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Nursing Assistance For Traumatic Brain Injury Patients With Intracranial Adaptive Capacity Decrease Using 30º Head Up Position Intervention At Jendral Ahmad Yani Hospital Metro City

Tasmadi[1], Eko Wardoyo[1], Sugiarto[1]
[1]*Universitas Aisyah Pringsewu, Lampung, Indonesia*

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Corresponding Author :
Tasmadi
E-mail : tasmadi25@gmail.com

ABSTRACT

Background & Objective: A head injury is a traumatic disruption of brain function with or without interstitial hemorrhage in the brain substance without a break in brain continuity. The purpose of this study was to determine Nursing Care for Traumatic Brain Injury Patients with Decreased Intracranial Adaptive Capacity Using the 30º Head Up Position Intervention.

Method: The method in this scientific work with a descriptive approach to nursing care involving 2 head injury patients, the instrument used is an assessment sheet, the application of the 30º Head Up position is carried out for 4 days in patients 1 and 2, with the intensity of giving the 30º Head Up position 3 times a day for 30 minutes.

Result: The results of this study found that the main problem that arose in both patients was a decrease in intracranial adaptive capacity, the intervention that was arranged was intracranial management combined with giving the Head Up 30º position, implementation was carried out for 4 days, nursing evaluation of intracranial decline improved to 2 in the first patient and day 3 in the second patient.

Conclusion: The recommendation that the author can give is that the application of the Head Up 30º position can restore intracranial decline quickly.

Introduction

Head injury is a traumatic disturbance of brain function accompanied or without interstiil bleeding in the brain substance without being followed by a break in brain continuity (Muttaqin, 2019). According to Haryono & Utami, (2019) head injury is a broad term that describes a number of injuries that occur to the scalp, skull, brain, and underlying tissues and blood vessels in the head. Head injury is one of the causes of disability and even death and is a health problem for sufferers. The World Health

Organization (WHO) predicts that by 2030, head injuries will be the leading cause of disability and death globally (Wangidjaja & Wreksoatmodjo, 2022).

Based on data from the World Health Organization (WHO, 2020), it is found that around 69 million people around the world experience head injuries every year. The proportion due to road accidents, the largest came from Africa and Southeast Asia recorded at 56%, and the lowest in North America, namely, 25% (Makmur et al., 2020). The incidence of head injury cases in Indonesia based on the Basic Health Research report (Riskesdas, 2023) found that head injuries were the third most common injury with a proportion of 12.8% after limb injuries. This incidence rate cannot in detail explain the total number of cases because epidemiological research on head injuries in Indonesia is still very limited and there are still many cases that are not reported (Samsir et al., 2022).

According to the results of the Basic Health Research (Riskesdas, 2023) where the region with the most head injuries is Gorontalo with a dominance of 17.9%, while South Sulawesi ranks sixth after NTT with a pervasive 15% (Kemenkes RI, 2023). It was found that the prevalence of head injury in Lampung Province was the largest in the districts of Bandar Lampung, Metro, and Tulang Bawang, the highest prevalence of causes of head injury was falling (61.2%), due to sharp / blunt objects (23.6%), and land transportation accidents (17.9%). (Riskesdas, 2018).

The impact of head injuries caused by accidental falls, traffic accidents, sharp or blunt object impacts, impacts from moving objects, and head impacts on static objects will result in increased intracranial pressure (ICP) due to cerebral edema or bleeding that occurs in brain tissue. One sign of an increase in ICP is the occurrence of complaints in the form of headache experienced by post-traumatic patients. The headache occurs due to stretching of pain-sensitive intracranial structures, as well as an inadequate brain perfusion process, which leads to aerobic to anaerobic metabolism (Yusuf & Rahman, 2019).

Disorders due to head injury cause problems in the form of increased intracranial pressure characterized by decreased circulation of brain tissue, due to the O2 situation in the brain and decreased consciousness or decreased GCS values, to head pain. Increased intracranial pressure (IOP) is the total pressure exerted by the brain, blood and cerebrospinal fluid in the intracranial vault. Increased intracranial pressure (IOP) is an increase in cerebrospinal fluid (CSS) of more than 15 mmHg (normal value 3-15 mmHg). Increased intracranial pressure (PTIK) can also be caused by an increase in blood volume due to cerebral vein thrombosis, miningitis or vascular malformation (Siswanti, 2021).

