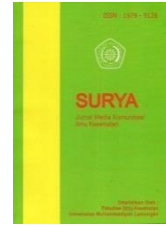




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## *Nursing Care for Mild Brain Injury Patients with 30° Head Elevation Interventions on Nursing Problems Decreased Intracranial Adaptive Capacity*

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### ABSTRACT

**Introduction:** Head injury or Traumatic Brain Injury (TBI) is defined as a disturbance in the normal functioning of the brain that can be caused by a collision, blow, or jolt to the head or a penetrating head injury. Decreased intracranial adaptive capacity is a disturbance of the intracranial dynamics mechanism in compensating for stimuli that can reduce intracranial capacity. This study aims to explore nursing problems in clients with mild brain injury.

**Methods:** This study uses a case report research design. The population in this study were patients admitted to the roudloh room with mild brain injury as many as 4 people. The sample was selected using purposive sampling technique and obtained a sample of 2 patients with a nursing problem of decreased intracranial adaptive capacity. Data collection using surgical medical nursing assessment format. Data was analyzed with descriptive analitic.

**Results:** The assessment results found that both patients experienced headaches, vertigo, nausea and vomiting and blurred vision. The nursing problem raised is a decrease in intracranial adaptive capacity. The intervention given is to provide a 30° head elevation. From the results of the intervention, it was found that the intervention had been resolved.

**Conclusion:** Giving semi fowler position with head elevation 30° in patients with nursing problems decreased intracranial adaptive capacity is very effective. The provision of interventions provided for 3 days with a 30° head elevation showed that both patients achieved outcome.

**Keywords:** Mild Head Injury, Head Elevation 30°, Head Injury

## INTRODUCTION

Head injury or Traumatic Brain Injury (TBI) is defined as a disturbance in the normal functioning of the brain which can be caused by a collision, blow, or jolt to the head or a penetrating head injury (Friden et al. 2015). Nursing problems in handling head injury patients are decreased intracranial adaptive capacity associated with cerebral edema (intracerebral hemorrhage) (Fadly & Siwi, 2020). decreased intracranial adaptive capacity is a disturbance of the intracranial dynamics mechanism in compensating for stimuli that can reduce intracranial capacity (PPNI, 2016).

Based on existing research, the incidence of head injuries is estimated to be 1.7 million people in the United States with head injuries each year. More than 52,000 people die, 275,000 are hospitalized, and nearly 80% are treated and referred to the Emergency Department. The features of head injury that cause death are fracture of the craniate base, diffuse brain injury, cerebral hematoma, and subdural hematoma (Nugroho et al., 2018). The annual incidence of head injury in Indonesia is estimated to reach 500,000 cases. As many as 10% of cases die before arriving at the hospital, 80% are categorized as mild head injuries, 10% as moderate injuries and 10% as severe head injuries (Golden N, 2020). Patients with brain injuries who experience a decrease in intracranial adaptive capacity are found to be 10% of brain injury cases (Anita, 2019).

Several factors that contribute to the outcome of head injury patients include demographic, clinical, and other factors based on Computerized Tomography Scan (CT-Scan) characteristics such as epidural hematoma, subdural hematoma, brain swelling, basal cistern compression, midline shift deviation (Tjahjadi, 2018). The timing of surgery of head injury patients also contributes to the clinical outcome of patients (Ponsford J, 2018).

Factors that can worsen the condition of patients with head injuries must be established

as early as possible so that appropriate, accurate and systematic actions and therapies can be taken immediately in order to produce a good prognosis (Suyasa IK, 2019). One of the nursing problems that often arise in patients with brain injury is a decrease in intracranial adaptive capacity.

Decreased intracranial adaptive capacity is a disturbance of the intracranial dynamics mechanism in compensating for stimuli that can reduce intracranial capacity (SDKI, 2017). The problem of decreased intracranial adaptive capacity requires appropriate treatment to prevent worsening of the patient's condition. One of them is by positioning the semi fowler by giving a 30° head elevation intervention.

The application of intervention with the provision of 30° head up position is a position to raise the head from the bed at an angle of 30° but the position of the body remains parallel to the feet. Head up 30° position is useful for lowering intracranial pressure in patients with head injuries. If there is an increase in intracranial pressure, herniation can occur, namely a condition when brain tissue and brain fluid shifts from its normal position, so it is important to do a 30° head up (Imtihanah, 2017).

Based on the results of research conducted by Abdullah, Luneto, & Sarwan (2022) out of 15 respondents the level of consciousness in head injury patients before performing 30° head elevation was Apathy as many as 14 respondents (93.3%) and Sumnolen as many as 1 respondent (6.7%). And it is known that out of a total of 15 respondents the level of consciousness in head injury patients after 30° head elevation is composmentis as many as 14 respondents (93.3%) and Apathy as many as 1 respondent (6.7%).

The results of another study showed that there was a significant effect of the 30° head up position on changes in intracranial pressure, especially on the level of consciousness and mean arterial pressure of patients with head injuries (Pertami et al., 2017). This study aims to explore nursing problems in clients with

mild brain injury. Based on the brief description above, the researcher is interested in conducting research on "Nursing Care for Mild Brain Injury Patients with 30° Head Up Interventions on Nursing Problems of Decreased Intracranial Adaptive Capacity".

