

Post-Thoracic Surgery Nursing Care: A Comprehensive Review

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Abstract

Background: Thoracic surgery, including lobectomy, pneumonectomy, and esophagectomy, is associated with significant postoperative complications such as respiratory failure, pain, wound infection, arrhythmias, and thromboembolism. This narrative review synthesizes current evidence on postoperative nursing care following thoracic surgery.

Methods: A purposive search of PubMed, Google Scholar, ScienceDirect, CINAHL, and institutional resources was conducted, focusing on English-language literature published from 2014–2025. Articles addressing postoperative nursing assessment, interventions, and outcomes in thoracic surgery patients were reviewed and narratively synthesized.

Results: Evidence underscores the importance of structured nursing interventions in multiple domains: systematic assessment using tools like the Modified Early Warning Score (MEWS), respiratory care with incentive spirometry and physiotherapy, multimodal pain management, aseptic wound care, and chest tube management. Early ambulation, optimized nutrition, fluid balance, psychosocial support, and patient education further contribute to enhanced recovery. Nurse-led implementation of ERAS protocols has consistently been shown to reduce pulmonary complications, shorten hospital stays, and improve overall outcomes. However, challenges remain, including limited thoracic-specific nursing assessment tools, inconsistent application of standardized care pathways, and gaps in training in low-resource environments such as Nepal.

Conclusion: Postoperative thoracic care is highly dependent on skilled nursing interventions across multiple domains of recovery. Integrating ERAS principles, structured discharge planning, and nurse-led follow-up can significantly reduce complications and improve patient outcomes.

Introduction

Thoracic surgery, including procedures like lobectomy, pneumonectomy, and esophagectomy, presents significant postoperative challenges such as atelectasis, pneumonia, air leakage, wound infections, and arrhythmias.¹ Thoracic surgery, especially related to pulmonary resection, is not without risk, and is associated to considerable morbidity and mortality. Fast track or enhanced recovery after anesthesia protocols, minimally invasive surgery, and intraoperative anesthetic management improve the

prognosis and safety of thoracic surgery. Patients in the postoperative period of major thoracic surgery require intensive surveillance, especially the first 24–72h after surgery. Admission to the ICU is especially recommended in those patients with comorbidities, a reduced cardiopulmonary reserve, extensive lung resections, and those requiring support due to life-threatening organ failure. During the postoperative period, intensive cardiorespiratory monitoring, proper management of thoracic drainage, aggressive pain control (multimodal

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analgesia and regional anesthetic techniques Nurses play a crucial role in mitigating these risks and enhancing recovery outcomes through evidence-based interventions like respiratory physiotherapy, pain management, incentive spirometry, and early mobilization.^{1,2} thoracic surgery, especially related to pulmonary resection, is not without risk, and is associated to considerable morbidity and mortality. Fast track or enhanced recovery after anesthesia protocols, minimally invasive surgery, and intraoperative anesthetic management improve the prognosis and safety of thoracic surgery. Patients in the postoperative period of major thoracic surgery require intensive surveillance, especially the first 24–72h after surgery. Admission to the ICU is especially recommended in those patients with comorbidities, a reduced cardiopulmonary reserve, extensive lung resections, and those requiring support due to life-threatening organ failure. During the postoperative period, intensive cardiorespiratory monitoring, proper management of thoracic drainage, aggressive pain control (multimodal analgesia and regional anesthetic techniques

Enhanced Recovery After Thoracic Surgery (ERATS) protocols have further transformed nursing roles, emphasizing early mobilization, multimodal analgesia, and structured care pathways. Nurses serve as central figures in applying these protocols into daily clinical practice, ensuring optimal patient outcomes.³ Specialized nursing care improves recovery efficiency and reduces complications, hospital-acquired infections, and healthcare costs, as seen in international centers.⁴ However, in countries like Nepal, the lack of research, standardized protocols, and nurse-specific training hinders optimal postoperative outcomes.⁵

This review focuses on nursing perspectives and evidence-based strategies to optimize recovery, reduce complications, and improve the quality of thoracic postoperative care. There is particularly not much research on nursing interventions in thoracic post-operative care in settings like Nepal that are resource-constrained and oncology-focused. The purpose of this study is to gather information and existing practices, highlighting the critical role nurses play in promoting recovery and preventing complications.

