JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472
Journal of Holistic Nursing Science

Article journey
Submitted
7/1/2025
Revised
18/1/2025
Accepted
10/3/2025
Online first
25/3/2025

CASE STUDIES

A comprehensive nursing care for patient with lung tumor post-thoracotomy and Water Seal Drainage: a case study utilizing Roy's Adaptation Theory

Salsa Syifa[1], Hesti Rahayu[2], Novi Wida Rahayuningtyas[3]

Author information
[1,3] Clinical Nurses, Rumah Sakit Universitas Indonesia, Indonesia
[2] Department of Nursing, Universitas Pembangunan Nasional "Veteran" Jakarta, Indonesia

hestirahayu@upnvj.ac.id

https://doi.org/10.31603/nursing.v12i1.12979

Abstract
Lung tumors present a complex clinical challenge due to their potential for both benign and malignant manifestations. The physiological disruption caused by these tumors, particularly in the context of pleural effusion, necessitates meticulous nursing intervention. Specifically, the impairment of fluid reabsorption within the pleural cavity demands the implementation of Water Seal Drainage (WSD) as a critical therapeutic measure. In this context, nurses assume a pivotal role in delivering care and managing the intricate daily care requirements. Given the critical nature of this case, a detailed case study becomes essential to illuminate the nuanced aspects of nursing practice. The case study aimed to provide a descriptive analysis of the nurse's role in caring for a patient with left lung tumors and left pleural effusion following a thoracotomy. What distinguishes the case is the deliberate application of Roy's Adaptation Theory, recognizing the patient's heightened need for adaptive responses to the physiological and psychological stressors associated with their condition. The article outlines the fundamental responsibilities of nurses in managing patients with lung tumors including maintenance of the WSD system, pain management, and patient education. The nurse's role is not limited to physical care but extends to facilitating the patient's emotional, and psychological adjustment along with adaptation.

Keywords: Case study; lung tumor; nursing care; thoracotomy; Water Seal Drainage

Introduction

Tumors as the abnormal and uncontrolled proliferation of cells may lead to tissue growth that can be either benign or malignant (Anderson & Simon, 2020). These growths can manifest in various body locations, including the lungs (Nicholson et al., 2022). Lung tumors presenting abnormal cell proliferation can infiltrate the nose, pharynx, larynx, trachea and bronchi (Rodriguez & Abbott, 2023). Lung cancer ranks as the foremost cause of cancer incidence and mortality worldwide **(Figure 1)**, with approximately 2 million new cases and 1.8 million fatalities reported (Thandra et al., 2021). A study reported the highest mortality rate of lung cancers about 1.761.007 cases, representing 18.4% of all cancer-related deaths (Barta et al., 2019). In Indonesia, lung cancer accounts for 8.8% of new cancer cases, ranking it third among all cancer types (Andinata et al., 2019). Several risk factors lead to lung tumors are age, sex, genetics, smoking, infection, air pollution, chronic lung diseases, and exposure to carcinogens (Bade & Cruz, 2020). Malignant tumors necessitate comprehensive diagnostic evaluations, including anamnesis, physical examination, laboratory and histopathology, imaging, tumor marker, and molecular marker analysis (Vicidomini, 2023). The high incidence of lung tumors demands urgent attention due to their potential fatality (Tesfaw et al., 2023; Rogado et al., 2020). One significant complication of lung tumors is pleural effusion due to the impaired fluid reabsorption (Skok et al., 2019). The condition can compromise lung function and necessitate intervention to prevent lung collapse.

WSD is an important intervention for managing pleural effusion associated with lung tumors (Porcel, 2018). WSD involves inserting a catheter into the pleural space through a chest wall incision, connecting the distal end to a pleura-evac system (Zisis et al., 2015). The system comprises three chambers—suction, water seal, and collection—with the water seal chamber functioning as a one-way valve, allowing air and fluid to exit but preventing re-entry into the thoracic cavity (Sorino et al., 2024). WSD facilitates pleural space drainage, enabling patients to perceive the removal of air or fluid and experience lung re-expansion (American Lung Association, 2023). Nurses hold a crucial position in optimizing patient

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

outcomes through WSD care by maintaining respiratory status, insertion site, comprehensive assessment, pain management, and patient education (Open Resources for Nursing [Open RN], 2023).

Therefore, presenting a case study is important to describe the nurse's role in WSD management for a patient with a left lung tumor and left pleural effusion, post-thoracotomy, decortication, wedge excision lung biopsy, complicated by subcutaneous emphysema and hypercoagulability, in an adult inpatient setting. The case olds significant value for clinical nursing practice by offering a detailed, real-world illustration of how nursing care principles are applied in a complex patient scenario (Seshan et al., 2019). Through the meticulous documentation of specific interventions related to WSD, the case provides valuable insights for nurses caring for similar patients as it underscores the critical importance of inclusive care. Furthermore, it reinforces the application of evidence-based interventions to optimize patient outcomes and highlights the necessity of patient education to empower individuals with knowledge about their condition and treatment (Sakoda et al., 2020). The case also demonstrates effective strategies for managing complications such as subcutaneous emphysema and hypercoagulability alongside WSD management. Presenting these aspects of care can enhance the overall quality of nursing care for patients with lung tumors and pleural effusion.

