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General Anesthesia in Thoracal Fusion with Diagnosis of Compression Fracture of Thoracal Vertebra 7-8: A Case Report

Febby lidya Zannuba[1], *Made* Suandika[1*], and *Mariah* Ulfah[2]

[1]Anesthesiology Nursing Study Program, Faculty of Health, Harapan Bangsa University, Indonesia
[2]Nursing Study Program, Faculty of Health, Harapan Bangsa University, Indonesia

Abstract. Vertebral compression fractures occur due to pressure that causes cracks in the vertebral body. These fractures often occur in the elderly who have risk factors for osteoprosis. Surgery with fusion is one of the options. The use of general anesthesia is an option for surgery on the spine. Perioperative Anesthesia Nursing Care has been carried out on a 60-year-old man who underwent thoracic fusion surgery for a compression fracture of the T7-T8 vertebra. The patient was classified as ASA II and given general anesthesia with endotracheal intubation (ETT). The provision of care is carried out using an anesthesia care method approach including assessment, analysis and determination of problems, action plans / interventions, implementation and evaluation. The purpose of this report is to describe and identify anesthetic health problems in perioperative and optimize anesthetic management in patients. Keywords: Anesthesiology nursing care, general anesthesia, thoracal fusion, vertebral fracture.

1 Introduction

Vertebral compression fractures (VCF) are fractures that occur due to pressure causing small cracks in the vertebral body, resulting in bone sinking and decreased vertebral height (1). These fractures are commonly caused by osteoporosis, but can also result from trauma or other medical conditions, such as tumors (2). Surgical options to treat VCFs include fusion, which repairs and fuses the vertebrae after injury; bone removal to treat tumors; or kyphoplasty, which corrects the position of the spine by inserting a small balloon with a needle and filling the empty space with special cement (3). In this surgical procedure, general anesthesia is used to centrally relieve pain and induce loss of consciousness through a combination of amnesia, sedation, analgesia, and muscle paralysis drugs, which are reversible (4).

2 Method

* Corresponding author: madesuandika@uhb.ac.id

In this study, a case study with anesthesiology nursing care was used as the research methodology. Case studies are a type of empirical research that investigates modern phenomena in a real-world context (5). The anesthesia nursing care process includes participant selection, informed consent, investigation, data analysis, diagnosis determination, intervention plan creation, implementation, and evaluation. For this case study, Mr. M, who was diagnosed with a compression fracture of 7-8 thoracic vertebrae, was selected and had agreed to be a research participant.

Data were collected through interviews, physical examination, documentation, and medical records. As supporting data, data presentation was done descriptively, namely by narration or description. In addition, the client's verbal expression was used as support. Patients agreed to be research participants while adhering to medical standards and protocols. Confidentiality of patient data was strictly maintained and stored safely.

3. Result and Discussion

3.1. Case

A The patient was a 60-year-old male, consulted from the orthopedic department with a diagnosis of compression fracture of thoracal vertebrae 7-8. Scheduled for thoracal fusion surgery on September 19, 2024. In the anamnesis assessment, the main complaint was that the patient was restless and complained of discomfort. The history of the patient's current illness is low back pain when walking. The patient felt that he had fallen but could not remember when exactly the patient fell. The patient was then admitted to the ward for 5 days, rotgen photos and ECG were taken. The patient complained of not being able to walk for 1.5 months but could still move his legs.

From the physical examination, the patient's general condition was moderate and consciousness composmentis. Vital signs showed blood pressure 117/77 mmhg, pulse rate 80x/min, respiration rate 20x/min and body temperature 36˚C. Lower extremity examination found muscle weakness in both legs.

In the laboratory support examination, the Hemoglobin value was below normal with a value of 12.2 gr/dL, Hematocrit below normal with a value of 36.4%, Leukocytes above normal with a value of 17.96 10^3/uL, Erythrocytes below normal with a value of 10^6/uL, Eosinophils below normal with a value of 0. 1%, Neutrophils above normal with 93.2%, Lymphocytes below normal with 3.3%, NLR above normal with 27.90, Ureum above normal with 62.6 mg/dL, Creatinine above normal with 2.3 mg/dL.

