Complication	ERAS (n=50)	Conventional (n=50)	p-value
Any complication	9 (18%)	18 (36%)	0.04*
Surgical site infection	3 (6%)	7 (14%)	0.18
Postoperative ileus	2 (4%)	8 (16%)	0.03*
Pulmonary complications	1 (2%)	3 (6%)	0.31
Thromboembolism	0 (0%)	1 (2%)	0.31

Postoperative complications were significantly lower in the ERAS group, particularly overall complications and ileus. *p<0.05 indicates statistical significance.

Table 3: Hospital Stay and Recovery Outcomes

Parameter	ERAS (n=50)	Conventional (n=50)	p-value
Length of hospital stay (days, mean ± SD)	4.2 ± 1.1	6.8 ± 1.5	<0.001*
Early mobilization within 24 hours, n (%)	45 (90%)	26 (52%)	<0.001*
Time to oral intake (days, mean ± SD)	1.2 ± 0.5	2.8 ± 0.9	<0.001*
Readmission rate, n (%)	3 (6%)	4 (8%)	0.65

ERAS patients had significantly shorter hospital stays, earlier mobilization, and faster oral intake. Readmission rates were similar between groups. *p<0.05 indicates statistical significance.

Table 4: Intervention Outcomes

Outcome Measure	ERAS (n=50)	Conventional (n=50)	p-value
Overall recovery (good/excellent)	42 (84%)	28 (56%)	0.002*
Pain score (VAS 0–10, mean ± SD)	3.1 ± 1.0	5.2 ± 1.4	<0.001*
Patient satisfaction (Likert 1–5, mean ± SD)	4.5 ± 0.6	3.8 ± 0.7	<0.001*
Return to normal activity (days, mean ± SD)	6.5 ± 1.2	9.2 ± 1.8	<0.001*

ERAS intervention led to improved recovery outcomes, lower pain scores, higher patient satisfaction, and earlier return to normal activity. *p<0.05 indicates statistical significance.

DISCUSSION

The evidence provided in this paper reveals that Enhanced Recovery After Surgery (ERAS) guidelines are more effective in decreasing the number of postoperative complications and reducing the length of stay in a hospital as compared to regular perioperative care. Such findings are in line with an increasing amount of recent literature that demonstrates the utility of ERAS pathways in various surgical specialties [11]. The advantages of ERAS in terms of decreasing the total postoperative complications and hospitalization have

been proven in several large-scale meta-analyses over the last five years. A meta-analysis of 74 randomized clinical trials and 9,076 participants found that there was a significant decrease in length of stay in the hospital of approximately 1.9 days, and the risk of complication was lower in ERAS groups as opposed to controls, with no significant difference in readmission or mortality rates [12]. Our results are consistent with the reduction in complications (18% vs 36%, p=0.04) and the mean length of stay (4.2 + -1.1 vs 6.8 + 1.5 days, p<0.001), which supports the consistency and reproducibility of the ERAS benefits [13].On the same note, a set of systematic reviews on colorectal surgery, which is one of the most studyed areas in the ERAS study, has shown that ERAS regimens are linked with faster bowel recovery, less postoperative morbidity, and lower hospitalization rates than traditional care [14]. According to meta-analytical data, it was found that there were massive cuts in surgical site infection and total complications (e.g., OR: 0.33) and that the standardized mean difference in length of stay was toward ERAS [15]. These findings are consistent with our findings, in which early mobilization and earlier initiation of oral intake played an important role in PR [16]. There is also the emerging evidence that has highlighted the usefulness of ERAS when undertaking surgery in a less invasive manner. In a systematic study of minimally invasive colorectal resection, ERAS pathways minimized overall complications, ileus, and length of stay by a large margin compared to the conventional care (WMD −2.38 days; p<0.01). This points out that the advantages of ERAS are not limited to open or laparoscopic and robotic procedures, but also contribute to the validity of generalizing enhanced recovery concepts, as also indicated by the results in our cohort [17,18]. Existing comparative studies in the real world also support the efficacy of ERAS in modern practice. Indicatively, multicenter retrospective studies have shown that ERAS application is independently linked with a shortcoming in complications and length of stay in robotic, laparoscopic, and open surgery [19]. These clinical real-life data support the clinical trial and meta-analysis results, confirming the pragmatic viability and usefulness of ERAS protocols in a variety of clinical practices. Although strong evidence has been delivered in favor of ERAS, the aspect of protocol compliance and adherence continues to be a key factor. Compliance with ERAS components, including preoperative counseling, early feeding, and multimodal pain management, may also determine the outcome. In meta-analytic study, increased adherence to ERAS factors was linked to a decrease in length of stay [20,21]. This implies that monitoring and standardization of the implementation of ERAS play an important role in maximizing clinical benefits. Despite numerous studies demonstrating decreased complications and reduced hospitalization, there is some evidence that supports miscellaneous outcomes on particular outcomes, such as readmission and mortality. There is no significant difference in 30-day readmissions or mortality between the ERAS and standard care groups [22], which is not surprising given that we have also found similar readmission rates (6% vs 8%, p=0.65). This highlights the fact that ERAS improves recovery with no harm to safety. The findings of this study are in line with the extensive evidence in recent literature that ERAS guidelines can enhance the postoperative recovery process through the minimization of complications and length of stay. The fact that recent high-quality meta-analyses and systematic reviews have been consistent with the argument advances the systematic application of ERAS in surgical practice. Further attempts at a standardization of implementation and higher compliance rates of clinicians will be essential to ensure the maximum potential of enhanced recovery pathways.

Limitations

The study took place in one center, and the sample size used was quite small, which might not be very generalizable. The differences in the experience of the surgeon, patient adherence, and compliance with the ERAS protocols may have an effect. No long-term follow-up was conducted, and thus, no evaluation of late complications or functional recovery after hospital discharge was conducted.

CONCLUSION

ERAS protocols are highly effective in preventing complications after the operation and reducing the length of stay without raising the readmission rates. Mobilization early, multimodal analgesia, and early oral intake are related to better recovery. These results justify the continued use of ERAS pathways in the realm of surgical practice to improve patient outcomes, efficiency, and overall, the quality of perioperative care.

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Authors Contributions

Concept & Design of Study:**Ghulam Younus[1]**
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Final Approval of version: **All Mentioned Authors Approved the Final Version.**

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