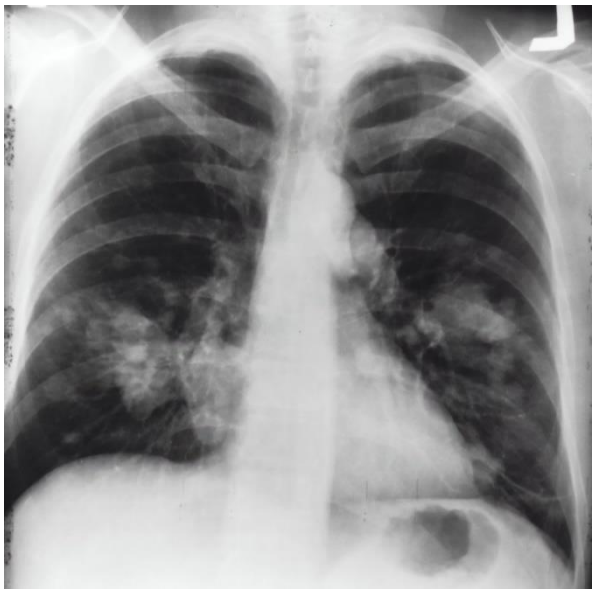

Figure 1. Illustration of x-ray image of lung cancer (Courtesy of www.unsplash.com).

The case study also integrates the Roy's Adaptation Theory that provides a framework for understanding and addressing the complexities of a patient with a lung tumor and pleural effusion requiring WSD. The theory emphasizes a holistic view of the patient as an adaptive system including physiological, psychological, and social dimensions (Callis, 2020). Roy's four adaptive modes provide a structured approach to assessing the patient's adaptation in each area. The framework guides the development of patient-centered nursing interventions directed to individual needs and adaptation (Jennings, 2017). Moreover, it offers a basis for evaluating the effectiveness of nursing care by assessing changes in the patient's adaptive responses (Candan et al., 2022). To date, there is no case study on post-operative lung surgery complications using Roy's Adaptation Theory. In the case study, the Roy's Theory allows nurses to assess how the patient is adapting to physiological changes due to the tumor and fluid accumulation. The WSD intervention itself aims to facilitate physiological adaptation, and the theory helps evaluate its effectiveness. Furthermore, the diagnosis and invasive procedure can cause considerable emotional distress that highlighting the importance of psychosocial adaptation (Peel & Mishra, 2023). The model enables nurses to assess emotional state, provide support, and enhance coping mechanisms (Alimohammadi et al., 2018). The aim of this study is to explore and evaluate the nursing care to patients with left lung tumors following thoracotomy and WSD, using Roy's Adaptation Theory as a framework. This study seeks to understand how individualized nursing interventions can enhance patient adaptation and recovery in this specific clinical context.

Case Presentation

This case study documents the nursing care provided to a 53-year-old male patient admitted on December, 2023, with a diagnosis of left lung tumor, left pleural effusion, post-thoracotomy, decortication, wedge excision lung biopsy, subcutaneous emphysema, and hypercoagulability. The patient also received WSD intervention. Data collection encompassed assessments, management, and evaluation. Initially, the patient reported a persistent cough, sometimes productive of phlegm, and preferred a sitting position for comfort due to a sensation of retained secretions when lying down. He also noted a three-month history of coughing, accompanied by weight loss, but denied night sweats, fever, bowel or urinary issues, or chest pain. Prior to inpatient admission, the patient received care in the Intensive Care Unit (ICU). Upon transfer to the inpatient ward, he complained of chest heaviness attributed to fluid accumulation and thick, yellow-green phlegm. Additionally, he reported pain at the WSD insertion site, rated 3-5/10 on the Numeric Rating Scale (NRS), exhibited grimacing and localized pointing to the pain area. Physical examination revealed an incision at the left 4th intercostal space (ICS) covered with gauze and a secured pleural drain (number 28). Upon admission, the patient's vital signs were: blood pressure 99/58 mmHg, pulse 98 bpm, respiratory rate 20 bpm, SpO2 96%, and temperature 36.5°C.

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

Figure 2. WSD Intervention (Documented by authors).

A Morse Fall Scale (MFS) score of 45 indicated a low fall risk. Subsequently, vital signs were monitored every shift, three times daily. On the second day, the patient experienced increased shortness of breath and chest heaviness, with a respiratory rate of 25 bpm and SpO2 of 95%. Consequently, oxygen therapy at 2 Liters Per Minute via nasal cannula was initiated. Following this intervention, the patient's shortness of breath improved, with a respiratory rate of 18 bpm and SpO2 of 96%, leading to the discontinuation of oxygen on the third day.

