Healthy Tadulako Journal (Jurnal Kesehatan Tadulako)
Vol. 11 No. 1, January 2025
P-ISSN : 2407-8441/e-ISSN : 2502-0749

Original Research Paper

Nursing Care of Spontaneous Ventilation Disorder in Mr. D With Post-Thoracostomy Decortication on the Indication of Right Hydropneumothorax in the Intensive Care Unit (ICU) Room of RSUD Prof. Dr. Margono Soekarjo Purwokerto

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Keywords:
hydropneumothorax, thoracostomy, semi-fowler position

Article History:
Received: 2024-06-06
Revised: 2024-07-07
Accepted: 2024-12-25

Published by:
Tadulako University,
Managed by Faculty of Medicine.
Email: healthytadulako@gmail.com
Phone (WA): +6285242303103
Address:
Soekarno Hatta Street Km. 9. City of Palu, Central Sulawesi, Indonesia

ABSTRACT

Background: Hydropneumothorax is a medical emergency marked by air and fluid accumulation in the pleural cavity, leading to lung collapse and respiratory dysfunction. Though exact prevalence is unclear, it is estimated at 2.4–17.8 cases per 100,000 annually. This condition can cause spontaneous ventilation disorders, particularly in post-operative patients. **Objective:** To describe the nursing care management of spontaneous ventilation disorder in Mr. D, a post-thoracostomy decortication patient with right-sided hydropneumothorax in the ICU of RSUD Prof. Dr. Margono Soekarjo Purwokerto. **Methods:** A descriptive case study approach was used. Data were gathered through interviews, physical assessments, observation, and documentation review. **Results:** Mr. D was diagnosed with spontaneous ventilation disorder due to airway obstruction post-thoracostomy. The primary nursing intervention was positioning in semi-Fowler's position, which helped reduce dyspnea and improve respiratory rate. However, full resolution was not achieved during the care period. **Conclusion:** In post-thoracostomy decortication patients, airway obstruction can weaken respiratory muscles and impair ventilation. Semi-Fowler positioning is beneficial for symptom relief, but continuous and comprehensive nursing care is essential to restore optimal respiratory function.

Introduction

Hydropneumothorax is a malignant disease that causes death and is more common in people who have acute pulmonary clinical disease or other diseases that can cause lung disorders. In Indonesia, there are a lot of people affected by the disease because of poor activities such as smoking, rarely exercising. It is indicated in people who have symptoms of shortness of breath, persistent cough, chest pain, and pulmonary TB disease. Spread In patients who have abnormalities in the lungs, it can also attack other organs outside the lungs such as the pleura, meninges, pericardium (pericardium), and lymph nodes. Hydropneumothorax can also attack anyone, whether old, young, or even children. The diagnosis of this disease is evidenced by the reinforcement of the existence of supporting data for Thorax AP photos. For this reason, this case study explains how nursing care for hydropneumothorax patients who are undergoing treatment in the instalasi care unit (ICU).

Hydropneumothorax is a condition where there is air and fluid in the pleural cavity which results in the collapse of lung tissue. Under normal conditions, the pleural cavity is not filled with air so that the lungs can freely expand against the chest cavity. This fluid can also be accompanied by pus (empyema) and this is called piopneumothorax[1]. This condition can occur due to various factors, the most common causes are bacterial infections, chronic obstructive pulmonary disease (COPD), tuberculosis, but it can also be

pneumonia, bronchitis, to bronchiectasis, can also be caused by trauma or impact, usually due to accidents, puncture wounds, tumors and cancer. In this condition, patients will usually experience shortness of breath, chest pain, cold sweat, coughing, palpitations and weakness. If the patient is suspected of *having hydropneumothorax*, the patient will be asked to do a supporting examination in the form of chest X-ray, CT scan or ultrasound [2].

