

CORRELATION OF AGE WITH CLINICAL OUTCOME IN ACUTE THROMBOTIC STROKE PATIENTS WITH COVID-19

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ABSTRACT

Background: Coronavirus Disease 19 (COVID-19) can cause thrombotic complications, one of them is ischemic stroke. Stroke is one of the main cause of disability. Age has been shown to be associated with the outcome of patients with acute ischemic stroke (AIS). The aim of this study is to prove the correlation between age and clinical outcome as measured by National Institutes of Health Stroke Scale (NIHSS) in acute thrombotic stroke with COVID-19.

Methods: This study use a cross sectional design. The sample in this study was acute thrombotic stroke patients with COVID-19 from March 2020 to May 2021 at the Emergency and Isolation Ward at Dr. Soetomo General Hospital Surabaya. Age and NIHSS data were taken from medical records when the patient first admitted.

Results: We collected 21 subjects consisting of 12 males and 9 females. The mean age of the subjects was 57.62 ± 10.05 , with the youngest age was 37 years old and the oldest was 78 years old. The range of NIHSS in this study was 1-33. We found a positive correlation, with moderate correlation strength, between the age variable and the NIHSS which was statistically significant ($r=0.483$; $p=0.026$).

Conclusion: There is a positive correlation between age and clinical outcomes as measured by NIHSS in acute thrombotic stroke patients with COVID-19.

Keywords: Acute Thrombotic Stroke, Age, Coronavirus Disease-19, NIHSS

INTRODUCTION

Stroke is the second leading cause of death worldwide, and the leading cause of Disability Adjusted Life Years (DALYs). [1,2] Stroke primarily affects adult individuals in the prime of their productive lives. [3] Ischemic stroke is the most common stroke, accounting for 87% of all stroke. [4] Coronavirus Disease 19 (COVID-19) was first reported in Wuhan, Hubei, China in December 2019. [5] In severe COVID-19, microthrombi formation occurs due to fulminant activation of coagulation and consumption of clotting factors. This contributes to the high incidence of thrombotic complications, such as deep vein thrombosis, pulmonary embolism, and arterial thrombotic complications, i.e ischemic stroke. [6] As many as 36.4% of COVID-19 patients have neurological symptoms, and it is more common in patients with severe disease. [7] In previous studies, about 0.9% of patients with a diagnosis of COVID-19 had an ischemic stroke. [8] Increasing age is significantly associated with disease severity of COVID-19. [9] Ischemic stroke with COVID-19 results in poorer functional outcome and higher mortality compared to non-COVID-19 ischemic stroke. [10] In a previous study, it was also mentioned that age is independently associated with acute ischemic stroke (AIS) patient outcome. [11] Prediction of acute stroke patient outcome has important benefits for guiding treatment management, planning patient rehabilitation, and providing better information to patients and their families. [12]

Method

This research is an observational analytic with cross sectional study approach. The sample of this study was acute thrombotic stroke patients with COVID-19 in the Isolation and Emergency Ward during

March 2020 - May 2021. Inclusion criteria were patients with acute thrombotic stroke, first attack with onset less than 72 hours, and diagnosed with COVID-19. Exclusion criteria were history of head trauma and presence of malignancy, or infection other than COVID-19. Data on age and NIHSS were obtained from medical records when the patient was first admitted. Demographic data and clinical outcomes were collected from medical records and analyzed using SPSS 22 software. Normality test for age and NIHSS scale variables used the Shapiro-Wilk test. Data analysis used the Pearson correlation statistical test. P-value less than 0.05 was considered statistically significant. This research has been approved by the Health Research Ethics Committee of RSUD Dr. Soetomo.

Results

We collected 21 research subjects. Subjects dominated by male gender, i.e 12 subjects (57.1%), while female was 9 subjects (42.8%). The majority of patients suffered from hypertension (76.1%) and diabetes mellitus (66.6%). Thrombolytic therapy was not performed in this study. The basic characteristics of the research subjects are shown in tables 1 and 2. The normality test show the distribution of age data was normally distributed. The youngest subject was 37 years old and the oldest was 78 years old. The mean age value in this study was 57.62 ± 10.05 , as shown in table 2. The normality test for NIHSS data showed that the data distribution is normally distributed. The minimum NIHSS value in this study was 1, and the maximum value was 33, as shown in table 3.

CORRELATION BETWEEN AGE AND NIHSS

There is a positive correlation between age and NIHSS which is statistically significant (p-value <0.05), with moderate correlation strength ($r=0.483$), as shown in table 4.

Discussion

From March 2020 to May 2021, we found 21 patients who met the study criteria. Male subjects (57.1%) dominated than female. This study shows that more men suffer from acute thrombotic stroke than women. This is in suitable with several studies which state that men are more likely to suffer from stroke than women, and gender is a risk factor that cannot be modified.[13]

In this study, mean age of the subjects was 57.62 ± 10.05 . The majority of ischemic strokes occur in individuals older than 65 years.[14] In recent years, the mean age of stroke onset has decreased, and stroke incidence and hospitalization rates have increased globally among young individuals.[15]

The correlation analysis between age and NIHSS scale showed $r = 0.483$ which was statistically significant with p-value = 0.026. This indicates that there is a positive correlation between increasing age and increasing clinical outcomes as measured using the NIHSS.

In elderly patients, because the immune system decreases with age, they are more likely to develop a critical illness. Older people also tend to have more comorbidities. When patients with underlying diseases such as diabetes and hypertension, the body is in a state of stress for a long time and immunity tends to be low. A long-term history of diabetes and hypertension will damage vascular structures, and are more likely to develop critical illness in cases of infection.[16] Whereas ischemic stroke with more severe COVID-19 results in poorer functional outcome.[10] Previous studies have shown that age is independently associated with outcome of acute ischemic stroke patients.[11] Older patients had more severe stroke features, seen from a higher prevalence of deficits in sitting and standing balance and impaired level of consciousness. Poor sitting balance is associated with poor output. Impaired sitting and standing balance in older patients may be due to age-related pathologies such as musculoskeletal and cardiac problems. Older stroke patients also have higher dependency and morbidity rates before stroke.[17]

Conclusions and suggestions

There is a positive correlation between age and clinical outcome as measured by NIHSS in patients with acute thrombotic stroke with COVID-19 which is statistically significant. Further research needs to be done, especially to analyze the confounding variables that affect the NIHSS.

Ethical Clearance: This study received an ethical approval number.

Source of Funding: This research was carried out through individual funding.

Conflict of interest: There was no conflict of interest from this study.

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TABLE 1. CHARACTERISTICS OF RESEARCH SUBJECTS

Variable	n	% (n total = 21)
Demography		
Sex		
Males	12	57,1
Female	9	42,8
Risk Factors		
Hypertension	16	76,1
Diabetes Mellitus	14	66,6
Dyslipidemia	9	42,8

TABLE 2. AGE CHARACTERISTIC OF ACUTE THROMBOTIC STROKE PATIENTS WITH COVID-19

Variable	Minimum	Maximum	Median	Mean±SD
Age	37	78	56	57,62±10,05

Table 3. Characteristics of NIHSS patients with acute thrombotic stroke with COVID-19

Variable	Minimum	Maximum	Median
NIHSS value	1	33	9.00

Table 4. Correlation between age and NIHSS

	Correlation coefficient	<i>p-value</i>
Age and NIHSS	0,483	0,026