The patient's WSD system was in place from December 7, 2023, until December 10, 2023 **(Figure 2)**. Supportive examinations included a blood gas analysis revealing pH 7.499, pCO2 29.80 mmHg, pO2 179.5 mmHg, SaO2 99.7%, BE 1.60 mmol/L, standard BE 0.0 mmol/L, standard HCO3 25.8 mmol/L, HCO3 23.40 mmol/L, and total CO2 24.3 mmol/L. Chest X-ray examinations conducted on December 7, 2023, and December 10, 2023, showed progressive findings, including opacity throughout the left lung field, consistent with pneumonia, tuberculosis, and malignancy, left pleural effusion, left hemithorax drain placement, and extensive subcutaneous emphysema **(Figure 3)**. The subsequent X-ray indicated left hydropneumothorax, pneumomediastinum, and a slight increase in subcutaneous emphysema **(Figure 4)**. Nurses monitored the WSD insertion site every shift until the tube's removal on day four. Wound care, involving cleaning with NaCl 0.9% and dressing with tulle and gauze, was performed every three days. Notably, no leakage was observed from the wound dressing throughout the patient's stay. Furthermore, the skin condition around the insertion site was assessed every three days for signs of infection. Palpation revealed crepitus on the second day, indicative of subcutaneous emphysema, extending to the upper and lower left back, left neck, and upper left arm. The patient also reported a loose, swollen sensation in these areas. Continuous closed drain suction was maintained while the WSD tube was in place. Additionally, nurses, in collaboration with the patient and family, performed crepitus massage towards the WSD insertion site to facilitate air expulsion. By the fourth day, crepitus had significantly decreased. WSD care involved monitoring respiratory status, the insertion site, the system, and pain, as well as patient education. The WSD system was evaluated every shift for fluid amount, characteristics, and leakage **(Table 1)**.

Figure 3. X-ray examination (Documented by authors).

These physiological assessments aligned with Roy's Adaptation Model, focusing on basic physiological integrity. Additionally, the patient's self-concept (psychological and spiritual aspects), role function, and interdependence were assessed. The patient, of Islamic faith, demonstrated acceptance of his illness, utilizing prayer and communication with his wife as coping mechanisms. His wife provided consistent support. The patient's role as a small entrepreneur was disrupted due to hospitalization, affecting both him and his wife's ability to work. However, he maintained strong familial relationships, evidenced by frequent video calls with his children. Nursing diagnoses included impaired gas exchange related to ventilation-perfusion imbalance, acute pain related to physical injury, and impaired skin integrity related to external factors. Pain management, utilizing the NRS, involved positioning, deep breathing, and analgesic administration. Initially, the patient reported pain scores of 3-5/10. By the third day, pain decreased to 1/10, and by the fourth day, the patient mobilized without difficulty. Patient education focused on breathing exercises, relaxation techniques, effective coughing, and safe mobilization. The patient demonstrated good comprehension and adherence to these instructions.

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

Table 1. WSD assessment.

Day	Volume of Fluid (cc)	Characteristics	Undulation	Leak
1	30	Serohemorrhagic*	Present	None
2	100	Serohemorrhagic	Present	None
3	20	Serohemorrhagic	Present	None
4	40	Serous**	Present	None
4	WSD removed			

* A type of wound drainage that is both serous (clear, watery) and containing blood (hemorrhagic).
** a clear, thin, and watery fluid that is a normal part of the inflammatory stage of wound healing.

Discussion

This case study demonstrates the application of Roy's Adaptation Theory in providing comprehensive nursing care for a patient with a left lung tumor post-thoracotomy, complicated by pleural effusion and requiring WSD. Assessing the comprehensive aspect can implement interventions that address the challenges associated with the complex clinical scenario. The holistic approach improved respiratory function, pain management, and emotional well-being. In this case, the patient complained of coughing with phlegm, chest feeling filled with fluid and heavy, a history of weight loss, and a long history of coughing for more than three months. This is consistent with study explaining the symptoms of lung cancer are chronic cough, blood-tinged sputum, chest pain, shallow breathing, weight loss, fatigue, fever, and dyspnea (Xing et al., 2019). During the treatment delivery, thoracotomy + decortication + wedge excision lung biopsy was performed on the patient to reduce emerging symptoms. Lung tumors can hinder fluid reabsorption in the pleural cavity leading to pleural effusion (Jany & Welte, 2019). The thoracotomy procedure in the patient was followed by WSD insertion due to the known fluid accumulation in the patient's pleural cavity. WSD insertion will regulate fluid outflow from the pleural cavity and prevent air from re-entering by using a catheter through a small incision in the chest wall. Subsequently, WSD can also help improve lung expansion and reduce symptoms of shortness of breath (Hapsari & Yudhawati, 2021).

