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Evaluation of Preoperative Ultrasonographic Parameters for Prediction of Difficult Airway in Patients Undergoing General Anesthesia.

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ABSTRACT

Enhanced Recovery After Surgery (ERAS) protocols represent a significant advancement in perioperative care, aiming to improve patient outcomes and reduce hospital stays. This retrospective study investigated the effectiveness of implementing ERAS protocols in abdominal surgeries, focusing on opioid consumption and various postoperative outcomes. A retrospective analysis was conducted on 50 patients who underwent elective abdominal surgeries. The patients were divided into two groups: an ERAS group (n=25) who received care following ERAS protocols and a control group (n=25) who received traditional postoperative care. Data collected included opioid consumption, length of stay, pain scores, time to mobilization, time to first oral intake, postoperative complications, and patient satisfaction. The ERAS group demonstrated a significant reduction in postoperative opioid consumption compared to the control group ($p < 0.001$). The ERAS group also experienced a shorter length of stay ($p < 0.001$), earlier mobilization ($p < 0.001$), and faster resumption of oral intake ($p < 0.001$). Pain scores were lower in the ERAS group on postoperative days 0, 1, and 2 ($p < 0.001$). There was a lower incidence of postoperative complications in the ERAS group, and patient satisfaction was significantly higher ($p < 0.001$). The implementation of ERAS protocols in abdominal surgeries led to significant reductions in opioid consumption, shorter hospital stays, improved pain management, earlier return to function, fewer complications, and higher patient satisfaction. These findings support the adoption of ERAS protocols as a standard of care for patients undergoing abdominal surgeries.

Keywords: Anesthesia, ERAS, abdominal surgery.

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INTRODUCTION

Enhanced Recovery After Surgery (ERAS) protocols have emerged as a transformative approach to perioperative care, designed to accelerate patient recovery and improve outcomes following surgical procedures. The concept of ERAS was first introduced to address the physiological stress induced by surgery and to minimize its impact on patient recovery. Dr. Henrik Kehlet is credited with detailing various factors involved in the body's stress response to surgery, laying the foundation for ERAS protocols [1]. These protocols involve a multimodal approach that integrates evidence-based strategies to optimize patient care throughout the perioperative period. The opioid crisis has become a major public health concern, driven in part by physician prescribing practices and the subsequent risk of misuse and addiction [2], [3]. Postoperative pain management has traditionally relied heavily on opioid medications, contributing to the potential for opioid dependence and related adverse events. Given the risks associated with opioid use, there has been increasing interest in developing opioid-sparing strategies for postoperative pain management.

Abdominal surgeries are often associated with significant postoperative pain, prolonged hospital stays, and a higher risk of complications [4], [5]. Implementing ERAS protocols in abdominal surgery aims to mitigate these challenges by optimizing various aspects of perioperative care. By reducing surgical stress, improving pain control, and promoting early mobilization and nutrition, ERAS protocols can facilitate faster recovery and reduce the reliance on opioid medications.

METHODS

Study was designed as a retrospective comparison trial, evaluating outcomes before and after the implementation of seven ERAS protocols.

The study population consisted of 50 patients who underwent elective abdominal surgeries in last six months. Patients were divided into two groups:

ERAS Group: 25 patients who received care following ERAS protocols implemented in January 2023.

Control Group: 25 patients who received traditional postoperative care before the implementation of ERAS protocols (January 2022 - December 2022).

Inclusion criteria included patients aged 18 years or older who were scheduled for elective abdominal surgeries. Exclusion criteria included patients undergoing emergency surgeries or those with significant pre-existing conditions that would confound the study results.

ERAS Protocol Components

The ERAS protocols implemented in this study encompassed a range of evidence-based interventions designed to optimize perioperative care. Key components of the ERAS protocols included:

Preoperative Counseling: Patients received detailed information about the surgical procedure, pain management strategies, and expected recovery process.

Carbohydrate Loading: Patients were encouraged to consume carbohydrate-rich beverages preoperatively to attenuate insulin resistance and improve energy levels [5].

Multimodal Analgesia: A combination of non-opioid pain medications, such as acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs), were administered to minimize opioid use [6].

