AG Salud. 2025; 3:178
doi: 10.62486/agsalud2025178

CASE REPORT

Nursing care: Postoperative thoracotomy patient with drainage from the Virginia Henderson model

Cuidados de enfermería: Paciente postoperado de toracotomía con drenaje desde el modelo de Virginia Henderson

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Cite as: Chumpitaz M, Reyes-Reyes E, Ccusi-Alvarez S, Ponti LE. Nursing care: Postoperative thoracotomy patient with drainage from the Virginia Henderson model. AG Salud. 2025; 3:178. https://doi.org/10.62486/agsalud2025178

Submitted: 08-04-2024 **Revised:** 12-09-2024 **Accepted:** 24-03-2025 **Published:** 25-03-2025

Editor: Dr. Telmo Raúl Aveiro-Róbalo

ABSTRACT

Introduction: the clinical case of an 81-year-old man is presented who, after wide left lung thoracotomy and drainage surgery, presented hemodynamic decompensation in the post-anesthesia recovery room.
Objective: is to apply an individualized care plan that allows hemodynamic balance for the post-operative patient.
Conclusions: a Care Plan with NANDA, NOC and NIC was made for the patient, applying the assessment of the Virginia Henderson model and the AREA model, prioritizing the diagnoses: Decrease in cardiac output and deterioration of gas exchange, whose final evaluation was 1,2,3.

Keywords: Postoperative Care; Nursing Care; Thoracotomy; Models; Nursing.

RESUMEN

Introducción: se presenta el caso clínico de un varón de 81 años que, tras una cirugía de Toracotomía izquierda amplia de pulmón y drenaje, presenta una descompensación hemodinámica en sala de recuperación posanestésica.
Objetivo: es aplicar un plan de cuidados individualizado, que permita un equilibrio hemodinámico al paciente postoperado.
Conclusiones: se realizó un Plan de Cuidados con NANDA, NOC y NIC al paciente aplicando la valoración del modelo de Virginia Henderson y el modelo AREA, priorizando los diagnósticos: Disminución del gasto cardiaco y deterioro del intercambio gaseoso, cuya evaluación final fue 1,2,3.

Palabras clave: Cuidados Posoperatorios; Cuidados de Enfermería; Toracotomía; Modelos de Enfermería.

INTRODUCTION

Lung cancer is responsible for 2 million new cases and 1,76 million deaths annually worldwide. Non-small cell lung cancer accounts for 85 % of diagnoses, and adenocarcinoma is the most common subtype.[1,2] Surgeries such as segmentectomies, lobectomies, and pneumonectomies improve life expectancy in patients with early lung cancer.[3] According to Henderson, the fundamental role of the nursing professional is to carry out the actions that the patient cannot do at a certain point in their life cycle, either as a substitute or as a support.[4]

CASE REPORT

81-year-old male with a history of diabetes mellitus. In October 2019, he presented with progressive dyspnea, and CEA and PSA tests were elevated. A bilateral pleural effusion was diagnosed at a cancer center, and a biopsy revealed adenocarcinoma of the left lung. Before surgery, laboratory tests were routine. On August 20, 2020, he underwent a left thoracotomy with drainage. During surgery, he bled 800 ml, and his fluid balance was positive (+1700 ml). For the immediate postoperative period, he was admitted to the post-anesthetic recovery unit, where he was assessed according to the Virginia Henderson model.

1. Need for oxygenation and circulation:
   - At 17:00 hours, the patient with ventilatory support by nasal cannula (FiO2 40 %) and SO2 92 %.
   - At 20:30 hours, hemodynamically unstable with altered blood gas levels and signs of pneumothorax and subcutaneous emphysema on radiographic control.
   - Arterial pressure was observed as 68/43 mmHg, heart rate as 106 bpm, and hemoglobin as 5,9 g/dl.

