RESEARCH ARTICLE

The effect of enhanced recovery after lung cancer surgery combined with fine surgical nursing on rehabilitation

Jiali Dong, Xiaoling Zhu

Abstract

Objective: To analyse the enhanced recovery after surgery approach combined with fine surgical nursing on recovery time, pain, sleep quality and satisfaction with care after lung cancer surgery.

Method: The cross-sectional study was conducted at the Nanjing Chest Hospital, China, from October 2019 to March 2022, and comprised non-small cell lung cancer patients undergoing single-port video-assisted thoracoscopic surgery. Patients receiving fine surgical nursing in addition to conventional enhanced recovery after surgery formed the intervention group A, while those receiving the conventional enhanced recovery after surgery care alone formed control group B. Intraoperative blood loss, operative time, extubation time and length of stay values were noted for both the groups using standard scales. Nursing satisfaction and the incidence of adverse reactions in the two groups were also noted. Data was analysed using SPSS 23.

Results: Of the 99 patients, 46(46.5%) were in group A; 23(50%) males and 23(50%) females with mean age 70.3±4.8 years and mean body mass index 26.76±2.55kg/m^2. There were 53(53.5%) patients in group B: 16(30.2%) males and 37(69.8%) females with mean age 69.9±4.4 years and mean body mass index 25.93±2.40kg/m^2 (p>0.05). Intraoperative blood loss, operative time, postoperative extubation time and length of stay in group A were lower than those in group B (p<0.05). Pain and sleep quality values in group A were lower, while health status value was higher than group B (p<0.05). Group A had significantly higher nursing satisfaction compared to group B (p<0.05).

Conclusion: The use of enhanced recovery after surgery combined with fine surgical nursing in patients with non-small cell lung cancer after video-assisted thoracoscopic surgery promoted postoperative recovery.

Keyword: Enhanced recovery after surgery, Thoracic surgery, Video-assisted, Non-small cell lung cancer, Visual analogue scale, Perioperative nursing. (JPMA 74: 874; 2024) **DOI: https://doi.org/10.47391/JPMA.9035**

Introduction

Currently, the incidence and mortality rate of non-small cell lung cancer (NSCLC) are extremely high and on the rise worldwide.[1] It is now the malignancy with the highest incidence and mortality rate in the male population.[2] At present, the aetiology of NSCLC is not completely clear, and the causative factors mainly include smoking, air pollution, diet, genetics and history of lung disease.[3,4] The main clinical treatment for NSCLC is surgery. With the continuous development of minimally invasive technology, single-port video-assisted thoracoscopic surgery (VATS) has gradually become a common procedure for the treatment of NSCLC in thoracic surgery, which has high safety, less trauma and fewer adverse effects.[5] Studies have shown that single-port VATS is the best choice for the treatment of stage II pleural effusion (PE) and is the gold standard for NSCLC surgery.[6] Although some progress has been made in the diagnosis and treatment of NSCLC, single-port VATS is ultimately a mechanical, invasive operation. It is difficult in modern medical research to further improve the safety of single-port VATS and to further enhance the therapeutic effect of patients, especially the elderly ones.[7,8]

As nursing interventions have been refined and developed, they have had a positive impact on improving the recovery of patients with various diseases.[9] Enhanced recovery after surgery (ERAS) intervention is a crucial clinical model identified to further optimise treatment measures and accelerate the postoperative recovery process of patients based on evidence-based medicine (EBM) by collaborating with medical staff from various disciplines to serve the patients.[10,11] In turn, surgical care on this basis improves patients' recovery throughout the perioperative period, and has important implications for enhancing their prognosis.[12] Fine surgical nursing (FSN) is a new type of management concept that combines theory and practice to promote surgical outcomes by implementing refined management of all aspects before and after surgery.[13] Studies have mostly combined ERAS with routine nursing, and it has achieved excellent results in colorectal cancer, spine surgery and other operations, and found that it can significantly improve the postoperative recovery of patients.[14]

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The current study was planned to analyse the ERAS approach combined with FSN on recovery time, pain, sleep quality and satisfaction with care after lung cancer surgery. It was hypothesised that the implementation of FSN under ERAS may have a multiplier effect on the recovery of patients with single-port VATS.