## RESEARCH METHODS

This study used a case report research design. The population in this study were patients admitted to the roudloh room with mild brain injury as many as 4 people. The sample was selected using purposive sampling technique and obtained a sample of 2 patients.

This research variable is a mild brain injury patient with a nursing problem of decreased intracranial adaptive capacity, by giving a semi-fowler position by giving a 30° head elevation. Data collection using surgical medical nursing assessment format. The research was conducted in September 2023 at the Muhammadiyah Lamongan Hospital. Data analyzed with descriptive analytic.

## RESEARCH RESULTS

Table 1 shows that there is one person who is female (1 person, 50%), and one person who is male (50%). All respondents were at an adult age of 19-59 years old and were Muslim. Most respondents were married and had a high school education.

The combination of 30° head elevation therapy interventions was carried out for three consecutive days in each client's hospital room. The outcome and evaluation criteria used refer to Table 2

Table. 1 Respondent Characteristics

No.	Client Data	Client 1	Client 2
1	Name	Mr. W	Ms. S
2	Gender	Male	Female
3	Age	43 th	20 th
4	Address	Lamongan	Lamongan
5	Religion	Islam	Islam
6	Jobs	Self-employed	Student
7	Education History	High School	S1
8	Tribe	Java	Java
9	Marital Status	Marry	Unmarried
10	Main complaint within 1 year	Headache after an accident	Head pain post KLL
11	Efforts to overcome	None	None
12	Past medical history	None	None

Table 2. Nursing Diagnoses and Interventions

Nursing Diagnosis	Nursing Planning Objectives & Outcome Criteria	Intervention																								
<b>Decreased Intracranial Adaptive Capacity</b>	Intracranial Adaptive Capacity (L.06049)	Management of Increased Intracranial Pressure (I.06194)																								
<b>D.0066</b>	Objective: After 3x24 hours of nursing care, it is expected that the intracranial adaptive capacity will increase	Observation:																								
<b>Definition:</b>	Outcome Criteria:	1. Identify the cause of ICT improvement																								
Head injury is a traumatic disruption of brain	<table border="1"> <thead> <tr> <th></th> <th>Declining</th> <th>Decreased Enough</th> <th>Medium</th> <th>Improved Enough</th> <th>Increased</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Awareness level</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td></td> <td>Increased</td> <td>Improved</td> <td>Medium</td> <td>Decreased</td> <td>Declining</td> </tr> </tbody> </table>		Declining	Decreased Enough	Medium	Improved Enough	Increased	1	Awareness level						1	2	3	4	5		Increased	Improved	Medium	Decreased	Declining	2. Monitor for
	Declining	Decreased Enough	Medium	Improved Enough	Increased																					
1	Awareness level																									
	1	2	3	4	5																					
	Increased	Improved	Medium	Decreased	Declining																					

function with or without interstitial hemorrhage in the brain substance followed by a break in brain continuity.	Enough		Enough		signs/symptoms of ICT increase 3. Monitor respiratory status 4. Monitor fluid intake and output Therapeutic 1. Give semi-fowler position 2. Prevent seizures 3. Maintain normal body temperature Collaboration Collaborative administration of mannitol 3x125 cc			
	2	Headache	1	2		3	4	5
	3	Bradikardi	1	2		3	4	5
	4	Restless	1	2		3	4	5
			Worsening	Quite Worse		Medium	Fairly Improved	Improving
	5	Blood pressure	1	2		3	4	5
	6	Pulse pressure	1	2		3	4	5

Table 3. Developmental Record of Intracranial Adaptive Capacity Increased in 2 Clients

No	Indicator	Client Development														
		Day 1					Day 2					Day 3				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1.	Awareness level (increased)		→		→			→		→			→		→	
2.	Headache (decreasing)		→		→			→		→			→		→	
3.	Bradycardia (decreased)		→		→			→		→			→		→	
4.	Restlessness (decreased)		→		→			→		→			→		→	
5.	Blood pressure (improved)		→		→			→		→			→		→	
6.	Pulse pressure (improved)		→		→			→		→			→		→	

Description: Client 1 → ; Client 2 →

## DISCUSSION

### Assessment Results

The results of the assessment obtained through interviews and observations, the authors found problems complained of by both clients with a diagnosis of mild brain injury. This is based on subjective and objective data on client 1, the patient complained of pain in the head of pain felt like stabbing with a pain scale of 6, the patient experienced a decrease in consciousness GCS 355, nausea vomiting, dizziness, the patient seemed weak and restless, BP increased 190/66 mmhg, Bradycardia 48x/min.

Subjective and objective data on client 2 said complaining of head pain with a pain scale of 6, the patient experienced a decrease in consciousness GCS 356, the patient said nausea vomiting, dizziness, the patient seemed restless and weak, blurred vision, BP increased 142/66 mmhg, Bradycardia 50x / min. After being given nursing care, it is hoped that intracranial adaptive capacity will increase with the outcome criteria of decreased headache, improved blood pressure, decreased bradycardia, increased level of consciousness and decreased anxiety. Implementation carried out for 3 days is to measure vital signs, monitor for signs and symptoms of increased

ICP, provide head elevation of the patient's head 30 degrees and also implement collaborative drug administration.

