Application of Enhanced Recovery After Surgery in Patients Undergoing Gynecological Laparoscopic Surgery: Postprint

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Abstract

Objective: To investigate the efficacy of Enhanced Recovery After Surgery (ERAS) in patients undergoing gynecological laparoscopic surgery. Methods: We retrospectively collected data from 87 patients who underwent laparoscopic surgery in the gynecology department between July 2020 and June 2021. Forty-five patients admitted from July to December 2020 were assigned to the control group, and 42 patients admitted from January to June 2021 were assigned to the ERAS group. The control group received conventional perioperative nursing care, while the ERAS group received ERAS-based nursing interventions. Intraoperative parameters recorded for both groups included operation time, intraoperative blood loss, and hemoglobin (Hb) reduction. Postoperative parameters included time to first postoperative ambulation, time to first flatus, length of hospital stay, 12-hour postoperative Visual Analogue Scale (VAS) pain score, and incidence of postoperative complications (nausea and vomiting, shoulder and neck pain, abdominal distension). Results: The ERAS group exhibited a significantly shorter operation time compared with the control group ($P<0.05$). The ERAS group also demonstrated significantly shorter times to first flatus and first postoperative ambulation, a shorter length of hospital stay, and lower 12-hour postoperative VAS scores than the control group ($P<0.01$). The incidence rates of postoperative nausea and vomiting, shoulder and neck pain, and abdominal distension were significantly lower in the ERAS group than in the control group ($P<0.05$). Conclusion: Implementation of ERAS-based enhanced recovery nursing for patients undergoing gynecological laparoscopic surgery can effectively accelerate postoperative recovery, reduce postoperative pain and complication risk, and shorten hospitalization duration.

Full Text

Application of Enhanced Recovery After Surgery for Patients Undergoing Gynecologic Laparoscopy

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Abstract

Objective To explore the application effect of Enhanced Recovery After Surgery (ERAS) in patients undergoing gynecological laparoscopy.
Methods A retrospective analysis was conducted on patients who underwent gynecological laparoscopic surgery. According to the sequence of hospital admissions, patients were assigned to a control group receiving routine perioperative care and an ERAS group receiving ERAS-based nursing interventions. Primary outcomes included intraoperative indexes (operation time, intraoperative blood loss, and decrease in hemoglobin), postoperative indexes (time to first ambulation, time to first flatus, length of stay, Visual Analogue Scale [VAS] pain score at postoperative hour), and postoperative complications such as nausea and vomiting, shoulder/neck pain, and abdominal distension.
Results The ERAS group demonstrated significantly shorter operation time compared with the control group ($P<0.05$). Patients in the ERAS group had earlier time to first flatus, earlier postoperative ambulation, and shorter hospital stay, with lower VAS scores at postoperative hour ($P<0.05$). The incidences of nausea and vomiting, shoulder pain, and abdominal distension in the ERAS group were significantly lower than those in the control group ($P<0.05$).
Conclusion ERAS-based nursing care is effective in improving postoperative recovery for gynecological laparoscopy patients, reducing postoperative pain and complications, and shortening hospital stay.

Keywords: enhanced recovery after surgery; gynecology; laparoscopy; pain; perioperative nursing

Introduction

Enhanced Recovery After Surgery (ERAS) was first proposed by Danish anesthesiologist Kehlet in 1997. This multimodal approach, integrating surgery, anesthesia, nursing, and nutrition, reduces perioperative stress responses and minimizes physiological and psychological trauma from surgery. Currently, ERAS has been widely applied in clinical practice. The *ERAS Nursing Guidelines: Preoperative, Intraoperative, and Postoperative Care in Gynecology/Oncology Surgery* has demonstrated excellent clinical outcomes in the gynecological domain. ERAS combines multidisciplinary expertise to benefit patients through optimized perioperative management. This study investigates the application effects of ERAS in gynecological laparoscopy patients.

1. Materials and Methods

1.1 Study Design and Participants

This retrospective study included patients who underwent gynecological laparoscopic surgery. Patients admitted during the study period were assigned to the control group, while patients admitted during a subsequent period were included in the ERAS group.

Inclusion criteria: (1) Age >18 years; (2) No metabolic diseases such as hypertension, hyperthyroidism, or hypothyroidism; (3) Preoperative hemoglobin (Hb) >100 g/L; (4) Body mass index (BMI) >18.5 kg/m^2; (5) Met indications for laparoscopic surgery; (6) Provided informed consent.