Patients and Methods

The cross-sectional, prospective, non-randomised, controlled study was conducted at the Nanjing Chest Hospital (NCH), China, from October 2019 to March 2022. The sample comprised NSCLC patients aged >65 years, diagnosed by pathology at NCH with tumour stage I to IIb as per the tumour-node-metastasis (TNM) NSCLC staging guidelines,[15] who completely met the criterion for VATS surgery, and had no other preoperative treatment. The included patients had good compliance, and their complete data was available. Patients with contraindications to surgery, those with drug allergies, patients who had recently undergone relevant treatment, and those with coexisting malignancies were excluded, and so were those who were lost to follow-up. Written informed consent was obtained from all the patients and those who opted out before the end of follow-up were excluded. After approval from the ethics review committee of Nanjing Medical University, China, the sample size was calculated using the formula $N=Z^2\times[P\times(1-P)]/E^2$,[16] with Z=1.96, E=10%, and P=0.5%.

Since January 2021, our hospital started FSN in the thoracic surgery department. Therefore, 46 patients admitted after January 2021 were categorised into the intervention group A as they received FSN under ERAS. Whereas 53 patients admitted before January 2021 were categorised into the control group B as they received only routine care under ERAS. All patients were unaware of the grouping.

Preoperatively, the patients were given general anaesthesia (GA) and a double-lumen tracheal intubation was performed. They were placed in the lateral position, and an incision of approximately 3cm was made in the anterior or mid-axillary line of the 4th or 5th intercostal space, and an incision protection sleeve was placed. The thoracoscope and curved rod surgical instruments were placed at the upper and lower edges of the incision for accurate observation of thoracic adhesions, tumour condition, and lymph node (LN) condition. The arteries and veins surrounding the lesion were separated and the lesion was excised. Subsequently, the bronchopulmonary hilar LNs and mediastinal lymph were effectively cleared. Finally, the surgical incisions were cleared and sutured, and drains were routinely placed.

The patients were admitted to the hospital, and received routine care under multidisciplinary ERAS. First, a multidisciplinary ERAS team was established, and its medical and nursing staff members were trained to learn about the disease and develop an intervention plan. Patient information was collected, each member's responsibilities were assigned, the targetted care plan was customised by combining clinical knowledge and their own needs, and the group communicated diligently to provide timely feedback and intervention for their problems to promote smooth treatment.

In control group B, the nursing staff made good preparations before the surgery, introduced the surgical procedure to patients and their families, encouraged the patients to increase their confidence and helped them complete all preoperative preparations. After the operation, all patients were strictly monitored for signs and psychological activities. Due encouragement was provided, and they were reminded of dietary precautions in a timely manner to speed up their recovery until discharge. In the intervention group A, FSN was added to ERAS methodology. Surgical procedures were explained to the patients, and they were instructed about cardiopulmonary exercise and abdominal breathing. The nursing staff actively communicated with patients and assessed their psychology to make appropriate interventions in a timely manner. The staff also adjusted the temperature and disinfected the operating room before the surgery, and helped the patients keep the correct surgical position.

The patients were given indwelling catheters after anaesthesia, and fluids used during surgery were heated in advance. Eye protection patches were applied to the patients to help physicians prepare the needed instruments. Postoperative healthcare workers paid close attention to the drainage situation to prevent the catheter from twisting or dislodging. If the patients experienced severe pain or sleep disorders, they were promptly made to follow the medical advice for pharmacological intervention.

The observation of patients' incision was also made to actively prevent the occurrence of adverse reactions. The patients had a 3-month postoperative telephone follow-up.

Intraoperative blood loss, operative time, extubation time and length of stay (LOS) in both groups were noted. Postoperative pain was assessed using the Visual Analogue Scale (VAS)[17] and improvement in sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).[18] The VAS divides the pain into 10 points to indicate the degree of pain; 2-4=mild, 5-7=moderate, and 8-9=severe pain. The PSQI distinguishes human sleep quality by

measuring 7 domains; objective sleep quality assessment, sleep onset time, sleep duration, inertial sleep efficiency, sleep disturbance, use of sleep aids, and the number of times mental distress and dysfunction was felt due to lack of sleep during the day. Higher scores indicate poorer sleep quality.

Patients' attitudes towards nursing, quality of nursing, and content of nursing interventions was assessed using a predesigned nursing satisfaction questionnaire. The incidence of adverse reactions after surgery was recorded, and the short form 36 (SF-36)[19] questionnaire was used to assess their postoperative quality of life (QOL). SF-36 is a scale that has 8 dimensions and 36 items, with higher score indicating better QOL.

