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Evaluation of Enhanced Recovery After Surgery (ERAS) Protocols in Adult Intestinal Obstruction: A Prospective Cohort Study

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Abstract

This prospective cohort study aimed to evaluate the effectiveness of Enhanced Recovery After Surgery (ERAS) protocols in adult patients undergoing emergency surgery for intestinal obstruction. The study was conducted at a busy Emergency General Surgery Unit in a large tertiary referral hospital. A well-defined plan was implemented to compare outcomes between patients receiving the ERAS protocol and those receiving standard conventional care. The perioperative patient journey was optimized through individualized fluid therapy, analgesia, early feeding, and mobilization. The control group received standard post-ERAS management practices. Comprehensive outcome insights were gathered, including patient demographic details, clinical course, postoperative endpoints, and satisfaction surveys. The primary outcomes evaluated were complications, length of stay, and 30-day readmissions, while secondary outcomes included pain scores, time to flatus/bowels, and resource utilization. Data analysis involved appropriate statistical tests such as t-tests, Mann-Whitney U tests, chi-square tests, and multivariate regression. The results revealed superior perioperative outcomes in the ERAS group compared to conventional care. The ERAS group displayed significantly shorter operative time, reduced blood loss, and fewer complications. Postoperative complications, including surgical site infections, anastomotic leaks, and postoperative ileus, were significantly lower in the ERAS group. ERAS also resulted in significantly shorter hospital stays and higher levels of patient satisfaction, with improved pain control, faster recovery, and greater involvement in care reported by the ERAS group. Additionally, the implementation of ERAS protocols led to reduced healthcare resource utilization, including lower rates of readmissions within 30 days and fewer postoperative consultations, resulting in cost savings. These findings highlight the transformative impact of ERAS protocols in adult intestinal obstruction, leading to improved perioperative outcomes, shorter hospital stays, enhanced patient satisfaction, and optimized healthcare resource utilization. The integration of ERAS protocols has the potential to revolutionize surgical care and improve patient outcomes in emergency surgery settings.

Key words: Enhanced Recovery After Surgery (ERAS); Adult intestinal obstruction; Postoperative complications; patient satisfaction; Healthcare resource utilization

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Introduction

Enhanced Recovery After Surgery (ERAS) protocols have revolutionized perioperative care and have been widely implemented in various surgical specialties, leading to improved patient outcomes, reduced postoperative complications, and shortened hospital stays (1,2,3,4,5). ERAS protocols typically involve multiple evidence-based components aimed at enhancing surgical recovery and minimizing stress, including preoperative optimization, standardized anesthetic and analgesic techniques, early mobilization and optimized nutrition (6,7,8,9,10). Well-designed studies have demonstrated that following ERAS protocols can significantly reduce pain, improve functional recovery and result in shorter hospital stays for patients (11,12,13,14,15).

However, the application of ERAS protocols in adult intestinal obstruction, a challenging surgical condition, has not been extensively explored. Adult intestinal obstruction is a common and potentially life-threatening condition requiring timely surgical intervention (16,17,18,19). The traditional approach to managing adult intestinal obstruction often involves prolonged hospital stays and increased postoperative complications (20,21,22). Therefore, there is a pressing need to evaluate the effectiveness of implementing ERAS protocols specifically for adult intestinal obstruction.

While ERAS protocols have been widely adopted in numerous surgical specialties, their application in intestinal obstruction remains limited (23,24,25). Adult intestinal obstruction presents unique challenges including the need for prompt intervention, potential complications related to bowel ischemia/perforation, and the impact of surgery on already compromised bowel function (26,27,28). These factors may hinder full implementation of standard ERAS components, necessitating research to evaluate their effectiveness in this patient population (29,30,31).

This prospective cohort study aims to address this gap in knowledge by rigorously evaluating the effectiveness of implementing ERAS protocols in adult intestinal obstruction. By enrolling a well-defined cohort and comparing outcomes to standard care, valuable insights will be gained into optimizing care for these patients (32,33,34). Evaluation of perioperative outcomes, postoperative complications, length of stay, patient satisfaction and healthcare resource utilization will provide a comprehensive understanding of how ERAS affects patient care and resource use (35,36,37).

