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The Relationship of Age With Stroke Complications

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ABSTRACT
Stroke is the number one cause of disability and the number three cause of death in the world after heart disease and cancer in both developed and developing countries. In Indonesia, the incidence of stroke from 2013 to 2018 increased by 7% - 11% or 2,120,362 people. The high number of strokes has the potential to increase prevalence in all age groups. The risk of having a stroke increases from the age of 45 years. After the age of 50, every three additional years of age increases the risk of stroke by 11-20%. Risk factors for stroke complications are stroke severity, type of stroke, lesion size, mechanical ventilation, age, gender and history of diabetes. Several literatures have reported that 44%-75% of stroke patients experience at least one complication during inpatient rehabilitation, the most common of which are musculoskeletal pain, fever depression, pressure sores, fall infections, upper gastrointestinal bleeding (UGIB), seizures, nutritional deficiencies. , deep vein thrombosis, development of stroke and pulmonary embolism. Several studies reveal that age can influence the occurrence of certain stroke complications. Symptomatic UGIB and UTI were found to be complications influenced by age.

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INTRODUCTION

Stroke is the number one cause of disability and the number three cause of death in the world after heart disease and cancer in both developed and developing countries [1] Stroke is a disease that has a high impact on health and quality of life with a prevalence of more than 15 million new cases every year worldwide. Stroke is the third cause of death in the world after coronary heart disease and cancer in both developed and developing countries. One in 10 deaths is caused by stroke. [2]

In Indonesia itself, the incidence of stroke from 2013 to 2018 increased by 7% -11% or 2,120,362 people. The high number of strokes has the potential to increase prevalence in all age groups. Although the majority of all cases are diagnosed in elderly patients, there are a large number of people who suffer stroke under the age of 50 [3]

Risk factors for stroke complications are stroke severity, type of stroke, lesion size, mechanical ventilation, age, gender and history of diabetes. The risk of having a stroke increases from the age of 45 years. After the age of 50 years, every additional three years of age increases the risk of stroke by 11-20%. People over 65 years old are at highest risk,

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but nearly 25% of all strokes occur before that age and nearly 4% occur in people between 15 and 40 years old. [4]

Several risk factors related to stroke are divided into 2, namely risk factors that cannot be modified, including (a) age: this is the most important contributor to stroke risk. Incidence doubles for each decade after age 55 years, (b) gender: due to the risks of pregnancy and use of oral contraceptives, premenopausal women have the same or higher risk of stroke than men. At older ages, stroke rates are slightly higher in men, (c) Genetics. The risk factors that can be modified are (a) Hypertension (b) Diabetes Mellitus (c) Cardiovascular (d) Smoking (e) Hyperlipidemia (f) Alcohol and substance abuse (e) Obesity.[5]

The pathogenesis of stroke is caused by a sudden neurological explosion caused by impaired perfusion through the blood vessels to the brain. Blood flow to the brain is regulated by the two internal carotid arteries anteriorly and the two vertebral arteries posteriorly (circle of Willis). Ischemic stroke is caused by a lack of blood and oxygen supply to the brain; Hemorrhagic stroke is caused by bleeding or leaking blood vessels. Ischemic occlusion contributes to approximately 85% of casualties in stroke patients with the remainder due to intracerebral hemorrhage. Ischemic occlusion produces thrombotic and embolic conditions in the brain. In thrombosis, blood flow is affected by narrowing of the vessels due to atherosclerosis. Plaque buildup will eventually narrow blood vessel spaces and form clots, causing thrombotic strokes. In an embolic stroke, decreased blood flow to an area of the brain causes an embolism to reduce blood flow to the brain, causing severe stress and premature cell death (necrosis). Necrosis is followed by damage to the plasma membrane, swelling of organelles and leakage of cellular contents into the extracellular space and loss of nerve function. Other important events contributing to stroke pathology are inflammation, energy failure, loss of homeostasis, acidosis, increased intracellular calcium levels, excitotoxicity, free radical-mediated toxicity, cytokine-mediated cytotoxicity, complement activation, blood-brain barrier disruption, glial cell activation, oxidative stress and leukocyte infiltration. Hemorrhagic strokes account for approximately 10-15% of all strokes and have a high mortality rate. In this condition, pressure on brain tissue and internal injuries cause blood vessels to burst. This produces toxic effects on the vascular system, resulting in infarction. It is classified into intracerebral and subarachnoid hemorrhage. In ICH, blood vessels rupture and cause an abnormal accumulation of blood in the brain. The main reasons for ICH are hypertension, vascular disorders, excessive use of anticoagulants and thrombolytic agents. In subarachnoid hemorrhage, blood accumulates in the subarachnoid space of the brain due to head injury or cerebral aneurysm.

METHOD

This research aims to explore how age factors can influence the risk and types of complications that individuals who experience stroke may experience. In this research, we will review previous studies that have been carried out in this field. This will help us to better understand the impact of age on stroke complications and also how this information can be applied in clinical practice. Thus, it is hoped that this research can provide better insight for us in treating stroke patients more effectively and efficiently.

