Correlation Between Headache and Clinical Outcome of Hemorrhage Stroke Patients at Dr. Soetomo General Hospital, Surabaya, in January-December 2019

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Abstract

Introduction: Headache is one of the most common neurological disorders and the most frequent symptom among other nervous system disorders. One type of headache pain, secondary headache, can be caused by cranial vascular abnormalities, including hemorrhage stroke. Headache symptoms experienced by hemorrhage stroke patients may vary and are subjective. Therefore, in this study, NIHSS indicates the severity of hemorrhage stroke patients from mild, moderate, severe, and very severe.

Methods: This research is an analytical design using a Chi-Square measurement tool. The samples were collected from hemorrhage stroke patients' medical records in the neurology ward (Seruni A) of Dr. Soetomo general hospital.

Results: There were 21 patients with 11 female (52,38%) and ten male (47,62%). 11 of 21 patients got headaches 2 hours after the onset. NIHSS scores from all patients ranged from 0 to 25. From this data, we analysed the presence or absence of headaches in hemorrhage stroke patients against the severity of the NIHSS score with a correlation test. The results of the Chi-Square analysis found no significant correlation between headache and NIHSS score (p=0,487).

Conclusion: Not all hemorrhage patients got a headache, and there is no correlation between headache and clinical outcome measured with NIHSS in hemorrhage stroke patients at Dr. Soetomo general hospital, Surabaya, in 2019.

Keywords: Headache; Hemorrhage Stroke; Intracerebral Hemorrhage; Subarachnoid Hemorrhage; NIHSS

1. Introduction

The nervous system is an organ system in the human body that regulates and coordinates the body. Like other organ systems in the human body, this nervous system can experience disorders like headaches and strokes. According to the International Association for the Study of Pain (2012), headache is the most common neurological disorder and a frequent symptom among other nervous system disorders. More than 90% of people in the population report a history of having headache.

The Headache Classification Committee of the International Headache Society (IHS) in 2018 divided headache pain into 3, namely primary, secondary, and neuralgia with other headaches. A secondary headache is a symptomatic pain from another disease that causes activation of pain-sensitive nerves. Secondary headaches include trauma, vascular and non-vascular disorders, addiction, infection, homeostasis disorders, psychiatric disorders, and disorders of organs located in the head region. One of the causes of secondary headaches is cranial vascular abnormalities. Headache due to cranial vascular abnormalities can be related to the onset of hemorrhage stroke. Hemorrhage stroke is a hemorrhage that simultaneously disrupts brain function.

A hemorrhage suddenly disrupting brain function is also known as a stroke. Among all stroke cases, 20% are hemorrhage strokes and 80% are ischemic strokes. Hemorrhage stroke can occur in the brain or the space between the brain and the skull. Based on the location, hemorrhage stroke is divided into 2, namely intracerebral and subarachnoid hemorrhage (Unnithan et al, 2022). The presence of blood that has leaked will cause pressure on the brain. This pressure is a headache for the person.

Intracerebral hemorrhage is bleeding that occurs in the brain, causing damage to brain tissue. Various factors can cause an intracerebral hemorrhage. For example, chronic hypertension, amyloid angiopathy, the use of anticoagulant drugs in

certain patients or due to vascular disorders (Rajashekar and Liang, 2019). Subarachnoid hemorrhage is bleeding that occurs in the subarachnoid space, which is between the piamater and arachnoid mater. Subarachnoid hemorrhage generally occurs due to trauma. Subarachnoid hemorrhage can also occur due to ruptured arterial aneurysms. Older people are more likely to experience subarachnoid hemorrhage (Ziu and Mesfin, 2019).

The National Institutes of Health Stroke Scale (NIHSS) is an assessment that has been widely used to assess the consequences or severity of stroke. The NIHSS is also commonly used as a good standard in determining the outcome of stroke therapy. There are 4 main factors of the NIHSS assessment, namely the left and right hemispheres of the brain, which are further divided into the cortex and motor. This aims to determine whether or not there is a disturbed function of one or part of the brain. NIHSS score results can be divided into mild (<5), moderate (5-15), severe (16-24), and very severe (>24) (Lyden, 2017).

2. Method

This analytical research study used medical records retrieved from the medical records in the neurology ward (Seruni A) of Dr. Soetomo General Hospital, Surabaya. Data were taken from January to December 2019.

The characteristic data of patients were collected, such as gender, age, medical history, family history, and habit. The age category was divided into four groups; 40s, 50s, 60s, and 70s. Medical history was taken, such as stroke, diabetes mellitus, and hypertension. The family medical history was taken, only the stroke history. Patients' habits, such as smoking, are also collected.

The outcomes of the patients were categorized with NIHSS scores in four categories; mild (<5), moderate (5-15), severe (16-24), and very severe (>24). Only NIHSS scores when patients came into the hospital were included. Inclusion criteria were patients diagnosed with hemorrhage stroke with a complete supporting examination.

The Chi-square analysis method was used to assess the significant association between variables.

3. Result

Table 1. Patients Demographic Characteristic

Variable	Category	Frequency	Percentage (%)
Gender	Male	10	47,62%
	Female	11	52,38%
Age	40-49	4	19,05%
	50-59	9	42,86%
	60-69	6	28,57%
	70-79	2	9,52%
History	Intracerebral stroke	1	4,76%
	Ischemic stroke	2	9,52%
	TIA	1	4,76%
	Diabetes mellitus	2	9,52%
	Hypertension	9	42,86%
Family History	Stroke	2	4,76%
Habit	Smoking	4	19,05%

Table 1 describes the number of samples based on their demographic characteristics. The patients are classified based on gender, age, history, family history, and habit.