2. Need for nutrition and hydration: In NPO, with dry skin and mucous membranes, he received the fifth saline serum, polygeline, and a globular package, as well as noradrenaline for stabilization.
3. Need for elimination: Reduced diuresis (<50 ml/hour)—thoracic drainage with 1500 ml of blood fluid in 5 hours.
4. Need for movement and posture: There is limited post-surgical movement, and the patient is in a semi-Fowler's position with muscle weakness.
5. Need for rest and sleep: Drowsy, responds to verbal stimuli, but tends to sleep.
6. Need for dressing and undressing: Not assessable due to degree of dependency. III.
7. Need to maintain body temperature within normal limits: Mild hypothermia (35.9 °C), cold skin, and tremor.
8. Need to be clean and neat and maintain skin integrity: Bleeding at the corner of the mouth and bloody discharge from the surgical wound.
9. Need to avoid danger: High risk according to the MORSE scale, with rails at the top and bed rail.
10. Need to communicate: Respond with short, coherent sentences in a low tone.
11. Beliefs and values: Catholic, accepts blood transfusions.
12. Need to work/achieve: Unable to carry out activities due to his post-surgical condition.
13. Need for recreation: Limited movement.
14. Need to learn or satisfy curiosity: Asks about his state of health when he wakes up.

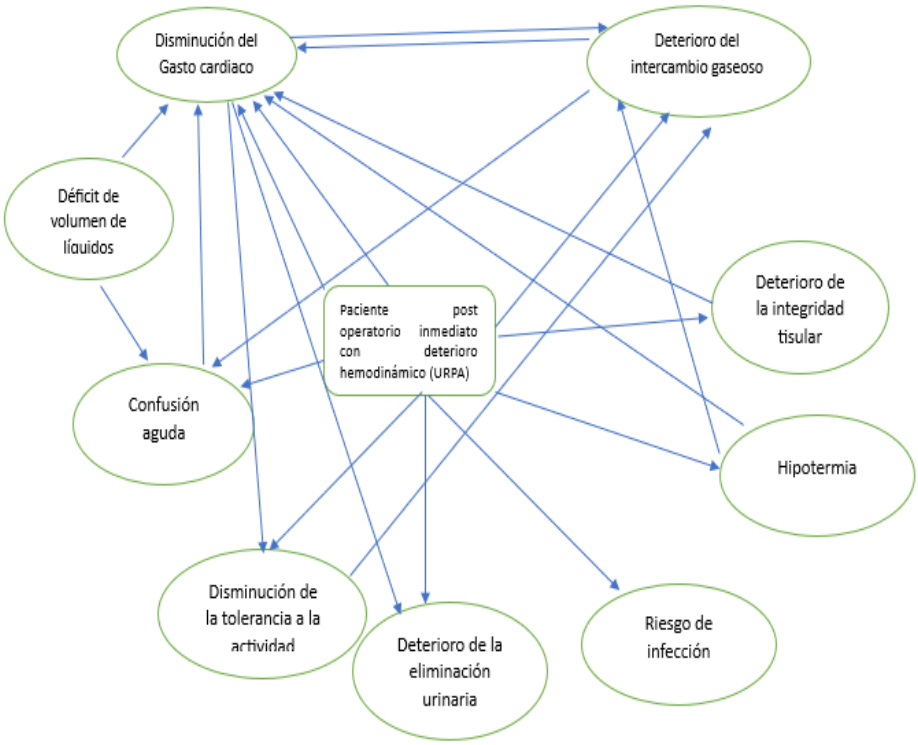

Figure 1. AREA model, for prioritizing nursing diagnoses

https://doi.org/10.62486/agsalud2025178

Care planning and delivery

The assessment was conducted according to the Virginia Henderson Model and linked to the NANDA-I diagnoses. Two diagnoses were prioritized: decreased cardiac output and impaired gas exchange. An individualized care plan was developed, which is detailed according to the nursing intervention classification (NIC) and the classification of expected outcomes (NOC) according to NANDA-I. These were chosen using the AREA model, which identifies the key diagnosis based on its impact on other diagnoses (figure 1).