The findings of this research will significantly impact practitioners managing adult intestinal obstruction. By demonstrating potential benefits, healthcare providers can optimize patient care, improve outcomes and reduce costs using an evidence-based approach (38,39,40). The insights gained will guide development and implementation of protocols specifically tailored for intestinal obstruction, ensuring delivery of high-quality, evidence-based care to this vulnerable group (41,42,43). In conclusion, this prospective cohort study aims to evaluate the effectiveness of ERAS protocols in adult intestinal obstruction through enrolling a well-defined cohort and assessing multiple important outcomes (44,45,46). The findings will guide clinical decision-making and potentially improve patient outcomes for intestinal obstruction.

Materials and Methods

A Busy Emergency General Surgery Unit

This study was conducted at the Emergency General Surgery Unit of a large tertiary referral hospital serving over 500,000 people annually. As a high volume center, it provided an ideal setting to recruit a sizeable cohort.

Selecting an Appropriate Study Population

Consecutive adult patients aged 18-80 years undergoing emergency surgery for intestinal obstruction between 2020-2021 were invited to participate. Those unable or unwilling to provide consent were excluded.

A Well-Defined Plan for Comparing Outcomes

Patients were assigned in date order to either receive the novel ERAS protocol or standard conventional care. This allowed for a clean comparison between carefully managed groups.

Optimizing the Perioperative Patient Journey

A dedicated team implemented a protocol individualizing fluid therapy, analgesia, early feeding and mobilization to enhance recovery. Strict adherence was ensured through checklists.

Standard Post-ERAS Management Practices

The control group received conventional departmental care as per standard guidelines without the enhanced recovery elements.

Gathering Comprehensive Outcome Insights

Patient demographic details, clinical course, postoperative endpoints and satisfaction surveys were systematically recorded using customized databases and electronic records.

Key Factors for Evaluating Recovery

The primary outcomes were complications, length of stay and 30-day readmissions. Secondary outcomes included pain scores, time to flatus/bowels and resource utilization.

Appropriate Analysis of the Collected Data

Continuous variables were analyzed using t-tests, Mann-Whitney U tests as appropriate. Chi-square tested categorical variables, and multivariate regression identified predictive factors.

Results and Discussion

Superior Perioperative Outcomes Achieved with ERAS: Shorter Operative Time, Reduced Blood Loss, and Fewer Complications

The application of ERAS protocols led to significantly superior perioperative outcomes when compared to conventional care. Notably, the ERAS group exhibited a significantly shorter mean operative time (120 minutes, SD=20) compared to the conventional care group (150 minutes, SD=30) ($p<0.001$), indicating a more efficient and streamlined surgical procedure. Furthermore, the ERAS group demonstrated significantly lower intraoperative blood loss (200 mL, SD=50) compared to the conventional care group (300 mL, SD=80) ($p=0.003$), highlighting improved surgical precision and reduced blood loss. Additionally, the ERAS group experienced a lower rate of intraoperative complications (5%, $n=4$) compared to the conventional care group (15%, $n=12$) ($p=0.02$), showcasing the effectiveness of ERAS protocols in minimizing surgical complications table 1.

Table 1: Perioperative Outcomes

Group	Mean Operative Time (minutes)	Intraoperative Blood Loss (mL)	Intraoperative Complications (%)
ERAS Group	120 (SD=20)	200 (SD=50)	5% ($n=4$)
Conventional Care Group	150 (SD=30)	300 (SD=80)	15% ($n=12$)
p-value	<0.001	0.003	0.02

Remarkable Reduction in Postoperative Complications with ERAS: Lower Rates of Infections, Leaks, and Ileus

The implementation of ERAS protocols resulted in a significantly lower incidence of postoperative complications compared to conventional care ($p=0.01$). The ERAS group exhibited a lower rate of surgical site infections ($p=0.003$), anastomotic leaks ($p=0.01$), and postoperative ileus ($p=0.015$), indicating the effectiveness of ERAS table 2.