Data was analysed using SOSS 23. Data was expressed as freuquencies and percentages, or mean±standard deviation, as appropriate. Independent sample t-test was used for comparison between the groups, while paired t-tests were used for intragroup comparisons. Chi-square test was used when necessary. P<0.05 was considered significant.

Results

Of the 99 patients, 46(46.5%) were in group A; 23(50%) males and 23(50%) females with mean age 70.3±4.8 years and mean body mass index (BMI) 26.76±2.55kg/m^2. There were 53(53.5%) patients in group B: 16(30.2%) males and 37(69.8%) females with mean age 69.9±4.4 years and mean BMI 25.93±2.40kg/m^2 (p>0.05).

TNM stage was not significantly different between the groups (Table 1).

Intraoperative blood loss in group A was 95.1±12.1mL, which was significantly lower than group B 113.2±18.6mL (p<0.05) (Figure 1A). And operation time in group A was

Table-1: Intergroup comparison of patient characteristics.

Group	n	Mean Age (years)	Gender Male/Female	BMI (kg/m^2)	TNM staging Phase I/Phase II	type of pathology Squamous cell carcinoma/ adenocarcinoma
Observation group	46	70.3±4.8	23 (50.00)/23 (50.00)	26.76±2.55	41 (89.13)/5 (10.87)	1 (2.17)/45 (97.83)
Control group	53	69.9±4.4	29 (54.72)/24 (45.28)	25.93±2.40	48 (90.57)/5 (9.43)	3 (5.66)/50 (94.34)
$x^{2/t}$		0.433	0.220	1.672	0.056	0.772
p-vlaue		0.666	0.639	0.098	0.813	0.380

BMI: Body mass index, TNM: Tumour, node, metastasis.