Methodology

To compile the data on postoperative nursing care in thoracic surgery, a narrative review methodology was used. Using terms like "postoperative care," "thoracic surgery," and "nursing interventions," literature search was done in PubMed, Google Scholar, ScienceDirect, and CINAHL. English-language publications from 2014 to 2025 were taken into account, with previous seminal research included when it was extremely pertinent. Peer-reviewed original research, reviews, clinical recommendations, and reputable reports on postoperative nursing care following thoracic surgeries such as VATS, lobectomy, pneumonectomy, and thoracotomy were among the eligible sources. Excluded were duplicates, research unrelated to thoracic surgery, non-English publications, and full-texts that were not accessible. Under theme areas, the findings were narratively synthesised to emphasise prevalent complications, evidence-based practices, and nursing care implication.

Nursing Assessment

Nursing assessment is crucial following thoracic surgery to monitor for complications such as venous thromboembolism (VTE), pain, bleeding, and respiratory failure. By monitoring changes in vital signs, mental status, and breathing rate, nurses frequently employ instruments like the Modified Early Warning Score (MEWS) to identify early indicators of clinical deterioration.⁶

Standardized nursing roles in early mobilization, respiratory physiotherapy, effective analgesia, and nutritional support components are crucial for lowering hospital stays and pulmonary problems, according to ERAS (Enhanced Recovery After Surgery) guidelines.⁷

Thoracic patients' pain assessment is still not standardized: The lack of a specific postoperative pain assessment for thoracic surgery has been highlighted through a recent study, which also emphasized the necessity for establishing one tool.⁸

Surveys show that consistent application of ERAS principles in thoracic settings is still variable due to resource and staffing constraints.⁹

Recovery could be substantially enhanced and care could be standardized by creating a single, thoracic-specific nursing evaluation strategy that incorporates

breathing monitoring, pain scales, and early warning systems.⁸

Respiratory Care

Respiratory care is a primary focus of nursing after thoracic surgery due to the high risk of postoperative complications such as atelectasis, pneumonia, hypoxia, and respiratory failure. Nurses are essential in facilitating efficient ventilation, preventing pulmonary compromise, and hastening the healing process.¹⁰

1. **Oxygen therapy and monitoring:** Postoperative patients frequently experience impaired gas exchange as the result of shallow breathing brought on either pain or an impairment in lung capacity. Monitoring SpO₂ and respiratory rate, titrating oxygen, and maintaining target oxygen saturation (usually 94–98%) are all tasks undertaken by nurses.¹⁰ Nurse-led oxygen regimens have demonstrated better results and quicker recuperation.¹¹
2. **Incentive spirometry (IS) and Deep Breathing Exercise :** Alveolar expansion and oxygenation are enhanced when deep breathing and breath-holding techniques are used alongside with nurse-guided incentive spirometry (IS).¹² Despite the modest impact of certain significant trials in lowering pulmonary problems, IS is ultimately beneficial for high-risk patients, especially those with COPD.^{13,14}
3. **Chest physiotherapy and pulmonary hygiene:** Postural drainage, assisted coughing, and chest percussion are some methods that assist in eliminating secretions and keep alveoli from collapsing. Integrating these techniques with IS and deep breathing results in improvements in gas exchange parameters and lung volume.¹⁵
4. **ERAS nursing and structured protocols:** Nurses supervise structured respiratory treatment, educate patients, and make sure that protocols are implemented within ERAS frameworks. Research indicates that effective nursing leadership in ERAS improves thoracic surgery postoperative results.¹⁶