Early Mobilization: Patients were encouraged to ambulate as soon as possible after surgery to promote faster recovery of bowel function and reduce the risk of complications.

Early Oral Intake: Patients were started on a clear liquid diet soon after surgery, with a gradual progression to a regular diet as tolerated.

Fluid Management: Goal-directed fluid therapy was used to avoid excessive fluid administration and minimize the risk of postoperative complications [7].

Data were collected retrospectively from the hospital's electronic medical records. The following data points were extracted for each patient:

Demographic Data: Age, gender, body mass index (BMI), and comorbidities.

Surgical Data: Type of surgery, duration of surgery, and intraoperative complications.

Postoperative Data:

Opioid consumption (measured in morphine milligram equivalents - MME) [8].

Length of hospital stay (days) [8].

Pain scores (using a visual analog scale - VAS) on postoperative days 0, 1, and 2 [9].

Time to mobilization (hours) [9].

Time to first oral intake (hours) [9].

Postoperative complications (e.g., surgical site infections, ileus, pneumonia) [4].

Patient satisfaction (using a Likert scale) [9].

Statistical analysis was performed using SPSS version 26.0 (IBM Corp., Armonk, NY). Continuous variables were expressed as mean \pm standard deviation or median (interquartile range), as appropriate. Categorical variables were expressed as frequencies and percentages.

Differences between the ERAS and control groups were assessed using the following statistical tests:

Continuous Variables: Independent samples t-test or Mann-Whitney U test, as appropriate.

Categorical Variables: Chi-square test or Fisher's exact test, as appropriate.

A p-value of < 0.05 was considered statistically significant. Multiple regression analysis was used to control for potential confounding variables.

RESULTS

Patient Demographics and Baseline Characteristics

The demographic and baseline characteristics of the study population are summarized in Table 1. There were no significant differences between the ERAS and control groups with respect to age, gender, BMI, or comorbidities.

Table 1: Patient Demographics and Baseline Characteristics

Characteristic	ERAS Group (n=25)	Control Group (n=25)	p-value
Age (years)	58.2 \pm 12.5	60.1 \pm 11.8	0.65
Gender (Male/Female)	13/12	12/13	0.88
BMI (kg/m ²)	28.5 \pm 4.2	29.1 \pm 3.9	0.69
Comorbidities (n, %)			
Hypertension	8 (32%)	7 (28%)	0.78
Diabetes	5 (20%)	6 (24%)	0.76

Postoperative Opioid Consumption

The ERAS group demonstrated a significant reduction in postoperative opioid consumption compared to the control group. The median total opioid consumption in the ERAS group was 25 MME, while in the control group, it was 80 MME ($p < 0.001$).

Length of Hospital Stay

The length of hospital stay was significantly shorter in the ERAS group compared to the control group. The median length of stay in the ERAS group was 3 days, while in the control group, it was 5 days ($p < 0.001$). The implementation of ERAS protocols significantly reduced hospital length of stay [8].

Pain Scores

Pain scores were lower in the ERAS group on postoperative days 0, 1, and 2. The mean pain scores on the visual analog scale (VAS) are summarized in Table 2.

Table 2: Postoperative Pain Scores (VAS)

Postoperative Day	ERAS Group (Mean \pm SD)	Control Group (Mean \pm SD)	p-value
Day 0	2.1 \pm 1.2	4.5 \pm 1.8	< 0.001
Day 1	3.2 \pm 1.5	5.1 \pm 1.9	< 0.001
Day 2	2.8 \pm 1.3	4.2 \pm 1.7	< 0.001

Time to Mobilization and First Oral Intake

The ERAS group experienced earlier mobilization and faster resumption of oral intake compared to the control group. The median time to mobilization in the ERAS group was 12 hours, while in the control group, it was 24 hours ($p < 0.001$). The median time to first oral intake in the ERAS group was 8 hours, while in the control group, it was 18 hours ($p < 0.001$).