The prevalence of *hydropneumothorax* is not known with certainty, but the prevalence of *pneumothorax* ranges from 2.4-17.8 per 100,000 population per year. *Pneumothorax* is more commonly found in the *right hematothorax* than in the left *hematothorax*. Bilateral pneumothorax accounts for about 2% of all spontaneous *pneumothorax*. The sex ratio of men to women is 5:1. The incidence and prevalence of ventile *pneumothorax* is 3 - 5% of spontaneous *pneumothorax*. Pneumothorax has a 20% chance of recurrence a second time, and a 50% a third time[3]. Clinically in hydropneumothorax patients found typical symptoms, namely chest pain like stabbing accompanied by shortness of breath and coughing. This chest pain and shortness of breath can decrease or even get worse, then the pain will increase when breathing or coughing[2].

The initial management in the case of pneumothorax is emergency management, namely ensuring airway, breathing, and circulation patency, then conservative and invasive management, one of which is thoracosentesis. Thoracocentesis comes from the Greek words thorax (chest) and centesis (punksi), which means a procedure aimed at the evacuation of fluid or air from the pleural cavity. The action can be done by inserting a needle into the pleural cavity for fluid / air aspiration so that the lungs can expand perfectly. This procedure should be guided by ultrasound to lower the risk of complications. Almost even swelling in all parts of the chest will cause narrowing and result in shortness of breath. Narrowing due to too much fluid and air in the chest cavity will decrease the amount of outside oxygen that enters during inspiration thereby lowering oxygen. This condition will result in a decrease in tissue oxygen so that the patient experiences shortness of breath, paleness, and weakness [3].

Patients with pneumothorax will complain of shortness of breath so that the installation of a *thoracostomy* tube is required. In use, the thoracostomy hose is connected to a device called *Water Seal Drainage* (WSD). Its use is effective in reducing the occurrence of air leakage in the lungs, in this case it is also necessary to adjust the patient's position in order to facilitate adequate breathing, giving a semi-fowler position is a half-sitting technique by elevating the bed so that the head is in position 30°. The semi-fowler position can increase lung expansion so that oxygen more easily enters the lungs and optimal breathing patterns. The application of the semi fowler position (sitting position 30°) in accordance with the SOP helps reduce shortness of breath and helps optimize *respiratory rate*, speed and flow capacity, increase spontaneous tidal volume, and reduce pressure on the diaphragm provided by the stomach contents, improve respiratory system compliance so that oxygenation increases and the problem of ineffectiveness of breathing patterns can be resolved [4].

Materials and Methods

Study Design

This study used a descriptive case study design with data analyzed descriptively. It adopted a comprehensive nursing care approach, covering the stages of assessment, diagnosis formulation, planning, intervention implementation, and evaluation, to provide a thorough understanding of the nursing care process for patients with spontaneous ventilation disorders due to hydropneumothorax.

Sample

The sample consisted of one patient who met the following diagnostic criteria: (1) the subject was a hospitalized patient, (2) the subject was a male patient, and (3) the subject had a diagnosis of post-thoracostomy due to hydropneumothorax.

Data Collection Technique

Data were collected using a critical nursing care format in accordance with the standard guidelines of Universitas Harapan Bangsa Purwokerto. Techniques included direct observation, interviews, physical examinations, and documentation review.

Data Analysis Technique

The data obtained were analyzed descriptively to illustrate the nursing care process provided to the patient, focusing on identifying key problems, implementing appropriate interventions, and evaluating patient outcomes.

Ethical Considerations

Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from the patient prior to data collection. Patient confidentiality and privacy were maintained throughout the study process. The research was conducted in the Intensive Care Unit (ICU) of RSUD Prof. Dr. Margono Soekarjo Purwokerto from March 20 to 22, 2024.

Result

Study

The author obtained the results of the study that Mr. D age 64 years, male gender, address of Pemalang District, and last education junior high school with the main complaint of shortness of breath since a month ago, preceded by a long cough, postoperative thoracostomy patients on indications of hydropneumothorax, patients have a history of previous diseases, namely controlled hypertension and uncontrolled diabetes mellitus.

The results of the physical examination obtained from Mr. D include the patient's awareness of GCS composmentis: E4M5VT, installed ETT ventilator SIMV mode with RR settings: 12, Ps: 6, FiO2: 80%, PEEP: 5, installed *Water Seal Drainage* (WSD) hose red discharge fluid, installed DC, additional sound ronkhi, using breathing muscles, the patient looks restless, installed two-line infusion get NaCl therapy and RL 20 tpm, attached two syringe pumps with sukrita therapy, TD: 148/103mmHg, Pulse: 118x/min.

