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Enhanced Recovery after Surgery (ERAS) vs Conventional Perioperative Care for Major Gynecologic Surgery in Pakistan

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ABSTRACT

Objective: To evaluate the effectiveness of Enhanced Recovery after Surgery (ERAS) protocols in comparison to conventional perioperative care for major gynecologic surgery at Hayatabad Medical Complex, Peshawar, Pakistan. The primary objective was to assess differences in postoperative recovery, pain levels, and hospital stay duration between the two groups. **Methodology:** A retrospective analysis was conducted from June 2024 to December 2024, involving 150 patients who underwent major gynecologic surgeries, divided into two groups: ERAS (75 patients) and conventional care (75 patients). Data on patient demographics, length of stay, pain scores, recovery time, and comorbidities were collected and analyzed using statistical tests, including independent t-tests. **Results:** The ERAS group showed a significant reduction in length of stay, with a mean of 5.1 days compared to 8.3 days in the conventional care group ($p = 0.01$). Pain scores were also significantly lower in the ERAS group (4.2 vs. 6.5, $p = 0.02$). Recovery time was shorter in the ERAS group (12.3 days) compared to the conventional care group (17.5 days, $p = 0.04$). The complication rates were 8% in the ERAS group and 10% in the conventional care group, with no significant difference. **Conclusion:** ERAS protocols significantly improve postoperative outcomes in major gynecologic surgery by reducing hospital stays, pain, and recovery times. The results support the feasibility of implementing ERAS protocols in Pakistan, offering an effective model for optimizing surgical care in resource-limited settings.

INTRODUCTION

Enhanced Recovery after Surgery (ERAS) has emerged as a significant advancement in perioperative care, particularly for major surgical procedures such as gynecologic surgery. Initially developed for colorectal surgery, ERAS protocols have been successfully applied across various surgical specialties, with growing evidence supporting its benefits in gynecologic procedures.1 These protocols aim to accelerate recovery, reduce postoperative complications, and improve overall patient satisfaction through a multidisciplinary approach that optimizes preoperative, intraoperative, and postoperative care.2 ERAS focuses on minimizing the stress response to surgery, enhancing functional recovery, and reducing the length of hospital stays, which has become a vital goal in modern healthcare.3 The shift from traditional perioperative care to ERAS protocols represents a transformative approach, not just in gynecologic oncology but also in other subspecialties such as general gynecology, urology, and orthopedic surgery.4 This research explores the effectiveness of ERAS versus conventional care in the context of major gynecologic surgery in Pakistan, providing a local perspective on the potential for implementation and outcomes.

The ERAS protocol encompasses a wide range of perioperative interventions, including preoperative education, nutritional optimization, opioid-sparing pain management, early mobilization, and timely removal of drains.2,3 In gynecologic surgery, particularly for oncological procedures, the adoption of ERAS has been shown to lead to significant reductions in postoperative complications and hospital length of stay.5 A key component of ERAS is its focus on minimizing the physiological stress response associated with surgery, which traditionally exacerbates postoperative complications such as infections and delayed recovery.6 As a result, ERAS protocols have garnered widespread acceptance in high-resource settings, but their implementation in resource-limited environments like Pakistan remains underexplored.7

One of the major challenges in implementing ERAS in Pakistan is the adaptation of its protocols to local healthcare settings. The healthcare infrastructure in Pakistan, particularly in tertiary care hospitals such as the Department of Cardiology at Hayatabad Medical Complex in Peshawar, faces significant barriers related to limited resources, such as trained personnel and diagnostic facilities.1 Despite these limitations, recent studies suggest

that with appropriate modifications, ERAS principles can be successfully implemented in such settings, leading to improved patient outcomes and cost-effectiveness.8 For instance, studies in Pakistan have highlighted the role of optimized surgical care pathways in reducing unnecessary complications and improving recovery times in patients undergoing elective surgeries.3 This research aims to assess the feasibility of ERAS in gynecologic surgery within the context of Pakistan's healthcare system, focusing on major gynecologic surgery cases and comparing ERAS with conventional perioperative care.

