



EFFECTIVENESS OF LEVEL 1 PROGRESSIVE MOBILIZATION ON DECREASED INTRACRANIAL ADAPTIVE CAPACITY IN HEMORRHAGIC STROKE CASES

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ABSTRACT

Background: The prevalence of stroke diagnosed by doctors in Indonesia in 2018 was aged ≥ 15 years (10.9%) or an estimated 2,120,362 people. South Sulawesi has the highest prevalence of stroke based on diagnosis and symptoms reported by health workers.

Objective: The purpose of the case study was to carry out nursing care in hemorrhagic stroke patients with reduced intracranial adaptive capacity using level 1 progressive mobilization interventions in the ICU RSUP. Dr. Wahidin Sudirohusodo Makassar.

Method: The method used is a case study with data collection techniques through observation, interviews, physical examination and documentation.

Result: The results showed that level 1 progressive mobilization once a day for 3 days before and after the intervention found that level 1 progressive mobilization could be used to stabilize blood pressure, level of consciousness and oxygen saturation.

Conclusion: The conclusion based on the results show that the implementation of level 1 progressive mobilization showed that on the first day to the third day of implementation there was an increasing in hemodynamic state, in this case the blood pressure improved, oxygen saturation increased and the level of consciousness increased.

INTRODUCTION

Stroke is the third cause of death in industrialized countries after coronary artery disease (13%) and cancer (12%). The prevalence of stroke varies in different parts of the world (Mutiarasari, 2019). The number of

people suffering from stroke worldwide increases every year, with one in four people experiencing a stroke in their lifetime. Data from the World Stroke Organization shows that there are 13.7 million new stroke cases and 5.5 million deaths every year (Organization,

2021). The prevalence of stroke diagnosed by doctors in Indonesia in 2018 in the population aged ≥ 15 years (10.9%), or estimated at 2,120,362 people (Indonesian Ministry of Health, 2019). The prevalence of stroke based on health workers' diagnosis and symptoms is highest in South Sulawesi (17.9%), followed by the Special Region of Yogyakarta (16.9%). The highest prevalence of stroke in Indonesia, namely South Sulawesi, based on symptoms and diagnosis by health workers in 2007 was 7.4% and there was a drastic increase in 2013, namely 17.9% RISKESDAS 2013 (Nurhikmah et al., 2021)

A sudden stroke can cause physical and mental disability and death, both in productive age and in old age. Stroke is divided into ischemic stroke and hemorrhagic stroke. In general, about 50% of hemorrhagic strokes are fatal, while only 20% of ischemic strokes are fatal. Hemorrhagic stroke occurs because blood vessels leak (bleed) in the brain. High blood pressure/hypertension is the most important risk factor in terms of the severity of stroke risk. Other factors include smoking, hyperlipidemia, atrial fibrillation, ischemic heart disease, valvular heart disease and diabetes (Hutagalung, 2019).

Stroke patients who suffer from emergency conditions require monitoring of hemodynamic status, such as monitoring cardiovascular function fitness. The results of these hemodynamic measurements can be used to assess the patient's condition as quickly as possible so that caregivers can decide on the

appropriate action for the patient (Astuti et al., 2022a).

One intervention that can stabilize hemodynamics is Level I progressive mobilization, where this intervention has been proven to provide excellent results in improving the clinical status of stroke patients and critically ill patients treated in the Intensive Care Unit (ICU). the results of research conducted by (Astuti et al., 2022) states that interventions to control blood pressure and oxygen saturation in stroke patients can be carried out using progressive Level 1 mobilization which includes 300 head elevation, right and left tilt, and passive range of motion (Shodiqqurahman, 2022).

Based on the results of interviews with nurses, nurses generally take action to lower blood pressure by using calcium channel blocking drugs such as nifedipine, angiotensin converting enzyme (ACE) inhibitors such as captopril, and antidiuretics such as LASIK. Non-pharmacological therapy has been implemented, but its implementation is not optimal in accordance with the implementation of level 1 progressive mobilization (Zuliani, 2022).

Based on the above phenomenon, the author is interested in carrying out level I progressive mobilization intervention to stabilize blood pressure and oxygen saturation in hemorrhagic stroke patients.

METHODS

The method used is a case study with data collection techniques through

observation, interviews, physical examination and documentation. Management of level 1 progressive mobilization once a day for 3 days, namely on March 7-9 2023, using an instrument in the form of a nursing care format. This research consists of several stages including: preparation stage, data collection and report preparation (Supranto, 2013) (Nurdin & Hartati, 2019).

Implementation of the intervention begins with measuring the patient's blood

pressure and level of consciousness, then the intervention is carried out by providing a head of bed position of 30° for 30 minutes, then giving passive ROM for 10 minutes, then positioning the patient on the right side for 1 hour and on the left side for 1 hour. This is done once a day during service. The duration of time for administering this intervention to patients is 160 minutes or 2 hours 40 minutes.

