

Research Article

Application of the ERAS Approach in Peri-operative Care for Patients Undergoing SV-VATS: A Review

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Abstract

Objective: To conduct a systematic review on the utilization of the Enhanced Recovery After Surgery (ERAS) concept in the peri-operative nursing care for patients having spontaneous ventilation video-assisted thoracic surgery (SV-VATS), and present a reference for formulating clinical pathways suited to the domestic context. **Methods:** A comprehensive literature review was carried out to obtain and examine research regarding ERAS implementation in SV-VATS perioperative care. **Results:** Present evidence shows that through optimizing pre-operative assessment and preparation, intra-operative nursing cooperation, and post-operative rehabilitation actions, ERAS protocols can efficiently shorten the post-operative hospital stay, lower complication rates, and remarkably enhance patients quality of life. **Conclusion:** Currently, no unified standard exists for the specific implementation of ERAS in the peri-operative phase of SV-VATS. Future high-level research is needed to improve ERAS strategies and establish standardized evaluation criteria.

Keywords

Enhanced Recovery After Surgery (ERAS), Self-ventilating Video-assisted Thoracic Surgical Procedure (SV-VATS), Perioperative Nursing and Care, Evaluation

1. Introduction

The idea of Enhanced Recovery After Surgery (ERAS), first proposed by the Danish surgeon Kehlet in 1997, shows a shift in the model of peri-operative care [1]. Its importance in modern nursing practice has become increasingly prominent, and its successful application has expanded from the original colorectal surgeries to various fields like orthopedics, urology, and thoracic surgery [2].

Simultaneously, spontaneous ventilation video-assisted thoracic surgery (SV-VATS) has emerged as a significant ad-

vancement in minimally invasive thoracic surgery. By performing operations under general anesthesia without endotracheal intubation and combining it with local anesthesia, SV-VATS preserves spontaneous breathing and avoids muscle relaxants. This approach offers advantages when compared to conventional thoracotomy and traditional single-lung ventilation VATS. These advantages include fewer injuries, reduced airway instrumentation, and less pulmonary problems [3]. As a result, the full integration of ERAS concepts into the peri-operative care of SV-VATS patients has become an important

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Received: 15 July 2026; **Accepted:** 24 August 2026; **Published:** 4 September 2026



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area of focus in clinical practice and academic studies. The ERAS approach, by integrating multidisciplinary resources and establishing standardized nursing pathways, effectively addresses the limitations of traditional nursing models and provides patients with more scientific and efficient perioperative care [4].

2. Materials and Methods

This research is a comprehensive literature examination. An all-around literature exploration was carried out by utilizing electronic databases such as PubMed, Web of Science, CNKI, and Wanfang Data to find relevant research works released from January 2020 to December 2025. The employed search approach utilized a blend of keywords and Medical Subject Headings (MeSH) terms associated with Enhanced Recovery After Surgery, ERAS, Spontaneous Ventilation Video-Assisted Thoracic Surgery, SV-VATS, non-intubated thoracoscopic surgery, perioperative nursing, and thoracic surgery.

Inclusion criteria included: (1) clinical guidelines, randomized controlled trials (RCTs), cohort studies, and case-control research; (2) studies concentrating on the utilization of ERAS principles during the perioperative phase for patients having SV-VATS or relevant thoracoscopic operations; and (3) studies presenting at least one outcome measure like duration of hospital stay, complication frequencies, pain scores, or quality of life. Research studies were eliminated if they were individual case reports, conference abstracts lacking the full-length text, or not accessible in either English or Chinese.

3. Results

3.1. Preoperative Assessment and Preparation

3.1.1. Preoperative Smoking Cessation

Evidence indicates that the negative pulmonary impacts of smoking can be notably mitigated around four weeks after quitting, thus promoting postoperative recuperation. Research shows that smokers who undergo lung resection have a rate of postoperative pulmonary complications that is about two times that of non-smokers or individuals who have stopped smoking for over four weeks [5]. Even though there isn't a comprehensive consensus on the optimal duration of preoperative abstinence, a period of four weeks is regarded as a reasonable balance between safety and rehabilitation benefits, which aligns with the primary ERAS goals of reducing stress and promoting recovery [6].

3.1.2. Preoperative Preventive Respiratory Training

Specific actions, such as deep-breath training, effective cough drill, and aerobic physical activities, can strengthen respiratory muscles, enhance pulmonary ventilation, and lower the incidence of postoperative pulmonary issues [7]. Systemic

respiratory exercise can not only boost surgical tolerance but also help in decreasing postoperative problems and improving long-term life quality.

3.1.3. Preoperative Psychological Intervention

Pre-operative Patient instruction represents a crucial factor. It encompasses detailed accounts of the surgical procedure, expected outcomes, and precautionary steps to ease the unease about the unknown [8]. Significantly, customized strategies should be devised considering factors like personality traits and cultural background to achieve the optimal results.

3.1.4. Preoperative Nutritional Assessment and Intervention

Customized nutritional assistance can effectively reduce infection frequencies, shorten hospital durations, and improve the quality of life [9]. The NRS-2002 Nutritional Risk Assessment scale can identify high-risk patients for targeted interventions. The most up-to-date guidelines released by the European Society for Clinical Nutrition and Metabolism (ESPEN) emphasize that nutritional assessment and appropriate interventions are vital for the comprehensive management of patients [10].

3.1.5. Optimization of Preoperative Fasting and Fluid Restriction

Current anesthetic recommendations allow patients to consume easily-digestible foods within 6 hours and clear fluids within 2 hours before induction. This helps prevent pre-operative fluid loss without increasing aspiration-related complications [11]. Pre-operative carbohydrate intake is a well-known crucial component of ERAS [12].