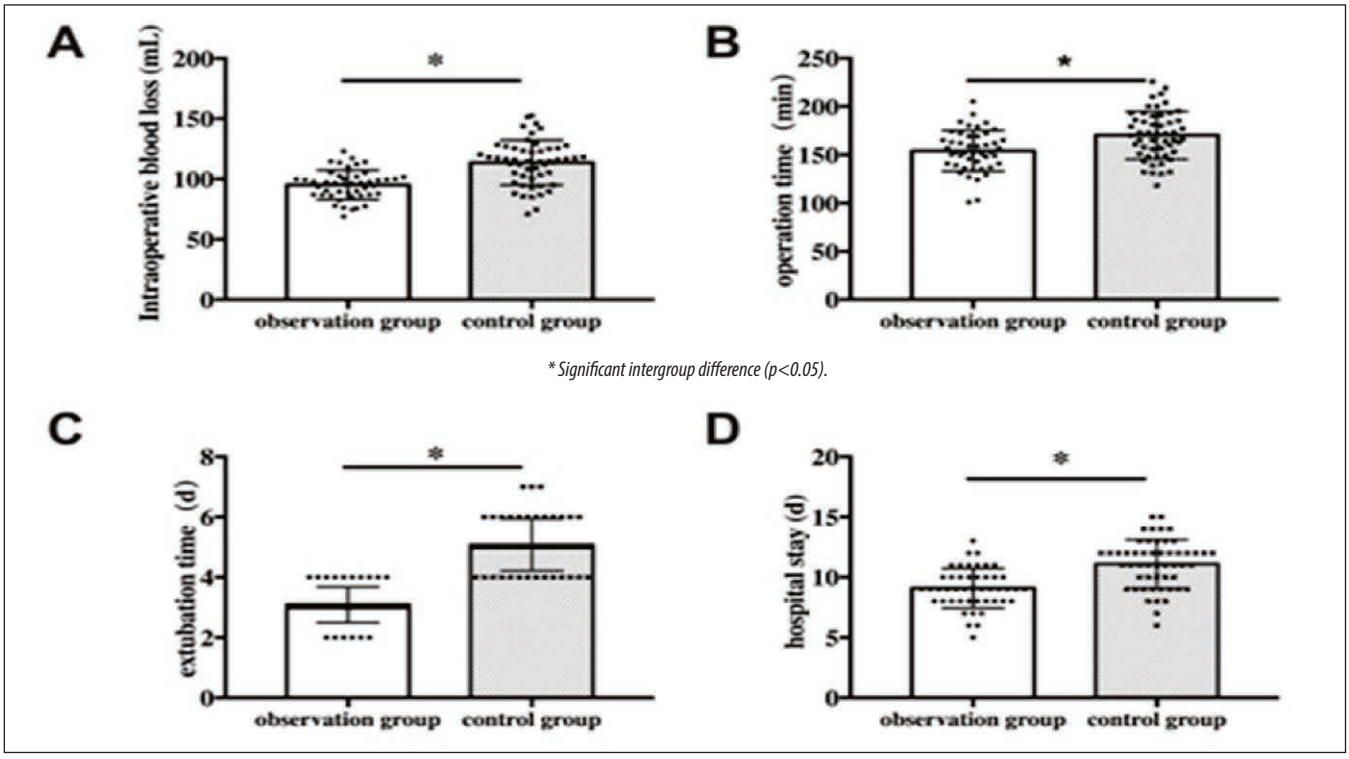

Figure-1: Intergroup comparison of perioperative indicators (A) intraoperative blood loss, (B) operative time, (C) extubation time, And (D） length of hospital stay..

154.1±211 min compared to group B (p<0.05) (Figure 1B). Postoperative extubation time was shorter in group A 3.1±0.6d compared to group B (p<0.05) (Figure 1C). LOS was markedly shorter in group A 9.1±1.6d compared to group B (p<0.05(Figure 1D).

The mean VAS score in group A post-operation was 5.5±1.2, while in group B it was 6.8±1.4 (p<0.05) (Figure 2A). PSQI score in group A was 5.4±1.3, which was lower than group B 8.6±1.5 (p<0.05) Figure 2B).

The nursing attitude score in group A was 87.7±6.3 compared to 73.3±7.2 in group B (p<0.05) (Figure 3A). The quality of nursing score in group A was 89.8±5.9 and it was significantly higher compared to group B (p<0.05, Figure 3B). Group A had significantly better results than group B in terms of nursing content scores (p<0.05) (Figure 3C).

The incidence of adverse reactions in group A was lower than group B, but the difference was not significant (p>0.05) (Table 2).

Physiological function, role-physical, body pain, general health, vitality, social function, role-emotional, and mental health scores of group A were observed to be (86.82±4.78), (79.96±5.22), (84.48±3.36), (75.85±4.34), (77.65±4.00), (72.11±3.89), (76.02±3.49), and (75.15±4.58), respectively. While the group B was (68.98±3.33), (71.89±5.12), (77.98±2.76), (70.89±2.89), (72.02±4.58), (66.09±4.47), (68.83±4.30), and (68.08±4.22), respectively. The QOL scores of group A were higher than group B in both groups (p<0.05) (Figure 4A-H).