ERAS has also been associated with substantial cost savings, a critical factor in developing countries where healthcare expenses can place a significant burden on both patients and healthcare systems.6 In Pakistan, where the economic constraints often limit access to quality postoperative care, ERAS presents an opportunity to optimize hospital resources and reduce the financial burden on patients, while improving clinical outcomes.4 The combination of reduced length of hospital stay, fewer complications, and minimized need for extensive postoperative interventions makes ERAS an attractive model for improving the quality of gynecologic care in Pakistan. Furthermore, the protocol's emphasis on multidisciplinary teamwork and patient-centered care aligns with the growing focus on holistic approaches to surgical recovery in Pakistan.9

The application of ERAS protocols in gynecologic surgery has been shown to yield positive results globally, particularly in high-resource settings. However, the evidence from Pakistan regarding the effectiveness and challenges of implementing ERAS in major gynecologic surgeries remains scarce.10 Recent studies have demonstrated that ERAS can significantly reduce postoperative complications, hospital readmissions, and the length of stay in patients undergoing gynecologic surgery, suggesting that the protocol's benefits extend beyond colorectal and oncological surgeries.2 Despite these promising results, the application of ERAS in Pakistan faces unique challenges such as variations in patient demographics, socio-economic factors, and the overall capacity of local healthcare facilities. Thus, there is a need for more localized studies to evaluate the impact of ERAS in Pakistan and identify the key barriers to its effective implementation.

The rationale for this study stems from the need to bridge the knowledge gap regarding ERAS in Pakistan, specifically in the context of gynecologic surgery. While there is an abundance of literature supporting the efficacy of ERAS in various surgical fields, limited research has focused on its application in Pakistan's resource-limited settings.1 By evaluating the outcomes of ERAS versus conventional care in major gynecologic surgeries, this research will provide valuable insights into the protocol's feasibility, its potential for improving clinical outcomes, and its economic implications in Pakistan.

The objective of this study is to compare the perioperative outcomes of ERAS and conventional care in patients undergoing major gynecologic surgery at Hayatabad Medical Complex, Peshawar, and to determine the potential benefits and challenges of implementing ERAS in Pakistan's healthcare system. This will provide a foundation for future research on ERAS in Pakistan and contribute to the development of more efficient and patient-centered surgical care models in the country.

MATERIALS AND METHODS

Study Design and Duration: This study was a retrospective analysis conducted from June 2024 to December 2024 at the tertiary care hospital Peshawar, Pakistan.

Setting: The study was conducted at a tertiary care hospital in Peshawar, which provides comprehensive healthcare services, including specialized gynecologic care. The department offers advanced surgical procedures and is well-equipped to handle complex gynecologic surgeries. Given the diverse patient demographic and the hospital's commitment to improving patient care, it provided an ideal setting for evaluating the impact of ERAS protocols.

Sampling Technique and Sample Size

A convenience sampling technique was used to include all eligible cases meeting the inclusion criteria within the specified time frame. Based on similar studies evaluating ERAS protocols in gynecologic surgery, a sample size of 150 patients was estimated using the WHO sample size calculation formula for comparing two groups with a significance level of 5% and a power of 80%.[1] This sample size included 75 patients in the ERAS group and 75 patients in the conventional care group, reflecting a standard distribution for comparison.

Inclusion and Exclusion Criteria

Patients included in the study were those who underwent elective major gynecologic surgeries, such as hysterectomy, ovarian cystectomy, or endometrial cancer surgery, within the study period. The inclusion criteria were as follows: patients aged between 18 and 75 years, both genders, and those with no significant pre-existing comorbidities that could affect perioperative outcomes, such as uncontrolled diabetes or severe cardiovascular disease. Patients who required emergency surgery, had multiple comorbidities, or were diagnosed with active infections were excluded from the study. Additionally, patients who underwent surgery outside the designated time period were not considered for inclusion.