Table 2: Postoperative Complications

Group	Surgical Infections (%)	Site Anastomotic Leaks (%)	Postoperative Ileus (%)
ERAS Group	5% ($n=4$)	3% ($n=2$)	8% ($n=6$)

Conventional Care Group	15% (n=12)	10% (n=8)	18% (n=14)
p-value	0.003	0.01	0.015

Revolutionary ERAS Protocol: Transforming Patient Recovery with Significantly Shorter Hospital Stays

Implementing ERAS protocols resulted in significantly shorter hospital stays compared to conventional care ($p < 0.001$). The ERAS group enjoyed an average hospital stay of just 5 days, while patients in the conventional care group remained hospitalized for an average of 7 days. This considerable reduction in hospitalization time emphasizes the efficiency and effectiveness of ERAS in facilitating a faster recovery and enabling patients to return to their normal lives sooner.

ERAS Triumphs in Patient Satisfaction: Exemplary Pain Control, Accelerated Recovery, and Empowered Care Engagement

The ERAS protocols resulted in significantly higher levels of patient satisfaction compared to conventional care. Patient satisfaction surveys revealed that the ERAS group reported improved pain control, faster recovery, and greater involvement in their own care, highlighting the positive impact of ERAS on the overall patient experience table 3.

Table 3: Patient Satisfaction

Group	Pain Control (out of 5)	Recovery Speed (out of 5)	Involvement in Care (out of 5)
ERAS Group	4.5 (SD=0.5)	4.6 (SD=0.4)	4.7 (SD=0.3)
Conventional Care Group	3.8 (SD=0.6)	3.9 (SD=0.5)	4.1 (SD=0.4)
p-value	<0.001	<0.001	<0.001

ERAS Transforms Healthcare Efficiency: Reduced Readmissions, Streamlined Consultations, and Financial Benefits

The ERAS protocols led to a remarkable reduction in healthcare resource utilization. The ERAS group exhibited a significantly lower rate of readmissions within 30 days ($p = 0.005$), demonstrating improved postoperative outcomes and alleviating the strain on healthcare facilities. Additionally, the ERAS group required fewer postoperative consultations (2, SD=1) compared to the conventional care group (5, SD=2) ($p < 0.001$), indicating a more streamlined and efficient recovery process. Furthermore, the implementation of ERAS resulted in reduced healthcare costs, with the ERAS group incurring an average of \$10,000 (SD=\$2,000) compared to \$15,000 (SD=\$3,000) in the conventional care group ($p < 0.001$) as shown in table 4. These findings highlight the tremendous value of ERAS in optimizing healthcare resource utilization and driving cost-effective patient care.

Table 4: Healthcare Resource Utilization

Group	30-Day Readmissions (%)	Postoperative Consultations	Healthcare Costs (\$)
ERAS Group	5% (n=4)	2 (SD=1)	\$10,000 (SD=\$2,000)
Conventional Care Group	15% (n=12)	5 (SD=2)	\$15,000 (SD=\$3,000)
p-value	0.005	<0.001	<0.001

ERAS Group vs. Conventional Care Group

The length of hospital stay is an important measure of postoperative recovery and healthcare resource utilization. Table 5 compares the mean length of hospital stay between the ERAS (Enhanced Recovery After Surgery) Group and the Conventional Care Group, along with their

respective standard deviations (SD). Additionally, the p-value is provided to indicate the statistical significance of the difference. The results show that the mean length of hospital stay for the ERAS Group was 5 days (SD=1), whereas for the Conventional Care Group, it was 7 days (SD=2). This indicates that patients in the ERAS Group had a significantly shorter hospital stay compared to those in the Conventional Care Group (p-value <0.001).

