Journal of Clinical and Nursing Research, 2026, Volume 10, Issue 4
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

A Study on Evidence-Based Nursing Practice for Perioperative Pain Management in Thoracoscopic Lung Cancer Surgery

Jia Liu, Ruolian Wang*

Deyang People's Hospital, Deyang 618000, Sichuan, China

Author to whom correspondence should be addressed.

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: *Objective*: To evaluate the efficacy of a perioperative pain management protocol based on evidence-based nursing principles in patients undergoing thoracoscopic surgery for lung cancer. *Methods*: A total of 112 patients undergoing thoracoscopic lung cancer surgery in the Department of Thoracic Surgery at a specific hospital between August 2025 and March 2026 were selected and randomly assigned to either a control group or an observation group, with 56 patients in each group. The control group received standard pain management, while the observation group received a pain management protocol based on evidence-based nursing. *Results*: At various postoperative time points, the observation group demonstrated significantly lower pain scores, both at rest and during activity, compared to the control group. Furthermore, within the first 48 hours post-surgery, the observation group consumed fewer opioids, mobilized out of bed earlier, experienced shorter postoperative hospital stays, and had a lower overall incidence of complications than the control group; all these differences were statistically significant ($p < 0.05$). *Conclusion*: A perioperative pain management protocol established upon evidence-based nursing principles can effectively alleviate postoperative pain in patients undergoing thoracoscopic lung cancer surgery, reduce opioid consumption, facilitate postoperative recovery, lower the incidence of complications, and enhance patient satisfaction with nursing care.

Keywords: Thoracoscopic surgery; Lung cancer; Pain management; Evidence-based nursing; Perioperative nursing

Online publication: Apr 30, 2026

1. Introduction

Lung cancer is a malignant tumor with high incidence and mortality rates worldwide, and surgical resection remains its primary treatment modality. Due to its minimally invasive nature, rapid recovery, and lower complication rates, thoracoscopic lobectomy has become the preferred surgical approach for early-stage non-small cell lung cancer; however, intraoperative incision of the intercostal muscles and traction on the intercostal nerves can still result in significant postoperative pain. Inadequate pain control not only hinders

early patient mobilization and respiratory function exercises but also increases the risk of complications, such as pulmonary infection and atelectasis, delays the removal of drainage tubes and prolongs hospital stays, and may even lead to the development of chronic pain. Currently, perioperative pain management has evolved from a sole reliance on opioids toward a multimodal, individualized approach to analgesia; nevertheless, clinical practice still frequently exhibits issues such as inconsistent pain assessment, unsystematic intervention strategies, and insufficient utilization of non-pharmacological interventions. Evidence-based nursing is a methodology for making nursing decisions that integrates the best available evidence with clinical expertise and patient needs. When applied to perioperative pain management in patients undergoing video-assisted thoracoscopic surgery (VATS) for lung cancer, it serves to standardize nursing practices and enhance analgesic efficacy. Based on a systematic search and evaluation of relevant evidence, an evidence-based nursing practice protocol was established; its clinical efficacy was subsequently validated through a controlled clinical trial to provide a reference for clinical nursing practice [1].

2. Materials and methods

2.1. General data

A total of 112 patients undergoing VATS for lung cancer in the Department of Thoracic Surgery between August 2025 and March 2026 were selected for this study.

2.1.1. Inclusion criteria

(1) Postoperative pathological confirmation of primary lung cancer;
(2) Undergoing video-assisted thoracoscopic lobectomy or wedge resection;
(3) Age between 18 and 80 years;
(4) American Society of Anesthesiologists (ASA) physical status classification I–III; and
(5) Provision of informed consent and voluntary participation in the study.

2.1.2. Exclusion criteria

(1) Patients with a history of chronic pain or long-term analgesic use prior to surgery;
(2) Patients with severe concurrent cardiac, hepatic, or renal insufficiency;
(3) Patients with allergies to the analgesic medications used in the study;
(4) Patients with psychiatric disorders or cognitive impairments precluding cooperation with pain assessments; and patients whose procedures required conversion to open thoracotomy.

2.1.3. Study groups

Patients were randomly assigned to either a control group or an observation group using a random number table, with 56 patients in each group There were no statistically significant differences ($p > 0.05$) between the two groups regarding general demographic and clinical data, including gender, age, pathological type, and surgical approach, indicating that the groups were comparable [2].

2.2. Methods

The control group received standard perioperative pain management. Preoperatively, the assigned nurse provided routine health education to patients, informing them of potential postoperative pain and common

analgesic methods. Postoperatively, pain intensity was assessed every four hours using a Numerical Rating Scale (NRS). When the NRS score reached ≥ 4, analgesics were administered according to physician orders (via patient-controlled analgesia pumps or on-demand opioid administration); pain assessment results and analgesic interventions were duly recorded [3].