The patient was planned for general anesthesia technique using ETT. The patient was premedicated with ondansentron 4mg and fentanyl 100mcg and induced with propofol 200mg and sevoflurane 2%. The patient was given 30mg of rockuronium muscle paralyzer. The patient was intubated with ETT No.7 non kinking type with a depth of 20cm.

Fig 1: Installed markers at the height of the thoracic vertebrae 3 to 7. Impression; Spondylosis (+) with bridging osteophytes, spondylolisthesis of lumbar vertebra 5 to sacrum vertebra 1 (25 to 50% grade 2) with sclerotic narrow intervertebral discs and vaccum phenomenon (+) accompanied by HNP.

Angkylosing spondylitis (AS) is a chronic inflammatory disease that affects the axial spine. This type of disease can present with many symptoms and clinical signs. The condition often leads to impaired spinal mobility and postural abnormalities. In addition, it is associated with an increased risk of cardiovascular disease, which is thought to be a result of the systemic inflammation present in people with a history of spondylitis (6). HNP is when the nucleus pulposus exits and protrudes, pressing towards the spinal canal through a torn annulus fibrosus (7).

3.2. Preoperative Management

The patient was a 60-year-old male, consulted from the orthopedic department with a diagnosis of compression fracture of thoracal vertebrae 7-8 for thoracal fusion. Planning for the patient should be based on the patient's medical history, physical examination results and laboratory investigations. The results of physical tests showed that the patient's consciousness remained compos mentis, the pupils were isocorrected, and the light reflex was positive. Radiologic examination revealed spondylosis with bridging osteophytes.

The measured blood pressure at the time of preoperative assessment was 164/94. History of asthma, heart disease, stroke and kidney disease was denied. The patient's renal function examination showed elevated ureum and creatinine with ureum 62.6 mg/dL and creatinine 2.3mg/dL. The electrocardiogram showed no left ventricular hypertrophy, and the thoracic X-ray showed no cardiomegaly. This suggests renal problems characterized by elevated ureum and creatinine levels (8). Lactic acid build-up can cause enzymes responsible for energy-producing pathways to be inhibited and lead to the depletion of energy reserves (9).

There are three factors that are broadly considered in the selection of anesthesia techniques such as patient condition factors, procedure factors, and logistical factors. Patient factors to be considered are comorbidities, aspiration risk, age, cooperative ability, ease of airway management, coagulation status, history of previous anesthetic response and patient request. Procedural factors that can be taken into consideration include surgical site, operative technique, patient position during surgery and estimated duration of surgery. Logistical factors that influence the choice of anesthetic technique are postoperative disposition, postoperative analgesic plan and equipment availability (10).

Based on the duration and location of the surgical procedure on the vertebrae, the patient was an indication for general anesthesia with ett. There are no absolute contraindications for general anesthesia other than patient refusal. However, there are many relative contraindications. Relative contraindications include patients with medical conditions that are not optimized prior to elective surgery, patients with a difficult airway or other significant comorbidities (severe aortic stenosis, significant pulmonary disease, CHF, etc.), undergoing procedures that can be performed with regional or neuraxial techniques, therefore, avoiding airway manipulation and physiological changes associated with general anesthesia (11).

3.3. Inform Consent

The consent given by the patient or his/her rightful guardian to the doctor to perform medical treatment on the patient after obtaining complete information and understanding about the procedure is known as informed consent (12). Basically, informed consent has moral, disciplinary, and legal reasons to protect patients from any possible actions of medical personnel that are not approved or authorized by the patient (13).

Patients are given information about the diagnosis of the disease, physical condition according to ASA, procedures and objectives of general anesthesia using ett, benefits, risks and complications that may occur in pre, intra and post anesthesia. Patients and families agree and then sign the informed consent sheet. Inform consent given by the officer aims to straighten out the patient's perception or understanding that is less precise about the operation (14).