WSD care requires a multidisciplinary approach so that patients receive adequate management. Nurses must assess respiratory status and document it, which includes vital signs, observing shortness of breath, and auscultating lung sounds. Monitoring blood pressure and pulse is important to detect arrhythmias, tachycardia, or bradycardia, which might indicate pain, anxiety, hypoxemia, or electrolyte imbalance. At the same time, temperature monitoring plays a crucial role in detecting infections (Evans et al., 2015). On the first day of care, RR was noted at 25 bpm, SpO2 96%. On the second day, the patient complained of shortness of breath and a heavy chest, leading to collaboration for oxygen administration via nasal cannula. This is consistent with a study that described tachypnea can occur in patients with pleural effusion because fluid accumulation presses the lung preventing full expansion and thus impairing the lung's diffusion capacity (Krishna et al., 2024). Additionally, pain can influence the breathing rate in patients with pleural effusion (Tiwari et al., 2022). The patient's progress after four days of WSD insertion in the adult ward showed improvement, with a respiratory rate range of 18-20 bpm and SpO2 ranging from 96-98%. Nurses need to monitor the WSD insertion area to ensure dressings are secure and there is no leakage (Open Resources for Nursing [Open RN], 2023). Monitoring wound dressings can also identify signs of infection, which include the presence of discharge, color changes, or unusual odors, which could indicate infection (Ding et al., 2022). In this case, the patient received wound care every three days, and evaluations showed no wound leakage from admission until discharge. The absence of leakage is a good indicator of dressing integrity and infection control (DeVries et al., 2021). Monitoring the skin condition around the WSD insertion site can help identify signs of infection and other complications (Do et al., 2021).

Figure 4. X-ray examination (Documented by authors).

In WSD care, nurses need to monitor for signs of infection like redness or purulence, bleeding, and palpate for crepitus, which indicates subcutaneous emphysema (Open Resources for Nursing [Open RN], 2023). In this case, no signs of infection were found at the insertion site, but crepitus was detected on the second day of admission in the adult

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

ward. Crepitus was present in parts of the upper and lower left back, part of the back of the left neck, and the upper left arm, with the patient also complaining that the skin on the back of the left arm and back felt loose and swollen. Crepitus has a pathognomonic tactile sensation of 'walking in the snow' (Melhorn & Davies, 2021). Radiographically, it appears as radiolucent striations that traverse the subcutaneous tissues and muscle (Melhorn & Davies, 2021). The interventions, in this case, included collaboration with the doctor for continuous closed drain suction while the WSD tube was in place. Nurses, together with the patient and family, also massage the crepitus area towards the WSD tube insertion to help expel air. Continuous closed drain suction in patients with chest tubes post-thoracotomy effectively prevents blood, fluid, or air accumulation. Additionally, closed drain suction is known to help reduce pressure within the surgical wound cavity (Harish et al., 2021). After four days of care, crepitus significantly decreased. Specifically, there was no crepitus in the upper left back and back of the left neck, with only slight crepitus remaining in the lower part of the skin of the upper left arm, indicating the interventions were effective in reducing the patient's subcutaneous emphysema.

During WSD care, nurses need to monitor the WSD system: first, ensure the WSD is positioned correctly, not tilted or fallen, and placed lower than the patient's chest to prevent fluid or air from re-entering the chest cavity **(Figure 5)**. Second, check for any obstructions in the WSD tubing, like kinks, foreign objects, or anything else that might impede drainage to the collection chamber. Third, ensure that all connections are secure without leaks from the tubing or the WSD device. Nurses then monitor for undulation in the water seal, which should move up and down with the patient's breathing. If undulation is not visible, it might indicate an obstruction blocking air or fluid flow to the WSD or, at certain times, the lung has fully re-expanded. Based on the monitoring of this case, undulation was observed from the insertion until the removal of the WSD tube. Bubbling in the suction control should be monitored to identify continuous air leaks from the pleura into the drainage system. Nurses also must monitor and document the amount, color, and characteristics of the fluid in the collection chamber. Such monitoring can indicate complications like massive bleeding or infection (Open Resources for Nursing [Open RN], 2023). Nurses consistently report this monitoring WSD system to the doctor at 6 am every 24 hours for evaluation and to decide the next care plan. In this case, the fluid increase in WSD was 30 cc serohemorrhagic on day one, 100 cc serohemorrhagic on day two, 20 cc serohemorrhagic on day three, 40 cc serous on day four, and then WSD was removed by the doctor and nurse.