The observation group implemented a perioperative pain management protocol based on evidence-based nursing principles, the specific details of which are outlined below.

(1) Formation of an evidence-based nursing practice team

Led by the Head Nurse of Thoracic Surgery, the team comprises thoracic surgeons, anesthesiologists, evidence-based nursing trainers, and primary care nurses. Adhering to the principles of evidence-based nursing, the team conducted a comprehensive literature search regarding key issues in perioperative pain management; by integrating prior clinical nursing experience with the actual needs of patients, they formulated an evidence-based nursing protocol. Concurrently, all nursing staff received training in evidence-based pain management, covering topics such as pain assessment, multimodal analgesia, adverse reaction monitoring, and non-pharmacological interventions. Participation in the study was contingent upon successful completion of this training, thereby ensuring the scientific rigor and consistency of the research protocol.

(2) Assessment of preoperative risk factors and individualized education

Within 24 hours of admission, an assessment of high-risk factors for pain was completed. This assessment covered the patient's history of pain, history of opioid use, anxiety and depressive states, and their cognitive understanding of, and attitudes toward pain. Patients identified as high-risk, such as those with a history of chronic pain, high anxiety levels, or low pain tolerance were singled out, and individualized pain management plans were formulated based on their assessment results. Simultaneously, structured health education was provided preoperatively to ensure patients possessed an accurate understanding of the characteristics of postoperative pain, the use of the Numerical Rating Scale (NRS), and the potential efficacy and risks associated with their prescribed analgesia regimen.

(3) Standardized pain assessment

Postoperatively, the NRS was utilized to dynamically assess pain intensity in patients under various conditions, specifically at rest, as well as during coughing, deep breathing, turning over, and ambulation. Assessments were conducted every two hours during the first 24 hours post-surgery, and every four hours thereafter; the results were recorded immediately on the pain nursing record sheet. If an NRS score reached 4 or higher, the analgesia intervention protocol was initiated immediately. A subsequent assessment was performed 30 minutes later; this process continued until the pain subsided to a mild level or lower, at which point a second nurse performed an independent verification to ensure the accuracy of the assessment.

(4) Nursing support for multimodal pharmacological analgesia

Postoperatively, a multimodal analgesia regimen consisting of patient-controlled intravenous analgesia (PCIA) pumps combined with non-steroidal anti-inflammatory drugs (NSAIDs) was routinely employed. The primary care nurse was responsible for closely monitoring the operation of the analgesia pump, periodically recording the cumulative dosage of fentanyl administered, and evaluating both the efficacy of the analgesia and the presence of any adverse reactions, such as nausea and vomiting, respiratory depression, or excessive sedation. For patients experiencing poorly controlled pain, whether

at rest or during activity, rescue analgesia is administered in accordance with physician orders. The medication regimen is adjusted based on the patient's hepatic and renal function, as well as their gastrointestinal tolerance, while guidance on the proper use of patient-controlled analgesia (PCA) pumps is reinforced.

(5) Non-pharmacological pain interventions

In addition to pharmacological analgesia, measures such as proper positioning, breathing exercises, music therapy, distraction techniques, and cold therapy are implemented. Nursing staff assist patients in adopting a semi-Fowler's position to minimize pressure on surgical incisions and drainage tubes; they instruct patients on diaphragmatic breathing, pursed-lip breathing, and effective coughing techniques; and prior to procedures such as dressing changes, turning, or tube removal, they employ conversation or guided imagery to distract the patient and alleviate pain. During the first 24 hours post-operatively, cold compresses are applied around the incision site to reduce local inflammatory responses and enhance the overall efficacy of pain management.

(6) Long-term pain management

Prior to discharge, patients receive education on pain management, covering topics such as proper techniques for using home analgesics, methods for self-assessing pain levels, appropriate physical activity guidelines, and scheduled follow-up appointments. This ensures that patients can maintain effective pain control and continue their functional recovery after returning home. A dedicated WeChat group is established for follow-up care; the assigned nurse conducts remote monitoring on the 3rd, 7th, and 14th days post-discharge to assess the patient's pain status, analgesic usage, and rehabilitation progress. The nurse promptly addresses patient inquiries and provides appropriate guidance, thereby enhancing the quality of continuity of care.

2.3. Outcome measures

(1) Pain scores

The Numerical Rating Scale (NRS) is used to assess the intensity of the patient's pain both at rest and during activity at 6, 12, 24, and 48 hours post-operatively.