3.4. Intraoperative Induction

Before induction, the patient was given premedication drugs such as ondansentron 4mg and fentanyl 100mcg. After premedication, the patient was induced with 200mg propofol and 2% sevoflurane then after controlling the patient's airway, 30mg rocuronium muscle paralyzer was given. after the muscle paralyzer reached its onset, the patient was intubated with a size 7 non kinking ett with a depth of 20cm. during surgery, muscle paralyzer maitenance with 10mg rocuronium was performed every 30 minutes. During the preoperative evaluation, the patient's position should be considered. This is because ideal patient positioning involves a balance between surgical comfort and the risks associated with patient positioning. The surgeon and anesthesiologist are responsible for the positioning of the neurosurgical patient. Difficult positions require adequate depth of anesthesia, hemodynamic stability, invasive monitor protection, and evidence of proper oxygenation (15).

Non-invasive monitoring of blood pressure, oxygen saturation, etCo2 and urinary catheter were performed on the patient. During surgery the patient's breathing was controlled by ventilator with a tidal volume of 500ml, respiratory rate of 12x/min and peep of 5cmH2O, O2 1.5lpm and water 1.5lpm. During surgery, hemodynamics was relatively stable with blood pressure of systole 100-120mmhg and diastole 53-74mmhg, heart rate between 64-76x/min and oxygen saturation 98-100%, bleeding during surgery was approximately about 100cc, and urine output +- 600cc. At the time of termination of anesthesia, neostigmine antidotum 2mg and atropine sulfate 0.5mg were administered intravenously. The patient was extubated in a conscious state and then transferred to the recovery room.

3.5. Postoperative

Patients are transferred to the recovery room for monitoring of consciousness, blood pressure, pulse rate and oxygen saturation. The goals of patient care after surgery in the recovery room include monitoring and treating respiratory problems quickly and appropriately, maintaining a stable respiratory and circulatory system, monitoring surgical wound bleeding, maintaining fluid balance, and managing pain (16).

Hemodynamic monitoring is very important for nurses. Hemodynamic conditions affect the body's oxygen flow and cardiac function, so appropriate monitoring and treatment is required (17). During the recovery room, systolic blood pressure was 110-120mmhg, diastole was 65-72x/min, pulse rate range was 65-76x/min and oxygen saturation was 99-100%. The patient complained of not being able to speak and looked very panicked. Dhikr therapy was carried out to patients while in the recovery room to reduce anxiety, fear, make peace and ask Allah SWT so that pain can be reduced (18).

Pain can be defined as an unpleasant sensory experience or emotional feeling associated or similar to actual or potential tissue damage (19). Therefore, postoperative analgesics in the form of NSAIDs and paracetamol are also given. NSAIDs and paracetamol have been widely used as alternatives, and they appear to be more effective for controlling mild to moderate postoperative pain when used alone or in combination with opioids (20). The patient was transferred to the ward after 30 minutes of monitoring. The patient's general condition was post thoracal fusion surgery with a total aldrete score of 9 which meant that he could be transferred to the inpatient ward (21). The patient was positioned in a supination position, this position helps to keep the body aligned.

Fig 2. Impression: predicle screw fixation as high as 6 to 10 thoracic vertebrae.

The next recovery recommendation is the provision of postoperative analgesics according to the indications and recommendations of the doctor. In this patient, postoperative analgesics were given in the form of dexketoprofen, tramadol and ketorolac in 500ml RL liquid with a drip amount of 20tpm, as well as 1g paracetamol infusion. monitoring of vital signs every 30 minutes for 24 hours is also a note for care in the postoperative ward. A high-protein diet was recommended to stimulate the production of endogenous growth factors, which is the basic principle of bone formation (22).

4 Conclusion

General anesthesia with ett was performed on a 60-year-old man diagnosed with a compression fracture of 7-8 thoracic vertebrae, ASA II physical status who will undergo thoracal fusion surgery.

The patient was premedicated with ondansentron 4mg and fentanyl 100mcg and induced with propofol 200mg. the patient was given a rokuronium muscle paralyzer and then intubated with a no7 type non kinking ett with a depth of 20cm. during surgery the patient was given maintenance rokuronium muscle paralyzer as much as 10mg per 30 minutes. The operation lasted for +-2 hours.

Postoperatively, the patient was transferred to the recovery room and observed for 30 minutes. Consciousness and hemodynamic status were good during observation. The patient did not complain of dizziness, anxiety and shortness of breath, then allowed to return to the ward and continued therapy with postoperative analgesics, monitoring vital signs every 30 minutes for 24 hours and a high protein diet to help bone formation.

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