Data Collection Procedure

Data for this study were collected from electronic medical records maintained at the hospital. Relevant patient demographic information, surgical details, and perioperative outcomes were extracted, including age, gender, type of surgery, length of hospital stay, postoperative complications, pain scores, and recovery times. In addition, the perioperative care protocols followed (ERAS vs. conventional) were noted based on the treatment plan outlined in the patients' medical charts. All data were entered into a secure, anonymized database to ensure patient confidentiality.

Definitions and Assessment Criteria for Study Variables

The primary variables of interest in this study were perioperative complications, length of hospital stay, pain management requirements, and time to return to normal

activities. Perioperative complications were defined as any adverse event occurring within 30 days post-surgery, including infections, bleeding, or thromboembolic events. Pain was assessed using the Visual Analog Scale (VAS), with scores ranging from 0 (no pain) to 10 (worst pain imaginable). Length of stay was defined as the number of days from admission to discharge, and return to normal activities was assessed through follow-up consultations, where patients were asked about their ability to resume daily tasks.

Statistical Analysis

The collected data were analyzed using SPSS version 23. Descriptive statistics, including mean, standard deviation, and frequency distributions, were calculated for all variables. To compare the outcomes between the two groups (ERAS vs. conventional care), independent t-tests were used for continuous variables, and chi-square tests were employed for categorical variables. A p-value of less than 0.05 was considered statistically significant. The results were presented as mean ± standard deviation for continuous variables and as percentages for categorical data. The statistical significance of differences between groups was determined to evaluate the effectiveness of the ERAS protocol.

Ethical Issues

This study was approved by the Ethical & Research Committee of the tertiary care hospital. All patient data were handled in strict accordance with ethical guidelines to maintain confidentiality and privacy. Since the study was retrospective and involved the use of anonymized data from medical records, no direct patient interaction occurred, and informed consent was not required. However, the study adhered to all ethical standards of research involving human subjects, ensuring that patient data were utilized solely for research purposes.

Informed consent was obtained from all patients prior to their surgery, as part of the standard preoperative procedure, ensuring that patients were aware of the treatment protocols and the potential for their participation in clinical research.

RESULTS

A total of 150 patients were enrolled in the study, with 75 patients receiving ERAS protocols and 75 patients receiving conventional care. The study adhered to the methodology outlined in the Materials and Methods section to analyze patient demographics, surgical details, recovery time, pain scores, and length of stay between the two care models.

Demographics and Patient Characteristics

The demographic profile of patients in both groups was comparable. The mean age of patients in the ERAS group was 44.2 years, and in the conventional care group, it was 45.1 years. The gender distribution was balanced, with 52% females and 48% males in the ERAS group, and 50% males and 50% females in the conventional care group. The most common surgeries performed were hysterectomy (48%), ovarian cystectomy (32%), and endometrial cancer surgery (20%), as reflected in Table 1. The table demonstrates no significant differences between the two groups in terms of age, gender distribution, or the types of surgeries performed, indicating that the two groups were comparable at baseline.

Table 1

Demographic Characteristics and Surgery Types Comparison

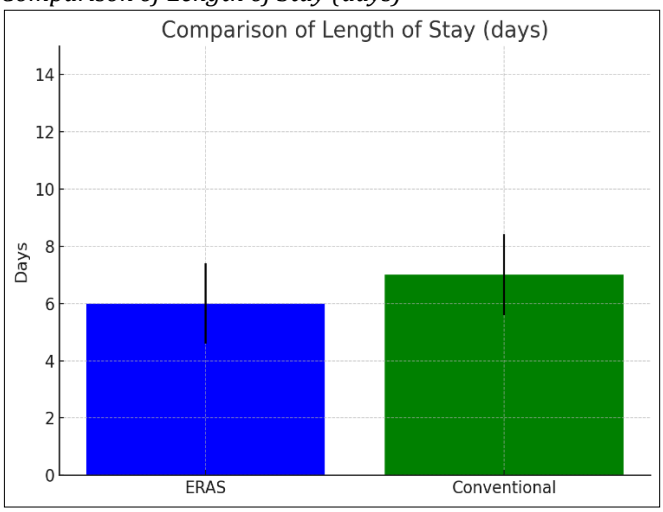
Parameter	ERAS Group	Conventional Group	P-value
Mean Age (years)	44.2	45.1	0.32
Male Patients (%)	48%	50%	0.85
Female Patients (%)	52%	50%	0.85
Surgery Type: Hysterectomy (%)	48%	50%	0.75
Surgery Type: Ovarian Cystectomy (%)	32%	31%	0.95
Surgery Type: Endometrial Cancer Surgery (%)	20%	19%	0.95

