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NON CONTRAST HEAD CT SCAN FINDINGS IN STROKE PATIENTS AT THE RADIOLOGY DEPARTMENT OF TIARASELLA HOSPITAL BENGKULU 2024

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ABSTRACT

Stroke is the third leading cause of death in the world. Stroke is a condition with clinical signs that develop rapidly in the form of focal and global neurologic deficits, which can worsen and last for 24 hours or more. The purpose of this study was to determine the description of head CT Scan results in patients with clinical stroke both ischemic and non-hemorrhagic in the radiology section of Tiarasella Hospital Bengkulu for the period Januari-December 2024. Methods: This study is retrospective descriptive study by utilizing secondary data in the form of head CT scan request and answer sheets. Results: Based on 50 patient data obtained, 74 patients were diagnosed with ischemic stroke (92%) and haemorrhagic stroke (8%). There were more male (54%) than female (46%) patients. The age group of 56-65 years was the largest age group, namely 19 patients (38%) followed by the age of more than equal to 66 years as many as 18 patients (36%); Conclusion: Patients with radiological diagnosis of ischemic stroke were the most patients.

Keywords: CT Scan, Stroke, Radiology

Introduction

According to the World Health Organization (WHO), stroke is a condition in which rapidly developing clinical signs are found in the form of focal and global neurological deficits, which can be severe and last for 24 hours or more and/or can cause death, without any other clear cause other than vascular. Stroke is the third leading cause of death in the world. From 1990 to 2019, the total number of strokes due to risk factors increased from 91.5 million to 125.0 million. The five main risk factors for stroke are high systolic blood pressure, high BMI (24.3%), high fasting plasma glucose (FPG) (21.1%); body mass index (20.2%), ambient particle pollution (20.1%) and smoking (17.6%).[1] In Indonesia, the prevalence of stroke (permil) based on a doctor's diagnosis in the population aged ≥15 years is 8.3 permil or around 2,324,000. The Special Region of Yogyakarta Province occupies the highest position, which is 11.4% and the lowest cases are in the new province, namely Papua Pegunungan, which is 0.9%. While Bengkulu Province is 6.0%.[2]

The Indonesian Neurologists Association (PERDOSSI) emphasizes the importance of a quick and accurate diagnosis in stroke cases to

determine the right treatment. Stroke diagnosis is based on careful anamnesis, neurological physical examination, and supported by supporting examinations such as neuroimaging. Common symptoms of stroke include sudden weakness on one side of the body, speech disorders, sudden loss of vision, and impaired coordination.[3] The Indonesian Neurologists Association (PERDOSSI) recommends the use of stroke assessment scales, such as the Dave UNHAS Stroke Score (SSDU), to assist in the classification and diagnosis of stroke.[4] In addition, brain imaging such as CT scan which is the gold standard is very important to differentiate between ischemic and hemorrhagic stroke, which will affect the subsequent therapeutic strategy. Timely and accurate diagnosis is crucial in determining the patient's prognosis and preventing further complications.[5]

Stroke has several major risk factors that can increase the likelihood of this condition occurring. High systolic blood pressure (hypertension) is a significant risk factor, as it can damage the walls of blood vessels and increase the chances of stroke. High Body Mass Index (BMI) or obesity also contribute to the risk of stroke, as they are associated with conditions such as hypertension and diabetes. High glucose levels, such as those seen in diabetes mellitus, can damage blood vessels and increase the risk of plaque formation that can block blood flow to the brain. Exposure to environmental particle pollution has been identified as a risk factor for stroke, as fine particles can trigger inflammation and oxidative stress that damage the cardiovascular system. Smoking also significantly increases the risk of stroke, as it can cause damage to blood vessels, increase blood pressure, and accelerate the process of atherosclerosis.[6]

Early detection of stroke symptoms and immediate medical care at a hospital that has CT scan facilities is very important to determine the type of stroke experienced, whether non-hemorrhagic stroke (SNH) or hemorrhagic stroke (SH). The golden period for stroke treatment is 3 to 4.5 hours after the attack occurs; therefore, early recognition of symptoms and immediate treatment can reduce the risk of death and permanent disability. CT scan is a fast and effective examination to differentiate between ischemic and hemorrhagic stroke, allowing for appropriate treatment and preventing further severity.[7] This study aims to see the CT Scan image with a stroke diagnosis at Tiarasella Hospital, Bengkulu City.

Methods

This study is a retrospective descriptive study using a cross-sectional design. The data is secondary data in the form of medical records in the Radiology Department of Tiarasella Hospital Bengkulu from January to December 2024. The population of this study was all stroke patient data at Tiarasella Hospital in 2024 totaling 50 patients. The sampling technique was Total sampling, which consisted of 50 people in total. The research variables studied were age, gender, and CT Scan results of the Head. Furthermore, the data was analyzed univariately using SPSS.

Table 1. Distribution of Stroke Patients by Age, Gender and Radiological Diagnosis

	N	%
Age		
Late Adulthood (36-45)	1	2
Early Elderly (46-55)	12	24
Late Elderly (56-65)	19	38
Seniors (>66)	18	36
Jenis Kelamin		
Male	27	54
Female	23	46
CT SCAN Kepala		
SH	4	8
SNH	46	92

Table 1 above shows that almost all stroke patients at Tiara Sella Hospital are elderly patients aged 56-65 years, as many as 38%, followed by elderly patients aged over 66 years at 36%, and early elderly (46-55 years) as many as 24%.