Pain Management

Subsequent to thoracic surgery, specifically a thoracotomy, postoperative pain is frequently severe

due to the location of the chest drain, rib retraction, and intercostal nerve injury. The prevention of complications including pneumonia and atelectasis, early mobilization, and adequate respiratory function all rely upon effective pain management.¹⁷

It is recommended to implement a multimodal analgesic strategy that combines opioids (such as morphine and fentanyl), non-opioid medications (such as NSAIDs and acetaminophen), and localized methods.¹⁸ After open thoracotomy, thoracic epidural analgesia continues to remain the gold standard, although paravertebral blocks are being utilized more and more for VATS since they have similar effectiveness and fewer side effects.¹⁹ Nurses are essential in assessing pain by using instruments like the Numeric Rating Scale (NRS) and keeping an eye out for analgesic side effects. Additionally, they employ non-pharmacological techniques that improve comfort and aid in healing, including as positioning, cold therapy, breathing techniques, and patient education.²⁰

Wound Care and Infection Prevention

Throughout postoperative thoracic surgical care, nurses' primary responsibilities are to provide effective wound care and infection control. The following subsection describes evidence-based nursing interventions for managing incisions and chest tubes, removing chest tubes, and reducing surgical site infections (SSIs).²¹ chest tube placement may deteriorate the ventilation capacity and increase difficulty of postoperative management of patients. The study investigated on the effects of enhanced recovery after surgery (ERAS

1. Chest Incision and Chest Tube Site Care : In accordance with hospital procedure, dressings should be kept clean and dry, occlusive, and sterile. If they become soiled, they should be changed sooner. Monitor for erythema, warmth, swelling, increasing pain, or purulent discharge at the locations of the incision and tube every day.²² To facilitate inspection and ease skin tension, clean the area around the tube entry point with a solution containing chlorhexidine. Then, use split gauze and a clear adhesive dressing (such as Tegaderm). To prevent dislodgement and traction injuries, secure tubes to the skin with tape and sutures.²³ Early nursing surveillance is critical to detecting wound infection .

2. Chest Tube Management and Removal: A drainage system that is positioned below chest level must be connected to chest tubes. Nurses' ought to maintain vigilant tabs on the characteristics and volume of drainage, make sure the tube is not kinked, and check for air leaks using digital measurements or tidaling. Before removal, fluid production of less than 200 mL over 24 hours is generally acceptable; in certain situations, ERAS methods may safely permit up to 450–500 mL.^{18,21} chest tube placement may deteriorate the ventilation capacity and increase difficulty of postoperative management of patients. The study investigated on the effects of enhanced recovery after surgery (ERAS To minimize pneumothorax, removal must be done sterilely, timed with the patient's exhalation or Valsalva maneuver, and quickly followed by the administration of an occlusive bandage made of petroleum.²¹ chest tube placement may deteriorate the ventilation capacity and increase difficulty of postoperative management of patients. The study investigated on the effects of enhanced recovery after surgery (ERAS

Chest tube-focused Enhanced Recovery After Surgery (ERAS) programs have been demonstrated to decrease hospital stays, discomfort, postoperative complications, and drainage durations without raising safety concerns.¹⁸

3. Surgical Site Infection (SSI) Prevention: The fundamental component of SSI prevention is adherence to stringent aseptic technique during dressing changes and high-risk procedures, as well as preoperative antibiotic prophylaxis in accordance with thoracic surgery standards. When changing dressings, a non-touch sterile technique is advised, and institutional SSI monitoring programs with audit and feedback mechanisms must to include wound surveillance.²⁴

Apart from technical wound care, optimizing other recovery components including early mobilization, incentive spirometry, respiratory physiotherapy, and efficient pain management minimizes pulmonary issues which could indirectly elevate the risk of SSI.¹⁸

Early Ambulation and Mobilization

The most important aspect of postoperative treatment following thoracic surgery is early ambulation,

which is linked to a substantial reduction in vascular complications including deep vein thrombosis (DVT) and pulmonary embolism in addition to pulmonary issues like pneumonia and atelectasis. A crucial component of Enhanced Recovery After Surgery (ERAS) pathways, early movement, frequently within 24 hours of surgery, promotes less morbidity, quicker recovery, better pulmonary function, and shorter hospital stays.²⁵