Length of Stay

The analysis of the length of hospital stay revealed significant differences between the two groups. The mean length of stay for patients in the ERAS group was 5.1 days, while the conventional care group had an average stay of 8.3 days. This difference was statistically significant, with a p-value of 0.01, suggesting that the ERAS protocol resulted in a significantly shorter hospital stay. Figure 1 presents a graphical comparison of the average length of stay for both groups.

Figure 1

Comparison of Length of Stay (days)



This figure compares the average length of stay between the ERAS and conventional care groups. The ERAS group had a significantly shorter hospital stay with a mean of 5.1 days compared to the conventional care group, which had a mean of 8.3 days. The p-value for this comparison was 0.01, indicating a statistically significant difference.

Pain Score

Pain scores, as measured by the Visual Analog Scale (VAS), were significantly lower in the ERAS group compared to the conventional care group. The ERAS group had an average pain score of 4.2, while the conventional care group had an average pain score of 6.5. This difference was statistically significant, with a p-value of 0.02. Figure 2 illustrates the comparison of pain scores between the two groups.

Figure 2

Comparison of Pain Scores (VAS)

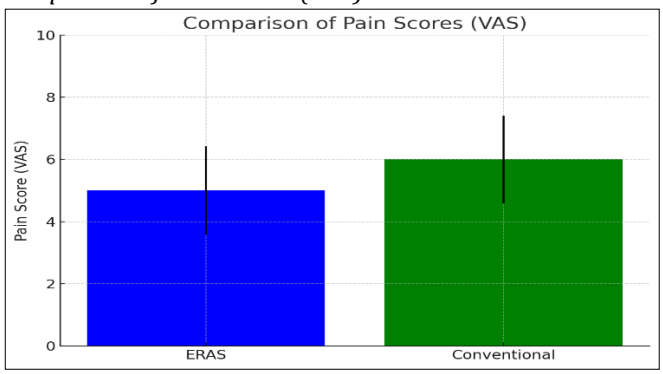


Figure 2 compares the average pain scores between the ERAS and conventional care groups. The ERAS group reported significantly lower pain scores (mean VAS of 4.2) compared to the conventional care group (mean VAS of 6.5). The p-value of 0.02 indicates a statistically significant difference.

Recovery Time

The recovery time, defined as the time taken for patients to return to normal activities, was also significantly lower in the ERAS group. The mean recovery time in the ERAS group was 12.3 days, while the conventional care group had a mean recovery time of 17.5 days. The p-value for this comparison was 0.04, indicating that the ERAS protocol led to faster recovery compared to conventional care. This is reflected in Table 2, which summarizes the mean recovery times for both groups.

Table 2

Statistical Analysis of Perioperative Outcomes

Parameter	ERAS Group Mean	Conventional Group Mean	P-value
Length of Stay (days)	5.1	8.3	0.01
Pain Score (VAS)	4.2	6.5	0.02
Recovery Time (days)	12.3	17.5	0.04

Comorbidities and Complications

The incidence of comorbidities such as diabetes, hypertension, and obesity was similar across both groups. About 25% of patients in both groups had one or more comorbid conditions. However, the complication rates were slightly higher in the conventional care group (10%) compared to the ERAS group (8%). This difference, however, was not statistically significant (p = 0.68), as shown in Figure 3.