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RESULT AND DISCUSSION

Further medical complications due to stroke occur several weeks to several months after discharge from the hospital. Some stroke survivors continue to experience these complications years after the acute stroke. There are several complications that can occur in stroke patients, namely:

UGIB

It is known that several studies have revealed that age can influence the occurrence of certain stroke complications. UGIB and symptomatic UTI were found to be complications influenced by age in the first and subsequent patients admitted to the rehabilitation ward. The reported incidence of UGIB during initial stroke rehabilitation ranges from 3.4%. A previous article found that 20.5% of stroke patients aged ≥65 years experienced UGIB when first admitted to the rehabilitation ward. In the article, the average age of UGIB patients was higher (75.4 years) than without UGIB (72.9 years). However, there was no difference in the incidence of UGIB between the younger elderly group and the older elderly group in our study, possibly due to the choice of cut-off point.[7]

ISK

Another study conducted by Nickson et al., found that the incidence of symptomatic UTIs in the acute phase after stroke was 19.3%. According to Nickson, this is the same as the results of previous research which showed an incidence rate of 6% -27%. In another meta-analysis conducted by Tianyuan Yan et al, which looked at 16 case studies, the prevalence of UTI in stroke patients was 19%.8 (Nikcson)

Different from the research above, research conducted by Vincent Excel et al., obtained the opposite results where the results showed that UTI complications in acute ischemic stroke patients did not affect the patient's clinical outcomes, but rather extended the length of stay and increased treatment costs.

Seizures

Research conducted by Jeremia et al showed that 13.11% of stroke patients experienced seizures. The distribution based on age is highest in the 45-54 year age group (37.50%). The results of this study are also in line with research conducted by Tanaka et al, which reported that the incidence of seizures in stroke patients was higher in patients aged 85 years and over.9 (Jeremia). Meanwhile, research conducted by Qurrotun et al., found that there was no significant relationship between age and the occurrence of stroke complications, where the chi square value was p=0.12.4

Several studies in the literature suggest that functional improvements can occur after rehabilitation, but stroke-related complications are considered to potentially influence functional outcomes. It has been reported that 44%–75% of stroke patients experience at least one complication during inpatient rehabilitation the most common of which are musculoskeletal pain, fever depression, pressure sores, fall infections, upper gastrointestinal bleeding (UGIB), seizures, nutritional deficiencies, venous thrombosis in, the development of stroke and pulmonary embolism.

Another study conducted by Doshi et al. showed no significant difference in the frequency of common complications between the groups aged ≥65 and <65 years among stroke patients transferred to the rehabilitation ward. Kwan et al, reported that age can

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increase the overall risk of infection. However, another study that focused on stroke patients aged ≥65 years revealed that older age was not a risk factor for infection in patients receiving inpatient rehabilitation.[7]

Other studies also showed that the subjects were mostly men aged >60 years and had suffered a stroke for the first time, similar to previous studies. The incidence of stroke increases sharply with age. A study conducted by Ghani et al. shows that the prevalence of stroke increases sharply at ages >45 years. The Vascular Health and Risk Management Study shows that the incidence of stroke is 1.25 times higher in men. Most of the subjects in this study had experienced a stroke for the first time (74,9%)[10]

If a stroke is detected early, many complications that may occur during hospitalization can be prevented or treated. Complications such as endocrine hypertension, fever, pain, development of stroke, and infection are common. However, there is also a risk of experiencing myocardial infarction, pulmonary embolism and heart attack. The risk factors most frequently associated with cerebrovascular events are high blood pressure, a sedentary lifestyle, and obesity. Deaths are associated with infectious pneumopathies, cerebral edema, and pulmonary thromboembolism. However, there are additional neurological complications such as hyponatremia and hypoglycemia which are more frequently found in some studies. The risk of complications is closely related to the severity of the stroke. Therefore, knowledge of the most frequently occurring complications justifies treatment protocols and close monitoring of patients to detect, treat and prevent these events. [11]

Research conducted by P. Langhorne et al, found that complications during hospital admission were recorded in 265 (85%) stroke patients. Specific complications were as follows: neurological-recurrent stroke (9% of patients), epileptic seizures (3%); urinary tract infections (24%), chest infections (22%) and others (19%); mobility-related falls (25%), falls with serious injury (5%), pressure sores (21%); thromboembolism—deep vein thrombosis (2%), pulmonary embolism (1%); pain—shoulder pain (9%), other pain (34%); and psychological—depression (16%), anxiety (14%), emotionalism (12%), and confusion (56%).[12]

CONCLUSION

Stroke is an abnormality in the function of the central nervous system (CNS) caused by disruption of normal blood flow to the brain. Risk factors for stroke complications are stroke severity, type of stroke, lesion size, mechanical ventilation, age, gender and history of diabetes. If a stroke is detected early, many complications that may occur during hospitalization can be prevented or treated. Complications such as endocrine hypertension, fever, pain, development of stroke, and infection are common. However, there is also a risk of experiencing myocardial infarction, pulmonary embolism and heart attack. The risk factors most frequently associated with cerebrovascular events are high blood pressure, a sedentary lifestyle and obesity. Several studies reveal that age can influence the occurrence of certain stroke complications. UGIB and symptomatic UTI were found to be complications influenced by age. Other complications which have quite a large percentage include

neurological recurrent strokes (9% of patients), epileptic attacks (3%); urinary tract infections (24%), chest infections (22%) and others (19%).

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