Nursing interventions that nurses can do to overcome the problem of increased intracranial pressure by means of pharmacological and non-pharmacological therapies. One of the non-pharmacological interventions that can be done is by giving a 30o head up position. The 30o head up position is a way of repositioning the patient's head higher by 30o from the bed with the body parallel and the legs straight or not bending. This position aims to reduce intracranial pressure in patients with head injuries (Soemarmo, 2018). This position can also increase oxygen flow to the brain. Other studies have stated that this head elevation position can increase cerebral circulation flow and maximize oxygen flow to brain tissue (Aditya, et al., 2019) and increase oxygenation flow to the brain (March, et al., 2019).

In line with research conducted by (Arif et al., 2021) on the effectiveness of the 30o head up position on reducing intracranial pressure for head injury patients in the

Lily Room of Sunan Kalijaga Demak Hospital, the results showed that there was an effect of the 30o head up position effectively reducing intracranial pressure for head injury patients in the Lily Room of Sunan Kalijaga Demak Hospital which was characterized by improved oxygen saturation, improved consciousness and reduced head pain. Another study conducted by Khasanah (2023) that intracranial pressure tends to decrease and from the 30o head up position tends to remain (although increasing, but the increase is very small, based on the Friedman test it was concluded that there was a difference in the average intracranial pressure before, after being given the 300 position in CKB patients in the emergency room.

Another study that is in line with the phenomenon in the field regarding the effectiveness of the 30o head up position is that giving a 30o head up position effectively helps improve tissue perfusion in patients with head injuries. In addition, it also aims to provide improved oxygen circulation to brain tissue (March, et al, 2020). Another effect of this intervention is to regulate the transfer of cerebrospinal fluid (CSS) from the intracranial compartment to the spinal subarachnoid cavity, so as to reduce ICP (Safar, et al, 2020).

Based on the pre-survey that the researchers conducted on June 10-12, 2024 based on data searches and observations and interviews with medical record staff of the Jendral Ahmad Yani Regional Hospital, Metro Lampung, the incidence of head injuries per month is around 130 patients admitted to the ICU and neurological ward and receive treatment, of which 100 of them are head injury cases with the average cause of accidents (RM RSUD Jend.Ahmad Yani, 2023).

Data from the Emergency Room of the General Ahmad Yani Metro Hospital, on average, patients with mild to severe head injuries experience a decrease in intracranial adaptive capacity and impaired cerebral perfusion characterized by head pain and decreased patient consciousness, actions taken by nurses at the General Ahmad Yani Metro Hospital to overcome these problems by providing pharmacological therapy and administering oxygen so that the process of decreasing ICP tends to take longer because it is not combined with positions that can reduce ICP, Therefore, based on the various data that have been presented, related problems, and previous research, the authors are interested in conducting a case study of the effectiveness of the 30o head up intervention on reducing intracranial pressure in traumatic brain injury patients at Jendral Ahmad Yani Metro Hospital in 2024.

Objective

The purpose of this study was to determine Nursing Care for Traumatic Brain Injury Patients with Decreased Intracranial Adaptive Capacity Using 30^o Head Up Position Interventions.

Method

The method in this scientific work is a descriptive approach to nursing care involving 2 patients with head injuries, the instrument used is an assessment sheet, the application of the Head Up 30^o position is carried out for 4 days in patients 1 and 2, with the intensity of giving the Head Up 30^o position 3 times a day for 30 minutes.

Results and Discussion

Respondent Characteristics

The characteristics of respondents found by the author in patient 1, namely, the name Mrs. E, 22 years old, female gender, high school education, and work as a housewife, the patient is a head injury patient due to falling from a motorcycle. The second patient the author found was Mrs. S 26 years old, female gender, S1 education, the patient was a severe head injury patient due to falling from a motorcycle.