Based on gender, of the 50 patients, more than half were male (54%), the rest were female (46%)

Table 2. Distribution of Stroke Cases per month

Month	Total	Percentage (%)
January	2	4
February	3	6
March	3	6

April	3	6
May	4	8
June	3	6
July	5	10
August	5	10
September	5	10
October	5	10
November	6	12
December	6	12
Total	**50**	**100**

Based on the data obtained from table 2, it can be seen that the most cases occurred in November and December, namely 6 cases (12%), and the fewest cases occurred in January with 2 cases (4%).

Results and Discussion

From the results of the study conducted in a retrospective descriptive manner, namely by taking data from the radiology and medical records department of Tiarasella Hospital during the period January-December 2024, it was found that the proportion of ischemic stroke patients was greater than hemorrhagic stroke patients. Based on the frequency distribution data of stroke types, data was obtained as many as 89 patients with a diagnosis of ischemic stroke as many as 32 patients (64%), while hemorrhagic stroke as many as 18 patients (36%). This is more or less the same as the results of the study conducted by Fahmi Yousef Khan who obtained data on 217 patients (80.4%) with ischemic stroke, and 53 patients (19.6%) with hemorrhagic stroke.[8]

In the frequency distribution data of gender, it can be seen that stroke patients are more male than female. Of the 50 patients diagnosed with stroke, 27 patients (54%) were male and 23 patients (46%) were female. Several studies also obtained similar results such as the study conducted by Airboix et al. who obtained comparative data on men and women who suffered from ischemic stroke of 354 (37%) compared to (63%).[9] However, this is different from the results of research conducted by Qudsum Yusaf at Lahora Hospital, which found that strokes occurred more frequently in female patients, as many as 47 patients (39.17%) compared to male patients, as many as 73 patients (60.83%). [10] This difference in research results is actually often the case in previous studies. This is explained in a research article published by the American Heart Association (AHA) that overall, the risk of stroke in men and women who smoke is greater than in people who do not smoke. However, unlike coronary heart disease where there is clear evidence of significant gender differences between men and women, for stroke the evidence shows that smoking gives the same risk to women and men, where for hemorrhagic stroke smoking can give a relatively greater danger to women than men. In the study it can be seen that men smoke more than women which can increase the risk of stroke later in life.[11]

Based on data on the distribution pattern of stroke sufferers based on age, the most stroke cases were found in the 56-65 age group with 19 patients (38%) and followed by the age group above 66 years with 18 patients (36%), then the 46-55 age group with 12 patients (24%). From these data it can be described that stroke tends to occur more often in older age groups but can still be said to be productive such as the age group with the most cases at Tiarasella Hospital, which is around 56-65 years. According to the type of stroke, the results of this study showed 46 cases of ischemic stroke and 4 patients of hemorrhagic stroke. This is supported by data from the Report From American Heart Association Journal, hospitalizations for acute ischemic stroke aincreased significantly for men and women and for certain racial / ethnic groups among young adults aged 18 to 54 years. The rate of stroke hospitalizations was almost double for men aged 18 - 34 years and 35 - 44 years.[12] Research conducted by W.T. Longstreth shows data that stroke incidence often occurs in the age range of 65-74, where in this study the data obtained showed that the most stroke cases occurred in the age range of 45-54 years The distribution of stroke cases per month illustrates that the most stroke cases occurred in November and December, each with 6 cases (12%), then in July, August, September, October with 5 cases (10%), then in May with 4 cases (8%), then in

April and March with 3 cases (6%), in January with the lowest cases with 2 cases (4%). Based on data from this study, it can be seen that the incidence of stroke at Tiarasella Hospital, Bengkulu City during the January-December 2024 period did not show a typical distribution pattern with the distribution pattern of cases each month.

Based on the data on the frequency of CT scan images of the head, it can be seen that the highest image results were obtained in patients with hypodense images of 32 patients (64%) from the total data obtained, which was 50 patients, where hypodense images were found in ischemic stroke patients, while hyperdense images were obtained in 18 patients (36%) who were hemorrhagic stroke patients. This is more or less the same as the results of a study conducted by Fahmi Yousef Khan who obtained data on 217 patients (80.4%) with ischemic stroke, and 53 patients (19.6%) with hemorrhagic stroke. The potential of CT scans to detect an acute stroke depends on the amount of time that has passed since the onset of the stroke. Where in the first hours after vascular occlusion, there are no changes in cerebral substance, except for functional deficits and no pathological abnormalities are found on CT scans. Only about 20% of infarction patients can be detected by CT scan in the first hour after the incident. Only 3-6 hours after the stroke, the initial infarct edema will appear as an irregular hypodense area and at 6-24 hours the hypodense area becomes clearer due to the penetration of the middle cerebral artery which causes the lentiform nucleus to blur. Starting from the 3rd to the 5th day, the infarct area becomes increasingly clear and hypodense.[13]

Conclusion

Based on the results of the study that has been conducted on the image of non-contrast head CT scans in stroke patients in the radiology department of Tiarasella Hospital in 2018, it can be concluded: The highest incidence of stroke is in ischemic stroke patients at 92%; The most patients diagnosed with stroke are male at 54%; The highest incidence of stroke is in the 56-65 year age group at 38%; The distribution of stroke cases does not show a typical distribution pattern with the distribution pattern of cases each month.

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