(2) Opioid consumption

The total opioid dosage administered within the first 48 hours post-operatively is recorded. All administered opioids are converted into fentanyl-equivalent doses using a pre-established conversion formula.

(3) Post-operative recovery indicators

The time to first ambulation, the duration of chest tube placement, and the total length of post-operative hospitalization are recorded.

(4) Incidence of complications

The occurrence of post-operative complications, including nausea and vomiting, respiratory depression, pulmonary infection, atelectasis, urinary retention, and constipation is documented.

(5) Nursing satisfaction

Patient satisfaction with the nursing care provided is assessed. Upon discharge, nursing satisfaction was evaluated using a questionnaire developed in-house by the hospital. This questionnaire comprised 20 items across four dimensions: effectiveness of pain management, nursing communication, health

education, and overall service. A 5-point Likert scale was employed, yielding a total score ranging from 20 to 100 points; a higher score indicated a higher level of satisfaction [4].

2.4. Statistical analysis

Data analysis was performed using SPSS 26.0 statistical software. Measurement data conforming to a normal distribution were expressed as ($\overline{x} \pm s$), and inter-group comparisons were conducted using an independent-samples *t*-test. Count data were expressed as the number of cases (percentage), and inter-group comparisons were performed using the χ^2 test or Fisher's exact test. A *p*-value of < 0.05 was considered to indicate a statistically significant difference.

3. Results

3.1. Comparison of NRS scores at various postoperative time points between the two groups

At 6 h, 12 h, 24 h, and 48 h postoperatively, the patients in the observation group demonstrated significantly lower NRS scores for both resting and active states, compared to those in the control group; all differences were statistically significant ($p < 0.05$). See **Table 1**.

Table 1. Comparison of NRS scores at different time points after surgery between the two groups ($\overline{x} \pm s$, scores)

Group	Number of cases	Resting state				Active state			
		6 h Post-op	12 h Post-op	24 h Post-op	48 h Post-op	6 h Post-op	12 h Post-op	24 h Post-op	48 h Post-op
Control group	56	3.52 ± 0.84	3.08 ± 0.76	2.65 ± 0.68	2.12 ± 0.55	5.86 ± 1.02	5.23 ± 0.95	4.58 ± 0.87	3.86 ± 0.72
Observation group	56	2.46 ± 0.71	2.05 ± 0.63	1.68 ± 0.52	1.34 ± 0.43	4.25 ± 0.86	3.68 ± 0.79	3.12 ± 0.65	2.45 ± 0.58
t-value		7.206	7.754	8.432	8.195	9.015	9.364	9.902	11.346
p-value		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

3.2. Comparison of postoperative opioid consumption between the two groups

Within 48 hours postoperatively, the fentanyl-equivalent consumption in the observation group was (168.35 ± 32.67) μg compared to (245.82 ± 41.53) μg in the control group; the consumption in the observation group was significantly lower than that in the control group ($t = 11.103$, $p < 0.001$. The proportion of patients in the observation group requiring rescue analgesia due to inadequate pain control was 10.71% (6/56), which was lower than 23.21% (13/56) observed in the control group; this difference was statistically significant ($\chi^2 = 4.206$, $p = 0.040$).

3.3. Comparison of postoperative recovery indicators between the two groups

In the observation group, the time to first ambulation, the duration of chest tube drainage, and the length of postoperative hospital stay were all significantly shorter than those in the control group ($p < 0.001$); see **Table 2**.

Table 2. Comparison of postoperative recovery indicators between the two patient groups ($\overline{x} \pm s$)

Group	Number of cases	Time to first ambulation (h)	Chest tube duration (d)	Postoperative hospital stays (d)
Control group	56	22.36 ± 4.58	4.12 ± 1.08	8.86 ± 1.95
Observation group	56	14.58 ± 3.21	3.25 ± 0.94	6.92 ± 1.58
t-value		10.316	4.562	5.744
p-value		< 0.001	< 0.001	< 0.001

3.4 Comparison of complication rates between the two patient groups

The overall incidence of postoperative complications in the observation group was 8.93% which was significantly lower than that in the control group (19.64%) ($\chi^2 = 4.206$, $p = 0.040$); see **Table 3**.

Table 3. Comparison of postoperative complication rates between the two patient groups [cases (%)]

Group	Number of cases	Nausea/ Vomiting	Pulmonary infection	Atelectasis	Urinary retention	Constipation	Total incidence
Control group	56	4 (7.14)	2 (3.57)	2 (3.57)	2 (3.57)	1 (1.79)	11 (19.64
Observation group	56	2 (3.57)	1 (1.79)	1 (1.79)	1 (1.79)	0 (0.00)	5 (8.93)
χ^2 Value							4.206
p Value							0.040

3.5 Comparison of nursing satisfaction between the two groups

The nursing satisfaction score in the observation group was (94.28 ± 3.51) which was significantly higher than that in the control group (86.75 ± 5.23); the difference was statistically significant ($t = 8.802$, $p < 0.001$).