This is in accordance with research conducted by Tsaousi (2020) which states that around 60% of post-craniotomy patients experience moderate or severe increases in intracranial pressure in the acute postoperative period. Research by Sharifipour et al. (2020) states that age affects a person's acceptance of stimuli due to signs of decreased intracranial adaptive capacity. Age is an important thing that affects the reaction and expression of pain that is felt, the increasing age, the higher the reaction and response to pain that is felt. Male and female characters are related to the nature of exposure and the level of vulnerability in dealing with problems that arise due to increased intracranial pressure. Yantini's research (2020) added that there is a significant relationship between gender and pain intensity due to increased intracranial pressure. It was revealed that men were more resistant to the sensation of pain experienced by women. The results of the study are not in line with this theory because both patients are female.

In terms of education level, both respondents had a high level of education. The level of education affects the coping mechanism of each individual in overcoming problems due to increased intracranial pressure such as nausea, dizziness, and pain (Mandagi, 2019). Thus the characteristics of the respondent's education level in this study where both patients have a high level of education can make patients able to broaden their views and mindset, so that respondents can receive information related to pain and are able to minimize the response to pain. Some studies mention that respondents who have experienced surgery have lower pain levels than those who have never experienced surgery before. This is because the pain experienced after previous surgery can be successfully eliminated, so it will be easier for the individual to take the necessary actions to relieve the pain felt. In line with research conducted by Yantini (2021) which states that good handling in the past will affect the interpretation of symptoms caused by increased intracranial pressure in the future.

According to the researcher's assumption, the impact that arises after craniotomy is a recurrent complication of neurosurgical procedures. This increase in intracranial pressure is caused by stretching of pain-sensitive intracranial structures, as well as inadequate perfusion of brain tissue. Usually symptoms of increased intracranial pressure can include nausea, vomiting, dizziness and pain will feel pulsating or pounding like tension-type headache.

Analysis of Major Nursing Problems

The main nursing problems found in the two patients both experienced the problem of decreased intracranial adaptive capacity, where patient 1 was characterized by the patient saying the head felt dizzy, the patient said nausea and wanted to vomit, the patient said the eyes were blurred and blurred vision, BP 130/90 mmHg, the acral was palpable cold, the patient looked weak, pulse: 110x/min, there was a wound around the head, a 3 liter nasal cannula was installed. while the signs in the second patient were that the patient said the head hurt, the patient said vomiting,

the patient said the eyes were blurry and blurred vision, the patient said he was always sleepy. Objective data, BP 140/90 mmHg, acral palpable cold, patient looks weak, pulse: 110x/min, there are wounds all over the head, 3 liters nasal cannula installed, GCS 12 apathetic Patient post op craniotomy There is bleeding in the head.

Decreased intracranial adaptive capacity is a disturbance of intracranial dynamic mechanisms in compensating for stimuli that can reduce intracranial capacity. Causes of decreased intracranial adaptive capacity: space-occupying lesions (e.g. space-occupying lesion - due to tumor, abscess), metabolic disorders (e.g. due to hyponatremia, uremic encephalopathy, hepatic encephalopathy, diabetic ketoacidosis, septicemia), cerebral edema (e.g. due to due to head injury [epidural hematoma, subdural hematoma, subarachnoid hematoma, intracerebral hematoma], hemorrhagic stroke, hypoxia, ischemic encephalopathy, postoperative), increased venous pressure (e.g. due to cerebral venous sinus thrombosis, heart failure, thrombosis/obstruction of jugular vein or superior vena cava), obstruction of cerebrospinal fluid flow (e.g. hydrocephalus), idiopathic intracranial hypertension. Signs and symptoms of decreased intracranial adaptive capacity major increased blood pressure with widened pulse pressure, bradycardia, irregular breathing patterns, decreased level of consciousness, slowed or unequal pupil response, impaired neurological reflexes (SDKI Working Group Team DPP PPNI, 2017).

According to the 2019 Indonesian Nursing Diagnosis Standards, there are several diagnoses that may appear in cases of traumatic brain injury, namely decreased intracranial adaptive capacity, risk of ineffective cerebral perfusion, impaired physical mobility, and ineffective airway clearance. However, the case has a difference where in the case I got the diagnosis of impaired physical mobility was not established because the patient was able to move both extremities.