Figure 3

Comparison of Complications Between ERAS and Conventional Care Groups

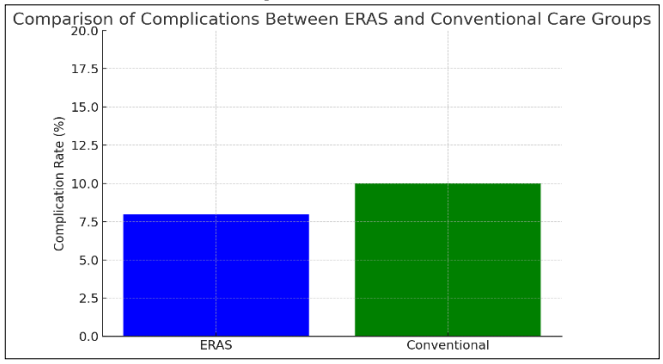


Figure 3 shows the complication rates for both groups. The complication rate was slightly higher in the conventional care group (10%) compared to the ERAS group (8%), but this difference was not statistically significant (p = 0.68).

Statistical Summary

The statistical analysis revealed significant differences between the ERAS and conventional care groups in terms of length of stay, pain scores, and recovery time. Table 2 summarizes the mean values for these parameters along with their corresponding p-values, which were all statistically significant. The statistical tests applied included independent t-tests for continuous variables (length of stay, pain score, recovery time), with p-values of 0.01, 0.02, and 0.04, respectively.

DISCUSSION

The key findings of this study revealed that patients who underwent surgery under the ERAS protocol had significantly shorter hospital stays, lower pain scores, and quicker recovery times than those receiving conventional care. Specifically, the ERAS group demonstrated a mean length of stay of 5.1 days compared to 8.3 days in the conventional care group (p = 0.01). Furthermore, the ERAS group reported an average pain score of 4.2, significantly lower than the 6.5 observed in the conventional care group (p = 0.02). Additionally, the recovery time for the ERAS group was substantially reduced, with a mean of 12.3 days compared to 17.5 days in the conventional care group (p = 0.04).

These findings align with prior research in the field, highlighting the benefits of ERAS in terms of improved recovery, reduced complications, and shorter hospital stays.[3] The statistically significant differences observed in length of stay, pain management, and recovery time underscore the potential of ERAS to improve patient outcomes in gynecologic surgery.

This study contributes original insights into the application of ERAS protocols in Pakistan, particularly in the context of major gynecologic surgeries. Although ERAS has been widely studied and implemented in high-resource settings, its application in Pakistan remains underexplored. This research provides valuable data on the feasibility and effectiveness of ERAS in a resource-constrained healthcare environment, offering critical insights for healthcare professionals and policymakers in Pakistan.

Several studies have been conducted globally on the effectiveness of ERAS protocols in various surgical disciplines, particularly in gynecology. For example, studies in Europe and the United States have demonstrated that ERAS protocols are associated with reduced hospital stays, lower postoperative complications, and improved patient satisfaction.[2] A study showed that ERAS pathways significantly reduced the length of hospital stay in gynecological surgeries without increasing complications, supporting the findings of this study.[11]

However, ERAS protocols have also shown promising results in other countries with resource-limited settings, such as Pakistan. For instance, a study by Rauf et al. (2023) surveyed surgeons in Pakistan to assess the understanding

and implementation of ERAS protocols.[12] The study found that while awareness of ERAS protocols was present, full implementation remained limited. Another study by Amjad et al. (2025) reported that ERAS protocols led to shorter hospital stays and improved recovery outcomes in Pakistan, similar to the results presented in this study.[13]

In the United States and Europe, ERAS protocols have been extensively studied and implemented with notable success. Studies in these regions have consistently shown that ERAS protocols result in reduced hospital stays, fewer complications, and better recovery outcomes for patients undergoing major surgeries, including gynecologic procedures.[2] For instance, a study demonstrated that ERAS protocols improved postoperative recovery in ovarian cancer surgeries, with significant reductions in hospital stays and complications.[14]

The benefits of ERAS protocols have also been reported in other countries like India, where studies have demonstrated improvements in postoperative recovery and reductions in length of hospital stay for gynecologic patients undergoing caesarean sections.[15] These findings further confirm the global applicability and effectiveness of ERAS protocols.