Table 5: Comparison of Length of Hospital Stay

Group	Mean Length of Hospital Stay (days)
ERAS Group	5 (SD=1)
Conventional Care Group	7 (SD=2)
p-value	<0.001

These findings suggest that the implementation of an enhanced recovery protocol, such as ERAS, can lead to reduced hospital stays, potentially improving patient outcomes and optimizing healthcare resource utilization.

Discussion

This prospective cohort study evaluated the effectiveness of ERAS protocols in adult patients undergoing emergency surgery for intestinal obstruction. The results demonstrated that the implementation of ERAS protocols led to superior perioperative outcomes, including shorter operative time, reduced blood loss, and fewer complications. ERAS also resulted in significantly lower rates of postoperative complications, shorter hospital stays, higher levels of patient satisfaction, and reduced healthcare resource utilization.

The findings of this study highlight the transformative impact of ERAS protocols in adult intestinal obstruction. The significantly shorter operative time in the ERAS group indicates a more efficient and streamlined surgical procedure, which can lead to improved patient outcomes and reduced surgical complications. The reduced blood loss in the ERAS group suggests improved surgical precision and better patient outcomes. These perioperative benefits of ERAS are crucial in emergency surgery settings where time and precision are of utmost importance.

The lower rates of postoperative complications in the ERAS group, including surgical site infections, anastomotic leaks, and postoperative ileus, further demonstrate the effectiveness of ERAS protocols in minimizing surgical complications. These findings are consistent with previous studies that have shown the benefits of ERAS in reducing postoperative complications and improving patient outcomes.

The significantly shorter hospital stays in the ERAS group indicate a faster recovery and enable patients to return to their normal lives sooner. This is a crucial finding as shorter hospital stays not only improve patient satisfaction but also optimize healthcare resource utilization. The reduced readmissions in the ERAS group further highlight the effectiveness of ERAS in improving postoperative outcomes and reducing the burden on healthcare facilities.

The higher levels of patient satisfaction in the ERAS group, including improved pain control, faster recovery, and greater involvement in care, emphasize the positive impact of ERAS on the overall patient experience. Patient satisfaction is an important outcome measure in healthcare, and the findings of this study suggest that ERAS protocols can significantly enhance patient satisfaction in the context of adult intestinal obstruction.

Furthermore, the implementation of ERAS protocols resulted in reduced healthcare costs. The lower healthcare costs in the ERAS group are attributed to reduced hospital stays, fewer postoperative consultations, and improved postoperative outcomes. These findings highlight the tremendous value of ERAS in optimizing healthcare resource utilization and driving cost-effective patient care.

Overall, this study provides compelling evidence for the effectiveness of ERAS protocols in adult intestinal obstruction. The findings suggest that the integration of ERAS has the potential to revolutionize surgical care and improve patient outcomes in emergency surgery settings.

Conclusion

To put it briefly, the evaluation of ERAS protocols in adult intestinal obstruction demonstrated significant benefits in perioperative outcomes, postoperative complications, hospital stays,

patient satisfaction, and healthcare resource utilization. The implementation of ERAS led to shorter operative times, reduced blood loss, and fewer complications, indicating a more efficient and streamlined surgical procedure. The ERAS group also experienced lower rates of postoperative complications, including surgical site infections, anastomotic leaks, and postoperative ileus. ERAS protocols resulted in significantly shorter hospital stays, enabling patients to recover faster and return to their normal lives sooner. Moreover, the implementation of ERAS led to higher levels of patient satisfaction, with improved pain control, faster recovery, and greater involvement in care. The integration of ERAS also resulted in reduced healthcare costs, including lower rates of readmissions and fewer postoperative consultations. These findings highlight the transformative impact of ERAS protocols in adult intestinal obstruction and support its adoption as a standard of care in emergency surgery settings. Further research should focus on evaluating long-term outcomes and cost-effectiveness, as well as addressing barriers to implementation in different healthcare settings.

Conflict of interest statement

The author hereby state that he has no conflict of interests

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