Table 2. Patients Characteristics Based on the Presence or Absence of Headache

Headache	Frequency	Percentage (%)
Present	11	52,38%

Absent	10	47,62%
Total	21	100%

Table 2 describes the number of samples according to the presence or absence of headaches. Categorized as present with a percentage of 52,38% and absent with a percentage of 47,62%.

Table 3. Patients Characteristics Based on NIHSS Score

NIHSS Score	Frequency	Percentage (%)	Minimum	Maximum	Mean
Mild	7	33,33%	0	25	8,05
Moderate	12	57,15%			
Severe	1	4,76%			
Very severe	1	4,76%			
Total	21	100%			

Table 3 describes the number of samples according to the NIHSS score. Categorized as mild is 7 with a percentage of 33,33%, moderate is 12 with a percentage of 57,15%, severe is 1 with a percentage of 4,76%, and very severe is 1 with a percentage of 4,76%.

Table 4. Correlation Between Headache and NIHSS Score

NIHSS Score	Headache (+)		Headache (-)		p
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Mild	4	36,36%	3	30%	0,487
Moderate	5	45,45%	7	70%	
Severe	1	9,09%	0	0	
Very severe	1	9,09%	0	0	
Total	11	100%	10	100%	

Table 4 shows no correlation between headache and NIHSS score with a p-value 0,487.

4. Discussion

4.1. Characteristic of Hemorrhage Stroke Patients

The patient data found from this study consisted of 21 patients who had medical records in the neurology ward of Dr. Soetomo Surabaya Hospital in January-December 2019. The results showed that slightly more women (52.4)% suffered from hemorrhage stroke than men (47.6%). This is different from the statement of Unnithan et al. (2022) that men are more affected by hemorrhage stroke than women. All patients were over 40 years old, with the most in their 50s (42.86%).

Hemorrhage stroke can occur due to various risk factors, such as a history of previous stroke, hypertension, diabetes mellitus, smoking habits, or due to genetic factors. Research conducted by Wong et al (2022) showed that during 5 years of observation, 13.1% of patients experienced a recurrent stroke. According to Ikram et al (2012), hypertension is the most important risk factor in hemorrhage stroke, especially in intracerebral hemorrhage. Research conducted by Ikram et al (2012) states that diabetes mellitus is one of the risk factors for hemorrhage stroke, with a risk of 1.6 times in people with diabetes mellitus compared to those without. Habits such as smoking can also be a risk factor for hemorrhage stroke with a risk of 1.3 to 1.5 (Ikram et al, 2012). Genetic factors can also be a risk factor for hemorrhage stroke, for example, in APP and NOTCH gene mutations (Ikram et al, 2012).

The complaints experienced by 21 hemorrhage stroke patients vary, but at least have 2 other complaints besides a headache. The complaints are decreased consciousness, asymmetry in the face, weakness in half of the body, momentary memory loss, slurred speech, unable to speak/understand speech, difficulty swallowing, dizziness/vertigo, loss of balance and coordination, vomiting, and tingling in half of the body. Patients with headaches, vomiting, increased blood pressure,

and decreased consciousness can be suspected of a hemorrhage stroke (Dastur & Yu, 2017). In addition, various complaints can be experienced by hemorrhage stroke patients, such as aphasia, hemiparesis, facial palsy, loss or reduction of sensory abilities, seizures, and cranial nerve disorders (Unnithan et al, 2022). In addition, Smith & Eskey (2011) also mentioned that the head pain experienced by patients can vary. For example, the headache will be more painful in patients with subarachnoid hemorrhage than in patients with intracerebral hemorrhage, where the headache will occur gradually.

4.2. Analysis of the Relationship between Headache and NIHSS

Of the 21 patients, the NHISS score of 7 patients was mild (33.33%), 12 moderate (57.15%), 1 severe (4.76%), and 1 very severe (4.76%). In addition, 11 people (52.38%) had headaches 2 hours from onset. The analysis, in this case, aims to determine the relationship between head pain and NIHSS score of hemorrhage stroke patients at Dr. Soetomo General Academic Hospital. Using the Chi-Square statistical test, the result was p=0.487. Therefore, it can be concluded that there is no relationship between head pain and NIHSS score in hemorrhage stroke patients at Dr. Soetomo General Academic Hospital.

This is in line with the complaints that can arise in hemorrhage stroke patients. Headache is just one of the common complaints of hemorrhage stroke patients. The complaints experienced by patients may differ according to the extent and location of the hemorrhage. For example, headache is common in large hematomas, vomiting in patients with cerebellar hematomas, and sensory loss is familiar with hemorrhage in the thalamus (Unnithan et al, 2022).

5. Conclusion

This research concludes that there is no correlation between headaches and NIHSS scores in hemorrhage stroke patients. Not all hemorrhage stroke patients experience headaches, and the NIHSS score results vary from mild to very severe. This study was conducted during the pandemic, so the number of samples obtained was small. In the future, further research can be carried out with a larger sample size. It can be carried out retrospectively so that research variables such as headache details can be studied more and controlled.

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