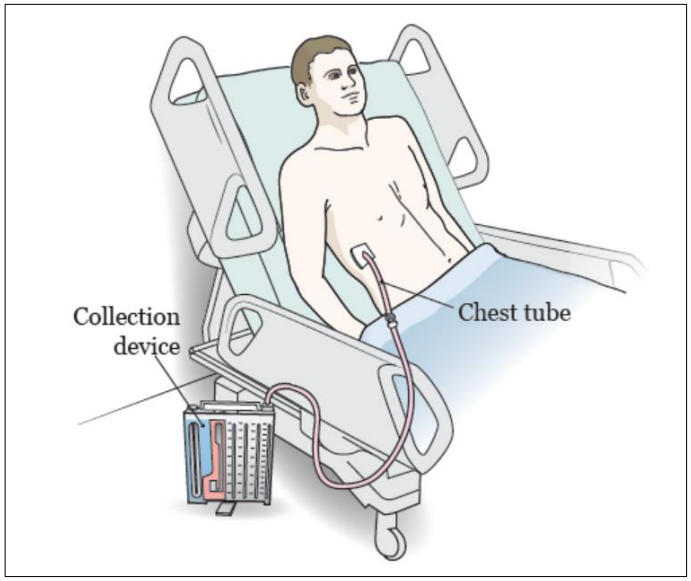

Figure 5. Illustration of chest tube and collection device (Courtesy of www.mskcc.org).

In the context of WSD care, monitoring and managing pain is a critical aspect. NRS has proven effective in various clinical settings, including postoperative care (Herr et al., 2019). In this case, the patient reported moderate pain (3-5/10) in the area of WSD insertion. Pain in postoperative incision sites typically occurs due to tissue trauma and inflammation (Pogatzki-Zahn et al., 2017). Nurses play a role in helping patients manage pain to enhance their comfort (Saleh, 2023). In this case, the nurse provided interventions such as adjusting to a comfortable position (sitting and leaning on a pillow in front), relaxation of deep breathing, and collaboration for analgesic administration. A study supported that positioning with a pillow can reduce pain in patients with chest tubes (Wulansari et al., 2023). Additionally, deep breathing relaxation is effective in reducing anxiety, and pain and improving oxygenation (Wang et al., 2023). The use of analgesics is common in postoperative patients and has been found effective in reducing pain in postoperative (Rojals et al., 2022). The analgetic is prescribed by a doctor and administered by nurses, while nurses also encourage the patient to do nonpharmacologic pain management. The patient reported a decrease in pain to a score of 1/10 on the third day and improved mobility by the fourth day, indicating effective pain management. In the context of postoperative care for thoracotomy patients, patient education is a critical aspect that can influence recovery. This education includes deep breathing exercises, effective coughing techniques, upright sitting positions, and gradual mobilization. These strategies aim to facilitate lung expansion, reduce pain, and speed recovery. Deep breathing relaxation and effective coughing are vital in reducing the risk of postoperative complications like pneumonia and atelectasis which are common in post-thoracotomy (Ahmad, 2018). Additionally, nurses should educate patients to sit upright because this position is important for facilitating lung expansion and reducing pain. Sitting

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

upright allows for more effective lung expansion and reduces pressure on the surgical area (Reichert et al., 2018). Furthermore, education on gradual mobilization is also crucial in thoracotomy patient recovery. Physical activity after surgery has been proven effective in reducing hospital stay duration and the risk of complications (Yeung, 2016).

In this case study, integrating Roy's Adaptation Theory is highly relevant as it provides a structured framework to understand and address the patient's holistic needs following a complex surgical intervention. Assessing the patient's adaptation across physiological, self-concept, role function, and interdependence modes, the theory enabled nurses to move beyond symptom management and address the patient's overall response to the lung tumor, thoracotomy, and WSD. This resulted in targeted interventions that optimized respiratory function, pain control, and patient's emotional coping. Moreover, the theory maintained social connections, and facilitated a smoother transition back to the role functions in society. However, there are limitations to fully implementing Roy's Adaptation Theory in a hospital setting due to time constraints and resource limitations, which often impede comprehensive assessments across all adaptive modes. Additionally, the need for standardized, easily applicable assessment tools aligned with Roy's model can be challenging. The subjective nature of psychosocial adaptation may introduce variability in interpretation. Furthermore, the theory's emphasis on individualized care may conflict with the standardized protocols and high patient turnover prevalent in acute care settings, potentially hindering the consistent application of its principles.

Conclusion

The case study demonstrates the effective application of Roy's Adaptation Theory in guiding nursing care for a patient with a left lung tumor post-thoracotomy, complicated by pleural effusion and requiring WSD. A good understanding of the kind of WSD is also needed to deliver high-quality nursing care as it will aid the patient's recovery process and prevent complications. Utilizing Roy's framework provides holistic care that addressed the patient's physiological, psychological, and social adaptations to the complex clinical situation. The case highlights the importance of integrating theoretical frameworks into clinical practice to provide patient-centered care. The successful management of the WSD system, coupled with comprehensive patient education and emotional support, underscores the important role of nurses in improving outcomes for patients undergoing complex thoracic procedures. Future research should explore the long-term adaptive responses of patients with lung tumors post-thoracotomy, particularly in relation to their quality of life and functional recovery. Research that explores the interprofessional collaboration in the care of these patients using Roy's model would be valuable.