3.2. Intraoperative Nursing Cooperation

3.2.1. Intraoperative Temperature Management

The main aim of temperature management during surgery is to keep the body temperature steady and prevent the negative impacts of low body temperature on the recovery after the operation. During the operation, hypothermia may result in a decreased metabolic rate, coagulation dysfunctions, and immunosuppression [13]. Comprehensive warming approaches involve forced-air warming covers, fluid heating devices, and proper regulation of the operating rooms temperature, along with real-time temperature tracking to guarantee efficacy [14].

3.2.2. Perioperative Fluid Management

Appropriate fluid management holds significance. The fundamental principle is goal-directed fluid therapy (GDFT), which customizes fluid replacement according to each patients specific parameters. Research findings affirm that GDFT notably lessens the occurrence of postoperative issues

such as nausea, vomiting, and ileus, and also cuts down the length of hospital stay [15, 16].

3.2.3. Airway Management Strategy

SV-VATS is carried out under general anesthesia without endotracheal tube insertion, keeping spontaneous respiration and evading muscle relaxants. This method lessens trauma and averts barotrauma, which is in good accordance with the concepts of enhanced recovery and facilitates better initial recovery when compared to conventional single-lung ventilation [17].

3.3. Postoperative Care

3.3.1. Postoperative Multimodal Analgesia

Multimodal pain management intends to offer efficient pain alleviation while reducing opioid usage and its associated negative impacts. Paravertebral nerve blockade is suggested as the optimal regional analgesia technique for thoracoscopic operations. Researches show that multimodal pain relief notably lessens postoperative discomfort and decreases stress reactions [18, 19].

3.3.2. Early Postoperative Ambulation

Early mobilization serves as a key element, with the goal of averting complications like deep vein thrombosis, pulmonary infection, and atelectasis. Research findings show that early mobilization can effectively reduce the risks associated with long-term bed rest [20]. Healthcare practitioners ought to formulate personalized activity schemes, frequently integrated with preventive measures [21].

3.3.3. Postoperative Diet Advancement

Upon emerging from anesthesia, when the patient does not have nausea or vomiting, the start of oral intake of clear fluids can be carried out, progressing to liquids or semi-liquids within one day. Early dietary intake facilitates the restoration of intestinal function, preserves the intestinal mucosal barrier, and enhances nutritional condition [22].

3.3.4. Drainage Tube Management

The present idea of thoracic drainage has changed from prophylactic to therapeutic drainage. For patients experiencing favorable lung re-inflation, the tube may be taken out when the daily amount of drainage is under 300 mL. Digital drainage systems allow for objective assessment and early removal [23, 24]. Urinary catheters should be removed within one day following the surgery.

4. Discussion

Although its proven advantages exist, a number of disputes and constraints were recognized. Initially, a notable obstacle is the absence of a unified gold standard protocol. Although

the overall principles are widely acknowledged, the particular details, like the ideal length of preoperative fasting and fluid limitation, the selection and relative effectiveness of various analgesic plans (for example, the exact time and method of nerve blocks), and the accurate standards for chest drain removal, show substantial differences among studies and institutions [25]. This diversity poses difficulties for the establishment of a globally applicable clinical route.

Secondly, the general quality of the evidence foundation, though increasing, needs further enhancement. Although numerous included studies are randomized controlled trials, they are frequently restricted by small sample numbers, which lessens statistical strength and the general applicability of the results. The built-in intricacy of ERAS interventions renders attaining double-blinding arduous, bringing in possible biases. Moreover, most of the research studies are from single-centers, and the results they obtain might be affected by particular institutional procedures and patient characteristics [26]. It is evidently necessary for large-scale, multi-center randomized controlled trials (RCTs) using strict methodologies to verify these results.

Lastly, existing research mainly centers on short-term results, including duration of stay and complication rates within 30 days. Future investigations ought to give precedence to longitudinal research to ascertain the long-term viability of the advantages linked to ERAS and to carry out thorough cost-effectiveness evaluations [26].

5. Conclusions

From an outcome-related perspective, the implementation of ERAS effectively shortens the postoperative hospital stay and reduces complications. Meanwhile, the patients recovery experience is significantly improved. From the perspective of healthcare economics, ERAS helps to cut down medical costs and improve the utilization efficiency of hospital resources.

In general, the ERAS concept holds significant clinical value and extensive application prospects in the peri-operative management of SV-VATS. However, the absence of a unified standard for its specific use during the SV-VATS peri-operative period is a crucial drawback. Future research should focus on strengthening its evidence base through more detailed, multi-center studies with larger sample sizes, more profound mechanistic investigations, and longer-term follow-up. This can contribute to the development of standardized, precise, and individualized clinical pathways, ultimately promoting the widespread and effective implementation of this advanced method in clinical practice.

Abbreviations

ERAS	Enhanced Recovery After Surgery
SV-VATS	Spontaneous Ventilation Video-Assisted Thoracic Surgery
GDFT	Goal-Directed Fluid Therapy

RCT	Randomized Controlled Trial
ESPEN	European Society for Clinical Nutrition and Metabolism
NRS-2002	Nutritional Risk Screening 2002

Author Contributions

Yang Jia: Writing – original draft

Zhang Heng: Writing – review & editing

Funding

This research obtained assistance from the Scientific Research Fund Initiative of the Yunnan Provincial Education Department, Project Number: 2024J0875.

Data Availability Statement

The data that back the findings of this review come from previously published studies that are cited in the reference list.

Conflicts of Interest

The writers state no conflicts of interest.

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