RESULTS

Table 1 Intervention Implementation Day 1

	TD Systolic	TD Diastolic	SPO2	GCS
Before intervention H1	164	112	97	4
After intervention H1	142	92	98	4

Based on the diagram above, the percentage of decrease and increase in each component before and after the intervention,

namely Systolic BP was 13.4%, Diastolic BP was 17.8%, SPO2 increased by 1% and GCS did not increase.

Tabel 2 Intervention Implementation 2

	TD Systolic	TD Diastolic	SPO2	GCS
Before intervention H2	148	100	99	4
After intervention H2	140	90	99	5

Based on the diagram above, the percentage of decrease and increase in each component before and after the intervention,

namely Systolic BP was 5.4%, Diastolic BP was 10%, SPO2 did not increase and GCS increased by 1%.

Table 3 Intervention Implementation Day 3

	TD Systolic	TD Diastolic	SPO2	GCS
Before intervention H3	139	92	98	5
After intervention H3	125	80	99	6

Based on the diagram above, the percentage of decrease and increase in each component before and after the intervention,

namely Systolic BP, was 10%, Diastolic BP was 13%, SPO2 increased by 1% and GCS increased by 1%.

DISCUSSION

From the results of the analysis above, the client experienced changes in hemodynamic status, namely blood pressure, oxygen saturation and level of consciousness along with the pharmacological therapy given and supported by the nurse's independent intervention, namely progressive mobilization level 1. After being given intervention in the form of progressive mobilization level 1 from the first day until the third day, stable blood pressure was obtained, namely BP: 164/112 mmHg, SpO₂: 97% and GCS: E2 M2 V_x (ETT) with changes in BP 125/80 mmHg, SpO₂: 99% and GCS: E3 M3 V_x (ETT). This shows that the client's decreased intracranial adaptive capacity is improving. One of the indicators for assessing a decrease in intracranial adaptive capacity is improved level of consciousness, improved blood pressure, and improved oxygen saturation (PPNI DPP SDKI Working Group Team, 2016).

However, in this case there was no significant change in the level of consciousness, this was because the patient's condition had contraindications, namely the patient experienced severe capitis trauma and the patient was in a sedated condition. This is in line with research conducted by (Hartoyo et al., 2017) that providing level 1 progressive mobilization intervention is providing independent intervention to patients which can affect blood pressure and level of

consciousness. This is also in line with research conducted by (Astuti et al., 2022) that this progressive mobilization can stabilize blood pressure and oxygen saturation in stroke patients. This research is also in line with research conducted by (Suyanti et al., 2019) that there is an effect of level 1 progressive mobilization on systolic blood pressure, diastolic blood pressure and oxygen saturation with a p value < 0.001 (systolic blood pressure) p value < 0.001 (diastolic blood pressure) and p value < 0.001 (oxygen saturation).

Systolic blood pressure is the blood pressure measured when the left ventricle of the heart contracts. Blood flows from the heart to the arteries so that the blood vessels are stretched to the maximum due to the maximum pressure exerted by the blood (Augustin et al., 2020). Diastolic blood pressure is the blood pressure that occurs when the heart relaxes. During diastole, no blood flows from the heart to the blood vessels so the blood vessels can return to their normal size, while blood is pushed to the more distal arteries (Augustin et al., 2020). Oxygen saturation is an indicator of oxygenation status. Oxygen saturation is the ability of hemoglobin to bind oxygen (Novriyanti, 2020).

In medicine, oxygen saturation (SaO₂), often referred to as "SATS", measures the percentage of oxygen bound by hemoglobin in the bloodstream. At low partial pressure of oxygen, most of the hemoglobin is deoxygenated, which means the process of

distributing oxygenated blood from the arteries to body tissues. Oxygen saturation measurement can be done using several techniques. The use of pulse oximetry is an effective technique for monitoring patients for small or sudden changes in oxygen saturation (Setyaningrum et al., 2017) (Widiyono, 2021).

(Rahmanti & Kartika Putri, 2016) in his research on progressive mobilization, significant results were found between progressive mobilization of the head of bed and range of motion on reducing blood pressure because progressive mobilization can increase changes in blood circulation in the heart so that it can reduce blood pressure.

This research is in line with research conducted by (Astuti et al., 2022), level 1 progressive mobilization is an action carried out in stages sequentially with the initial position *Head of Bed* The next 30° the patient is given passive ROM and positioned tilted to the left and right. This action has a positive impact on various body systems. Progressive mobilization can improve respiratory system functions such as frequency and depth of breathing, maximize alveolar ventilation, normalize the work of breathing and expansion of the diaphragm. This has an impact on oxygen transport throughout the patient's body (Augustin et al., 2020).