Both clients have typical symptoms of mild brain injury (COR) in line with the explanation (Firmada, 2021) that head injuries include scalp, brain and skull trauma. Mild brain injury is an event where the patient's GCS is between 13-15, there can be loss of consciousness for no more than 10 minutes, if there are comorbidities such as fracture, contusion or hematoma the patient will complain of dizziness, headache and nausea and vomiting.

### **Nursing Diagnosis**

Based on assessment data on both clients, the main symptoms of clients with mild brain injury (COR) are head pain, decreased consciousness, nausea and vomiting. Head injuries can cause increased intracranial pressure due to cerebral edema or bleeding in the brain.

One sign of increased intracranial pressure is headache. Headache occurs due to stretching of pain-sensitive intracranial structures, as well as inadequate perfusion of brain tissue (Kusuma, 2019). So it can be concluded that the nursing diagnosis in clients 1 and 2 is a decrease in intracranial adaptive capacity associated with cerebral edema.

### **Nursing Interventions**

Interventions given to clients 1 and 2 are Management of increased intracranial pressure identify the cause of increased ICP, monitor signs/symptoms of increased ICP, monitor MAP, provide semi fowler position (head up 30°), prevent seizures, maintain normal body temperature collaboration giving osmosis diuretics.

The action plan given to clients 1 and 2 has no difference, each is given the same intervention, namely the management of increased intracranial pressure. interventions that can be carried out based on the standard Indonesian nursing intervention guide, namely by providing a semi-fowler position by way of head up 30° (PPNI, 2018).

This 30° head up position is a way of positioning a person's head higher about 30° from the bed with the body parallel and the legs straight or not bending. The 30° head up position aims to reduce intracranial pressure in head injury patients. In addition, this position

can also increase oxygen to the brain (Kusuma, 2019).

This is in line with Aditya's research showing that a 30 ° elevation position can increase blood flow to the brain and maximize oxygen flow to brain tissue (Aditya, 2018). So that by giving a 30 ° head up is expected to maintain oxygen flow to the brain and prevent oxygen deficiency in the brain.

### **Implementation**

In the case of Mr. W and Ms. S after the implementation of nursing management of increased intracranial pressure carried out by giving head up 30 ° for three days, the client's response the first day there was no change, the second day there was a partial change and the third day experienced a change.

This is in line with Wahidin's research (2020) the results showed that before the Head Up 30 ° intervention was given, the results of the client's assessment showed that the client had decreased consciousness with a GCS value of 12, while after being given Head Up 30 ° for 1 x 7 hours it was found that the client had increased consciousness from GCS 12 (somnolent) to fully conscious GCS 15 (composmentis), Based on the results of this study, it can be concluded that doing Head Up 30 ° can effectively increase tissue perfusion in the brain and improve the client's general condition.

### **Evaluation**

Evaluation on the first day on September 11, 2023 client 1 obtained the results of the patient complaining of pain in the head, BP 192/77 mmhg, GCS 355, pulse 47x/minute. While client 2 obtained the results of the patient complaining of pain in the right side of the head, BP 120/82 mmhg, pulse 85x/minute, GCS 356.

Evaluation on the second day on September 12, 2023 client 1 obtained the results of pain in the head has begun to decrease, BP 178/71 mmhg, pulse 53x/minute. While client 2 obtained the results of the patient complaining of right head pain, feeling dizzy and the patient had difficulty sleeping, BP 128/82 mmhg, pulse 90x/minute.

Evaluation of the third day on September 13, 2023 client 1 obtained the results of the patient said the pain in the head had decreased, GCS 456, BP 156/78 mmhg, pulse 78 x/min. While client 2 obtained the results of the patient

complaining that the head still feels pain sometimes, the patient can sleep, BP 120/80 mmhg, pulse 85 x/min.

In the long term, evaluation of intracranial adaptive capacity may also provide important insights for further research. The data collected can assist in developing new protocols for the management of head injuries and improve our understanding of the adaptive mechanisms of the brain. This not only benefits the individual patient but also makes a significant contribution to the field of neurology as a whole (Maas AIR et al., 2022). Monitoring intracranial pressure is essential to prevent serious complications such as brain herniation, which can be fatal. Based on the data obtained, interventions such as drug administration, surgical procedures, 30° head elevation or other therapies can be performed to reduce the pressure and prevent further damage. In addition, this evaluation also helps in determining the patient's long-term prognosis and customizing an appropriate rehabilitation plan. With a comprehensive approach, it is hoped that patients can achieve optimal recovery and reduce the risk of long-term complications.

## CONCLUSION

The results of the study provided a semi fowler position with a head elevation of 30 ° in patients with nursing problems decreased intracranial adaptive capacity is very effective. The provision of interventions provided for 3 days with a 30 ° head elevation showed that both patients achieved outcome characteristics, namely increased level of consciousness, decreased headache, decreased bradycardia, decreased anxiety, improved blood pressure and improved pulse pressure.

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