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Body Temperature, Glasgow Coma Scale (GCS) and Mortality of Patients with Intracerebral Hemorrhage Stroke

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ABSTRACT

Stroke is the first rank in Asia and the third rank as a cause of death (mortality) in the world after heart disease and cancer. Intracerebral bleeding stroke occurs in almost 52% of deaths from all stroke incidents, resulting in a broader, more fatal and disabling disorders. This study aimed to find out the correlation of the body temperature and Glasgow Coma Scale (GCS) and the incidence of mortality of the stroke patients with intracerebral hemorrhage. This research was a correlational analytic study with a cross-sectional approach. The sample size was 51 samples, selected by the simple random sampling method. Stroke of intracerebral hemorrhage was determined based on clinical and CT scan examination, and the mortality was measured based on the complete medical record data. The data analysis used the Spearman Rank Correlation Test (Rho) with a significance of $\alpha = 0.05$. The results of the study showed that 44 respondents (86.3%) had body temperatures in the category of hyperthermia. 44 respondents (86.3%) experienced a poor Glasgow Coma Scale (GCS), and 45 respondents (88.2%) experienced mortality. Statistical test results obtained a p value of 0,000 with α of 0.05. Thus, there is a correlation between the body temperature and Glasgow Coma Scale (GCS) and the incidence of mortality of the stroke patients with intracerebral hemorrhage. The coefficient correlation of the body temperature and the mortality of stroke patients with intracerebral hemorrhage was r = .739, and that of the Glasgow Coma Scale (GCS) and that of the mortality was r = .911. The study showed a correlation between the body temperature and Glasgow Coma Scale (GCS) and the incidence of mortality of the stroke patients with intracerebral hemorrhage. This study recommended that the respective health workers appropriately make intervention to the body temperature and recognize the awareness status of the stroke patients to reduce intracerebral hemorrhage so as to reduce the patient mortality.

Keywords: Body temperature, GCS, Mortality, Intraserebral Hemorrhage Stroke.

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INTRODUCTION

Stroke is a disease condition due to a sudden cessation of blood flow to the brain. It occurs due to a blockage or rupture of blood vessels, causing a damage to and even death resulted from brain tissues having no exposure to blood flow, lacking oxygen and nutrients[1]. According to WHO 2010, every year 15 million people around the world experience strokes. About 5 million suffer permanent paralysis and another 5 million die. In Southeast Asia, there are 4.4 million people suffering from strokes. In 2020 it is estimated that 7.6 million people will die from such strokes[2]. Stroke cases of intracerebral hemorrhage occur in almost 52% of deaths from all stroke events, resulting in broader, more fatal, and disabling disorders. Mortality cases occuring within 30 days are 32% -50% of patients[3]. Based on the previous studies, the number of the stroke patients with intracerebral hemorrhage who died while being hospitalized was 63.9%, that of those with intracerebral hemorrhage who lived while being treated and returned home on doctor's indication was 36.1% according to the study conducted[4].

According to Basic Health Research data (RISKESDAS, 2013) the incidence of stroke in Indonesia was 12.1 per 1000 population. This data shows an increase compared to the previous year which was around 8.3. This was supported by the statistics of the Republic of Indonesia Health Research and Development Agency in 2014 stating that with a percentage of 21.1%, the main cause of death in Indonesia was stroke[5].

Based on the preliminary survey results in November 2018, the number of mortality of intracerebral hemorrhage stroke (PIS) in 2015 at Mardi Waluyo Blitar Regional Hospital was 49.1% and that in 2016 was 57.5%, or there was an increase in the number of mortality due to the intracerebral hemorrhage. This suggested that the high mortality in intracerebral hemorrhage stroke get more attention. An initial survey of 10 respondents taken showed that the body temperature of intracerebral hemorrhagic stroke patients ranged from 37.8° C to 38.9° C. This showed that the body temperature of the stroke patients with intracerebral hemorrhage increased or had hyperthermia, and for GCS patients with intracerebral hemorrhage stroke reached around <8.