This is also in line with the research results (Hartoyo et al., 2017), shows that there is an effect of level 1 progressive mobilization on blood pressure in critical patients with decreased consciousness. According to

research conducted by (Mustikarani & Mustofa, 2020) that the assignment of positions *Head up 30°* proven effective in increasing saturation levels in hemorrhagic stroke patients at RSUP. Dr. Kariadi Semarang. There was an improvement in blood pressure before and after the intervention, as did oxygen saturation, before and after the intervention. This intervention was given to Mr. Z is the one who suffers *hemorrhagic stroke* with the patient complaining of respiratory failure accompanied by decreased consciousness during the 3 days of intervention.

Budiyati (2016) in his research obtained results of changes in blood pressure after mobilization: head of bed and range of motion. These changes occur due to progressive mobilization as a provider of activity for patients to maintain muscle strength and to prevent adverse changes in cardiovascular responses. Changes in blood pressure can be caused by cardiac metabolism which is influenced by myocardial load, myocardial tension and myocardial contractility. Physical activity is beneficial for muscle strength and maintaining cardiovascular health.

Based on previous research and case studies, providing level 1 progressive mobilization intervention is effective in stabilizing the patient's hemodynamic status in hemorrhagic stroke patients. For this reason, in hemorrhagic stroke patients, level 1 progressive mobilization is important to carry

out continuously and become an independent intervention for nurses in the care of patients with hemorrhagic stroke. As a result of not mobilizing, it will cause the gravitational equilibrium to persist over time, as a result, the patient becomes increasingly difficult to adjust to changes in position (Astuti et al., 2022b)

Thus, the researchers assumed that there was a change in hemodynamic status, namely blood pressure in the patient *Hemorrhagik Stroke* with patients with decreased consciousness using level 1 progressive mobilization intervention for three consecutive days. Physiologically, level 1 progressive mobilization exercises are useful for maintaining cardiovascular balance, through several processes, namely (Mobiliu & Tomayahu, 2021):

1. On the first day the body adapts to level 1 progressive mobilization intervention treatment.
2. On the second day, the cardiovascular system will usually adapt by changing the plasma volume, which plays a role in sending message transmissions to the autonomic nervous system to change the elasticity of blood vessels, or the inner ear will respond, which is called the vestibular response, which affects the cardiovascular system during changes in position.

In providing level 1 progressive mobilization intervention, there are several activities including: (Mustikarani & Mustofa, 2020):

1. Position *head of bed* shows that the return flow of blood from the inferior part to the right atrium is quite good because the blood vessel resistance and right atrial pressure are not too high, so the volume of blood entering (*venous return*) to the right atrium is quite good and the right ventricular filling pressure (*preload*) increases, which can lead to an increase in stroke volume and *cardiac output*.
2. Passive ROM in the upper and lower extremities. The blood vessels become elastic and there is a dilation phase in the blood vessels, so the blood flow to the heart becomes smooth, which causes the heart to work stably so that the heart's ability to pump blood increases and then there is an increase in blood pressure.

On the research done by (Astriani et al., 2022) *Range of motion* Passive is able to increase oxygen saturation by improving blood flow throughout the body which is caused by lack of joint movement in non-hemorrhagic stroke patients. Passive range of motion therapy can be carried out simultaneously with pharmacological therapy in non-hemorrhagic stroke patients.

3. Changing the lateral or oblique position affects the return flow of blood to the heart, resulting in an increase in heart volume, therefore the heart's ability to pump blood increases.

Changes in lateral or oblique position affect the return flow of blood to the heart

and have an impact on hemodynamics. In critical patients it is better to be given mobilization rather than leaving the patient in the supine position continuously. Because leaving the patient immobilized will have a bad impact on the body's organs (Ananta Tanujiarso & Fitri Ayu Lestari, 2020).

Critical patients with a long treatment period will cause many health problems to arise, including pneumonia, weakness, acute pain, and problems with all body organ functions due to the influence of infections acquired while being treated in the ICU, which can lead to death. Immobilization of patients in the ICU contributes to further complications which are quite high in patients in critical condition and can result in death. In critical patients who experience immobilization there will be detrimental impacts because in the immobilized position oxygen consumption in critical patients will increase (Rahmanti & Kartika Putri, 2016b).

Mobilization has different benefits for each system. In the respiratory system,

mobilization functions to increase the frequency and depth of breathing, increase alveolar ventilation, reduce the work of breathing and increase diaphragm expansion. So providing mobilization is expected to increase oxygen transport throughout the body (Messer et al., 2015)

CONCLUSION

From the results of the analysis above, the patient experienced changes in hemodynamic status, namely blood pressure, oxygen saturation and level of consciousness along with the ongoing pharmacological therapy given and supported by level 1 progressive mobilization intervention on March 7-9 2023. However, in this case it was not There was a significant change in the level of consciousness, this was because the patient's condition had contraindications, namely the patient had severe capitis trauma and the patient was in a sedated condition.

SUGGESTION

Level 1 progressive mobilization is effective in patients who experience problems with decreased intracranial adaptive capacity.

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