The results of the examination supporting the effect of examination Thorax AP Emphysematous subcutis Photo Examination increased, Old Fractura Os Costa III-VI Lateral Dextra**,** Hydropneumothorax Dextra worsened. Blood laboratory tests Hemoglobin 10.2 (Low), Erythrocytes 3.88 (Low), Hematocrit 31.2 (Low), Platelets 475000 (High), Albumin 1.94 (Low), Calcium 7.7 (High). Blood gas analysis examination PO2 65.9 (Low), PCO2 26.2 (Low), HcO3 Actual 16.3 (Low), SaO2 99 (High). Therapy given: nebu (3x1): combivent &; Pulmicort.

Diagnosis

From the results of the study, nursing problems that can be raised are Spontaneous Ventilation Disorders associated with respiratory muscle fatigue, there is the use of breathing muscles, the presence of additional ronkhi sounds, level of consciousness: composmentis (E4M5VT), installed SIMV mode ETT ventilator with RR settings: 12, Ps: 6, FiO2: 80%, PEEP: 5, pupillary reaction: there is a reaction to light, the patient looks restless, TD: 148/103mmHg, Pulse: 118x/min. Therapy: nebu (3x1): combivent & Pulmicort.

Intervention

The researchers' nursing intervention uses guidelines from the Indonesian Nursing

Outcomes Standard (SLKI) and the Indonesian Nursing Intervention Standard (SIKI). The purpose of the outcome criteria for the diagnosis of Spontaneous Ventilation Disorder is related to respiratory muscle fatigue, namely after three days of nursing action, spontaneous ventilation is expected to increase with the criteria of decreasing dyspnea results, decreased use of breathing aid muscles, decreased anxiety, with interventions given, namely: 1) Ventilation Support through observation: monitor the status of respiration and oxygenation (use of breathing aid muscles, additional breathing sounds, oxygen saturation), therapeutic : give the semi fowler position, collaboration: collaboration of bronchodilator administration. 2) Airway suction through observation: identify the need for suction, therapeutic: perform suction only along ETT to minimize invasiveness.

Implementation

On March 20-22, 2024, implementation has been carried out, in accordance with the previously prepared plan and adjusted to the therapy that has been carried out by the hospital. The action taken on the first day was to monitor the status of respiration and oxygenation (there was use of breathing muscles, additional breathing sounds, increased oxygen saturation) the patient still seemed cooperative awareness of GCS composmentis: 10 (E4 M5 VT), PCO2: 22.5 mmHg (decreased), PO2: 65.9 mmHg (decreased), SaO2 decreased, TD: 148/103 mmHg, N: 118x/min, RR: 20x/min, S: 36.5°C. Next give the position of semi fowler 30°, The patient appears to be in the Semi Fowler 30 position° with a state that seems more comfortable and relaxed.

The action carried out on the second day identified the need for suction with a *suction* tube, the patient was given nebulizer therapy then mucus suction was carried out using *suction,* suction was carried out through an ETT hose, suction was carried out only along the ETT to minimize invasive, before suction was heard the sound of additional breathing ronkhi, then after the additional breathing sound decreased. Evaluating the status of respiration and oxygenation, the patient appeared to still be using breathing muscles, additional breathing sounds decreased after mucus sucking, decreased oxygen saturation, decreased consciousness, TD: 147/101 mmHg, N: 131 x / min, RR: 32 x / minute, SpO2: 94%. Furthermore, evaluating the provision of the semi fowler 30 position°, the patient is still maintained in the semi fowler 30 position° with a state that begins to agitate as evidenced by the patient trying to pull the ventilator tube attached.

The action carried out on the third day evaluating the status of respiration and oxygenation found that the patient was still using breathing muscles, additional breathing sounds began to decrease, oxygen saturation returned to a stable state, but occasionally there were changes in the patient's TTV, the patient's consciousness was unstable, TD: 159/197 mmHg, N: 140 x/min, RR: 30 x/min, SpO2: 99%. Evaluating the provision of semi fowler position 30°, the patient appears to be still in the semi fowler position 30° with a state of anxiety.