This is in line with (Libeskind 2024) who wrote that bleeding occurs due to a trauma process that causes rupture of cerebral blood vessels. The approach that can be used to treat diseases such as the case above is the theory of self-care. Basically, all humans have the need to do self-care and have the right to do self-care independently, unless the person is unable. Self care according to Dhorothea Orem, (2021) is an activity to fulfill the need to maintain the life, health and well-being of individuals both in health and illness carried out by the individual himself. In accordance with Orem's theory, the patient's condition in the case above is in a compensatory need where the patient is in an inability to carry out self-care activities, so that nurses and patients have the same role in carrying out self-care (Chloranyta, 2020).

Analysis of Nursing Actions Based on Nursing Diagnoses

In this case study, both patients had the same nursing diagnoses, namely decreased intracranial adaptive capacity, acute pain, and activity intolerance. Diagnosis of decreased intracranial adaptive capacity the main action taken is with intracranial manajaemn by adding 30o head up position actions, for acute pain diagnoses, the author provides pain management actions, and for activity intolerance the author provides activity therapy actions.

In this case study, the authors emphasize giving a 30o head up position to reduce the intracranial pressure experienced by both patients. Analysis of interventions to reduce intracranial adaptive capacity in trauma brain injury patients based on (SIKI, 2018) is the management of increased intracranial pressure, there are several interventions that can be done but cannot be done all by the author because it is

adjusted to the patient's condition and there are several limitations of the author. The interventions performed on the patient are Observation: identify the causes of increased ICP, monitor signs and symptoms of increased ICP. Therapeutic: give semi fowler position, minimize stimulus by providing a calm environment. Collaboration: collaborative administration of sedation and anticonvulsants. The main action given at the diagnosis of decreased intracranial adaptive capacity is head up 30º (semi fowler position) (SIKI, 2018).

The application of the intervention of providing a 30º head up position is a way of positioning a person's head higher about thirty degrees from the bed with the body in a parallel position and straight or non-bending legs. The Head up 300 position has the benefit of lowering intracranial pressure in patients with head injuries. In line with research conducted by (Pertami et al 2023) with the results of the study there was a significant effect of the 30º head up position on changes in intracranial pressure, especially at the level of consciousness and average arterial pressure of patients with head injuries. The 30º head up position is carried out in head injury patients because this position will facilitate the drainage of reverse blood flow from the intracranial so as to reduce intracranial pressure. Intracranial pressure will decrease significantly from the 0º-35º head up position but at the 40º position, ICT will rise again (Pertami et al, 2017). Then in a study conducted by (Ginting, 2020) with the results of the study there was an effect of oxygen administration and 30º head elevation on the level of consciousness in moderate head injury patients. The results of the intervention carried out, namely giving a 30 ° head up position to An R with the problem of decreased intracranial adaptive capacity with the final result of the patient's GCS increasing, namely GCS 15 E4M6V5 with the patient's consciousness composmentis, the patient is not restless and the patient is no longer bleeding from the mouth.

Analysis of Nursing Actions According to Research Results

The results of nursing action on the diagnosis of decreased intracranial adaptive capacity, after 3x24 hours of nursing care, are expected to decrease intracranial adaptive capacity in two patients can improve. In patient 1, the decrease in intracranial adaptive capacity began to improve on the 2nd day of treatment, which was marked by the patient not starting again, the view was not blurred and the consciousness was composmentis. In the second patient, the decrease in intracranial adaptive capacity began to improve on day 3 of treatment, where the patient's consciousness was composmentis, there was no bleeding, no nausea and dizziness had decreased.

According to Black & Hawks (2019) that moderate head injury patients have decreased intracranial adaptive capacity. Moderate head injury patients have decreased intracranial adaptive capacity associated with head trauma. Brain protection is a series of actions taken to prevent or reduce damage to brain cells caused by ischemia. Cerebral perfusion pressure (CPP) is the amount of blood flow from the cytemic circulation required to provide adequate oxygen and glucose for brain metabolism (Black & Hawks, 2021). Vital signs that are kept constant improve blood flow thereby improving neurological status.