Once the 2 nursing diagnoses have been identified, care planning can proceed.

Table 1. Individualized care plan

Nursing Diagnoses (NANDA)	Outcome Indicator (NOC)	Likert Scale		Interventions (IAS)	Activities nursing
		Initial Score	Final score		
00029 decreased cardiac output R/C preload and afterload e/p hypotension: 68/43 mmHg, thoracic drainage 1500, bleeding 800, Hb 5.9, HR: 56 x', metabolic acidosis, skin cold, drowsy.	041309 Decreased systolic BP	1	1	4250 Shock management: volume	Control the decrease of systolic BP <90 mmHg.
	041310 Decrease of diastolic BP	1	1	4250 Shock management: volume	Monitor for a decrease in diastolic BP <60 mmHg. Monitor for signs/symptoms of hypovolemic shock: increased HR, oliguria.
	041308 Post operative hemorrhage	1	1	4250 Shock management: volume	Control sudden blood loss or persistent bleeding. Place two large bore IV lines. Administer IV fluids such as crystalloids, colloids. Obtain blood samples for crossmatching. Ad. Hemoderivatives (blood, platelets or FFP, as appropriate (warm).
	041316 Decrease of Hb	1	3	4250 Shock management: volume	Monitor Hb./Ht level. Monitor coagulation studies (PT, TTP). Monitor metabolic studies.
	041315 Decreased cognition	2	3	4250 Shock management: volume	Monitor the patient's mental status or respiration. Perform blood gas monitoring and monitor oxygenation. Ad. Oxygen and monitor its efficacy and/or readiness to switch to MV.
	041312 Body heat loss	2	3	3800 Treatment of Hypothermia:	Apply active internal rewarming: administration of fluids and blood products will be warm. Monitor skin heat and T°.
	041901 Decreased pulse pressure	1	2	4150 Hemodynamic regulation	Monitor and document proportional pulse pressure (PS - PD /PD), expressing the result as a ratio or percentage). Determine the patient's perfusion status: extremity coolness, proportional pulse pressure of 25 % or less, and assess for hyponatremia.
	041902 decrease in mean BP	1	2	4150 Hemodynamic regulation	Monitor cardiac output or cardiac index and left ventricular systolic work rate, as appropriate. Administer inotropic/positive contractility drugs to maintain hemodynamic parameters. Monitor inflow and outflow and diuresis. Evaluate the effects of fluid therapy. Perform bladder catheterization Monitor hemodynamic status (HR, MAP, CVP, CO, HF) as available.

	041925 Metabolic acidosis	1	2	4150 Hemodynamic regulation	Monitor for causes of HCO3 deficit (e.g. hypotension, hypoxia ischemia). Monitor for electrolyte imbalances associated with metabolic acidosis (e.g. hyponatremia, hypokalemia). Administer fluids as appropriate for excessive losses. Administer Hco3 as prescribed. Monitor determinants of tissue O2 supply (PaO2. SPO2, Hb, and cardiac output). Monitor bicarbonate depletion due to tissue hypoxia. Monitor the CNS for worsening metabolic acidosis (decreased consciousness, coma). Monitor cardiopulmonary manifestations of worsening metabolic acidosis (e.g. hypotension, hypoxia, arrhythmias).