Author's declaration

All authors contributed to the provision of nursing care and the preparation of the manuscript. The final version has been reviewed and approved by all authors.

AI statement

The author did not use any generative text artificial intelligence tools during the writing process of the manuscript.

Funding

The case study received no funding from academic parties or other relevant institutions.

Availability of data and materials

All data are available from the authors.

Competing interests

There is no competing interest to declare.

Acknowledgments

The authors thanked the people who contributed to the writing process of the manuscript.

References

Ahmad A. M. (2018). Essentials of Physiotherapy after Thoracic Surgery: What Physiotherapists Need to Know. A Narrative Review. The Korean journal of thoracic and cardiovascular surgery, 51(5), 293–307. https://doi.org/10.5090/kjtcs.2018.51.5.293

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

Alimohammadi, N., Maleki, B., Abbasi, S., Shakerian, B., & Hemati, Z. (2018). The Effect of Adaptation Training on Controlling Maladaptation Behaviors in Adolescents with Asthma Based on Roy Adaptation Model. Tanaffos, 17(2), 103–109.

American Lung Association. (2023). Chest Tube Procedure. Www.lung.org. https://www.lung.org/lung-health-diseases/lung-procedures-and-tests/chest-tube-procedure

Anderson, N. M., & Simon, M. C. (2020). The tumor microenvironment. Current biology: CB, 30(16), R921–R925. https://doi.org/10.1016/j.cub.2020.06.081

Andinata, B., Bachtiar, A., Oktamianti, P., Partahi, J. R., & Dini, M. (2023). A Comparison of Cancer Incidences Between Dharmais Cancer Hospital and GLOBOCAN 2020: A Descriptive Study of Top 10 Cancer Incidences. Indonesian Journal of Cancer, 17(2), 119–119. https://doi.org/10.33371/ijoc.v17i2.982

Bade, B. C., & Cruz, D. C. S. (2020). Lung Cancer 2020: Epidemiology, Etiology, and Prevention. Clinics in chest medicine, 41(1), 1–24. https://doi.org/10.1016/j.ccm.2019.10.001

Callis A. M. B. (2020). Application of the Roy Adaptation Theory to a care program for nurses. Applied nursing research: ANR, 56, 151340. https://doi.org/10.1016/j.apnr.2020.151340

Candan, D. H., Doğan, S., Güler, C., & Carroll, K. (2022). Roy Adaptation Model: Theory-Based Knowledge and Nursing Care with a Person Experiencing COVID-19. Nursing science quarterly, 35(3), 304–310. https://doi.org/10.1177/08943184221092434

DeVries, M., Sarbenoff, J., Scott, N., Wickert, M., & Hayes, L. M. (2021). Improving Vascular Access Dressing Integrity in the Acute Care Setting: A Quality Improvement Project. Journal of Wound, Ostomy, and Continence Nursing, 48(5), 383-388. https://doi.org/10.1097/WON.0000000000000787

Ding, X., Tang, Q., Xu, Z., Xu, Y., Zhang, H., Zheng, D., Wang, S., Tan, Q., Maitz, J., Maitz, P. K., Yin, S., Wang, Y., & Chen, J. (2022). Challenges and innovations in treating chronic and acute wound infections: from basic science to clinical practice. Burns & trauma, 10, tkac014. https://doi.org/10.1093/burnst/tkac014

Do, H. T. T., Edwards, H., & Finlayson, K. (2021). Postoperative Wound Assessment Documentation And Acute Care Nurses' Perception Of Factors Impacting Wound Documentation: A Mixed Methods Study. International Journal Of Clinical Practice, 75(2), e13668. https://doi.org/10.1111/ijcp.13668

Evans, S. S., Repasky, E. A., & Fisher, D. T. (2015). Fever and the thermal regulation of immunity: the immune system feels the heat. Nature reviews. Immunology, 15(6), 335–349. https://doi.org/10.1038/nri3843

Hapsari, N., & Yudhawati, R. (2021). Bilateral primary spontaneous pneumothorax with multiple bleb performed by VATS and wedge resection: A rare case in Indonesian adult and review article. International journal of surgery case reports, 85, 106222. https://doi.org/10.1016/j.ijscr.2021.106222

Harish, R., Kazi, F. N., & Sharma, J. V. P. (2021). Efficacy of Subcutaneous Closed Suction Drain in Reduction of Postoperative Surgical Site Infection. Surgery journal (New York, N.Y.), 7(4), e275–e280. https://doi.org/10.1055/s-0041-1735900

Herr, K., Coyne, P. J., Ely, E., Gélinas, C., & Manworren, R. C. B. (2019). Pain Assessment in the Patient Unable to Self-Report: Clinical Practice Recommendations in Support of the ASPMN 2019 Position Statement. Pain management nursing: official journal of the American Society of Pain Management Nurses, 20(5), 404–417. https://doi.org/10.1016/j.pmn.2019.07.005