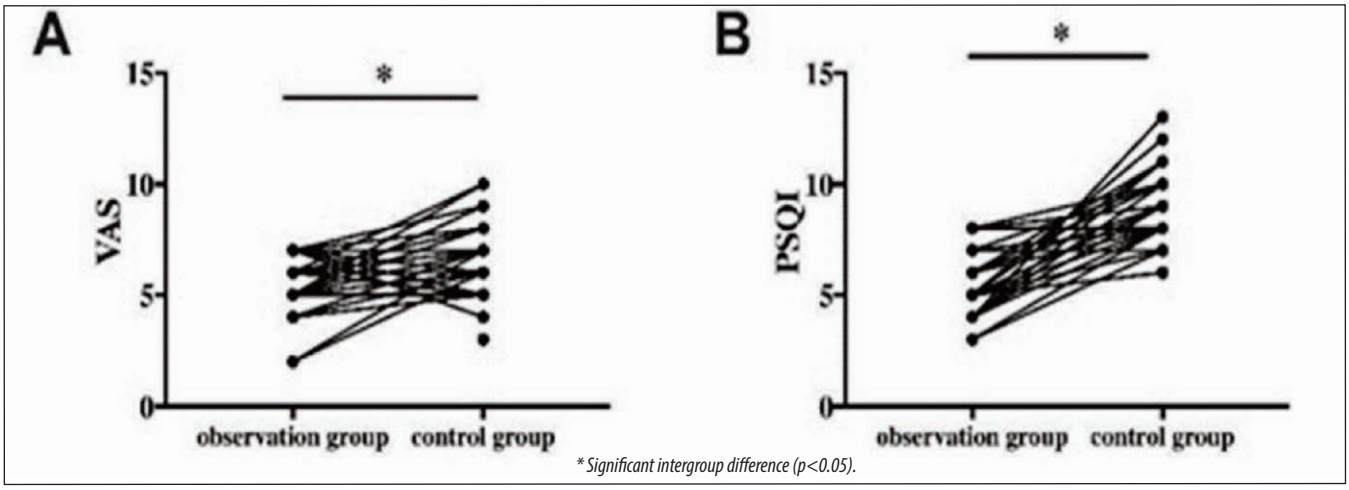

Figure-2: Intergroup comparison of postoperative scores for (A) Visual Analogue Scale and (B) Pittsburgh Sleep Quality Index.

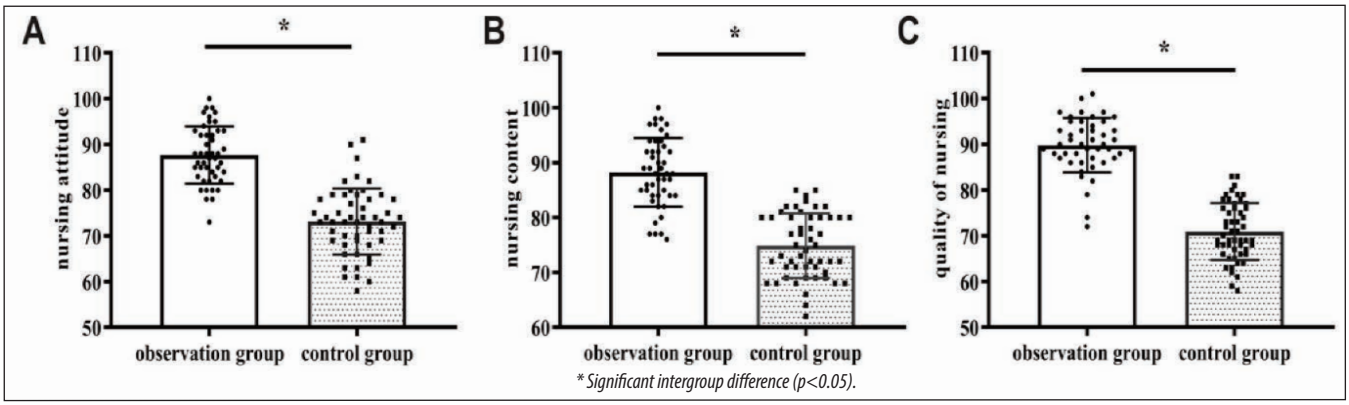

Figure-3: Intergroup comparison of (A) nursing attitude scores, (B) quality of nursing scores, and (C) nursing content scores.

Table-2: The incidence of adverse reactions.

Group	n	Arrhythmia	Infect	Hypoxia	Flatulence	Total adverse reaction rate (%)
Observation group	46	2 (4.35)	1 (2.17)	0 (0.0)	2 (4.35)	5 (10.87)
Control group	53	5 (9.43)	2 (3.77)	2 (3.77)	4 (7.55)	13 (24.53)
x^2						3.088
p-value						0.079