Table 2. Individualized care plan

Nursing diagnoses (NANDA)	Outcome indicator (NOC)	Likert scale		Interventions (NIC)	Nursing activities
		Initial score	Final score		
00030 Impaired gas exchange R/C ineffective respiratory pattern e/p severe hypoxemia: PaO2: 31,2, SPO2: 46,5 %, X-ray with findings of pulmonary alterations in HI, lung with Chest drainage.	040208 PaO2	1	1	3320 Oxygen therapy	Prepare oxygen equipment and administer through a heated and humidified system. Monitor the effectiveness of oxygen therapy.
	040210 arterial pH	1	1	1918 Management of acid-base balance	Monitor arterial pH trends.
	040212 SaO2	1	2	3320 Oxygen therapy	Switch the oxygen device from the CBN to the reservoir mask.
	040213 Chest radiograph findings	1	1	3320 Chest drainage care	Monitor for air leakage after insertion. Monitor for signs and symptoms of pneumothorax. Monitor for signs and symptoms of pneumothorax resolution. Document oscillation of tube water it, collected drainage and air leaks.
	041004 Respiratory Fx	1	2	3350 Respiratory monitoring	Observe for noisy breathing, such as stridor. Evaluate the thoracic movement, observe symmetry, use of intercostal and supraclavicular accessory muscles.
	041012 capacity to eliminate secretions	1	1	3350 Respiratory monitoring	Check the patient's ability to cough. Observe for diaphragmatic muscle fatigue.

NIC: Nursing Interventions Classification; NOC: Nursing Outcomes Classification.
Qualitative value of Likert scales: 1 (Severely compromised), 2 (Substantially compromised), 3 (Moderately compromised), 4 (Slightly compromised), 5 (Not compromised).

Evaluation of results/follow-up

The patient was in the post-anesthesia recovery room, where hemodynamic monitoring and ventilatory

support were performed. He did not respond to inotropes, fluids, or the administration of blood products. Due to blood loss, hypotension, and severe anemia (5.9g/dl), the patient was transferred to the operating room for reoperation.

DISCUSSION

Immediate postoperative complications included active bleeding and desaturation, which led to cardiovascular deterioration. Nursing interventions were crucial to manage hypovolemic shock and respiratory dysfunction. Strict monitoring of vital signs and chest drainage was essential. However, the lack of a strict fluid balance and the failure to quantify diuresis contributed to additional complications.

The first nursing diagnosis was decreased cardiac output due to blood volume loss, which affected circulatory, cardiac, and cognitive status. The initial intervention was managing hypovolemic shock with crystalloids, colloids, inotropes, blood, and plasma (table 1). According to Wellge B. et al., goal-directed therapy optimizes perioperative perfusion.[5] However, perioperative fluid management should also include the preoperative and postoperative periods. In the study, norepinephrine infusion was used in addition to fluid therapy to improve the patient's blood pressure and heart rate. Likewise, the survey by Truijen J. et al. mentions that continuous monitoring of blood pressure and other hemodynamic variables (pressure: central venous or measurement by Swan Gantz catheter) will make it possible to optimize postoperative hemodynamic care, also indicating that fluid therapy guided by hemodynamic monitoring could potentially reduce postoperative complications.[6]

In this case, the patient presented with hypotension, 1500ml chest tube bleeding, bradycardia, and oliguria that could have led to kidney failure or cardiovascular deterioration with a risk of death. For this reason, exhaustive monitoring and surveillance of chest drainage in a thoracotomized patient are essential. The use of fluids is even more critical, as in this case, fluids such as sodium chloride, polygeline, a packed red blood cell transfusion, and noradrenaline were administered to avoid hypovolemic shock, controlling the risk of fluid overload and hypoperfusion, so strict control of diuresis and renal function in these patients is essential, as referred to by Felipe Parra et al.[7]

The second priority diagnosis was impaired gas exchange, as the patient reported difficulty breathing. In this regard, the nurse took steps to improve the patient's ventilation and prevent hypoxemia, providing ventilatory support via a nasal cannula with a FiO2 of 40 %, saturating 92 %, and monitoring arterial gases, among other measures mentioned in the care plan (table 2). As noted by Smeltzer et al, in the immediate postoperative period, the main objective is to maintain ventilation and thus prevent hypoxemia and hypercapnia because respiratory complications are among the most frequent and severe problems in surgical patients.[8]