The multidisciplinary team and nurses must develop tailored mobilization plans to guarantee the efficacy and safety of early movement following thoracotomy or video-assisted thoracoscopic surgery (VATS). Studies show that scheduled activities that aim to increase ambulation within an hour after extubation are attainable and greatly enhance recovery results.²⁶ According to a prospective trial that used ERAS procedures in thoracic surgery, over 60% of patients were able to walk around 250 feet within an hour after being extubated. This was linked to less postoperative pulmonary problems and shorter median hospital stays. In thoracic postoperative recovery, our results highlight the significance of goal-directed, nurse-led mobilization as a regular procedure.^{26,27}

Nutrition, Fluid, and Electrolyte Management

A key component of postoperative recovery for patients undergoing thoracic surgery is optimal nutritional support. According to Enhanced Recovery After Surgery (ERAS) guidelines, prompt enteral nutrition beginning (within 24 to 48 hours after surgery) promotes gut integrity, lowers the risk of infectious complications, and enhances overall results.²⁸

Based on gastro-intestinal function and aspiration risk following procedures like lobectomies or esophagectomy, nurses evaluate feeding tolerance and progressively progress diet from clear liquids to complete diet. Both excessive and insufficient hydration can be prevented with goal-directed fluid management. Chest tube losses and surgical stress necessitate careful daily weight and intake/output monitoring.²⁹

Utilizing a goal-directed fluid strategy, nurses can prevent both hypovolemia and volume overload by taking intraoperative events and patient response

into consideration. After a thoracotomy, fluid management should minimize pulmonary edema and glycocalyx disruption while aiming for sufficient tissue perfusion.^{30,31}

Monitoring electrolytes, specifically potassium and sodium, is essential. Drains, third-space changes, or extended fasting may cause imbalances; malnourished patients may experience refeeding syndrome, necessitating careful feeding and electrolyte supplements.³²

Psychosocial Support & Patient Education

Thoracic surgery patients frequently experience high levels of stress, anxiety, uncertainty, and emotional discomfort because of the procedure's nature, possible side effects, and recovery period. Nurses are essential in educating patients and caregivers by giving them unambiguous, thorough information (verbal, written, and digital) regarding the surgical procedure, the anticipated recovery, self-care practices (including breathing techniques and mobility), symptom identification, and medication compliance.^{33,34}

Structured perioperative counseling facilitates emotional adjustment and helps establish reasonable expectation. Patient outcomes improve and family caregivers' anxiety and stress are reduced when they get education and coping skills training.³⁵

Interdisciplinary referrals to psychologists, social workers, or community support may be needed when significant distress, low health literacy, or inadequate home support is identified, as these factors can increase readmission risk.³⁶

Common Postoperative Complications and Nursing Interventions

Thoracic surgery patients are at high risk for a variety of postoperative problems, several of which can be life-threatening if nursing staff do not recognize and treat them immediately.³⁷

1. Respiratory Failure: Postoperative pulmonary complications (PPCs) which comprises atelectasis, pneumonia, or bronchospasm consistently lead to respiratory failure, which is still one of the most dangerous side effects. About 14–37% of individuals undergoing thoracic surgery had these PPCs, which can account for

as much as 80% of postoperative fatalities. By closely monitoring patient effort, respiratory rate, oxygen saturation, and breath sounds, nurses play a critical role in early detection. The main strategies for preventing respiratory decline are pain treatment, early mobilization, posture to maximize lung expansion, and promoting incentive spirometry.^{38,39}