Evaluation

Based on the evaluation carried out, awareness with a stable initial condition after the final condition action was sufficiently decreased, dyspnea indicators with the initial condition increased quite a bit after the final condition action was moderate. Indicators of the use of respiratory muscles with the initial condition are sufficiently increased after the action of the final condition is moderate. This shows that after three days of action, the nursing problem of Spontaneous Ventilation Disorder associated with respiratory muscle fatigue has not been resolved.

Discussion

Hydropneumothorax is a condition where there is air and fluid in the pleural cavity which results in the collapse of lung tissue. *Hydropneumothorax* is an *emergency* caused by the accumulation of air and fluid in the pleural cavity, as a result of disease or injury. The condition usually results from blunt or sharp trauma, or it may be due to complications of some disease. *Hydropneumothorax* can occur spontaneously without being preceded by an accident or trauma and can also occur due to trauma. *Hydropneumothorax* patients will complain of severe shortness of breath caused by the buildup of fluid and air in the lungs so that in that condition it is necessary to install *Water Sealed Drainage* (WSD) to remove fluid or air collected in the pleural cavity, it is hoped that the pressure of the pleural cavity can return as it should. In this condition, the patient is unable to breathe adequately so that a breathing apparatus is needed with the installation of a ventilator. There are signs including increased use of breathing muscles, supported by laboratory results showing increased PCO2 values, decreased PO2, decreased SaO2, restless patient conditions, resulting in spontaneous ventilation disorder nursing problems[5].

A study says 5.4% of all patients suffering from trauma, are patients who experience pneumothorax. The diagnosis of *hydropneumothorax* is established by anamnesis, physical examination and support. From the anamnesis, it is found that the patient's condition increases tightness, can be accompanied by severe chest pain, and decreased consciousness, therefore, the patient needs the help of mechanical ventilation or high-pressure oxygen administration [6].

In patients with spontaneous ventilation problems, it is necessary to consider the body position that is in accordance with the conditions at that time, with the provision of the right position, it is expected that the patient's adequacy is able to breathe adequately[7]. One of the interventions applied is body position to overcome the patient's shortness of breath. The position given is the semi fowler position. The semifowler position can improve the patient's respiratory status, this statement is supported by that the recommended position is the semi-fowler or fowler position because it allows the chest cavity to dilate and lung expansion to increase, but in this study was conducted on CHF patients. This condition causes oxygen intake to improve so that the respiratory process returns to normal[8.] Another study explained that placing patients in a semi-fowler position would help ease breathing. Research explains that the SpO2 semi-fowler position will be better than the supine position, patients who are bedridden in a supine position have the potential to increase the risk of part of the lung collapse. This is comparable to case studies conducted by researchers[9,10,11].

Conclusion

From the results of the study, composmentis patient awareness data with GCS: E4M5VT, installed SIMV mode ETT ventilator with RR settings: 12, Ps: 6, FiO2: 80%, PEEP: 5, additional ronkhi sound, using breathing muscles, patients seemed restless. TD: 148/103mmHg, Pulse: 118x/min. The patient is attached *a Water Seal Drainage* (WSD) hose whose fluid comes out red. Examination results of Thorax AP photos, impressions: Emphysematous subcutis increased, Old Fractura Os Costa III-VI Lateral Dextra**,** Hydropneumothorax Dextra worsened. So that it was found that nursing problems Spontaneous Ventilation Disorders are associated with respiratory muscle fatigue.

The implementation of nursing carried out is to monitor the status of respiration and oxygenation. Identify the need for suction. Gives the position of semi fowler. Perform suction only along the ETT to minimize

invasiveness. Collaborate on the administration of bronchodilators.

After 3 days of nursing action, nursing problems Spontaneous Ventilation Disorders associated with respiratory muscle fatigue have not been resolved with the results of the patient's sompnolence consciousness, with GCS values (E2W4V1), blood pressure 159/97 mmHg, breathing 30 x / minute, pulse 140 x / minute, temperature 40.1°C, vital signs are unstable.

Acknowledgment

The author would like to thank the RSUD Prof. Dr. Margono Soekarjo and Universitas Harapan Bangsa for helping and facilitating the implementation of this case study.

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