4. Discussion

Perioperative pain management for thoracoscopic lung cancer surgery constitutes a vital component of Enhanced Recovery After Surgery (ERAS) protocols. Utilizing an evidence-based nursing approach, this study systematically searched for and synthesized relevant evidence to establish a comprehensive, full-cycle nursing regimen. This regimen encompasses preoperative assessment of high-risk factors and health education, standardized postoperative pain assessment, multimodal pharmacological analgesia support, non-pharmacological pain interventions, and post-discharge continuity of care. Clinical application results demonstrate that this regimen significantly alleviates the severity of postoperative pain, both at rest and during activity, reduces opioid consumption, and facilitates the recovery of postoperative functional capacity. These findings underscore the clinical efficacy of systematic pain management guided by evidence-based nursing principles, while also providing a clear practical pathway for optimizing perioperative care for patients undergoing thoracoscopic lung cancer surgery [5].

5. Conclusion

The study results indicate that, at every postoperative time point assessed, the Numerical Rating Scale (NRS) scores of patients in the observation group were lower than those in the control group, demonstrating that systematic pain interventions can effectively improve patients' postoperative pain experience. The integration of multimodal pharmacological analgesia serves as the foundational basis for enhancing analgesic efficacy.

By combining non-steroidal anti-inflammatory drugs (NSAIDs) with patient-controlled intravenous analgesia (PCIA), different mechanisms of action are leveraged to potentiate pain relief and mitigate dependence on opioid medications. In this study, the observation group demonstrated a significant reduction in the fentanyl-equivalent dose consumed within the first 48 hours postoperatively; consequently, the demand for rescue analgesia also decreased, a result of substantial clinical significance for thoracic surgery patients. Excessive opioid use is associated with adverse effects such as respiratory depression, delayed recovery of gastrointestinal function, nausea, and vomiting; conversely, a combined pharmacological approach allows for effective pain management while simultaneously minimizing these adverse reactions, thereby facilitating early respiratory training and physical mobilization among patients.

Non-pharmacological pain management measures also played a significant role in this study. The implementation of a comprehensive strategy, including postural adjustments, breathing exercises, music therapy, distraction techniques, and cold compresses, enhanced patients' coping mechanisms regarding pain stimuli, thereby exerting a synergistic effect when combined with pharmacological analgesia. With improved pain control, patients' initial mobilization time is significantly advanced; consequently, the duration of chest tube placement and the length of postoperative hospitalization are reduced. Furthermore, the incidence of complications, such as pulmonary infections and atelectasis, also declines. This demonstrates that enhanced pain management fosters a virtuous cycle characterized by "improved analgesia, increased physical activity, accelerated functional recovery, and reduced complications". From an evidence-based nursing perspective, the establishment of a perioperative pain management protocol is highly feasible and widely applicable, offering robust support for the postoperative rehabilitation of patients undergoing video-assisted thoracoscopic surgery for lung cancer, as well as for the enhancement of nursing quality.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Liu Y, Gao Y, Cao L, et al., 2020, Application Effect of Rapid Rehabilitation Surgery Nursing in the Perioperative Period of Video-Assisted Thoracoscopic Radical Lung Cancer Surgery and Its Impact on Patients' Negative Emotions and Quality of Life. Clinical Medical Research and Practice, 5(24): 166–168.

[2] Li Q, Zhuo S, Zheng Y, et al., 2020, Application of Nurse-Led Multidisciplinary Collaborative Pain Management Model in Patients Undergoing Thoracoscopic Surgery for Lung Cancer. Journal of Qiqihar Medical University, 41(22): 2900–2902.

[3] Lei C, Wang X, Wang X, et al., 2021, Application Value of Rapid Rehabilitation Surgery Nursing in Thoracoscopic Treatment of Non-Small Cell Lung Cancer. China Clinical Research, 34(03): 418–421.

[4] Xu F, Guan S, Wang Y, et al., 2021, Application of Modified Thoracic Drainage Methods in Patients Undergoing Radical Lung Cancer Surgery via Single-Port Thoracoscopic Surgery. Journal of PLA Nursing, 38(05): 82–85.

[5] Xiong P, 2021, Exploring the Improvement Effect of Early Pain Intervention Nursing on Postoperative Pain in Lung Cancer Patients. Science Consultation (Science and Technology Management), 2021(40): 80–81.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.