Exclusion criteria: (1) Malignant tumors; (2) Gynecological diseases combined with other critical illnesses; (3) Incomplete research data.

The ERAS group comprised patients with a mean age of () years, while the control group had patients with a mean age of () years. Surgical procedures included laparoscopic adhesiolysis (ERAS group: cases; control group: cases) and combined laparoscopic-hysteroscopic procedures (ERAS group: cases; control group: cases). In the ERAS group, cases involved acute ovarian cyst torsion requiring conversion to open surgery, while the control group had cases with similar conversions. Other comorbidities were also documented.

1.2 Interventions

Control group: Received conventional perioperative nursing interventions, including fasting, skin preparation, and indwelling catheter placement. The intraoperative environment was maintained sterile with close monitoring of vital signs. Postoperatively, patients remained in supine position for hours, received anti-inflammatory treatment, and were administered % glucose injection, glucose-sodium chloride injection, or compound electrolyte glucose injection (mL). The urinary catheter was retained for hours, with removal based on patient condition. A liquid diet was permitted after anal flatus, progressing to semi-solid and then minimal solid food as tolerated.

ERAS group: Received ERAS-based nursing interventions.

Preoperative care: Patients accessed preoperative education materials via WeChat QR codes, supplemented by oral instruction from nurses and attending physicians, and provided informed consent. Preoperative blood glucose was controlled at mmol/L. Patients with hypertension history underwent close blood pressure monitoring until stable before surgery. For skin preparation, patients with sparse hair and no skin lesions required only umbilical cleaning with paraffin oil and showering; those with dense hair underwent hair removal within a cm radius of the umbilicus. No special bowel preparation, enemas, or oral laxatives were administered. Non-diabetic patients received carbohydrate clear liquid nutrition hours before surgery. Caprini thrombosis risk assessment

was performed, with moderate- and high-risk patients (Caprini score > points) receiving elastic stockings.

Intraoperative care: Combined intravenous-general anesthesia or combined epidural anesthesia was administered. Core body temperature was monitored and maintained above °C. Balanced salt solution was preferred for fluid management to maintain input-output balance, with intraoperative blood pressure maintained at no less than preoperative baseline levels.

Postoperative care: Upon returning to the ward, patients did not require pillow removal. They were assisted with turning, could chew gum to increase saliva production and stimulate gastrointestinal activity, and received passive lower extremity massage from family members. After hours, patients could assume free positioning. Following infusion completion, patient status was assessed to guide early ambulation. Pain was evaluated using the Visual Analogue Scale (VAS). Patients without nausea or vomiting received liquid diet hours after surgery, progressing to regular diet after anal flatus. Patients with persistent nausea/vomiting (including ≥ episodes) received intramuscular metoclopramide injection (mg). Urinary catheters were removed hours after infusion completion or based on individualized assessment.

1.3 Outcome Measures

Intraoperative indicators: Operation time, intraoperative blood loss, and hemoglobin (Hb) reduction.

Postoperative indicators: Time to first ambulation, time to first flatus, length of stay, VAS pain score at postoperative hour, and incidence of postoperative complications (nausea/vomiting, shoulder/neck pain, abdominal distension).

1.4 Statistical Analysis

SPSS software was used for statistical analysis. Continuous variables were expressed as mean ± standard deviation (x±s) and compared between groups using t-tests. Categorical variables were expressed as percentages (%) and analyzed using ^{2} tests. Statistical significance was set at $P<0.05$.

2. Results

2.1 Intraoperative Outcomes

As shown in , the ERAS group had significantly shorter operation time compared with the control group ($P<0.05$). Intraoperative Hb reduction was higher in the ERAS group than in the control group ($P<0.05$), while no significant difference was observed in intraoperative blood loss between the two groups ($P>0.05$).

Comparison of Intraoperative Indicators Between Two Groups (x±s)

Group n	Intraoperative Hb Reduction (g/L)	Intraoperative Blood Loss (mL)	Operation Time (min)
ERAS Group			
Control Group			

2.2 Postoperative Outcomes

The ERAS group demonstrated significantly earlier time to first flatus, earlier postoperative ambulation, and shorter hospital stay compared with the control group. Additionally, VAS scores at postoperative hour were significantly lower in the ERAS group (P<0.05) .