The radiographic results showed that he had moderate signs of pneumothorax and subcutaneous emphysema in the lateral wall of the left hemithorax. According to studies by Ahuja et al., the rapid identification of postoperative complications in the images is essential for proper patient management. It helps to determine when additional intervention is justified. He also mentions that knowledge of postoperative complications is key to early detection and intervention and that most complications after lung cancer surgery occur in the early postoperative period and can lead to significant morbidity and mortality.[9] For this reason, Ortega, M. states that the immediate postoperative assessment is to identify the patient's needs based on the principle that the priority is to save his life and stabilize him hemodynamically.[10]

CONCLUSION

The patient remained unstable during the first 6 hours of monitoring in the post-surgical unit, and the NOC indicators remained at 2 (table 2). Still, due to blood loss and deterioration of gas exchange, he underwent reoperation. This case highlights the importance of continuous evaluation using an assessment such as that of Virginia Henderson to improve the identification of problems such as fluid management, interpretation of hemodynamic monitoring, and improvement of vascular access in post-thoracotomy surgery patients.

BIBLIOGRAPHIC REFERENCES

1. Meng Y, Mao Y, Tang Z, Qiu X, Bajinka O, Tan Y, et al. Crosstalk between the lung microbiome and lung cancer. Microb Pathog. 2023 May 1;178:106062.

2. Thai AA, Solomon BJ, Sequist L V., Gainor JF, Heist RS. Lung cancer. Lancet [Internet]. 2021 Aug 7 [cited 2023 Aug 1];398(10299):535–54. Available from: https://pubmed.ncbi.nlm.nih.gov/34273294/

3. de Groot PM, Truong MT, Godoy MCB. Postoperative Imaging and Complications in Resection of Lung Cancer. Semin Ultrasound CT MR [Internet]. 2018 Jun 1 [cited 2023 Jul 3];39(3):289–96. Available from: https://pubmed.ncbi.nlm.nih.gov/29807639/

4. Arnal Campos CP. Nursing care for patients with Kounis syndrome. Enfermería Clínica (English Edition).

2022 May 1;32(3):203–9.

5. Wellge BE, Trepte CJ, Zöllner C, Izbicki JR, Bockhorn M. [Perioperative fluid management]. Chirurg [Internet]. 2020 Feb 1 [cited 2023 Jul 3];91(2):121–7. Available from: https://pubmed.ncbi.nlm.nih.gov/32025774/

6. Truijen J, Van Lieshout JJ, Wesselink WA, Westerhof BE. Noninvasive continuous hemodynamic monitoring. J Clin Monit Comput [Internet]. 2012 Aug 14 [cited 2023 Sep 2];26(4):267–78. Available from: https://link.springer.com/article/10,1007/s10877-012-9375-8

7. Felipe Parra M, Cáceres LM, Ortega JS, Valenzuela BM, Jofré FC, Monteagudo YF. Recuperación mejorada después de cirugía torácica. ERAS Enhanced recovery after thoracic surgery.

8. Hinkle JL, Cheever KH. Brunner y Suddarth Enfermería médicoquirúrgica.

9. Ahuja J, de Groot PM, Shroff GS, Strange CD, Vlahos I, Rajaram R, et al. The postoperative chest in lung cancer. Clin Radiol [Internet]. 2022 Jan 1 [cited 2023 Jul 3];77(1):6–18. Available from: http://www.clinicalradiologyonline.net/article/S0009926021002555/fulltext

10. Carolina Ortega Vargas. Valoración de enfermería al paciente postoperado de cirugía cardiovascular con el enfoque conceptual de Virginia Henderson. Sociedad Mexicana de Cardiología. 1999;7(4):28–35.

FUNDING

This work has not received any type of funding.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

ETHICAL CONSIDERATIONS

The confidentiality and anonymity of the patient under study were considered, and this work was also evaluated by the institution's ethics committee, which gave it the go-ahead.

ACKNOWLEDGEMENTS

I would like to thank the Oncosalud clinic for allowing me to carry out research in the nursing area.

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