- 2. Postoperative hemorrhage,** is a serious risk since retained blood in the thoracic cavity may result in infection, tamponade, pleural effusion, and arrhythmia, all of which are associated with longer ICU stays and more readmissions. The ERAS cardiac and thoracic recommendations encourage nursing approaches that emphasize regular checks for the patency of the chest tube and refrain from stripping the tube or performing superfluous suction.⁴⁰
- 3. Venous thromboembolism (VTE)** continues to pose a serious risk to this patient population, particularly in connection with immobility and cancer, which increase the incidence of VTE by up to 40% in the absence of prophylactic treatment. Early ambulation, lower-limb exercises, mechanical compression, and low molecular weight heparin (LMWH) according to protocol are all essential multimodal nursing interventions.⁴¹
- 4. Cardiac complications,** especially atrial fibrillation (AF), are also commonly observed after thoracic surgeries. Postoperative AF can occur in 4–37% of cases and is associated with increased morbidity. It is critical to identify signs like palpitations, chest pain, or dyspnea as soon as possible to stop further decline.³⁸
- 5. Wound infection and dehiscence** are linked to risk factors such as poor diet, diabetes, or COPD and emerge within 30 days after surgery. It has been demonstrated that regular nursing care, including daily aseptic wound inspection, dressing changes, temperature monitoring, and patient education on cleanliness and early warning symptoms, significantly reduces the incidence of SSI.⁴²

Discharge Planning and Follow-Up Care

Nurses serve as crucial in discharge planning because they're accountable for making sure the patient satisfies requirements like independent walking, oral

intake, pain management with oral medications, and comprehension of self-care instructions like wound care and incentive spirometry. Nurses instruct patients and caregivers on medicine administration, chest tube care (if present), breathing techniques, and issues that they ought to look out for before they depart from the hospital.⁴³

A structured follow-up is essential considering readmission rates following thoracic surgery can range from 6 to 19%, frequently as a result of preventable complications such wound infections and respiratory difficulties. Safe recuperation at home requires educating patients and their families about warning sign indicators, such as bleeding, increasing dyspnea, and chest pain, and promoting early walking and breathing exercises.⁴⁴

Conclusion

This review emphasizes how crucial evidence-based nursing practices are to lowering length of stay, improving patient outcomes, and avoiding complications, especially when used in Enhanced Recovery After Surgery (ERAS) frameworks. However, shortcomings in nursing education, insufficient availability of thoracic-specific evaluation instruments, and inconsistent use of established protocols continue to be major obstacles, especially in settings with minimal resources like Nepal.

The establishment and adoption of consistent evidence-based nursing standards specifically designed for patients undergoing thoracic surgery is crucial to closing these gaps. Furthermore, improving postoperative care quality demands increasing nurses' participation in multidisciplinary decision-making and ongoing professional growth. To promote protocol development and policy reform in low- and middle-income nations, future research should concentrate on patient-centered outcomes, cost-effectiveness, and localized impediments.

Limitations of the Study

This review is subject to several limitations. First off, the breadth of clinical study was limited by the paucity of empirical research with a nursing focus that particularly addressed post-operative care following thoracic surgery. For low-resource settings like Nepal, where staffing, equipment, and

protocol adherence varied greatly, the majority of the included material is limited in its application because it comes from high-income countries. Relying solely on peer-reviewed, English-language sources, the review might impose missed significant information from non-English or gray literature. Cross-comparison and generalizability are further complicated by the variations in institutional care regimens and surgical techniques (e.g., VATS vs. open thoracotomy) between the studies.

Recommendations

This review highlights the need for standardized, thoracic-specific nursing assessment tools that integrate respiratory monitoring, pain evaluation, and early warning systems to improve complication detection and patient safety. Nurse-led respiratory care bundles, multimodal pain management, and evidence-based wound and chest tube protocols should be incorporated into routine practice, alongside goal-directed early mobilization within ERAS frameworks.

To ensure continuity of care, standardized discharge pathways and nurse-led follow-up services should be prioritized. Capacity building through continuing education, simulation-based training, and policy support for adequate resources is necessary, particularly in low-resource settings such as Nepal. Further research is recommended to develop thoracic-specific assessment tools, evaluate nurse-led interventions, and explore more barriers to protocol implementation.

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