The previous research[6] explained that an increase in the body temperature of > 37.5 ° C affected a dangerous outcome of 63.9%. So, the data showed a predictor of body temperature and GCS affected the mortality incidence of intracerebral hemorrhage stroke. Of the intracerebral hemorrhage stroke population of 10-30%, all the strokes treated in hospital ended in disability and death[7].

According to the previous studies, it was stated that the initial GCS entry of > 8 had a good outcome prediction, whereas GCS of <8 was a predictive of a bad outcome ie mortality within 2 days of treatment[8]. Hemorrhagic stroke

patients on average experienced a high mortality, loss of consciousness upon arrival at the hospital[9]. Another study also stated that of 1175 patients, 87.6% of those with a GCS score of ≤8 had a mortality while the percentage of the mortality of those with a GCS score of ≥9 was 23.3% [9]. Based on the phenomenon above, a research was needed to study the relationship between the body temperature, the Glasgow Coma scale (GCS) and the incidence of mortality in stroke patients with intracerebral hemorrhage.

MATERIALS AND METHODS

The research design was correlational analytic with cross sectional approach using secondary data sources. The population of the study was all the patients at Mardi Waluyo Blitar Hospital in 2018, diagnosed and turned out to have suffered from a stroke of intracerebral haemorrhage based on history taking, physical examination, and CT Head Scan. The sample used in the study was some of the intracerebral haemorrhagee stroke patients at Mardi Waluyo Blitar Regional Hospital in 2018, diagnosed to have experienced strokes based on neurological examination and supported by brain CT-scan aids and they were not those going home on their own request. The sample size of the study was 51 patients.

The sampling technique used is probability sampling with the Simple Random sampling method. The variables observed or examined in the study were body temperature, Glasgow Coma Scale (GCS) and mortality. The parameters used for body temperature were hypothermia if the body temperature reached <35.5° C, normothermic if body temperature reached 36-37.50C, and hypertension if body temperature reached > 37.5° C, using thermometer and an ordinal scale. The Glasgow Coma Scale (GCS) parameters used are eye opening response (E), verbal response (V), motor response (M). GCS is categorized as bad if the score is <8, moderate: 9-12, good: 13-15 and uses an ordinal scale. For mortality, the parameters used are the cessation of vital functions, by measuring medical records and using nominal scales. The data of the study were obtained from the hospital medic records. The data obtained were then analyzed using the Spearman Rank (Rho) Correlation Test.

Age		
55 – 64 years	12	23.5%
65 – 74 years	23	45.1%
>75 years	16	31.4%
Job history		
Farmer	16	31.4%
Private company	16	31.4%
PNS (Government employees)	5	9.8%
IRT	14	27.5%
Stroke history		
Never	7	13.7%
Ever	44	86.3%
Education		
No formal education	9	17.6%
Elementary School	27	52.9%
High School	10	19.6%
College / University	5	9.8%
Blood tension		
Normotensiveon	1	2%
Hypertensionon	50	98%

Based on the data above, almost half of the respondents aged > 75 years old or under the category of the elderly, totaling 23 respondents (45.1%), a small proportion of the respondents had jobs as farmers and the private sector, each with 16 respondents (31.4%) . Nearly all the respondents had a history of stroke, with a total of 44 respondents (86.3%) and most of the respondents had basic education, with a total of 27 respondents (52.9%). The blood pressure history possessed by most respondents was accompanied with a history of hypertension, and the number was 50 respondents (98%).

Table 2. The correlation of GCS and mortality incidents to the stroke patient with intracerebral bleeding

GCS	Mortality				Total	
	Alive		Dead			
	F	%	F	%	f	%
Good	5	9.8	1	2	6	11.8
Average	1	2	0	0	1	2
Poor	0	0	44	86.3	44	86.3
Total	6	11.8	45	88.2	51	100
Correlation coefficient = .911** Sig. (2-tailed) = .000	α=0,05					

Sources : Secondary Data of Medical Records, 2018

Based on table 2 above, it is obtained that almost all the respondents hyaving a poor GCS experienced a mortality, and the number was 44 respondents (86.3%).