Providing oxygen through a simple mask and a 30 ° head position is an appropriate action in the classification of moderate head injuries to promote oxygen perfusion to the brain so as to help improve consciousness status. The 30-degree head up position is a position to raise the head from the bed at an angle of about 30 degrees and the body position is parallel (Bahrudin, 2021). Brain oxygen balance is influenced

by cerebral blood flow. Brain protection is a series of actions taken to prevent or reduce damage to brain cells caused by ischemia. Brain ischemia is a hemodynamic disorder that will cause a decrease in cerebral blood flow to a level that will cause irreversible brain damage. The basic method of brain protection is to free the airway and provide adequate oxygenation. The 30-degree head-up position aims to meet the oxygenation needs of the brain to avoid hypoxia of the patient, and the intracranial pressure is stabilized within normal limits. In addition, this position is more effective for maintaining the level of consciousness because it corresponds to the anatomical position of the human body which then affects the patient's hemodynamics (Batticaca FB, 2008).

The 30-degree head up position carried out in this study is a form of standard comfort intervention type, which means that actions are taken in an effort to maintain or restore the role of the body and provide comfort and prevent complications. The 30-degree head up position is the position of raising the head from the bed at an angle of about 30 degrees and the position of the body parallel to the feet. The 30-degree head up position has the benefit of lowering intracranial pressure in head injury patients. In addition, this position can also increase oxygen to the brain (Batticaca FB, 2023). Head up position 30o perfusion from and to the brain increases so that oxygen demand and metabolism increase marked by an increase in consciousness status followed by other vital signs. 2 respondents had abnormal pupils (anisocor, reaction+/+), possibly suppression of the ipsilateral 12 oculomotor nerve due to post optrepanation cerebral edema. Patients with large hematomas that give a large mass effect and neurological disorders (Bajamal, 2007). A normal brain has the ability of autoregulation, which is the ability of the organ to maintain blood flow despite changes in arterial circulation and perfusion pressure (Tankisi, et.al, 2021).

Autoregulation ensures constant blood flow through the cerebral vasculature above the perfusion pressure range by changing the diameter of the blood vessels in response to changes in arterial pressure. In clients with impaired autoregulation, some activities that can increase blood pressure such as coughing, suctioning, can increase cerebral blood flow so that it also increases ICP pressure (Thamburaj, V, 2024). The results of this study are in line with the research of Pertami SB, Sulastyawati, Anami P (2017) which shows that there is a significant effect of 30 ° head-up position on changes in intracranial pressure, especially in the level of consciousness and mean arterial pressure in patients with head injuries. The results of research by Martina, et al (2021) also show that the 30-degree Head Up position has an effect on oxygen saturation in stroke patients. In line with Huda's research, (2022) based on t-tests with a significance level of $\alpha = 0.005$, $p = 0.000$ means that there is an effective increase in cerebral perfusion with a 30 degree head elevation. Perfusion in patients with post-op trepanation after 8 hours. Head elevation of 30 degrees can improve cerebral perfusion in patients.

Conclusion

1. The assessment obtained from the two patients showed a difference in the general condition of the patient, where the first patient had a moderate head injury while the second patient had a severe head injury characterized by a decrease in the level of consciousness, while in the first patient the patient's consciousness was composmnetis.

2. The diagnoses obtained in both patients were decreased intracranial adaptive capacity, acute pain, and activity intolerance.
3. The interventions carried out in both patients were intracranial management combined with a 30o head up position so that intracranial decline improved, the second diagnostic intervention with pain management, and the third diagnostic intervention was activity therapy.
4. The implementation carried out is in both patients, namely by giving a 30-degree head up position to reduce intracranial adaptive capacity, giving a 30-degree head up position 3-4 times a day within 30 minutes.
5. Evaluation after nursing care is obtained in the first patient signs and symptoms of decreased intracranial adaptive capacity begin to improve on the second day, where the patient no longer complains of nausea, dizziness and blurred vision, while the results of the second patient signs and symptoms of decreased intracranial adaptive capacity begin to improve on the third day, where the patient is no longer starting, pain decreases and consciousness increases.

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