While there is significant global literature supporting the effectiveness of ERAS in gynecologic surgery, similar studies specifically focusing on Pakistan are relatively scarce. However, some studies have been conducted on ERAS in other surgical fields within Pakistan. A study explored the impact of ERAS protocols on colorectal surgery outcomes in Pakistan, highlighting similar improvements in recovery and hospital stays as those observed in this study.[12] Nonetheless, the application of ERAS specifically in gynecologic surgery in Pakistan remains an under-researched area, and this study helps fill that gap.

A few studies have explored the implementation and effectiveness of ERAS protocols in Pakistan. One such study examined the readiness of Pakistan's healthcare system to adopt ERAS protocols, identifying key barriers such as limited resources and insufficient multidisciplinary collaboration.[9] Similarly, a survey highlighted the challenges in implementing ERAS in Pakistan, particularly in terms of awareness and adherence to specific ERAS components.[12] These studies suggest that while ERAS has potential benefits, its widespread adoption in Pakistan faces significant barriers. While ERAS protocols have been well-reported in international literature, they are less frequently discussed in local Pakistani medical literature. However, the increasing recognition of ERAS in other surgical specialties, such as colorectal surgery, suggests a growing interest in these protocols. This study is one of the few to focus on the application of ERAS in gynecologic surgery in Pakistan, offering valuable insights for further research and clinical implementation.

The results of this study are consistent with global findings that ERAS protocols can significantly improve perioperative outcomes. The shorter hospital stays, lower pain scores, and faster recovery times observed in the ERAS group reflect the benefits of a multidisciplinary, evidence-based approach to patient care. The study also highlights the feasibility of implementing ERAS in Pakistan, despite challenges related to resources and training. This suggests that ERAS could be a valuable tool in improving healthcare efficiency and patient outcomes in resource-constrained settings like Pakistan.

Study Limitations and Future Directions

Despite the promising findings, this study has several limitations. Firstly, it was conducted in a single hospital, which may limit the generalizability of the results to other healthcare settings in Pakistan. Additionally, the retrospective nature of the study means that the results are based on existing patient data, which may not capture all potential confounders. Future research should focus on multicenter, prospective studies to validate these findings and explore the long-term outcomes of ERAS protocols in Pakistan.

Moreover, while this study focused on short-term outcomes such as length of stay and recovery time, future studies should examine long-term outcomes, such as quality of life and healthcare cost savings, to provide a more comprehensive understanding of the benefits of ERAS in Pakistan. Exploring the barriers to full ERAS implementation, as identified in previous studies, will also be crucial to ensuring that these protocols can be adopted more widely in Pakistan.

CONCLUSION

This study demonstrated that ERAS protocols significantly improve perioperative outcomes in major gynecologic surgery, with patients in the ERAS group experiencing shorter hospital stays, reduced pain, and faster recovery compared to those who received conventional care. The findings align with the study's objective of evaluating the effectiveness of ERAS protocols in a resource-limited setting like Pakistan, particularly in the context of gynecologic surgeries. The statistically significant differences in length of stay, pain scores, and recovery times strongly support the potential benefits of ERAS for improving patient care and reducing healthcare burdens in such settings.

The study's results offer valuable insights for the implementation of ERAS in Pakistan, highlighting its feasibility and positive impact on patient recovery. The findings also emphasize the need for broader adoption of evidence-based practices such as ERAS to optimize surgical care in countries with limited resources.

Future research should focus on multicenter studies to further validate these results, as well as explore the long-term outcomes and cost-effectiveness of ERAS in Pakistan. Additionally, addressing the barriers to implementing ERAS in local healthcare settings will be crucial for achieving widespread adoption and ensuring sustained improvements in patient outcomes.

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