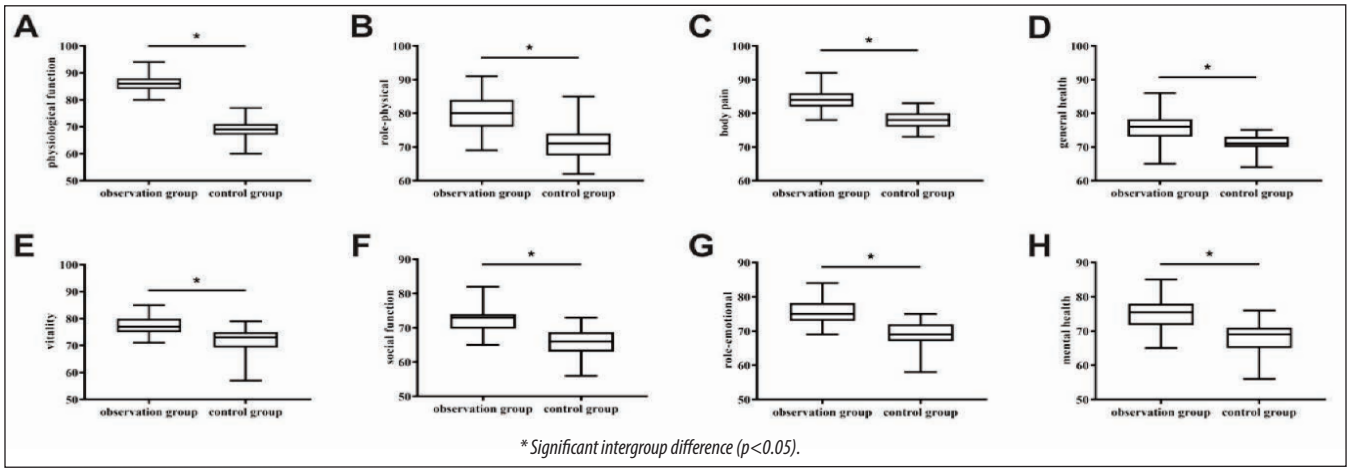

Figure-4: Intergroup comparison of (A) Comparison of PF scores, (B) Comparison of RP scores, (C) Comparison of BP scores, (D) Comparison of GH scores, (E) Comparison of VT scores, (F) Comparison of SF scores, (G) Comparison of RE scores, (H) Comparison of MH scores.

Discussion

Previous studies reported that ERAS was used with excellent results in gynaecologic oncological surgery and gastrointestinal surgery.[20] Therefore, the current study had important clinical implications as it explored the impact of FSN under ERAS.

Intraoperative blood loss, operative time, postoperative extubation time and LOS were shorter in the intervention group than in the control group, while postoperative VAS and PSQI scores were lower, indicating that FSN under ERAS had better therapeutic effect for single-port VATS treatment. A study reported that FSN under ERAS showed better improvement in colectomy cases.[21] It is well known that although single-port VATS has less trauma and bleeding, it still cannot avoid adverse effects, such as pain, pulmonary infection and arrhythmia, caused by surgical stress, which in turn affects functional recovery.[22] Thus, effective rehabilitation functional exercise in the perioperative period for NSCLC patients is important for enhancing physical strength, postoperative sputum evacuation, reducing pulmonary adverse effects, and improving treatment outcomes.[23]

ERAS uses EBM to reduce traumatic stress and postoperative adverse effects in surgical patients through multimodal interventions, thereby accelerating the recovery process.[24] Alternating bilateral lower extremity exercises, deep breathing coughing, sputum coughing and getting out of bed after lung surgery by implementing the ERAS quantification scale can improve patients' subjective motivation and compliance with postoperative rehabilitation management. Patients in the current intervention group performed alternating exercises of both lower limbs at an early stage, which not only increased muscle strength and promoted blood circulation, but also prevented the formation of venous thrombosis in the lower limbs. Early coughing and sputum can improve the airway's ability to clear secretions, thus improving lung function. Early bedtime activities help patients recover physically and prevent the occurrence of crushing pneumonia. On this basis, FSN can be more effective. The reason for this may lie in the interrelatedness and overall coherence of the joints of the service concept, culture and quality of fine nursing, and the preoperative communication with patients, which can increase their knowledge of the operating room and surgery, and thus eliminate negative psychology. In addition, preoperative rationalisation of nursing staff and multiple checks of patient information and surgical instruments minimised adverse events and improved patients' physiological comfort and surgical tolerance, which were consistent with current findings. Also, postoperative QOL in the intervention group was better, which again verified the superior application of FSN under ERAS for single-port VATS, which is worth promoting clinically. The applicability of single-port VATS in the clinic is improving.[25] The use of FSN under ERAS can further improve the clinical effect and safety of single-port VATS surgery, and improve the prognosis and QOL of patients, which is undoubtedly a major breakthrough in modern clinical treatment.

The present study has several limitations. Since there is a lack of uniform clinical guidelines for standardised care measures for single-port VATS, therefore, it cannot be ruled out that other individualised care strategies may also have better results. The follow-up patients for short, and long-term impacts of refined care could not be assessed. The sample size was small, and, as such, the findings lack comprehensiveness and generalisability. Randomised controlled trials (RCTs) with larger samples sizes are recommended.

Conclusion

FSN under ERAS could effectively shorten the postoperative recovery process of elderly patients with single-port VATS, and could improve their surgical comfort experience and nursing satisfaction.

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Conflict of Interest: None.

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Author Contribution:
JD: Design, drafting, final approval.
XZ: Data analysis, literature search, extraction, final approval.