Jany, B., & Welte, T. (2019). Pleural Effusion in Adults-Etiology, Diagnosis, and Treatment. Deutsches Arzteblatt international, 116(21), 377–386. https://doi.org/10.3238/arztebl.2019.0377

Jennings K. M. (2017). The Roy Adaptation Model: A Theoretical Framework for Nurses Providing Care to Individuals With Anorexia Nervosa. ANS. Advances in nursing science, 40(4), 370–383. https://doi.org/10.1097/ANS.0000000000000175

Krishna, R., Antoine, M. H., Alahmadi, M. H., & Rudrappa, M. (2024). Pleural effusion. Nih.gov; StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK448189/

Melhorn, J., & Davies, H. E. (2021). The Management of Subcutaneous Emphysema in Pneumothorax: A Literature Review. Current Pulmonology Reports, 10. https://doi.org/10.1007/s13665-021-00272-4

Nicholson, A. G., Tsao, M. S., Beasley, M. B., Borczuk, A. C., Brambilla, E., Cooper, W. A., Dacic, S., Jain, D., Kerr, K. M., Lantuejoul, S., Noguchi, M., Papotti, M., Rekhtman, N., Scagliotti, G., van Schil, P., Sholl, L., Yatabe, Y., Yoshida, A., & Travis, W. D. (2022). The 2021 WHO Classification of Lung Tumors: Impact of Advances Since 2015. Journal of thoracic oncology: official publication of the International Association for the Study of Lung Cancer, 17(3), 362–387. https://doi.org/10.1016/j.jtho.2021.11.003

Open Resources for Nursing (Open RN). (2023). Nursing Advanced Skills. In K. Ernstmeyer & E. Christman (Eds.), PubMed. Chippewa Valley Technical College. https://www.ncbi.nlm.nih.gov/books/NBK594492/

Peel, A. M., & Mishra, E. K. (2023). The Psychosocial Impact of Indwelling Pleural Catheters: A Scoping Review. Cureus, 15(7), e41689. https://doi.org/10.7759/cureus.41689

Pogatzki-Zahn, E. M., Segelcke, D., & Schug, S. A. (2017). Postoperative pain-from mechanisms to treatment. Pain reports, 2(2), e588. https://doi.org/10.1097/PR9.0000000000000588

Porcel J. M. (2018). Chest Tube Drainage of the Pleural Space: A Concise Review for Pulmonologists. Tuberculosis and respiratory diseases, 81(2), 106–115. https://doi.org/10.4046/trd.2017.0107

Reichert, M., Pösentrup, B., Hecker, A., Schneck, E., Pons-Kühnemann, J., Augustin, F., Padberg, W., Öfner, D., & Bodner, J. (2018). Thoracotomy versus video-assisted thoracoscopic surgery (VATS) in stage III empyema—an analysis of 217 consecutive patients. Surg Endosc, 32(6), 2664–2675. https://doi.org/10.1007/s00464-017-5961-7

Rodriguez, K., & Abbott, G. F. (2023). Fishman's Pulmonary Diseases and Disorders (6th ed.). New York: McGraw Hill.

Rogado, J., Pangua, C., Serrano-Montero, G., Obispo, B., Marino, A. M., Pérez-Pérez, M., López-Alfonso, A., Gullón, P., & Lara, M. Á. (2020). Covid-19 and lung cancer: A greater fatality rate?. Lung cancer (Amsterdam, Netherlands), 146, 19–22. https://doi.org/10.1016/j.lungcan.2020.05.034

Rojals, V. M., Charaja, M., De Leon Casasola, O., Montero, A., Narvaez Tamayo, M. A., & Varrassi, G. (2022). New Insights Into the Pharmacological Management of Postoperative Pain: A Narrative Review. Cureus, 14(3), e23037. https://doi.org/10.7759/cureus.23037

Sakoda, L. C., Meyer, M. A., Chawla, N., Sanchez, M. A., Blatchins, M. A., Nayak, S., San, K., Zin, G. K., Jr, Minowada, G., & Permanente Medical Group Lung Cancer Screening Task Force (2020). Effectiveness of a Patient Education Class to Enhance Knowledge about Lung Cancer Screening: a Quality Improvement Evaluation. Journal of cancer education: the official journal of the American Association for Cancer Education, 35(5), 897–904. https://doi.org/10.1007/s13187-019-01540-3

Saleh A. M. (2023). Nurses' assessment and management practices of pain among intensive care patients in King Khalid Hospital, Kharj, Riyadh. Heliyon, 9(9), e19986. https://doi.org/10.1016/j.heliyon.2023.e19986

Seshan, V., Matua, G. A., Raghavan, D., Arulappan, J., Al Hashmi, I., Roach, E. J., Sunderraj, S. E., & Prince, E. J. (2021). Case Study Analysis as an Effective Teaching Strategy: Perceptions of Undergraduate Nursing Students From a Middle Eastern Country. SAGE open nursing, 7, 23779608211059265. https://doi.org/10.1177/23779608211059265