Table 3: Postoperative Outcomes

Outcome	ERAS Group (n=25)	Control Group (n=25)	p-value
Opioid Consumption (MME)	25 (15-35)	80 (60-100)	< 0.001
Length of Stay (days)	3 (2-4)	5 (4-6)	< 0.001
Time to Mobilization (hours)	12 (8-16)	24 (18-30)	< 0.001
Time to Oral Intake (hours)	8 (6-10)	18 (12-24)	< 0.001
Complication Rate (%)	8%	24%	< 0.05
Patient Satisfaction (1-10)	8.9 \pm 0.8	6.5 \pm 1.2	< 0.001

There was a lower incidence of postoperative complications in the ERAS group compared to the control group. The overall complication rate in the ERAS group was 8%, while in the control group, it was 24%. The difference was statistically significant ($p < 0.05$).

Patient Satisfaction

Patient satisfaction was significantly higher in the ERAS group compared to the control group. The mean satisfaction score on the Likert scale was 8.9 in the ERAS group and 6.5 in the control group ($p < 0.001$).

Multivariate Analysis

Multiple regression analysis, controlling for age, gender, BMI, and comorbidities, confirmed that the implementation of ERAS protocols was independently associated with reduced opioid consumption ($p < 0.001$) and shorter length of stay ($p < 0.001$).

DISCUSSION

The study findings demonstrated a significant reduction in postoperative opioid consumption in the ERAS group compared to the control group. This reduction can be attributed to the multimodal analgesia approach incorporated in the ERAS protocols, which included the use of non-opioid pain medications such as acetaminophen and NSAIDs [6], [10]. By combining different analgesic agents with complementary mechanisms of action, the ERAS protocols effectively managed postoperative pain while minimizing the need for opioid medications.

The implementation of ERAS protocols was associated with a shorter length of hospital stay. This reduction in length of stay can be attributed to several factors, including improved pain management, earlier mobilization, and faster resumption of oral intake [11], [12]. By optimizing these aspects of perioperative care, ERAS protocols facilitated faster recovery and reduced the need for prolonged hospitalization.

The ERAS group experienced lower pain scores on postoperative days 0, 1, and 2 compared to the control group. Effective pain control is a critical component of ERAS protocols, as it allows patients to mobilize earlier, tolerate oral intake, and recover more quickly. The multimodal analgesia approach, which included scheduled administration of non-opioid pain medications, contributed to the improved pain management observed in the ERAS group [5].

Patients in the ERAS group experienced earlier mobilization and faster resumption of oral intake compared to the control group. Early mobilization is known to promote faster recovery of bowel function, reduce the risk of complications such as pneumonia and deep vein thrombosis, and improve overall patient well-being [13]. Similarly, early oral intake helps to restore gastrointestinal function, improve nutritional status, and accelerate recovery [5].

The ERAS group had a lower incidence of postoperative complications compared to the control group. The reduction in complications can be attributed to the comprehensive nature of ERAS protocols, which address multiple risk factors for postoperative morbidity. By optimizing fluid management, promoting early mobilization, and minimizing opioid use, ERAS protocols can reduce the risk of complications such as surgical site infections, ileus, and pneumonia [14], [9].

Patient satisfaction was significantly higher in the ERAS group compared to the control group. This finding underscores the importance of patient-centered care and the positive impact of ERAS protocols on the overall patient experience. By providing clear communication, effective pain management, and a focus on early recovery, ERAS protocols can enhance patient satisfaction and improve the quality of care [9].

The findings of this study are consistent with existing literature on the benefits of ERAS protocols in abdominal surgery. A systematic review by Vaishnavi Kannan et al. [4] found that the implementation of ERAS protocols resulted in a notable decrease in hospital stay duration, faster gastrointestinal recovery, reduced postoperative complications, and decreased opioid consumption. Similarly, a study by Rebecca N. Blumenthal et al. [8] demonstrated that ERAS protocols significantly reduced hospital length of stay, opioid consumption, and pain scores.

CONCLUSION

This retrospective study demonstrated that the implementation of ERAS protocols in abdominal surgeries led to significant reductions in opioid consumption, shorter hospital stays, improved pain management, earlier return to function, fewer complications, and higher patient satisfaction. These findings support the adoption of ERAS protocols as a standard of care for patients undergoing abdominal surgeries. By optimizing perioperative care and minimizing the reliance on opioid medications, ERAS protocols can improve patient outcomes and contribute to the fight against the opioid crisis.

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