Comparison of Postoperative Indicators Between Two Groups (x±s)

Group n	Time to Flatus (h)	Time to First Ambulation (h)	Length of Stay (d)	VAS Score (points)
ERAS Group				
Control Group				

2.3 Postoperative Complications

The incidence of postoperative nausea/vomiting, shoulder pain, and abdominal distension in the ERAS group was significantly lower than that in the control group (P<0.05) .

Postoperative Complications [n(%)]

Group	n	Nausea/Vomiting	Shoulder Pain	Abdominal Distension
ERAS Group				
Control Group				

3. Discussion

Gynecological laparoscopy has gained widespread acceptance due to its advantages of minimal trauma, rapid recovery, reduced bleeding, and shorter operative time. ERAS effectively reduces surgical stress responses and minimizes disruption to organ systems and endocrine function, thereby promoting postoperative recovery. Through multidisciplinary collaboration and rational planning

of preoperative, intraoperative, and postoperative care, ERAS significantly enhances recovery and reduces postoperative complication risk, particularly when combined with gynecological laparoscopy to improve patient comfort.

In this study, the ERAS group showed significantly earlier time to first flatus, earlier ambulation, shorter hospital stay, and lower VAS scores at postoperative hour compared with the control group ($P<0.05$). These findings can be attributed to several factors. First, the ERAS group received more personalized, comprehensive nursing care that holistically addressed patient physiological status before and after surgery. Effective preoperative education alleviated anxiety, fear, and tension, helping patients understand their role in the recovery process and gaining family support. This study found that educating family members, encouraging early ambulation and bed activities, and providing passive massage effectively reduced lower extremity venous thrombosis risk and promoted early recovery.

Postoperative pain management is a crucial component of ERAS, including VAS assessment and reduced opioid use. Timely education and explanation for family members further enhance rapid recovery effects. This study implemented preoperative and postoperative education to improve patient and family understanding of disease and recovery, thereby alleviating anxiety and fear. Additionally, training patients and families in acupoint selection and massage technique—particularly massage of the Neiguan point—effectively relieved nausea and vomiting symptoms and promoted gastrointestinal function.

Research indicates that shortened preoperative fasting time strengthens postoperative recovery by reducing patient tension, alleviating metabolic stress, and shortening hospital stay. This study administered carbohydrate clear liquid nutrition hours before surgery, maintaining gastrointestinal motility. Postoperative gum chewing stimulated saliva production and gastrointestinal activity, shortening time to first flatus. Removal of urinary catheters after infusion completion reduced patient discomfort and prompted timely ambulation when bladder distension occurred, enhancing voiding awareness, increasing activity frequency, and promoting gastrointestinal motility to shorten time to flatus.

Compared with traditional open surgery, laparoscopic procedures involve smaller incisions and shorter operative times. Studies have shown that laparoscopic surgery reduces hospital stay and postoperative complications. In this study, intraoperative Hb reduction differed significantly between groups ($P<0.05$). Although patients with low Hb were excluded or corrected before the study, disease severity and preoperative/intraoperative variations may have influenced results.

The ERAS group also demonstrated significantly lower incidence of postoperative nausea/vomiting, shoulder pain, and abdominal distension ($P<0.05$). Major risk factors for postoperative nausea/vomiting include female gender, age, motion sickness history, previous nausea/vomiting susceptibility, prolonged anesthesia, and opioid use. While this study showed clear results, other confounding

factors cannot be excluded. Research suggests that prophylactic antiemetic use before gynecological laparoscopy can relieve vomiting in % of patients. Active and timely postoperative antiemetic administration is an effective method to improve complications.

Postoperative shoulder pain and abdominal distension are associated with several factors: limited surgical field, CO_2 pneumoperitoneum, retained drainage tubes restricting gastrointestinal function, incomplete bowel preparation, and residual gas. This study did not involve abdominal drainage, and patients had stable preoperative conditions without inflammatory reactions. However, without stratification by surgical type and specific conditions, other influencing factors cannot be excluded.

In summary, applying ERAS in gynecological laparoscopy effectively reduces postoperative complications, accelerates recovery, shortens hospital stay, and improves overall postoperative comfort, representing a valuable clinical approach.

Conflict of Interest Statement: The authors declare no conflict of interest.

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Note: Figure translations are in progress. See original paper for figures.