Skok, K., Hladnik, G., Grm, A., & Crnjac, A. (2019). Malignant Pleural Effusion and Its Current Management: A Review. Medicina (Kaunas, Lithuania), 55(8), 490. https://doi.org/10.3390/medicina55080490

Sorino, C., Feller-Kopman, D., Mei, F., Mondoni, M., Agati, S., Marchetti, G., & Rahman, N. M. (2024). Chest Tubes and Pleural Drainage: History and Current Status in Pleural Disease Management. Journal of clinical medicine, 13(21), 6331. https://doi.org/10.3390/jcm13216331

Tesfaw, L. M., Dessie, Z. G., & Mekonnen Fenta, H. (2023). Lung cancer mortality and associated predictors: systematic review using 32 scientific research findings. Frontiers in oncology, 13, 1308897. https://doi.org/10.3389/fonc.2023.1308897

Thandra, K. C., Barsouk, A., Saginala, K., Aluru, J. S., & Barsouk, A. (2021). Epidemiology of lung cancer. Contemporary oncology (Poznan, Poland), 25(1), 45–52. https://doi.org/10.5114/wo.2021.103829

Tiwari, N., Kumbhare, R., & Walke, R. (2022). Physical Therapy Rehabilitation for a Chronic Alcoholic Patient With Loculated Pleural Effusion. Cureus, 14(10). https://dx.doi.org/10.7759/cureus.30368

Vicidomini G. (2023). Current Challenges and Future Advances in Lung Cancer: Genetics, Instrumental Diagnosis and Treatment. Cancers, 15(14), 3710. https://doi.org/10.3390/cancers15143710

Wang, H., Liu, X. L., Wang, T., Tan, J. B., & Huang, H. (2023). Breathing Exercises for Pain Management in Cancer Survivors: A Systematic Review. Pain management nursing : official journal of the American Society of Pain Management Nurses, 24(3), 299–310. https://doi.org/10.1016/j.pmn.2022.11.003

Wulansari, N., Rayasari, F., & Anggraini, D. (2023). Slow deep breathing exercise untuk mengurangi nyeri selama pelepasan water seal-drainage (WSD) pada pasien pneumothorax. Holistik Jurnal Kesehatan, 17(6). https://dx.doi.org/10.33024/hjk.v17i6.11933

Xing, P. Y., Zhu, Y. X., Wang, L., Hui, Z. G., Liu, S. M., Ren, J. S., Zhang, Y., Song, Y., Liu, C. C., Huang, Y. C., Liao, X. Z., Xing, X. J., Wang, D. B., Yang, L., Du, L. B., Liu, Y. Q., Zhang, Y. Z., Liu, Y. Y., Wei, D. H., Zhang, K., ... LuCCRES Group (2019). What are the clinical symptoms and physical signs for non-small cell lung cancer before diagnosis is made? A nation-wide multicenter 10-year retrospective study in China. Cancer medicine, 8(8), 4055–4069. https://doi.org/10.1002/cam4.2256

Yeung W. W. (2016). Post-operative care to promote recovery for thoracic surgical patients: a nursing perspective. Journal of thoracic disease, 8(Suppl 1), S71–S77. https://doi.org/10.3978/j.issn.2072-1439.2015.10.68

JHNS
Journal of Holistic Nursing Science
E-ISSN: 2579-7751 P-ISSN: 2579-8472

Zisis, C., Tsirgogianni, K., Lazaridis, G., Lampaki, S., Baka, S., Mpoukovinas, I., Karavasilis, V., Kioumis, I., Pitsiou, G., Katsikogiannis, N., Tsakiridis, K., Rapti, A., Trakada, G., Karapantzos, I., Karapantzou, C., Zissimopoulos, A., Zarogoulidis, K., & Zarogoulidis, P. (2015). Chest drainage systems in use. Annals of translational medicine, 3(3), 43. https://doi.org/10.3978/j.issn.2305-5839.2015.02.09

Authors' insight

Key points

- The case study emphasizes a holistic care that utilizing Roy's Adaptation Theory to support adaptation.
- The study highlights the critical role of nurses in the meticulous management of WSD systems.
- The case addresses the complexities of post-thoracotomy care, including pain management, respiratory support.

Emerging nursing avenues

- How does Roy's Adaptation Theory inform the nursing interventions of post-thoracotomy and WSD?
- What were the key challenges in promoting the patient's adaptation during the post-thoracotomy period?
- What measurable outcomes were used to evaluate the nursing care based on Roy's Adaptation Theory?

How to cite this article (APA style)
Syifa, S., Rahayu, H., & Rahayuningtyas, N. W. (2025). Nursing care for patients with left lung tumor post-thoracotomy and Water Seal Drainage: a case study utilizing Roy's Adaptation Theory. Journal of Holistic Nursing Science, 12(1),60-68. https://doi.org/10.31603/nursing.v12i1.12979