Table 3. Correlation of body temperature and mortality of stroke pation with intracerebral bleeding

RESULTS

Table 1. Characteristics of Respondent

Characteristics	Freuency	Percentage

	Mortality	Total

GCS	Alive		Dead			
	F	%	f	%	f	%
Hypotermy	0	0	0	0	0	0
Normotermy	5	9.8	2	3.9	7	13.7
Hypertermy	1	2	43	84.3	44	86.3
Total	6	11.8	45	88.2	51	100
Correlation coefficient = .739** Sig. (2-tailed) = .000	α=0,05					

Sources : Secondary Data of Medical Records, 2018

Based on table 3 above, the obtained data indicated that almost all the respondents having hyperthermic body temperature experienced a mortality with a total of 43 respondents (84.3%)

DISCUSSION

Correlation of the Glasgow Coma Scale (GCS) and the mortality of stroke patients with intracerebral hemorrhage

The results of the data analysis using the Spearman rank test showed that almost all the respondents of the stroke patients with intracerebral hemorrhage had a poor Glasgow Coma Scale (GCS) resulting in mortality of 44 (86.3%) of 51 respondents. The results showed that the value of ρ = 0,000 <α = 0.05, with a coefficient value of correlation between the Glasgow Coma Scale (GCS) and the mortality of the stroke patients with intracerebral hemorrhage was r = 0.911, the meaning of the correlation direction was positive, and the value of the correlation strength was very strong. Thus, the worse the Glasgow Coma Scale (GCS) of the patient, the higher the mortality of the stroke patients with intracerebral hemorrhage.

The most important estimates for assessing intracerebral hemorrhage outcome (PIS) are intra-cerebral hemorrhage volume, patient's level of consciousness (using the Glasgow Coma Scale score, body temperature, presence of intraventricular blood, age and infratentorial location)[10]. The intracerebral hemorrhage volume and GCS score could be effectively used to predict mortality rates within 30 days with a sensitivity of 96% and specificity of 98%, intracerebral hemorrhage with a volume of > 60 ml, and GCS score of ≤ 8 having a mortality rate of 91% in 30 days, intracerebral hemorrhage with a volume <30 ml and GCS score 9- 12 with a mortality rate of 19% and stroke patients with intracerebral hemorrhage with a GCS score of 13-15 having a mortality rate of 1%[11].

Correlation between body temperature and incidence of mortality of stroke patients with intracerebral haemorrhage

The results of the data analysis using the Spearman rank test found that almost all the respondents of the stroke patients with intracerebral hemorrhage experienced hyperthermy resulting in mortality totaling 43 respondents (84.3%) of 51 respondents. The results showed the value of ρ = 0,000 <α = 0.05, with the coefficient of the correlation of the`body temperature and the mortality of the stroke patients with intracerebral hemorrhage reaching r = 0.739, the meaning of the direction was the positive correlation, and the strength value showed strong correlation. Thus, the higher the body temperature of the patient, the higher the mortality of the stroke patients with intracerebral hemorrhage. The high body temperature after intracerebral hemorrhage was associated with hematoma expansion, cerebral edema, increased intracranial pressure, and initial

neurological damage. The higher body temperature of the patients with intracerebral hemorrhage stroke, the higher moortality, and this was due to hematoma expansion, cerebral edema, increased intracranial pressure, and initial neurological damage, resulting in death[12-20]. The results of the study conformed to the above theory which states that the higher the body temperature, the higher the incidence of mortality in stroke patients with intracerebral hemorrhage.

CONCLUSION

Some conclusion was drawn; (1) the body temperature of the stroke patients with intracerebral hemorrhage was almost entirely under category of hyperthermy. (2) Stroke patients with intracerebral hemorrhage almost all had a poor Glasgow Coma Scale (GCS). (3) Almost all the respondents with intracerebral hemorrhage experienced a mortality or death incidents. (4) There was a correlation between the body temperature and the mortality of the stroke patients with intracerebral hemorrhage, with strong and positive correlation. (5) There was a correlation between the Glasgow Coma Scale (GCS) and the incidence of mortality of the stroke patients with intracerebral hemorrhage, with a very strong and positive correlation.

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