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ORIGINAL ARTICLE

RISK FACTORS OF OCCIPITAL STROKE IN A TERTIARY EYE CENTER IN YOGYAKARTA, INDONESIA

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ABSTRACT

Introduction*: Occipital stroke involves the occipital lobe of the brain, which can impair the visual acuity in patients. Several risk factors have been proven as predisposing conditions for occipital stroke. This study investigates the risk factors for occipital stroke in tertiary eye center in Yogyakarta.*

Methods: The method of this study was cross-sectional research by analyzing secondary data from medical records of patients with occipital stroke hospitalized in Dr. Yap Eye Hospital, a tertiary eye center in Yogyakarta. Patients diagnosed with occipital stroke from January 2021 to December 2022 were included in this study. Demography, clinical data, and risk factors associated with occipital stroke were recorded. The descriptive statistic was performed to evaluate the risk factors for occipital stroke.

Results: *Sixty-one subjects were analyzed, comprised of 44 males (72%) and 17 females (28%). The majority of subjects within age ≥45 years old (93%). The attack occurred during activity (n=54, 89%) and wake-up (n=7, 11%). The involvement right eye (n=8, 13%), left eye (n=9, 15%), and bilateral (n=44, 72%). Of 122 eyes, 74 had hemianopia (61%), 34 had quadranopia (28%), and 14 had bilateral hemianopia (11%). Twenty-nine subjects had right occipital stroke (48%), 25 subjects had left occipital stroke (41%), and seven subjects had bilateral occipital stroke (11%). Most subjects had one risk factor (n=29, 48%) and two risk factors (n=23, 38%). Eight subjects had three risk factors (13%), and only one subject had four risk factors (2%).*

Conclusion: *Most risk factors of occipital stroke involve only single and double risk factors. Only a minority of subjects had multiple risk factors.*

Keywords*: occipital stroke, risk factors, visual pathways*

INTRODUCTION

Visual impairment after a stroke reduces the patient's quality of life. It is caused by transient monocular vision loss, visual field deficits, or ocular dysmotility.[1] Visual impairment is associated with the location of visual pathways in the brain. The retinal nerve fiber layers form the optic nerves and travel medially toward the optic canals to configure the prechiasmal visual pathway.[1] The nerve fiber layers in the area from the optic chiasm to the visual cortex form the retrochiasmal visual pathway.[1]

The ophthalmic artery and internal carotid artery (ICA) vessels vascularize the pre-chiasmal optic nerve with its branch, the central retinal artery, supplying the blood to the retina.[1] The anterior choroidal artery, a branch from the internal carotid artery, and the lateral posterior choroidal artery, a branch from the posterior cerebral artery, provide vascular supply to the

retrochiasmal fibers.[1] The optic nerve fibers culminate in the visual cortex of the occipital lobe, which is supplied mainly by the posterior cerebral artery, the terminal branches from the basilar artery.[1] These vascular systems supply the visual pathways involved in occipital stroke's visual impairment.

Visual field defects and several visual perceptual deficits may accompany occipital stroke. They associate with the lessening of patients' health-related quality of life.[2] Occipital stroke involves the occipital lobe of the brain, which can impair the visual acuity in patients.[3] Although most patients have no other neurological deficits besides visual-field defects, occipital stroke significantly impacts their quality of life, including changes to independent living, ability to drive, loss of confidence, and some links to depression.[2] Some risk factors have been identified as predisposing conditions for occipital stroke. This study aims to investigate the risk factors for occipital stroke in a tertiary eye center hospital in Yogyakarta, Indonesia.

METHODS

The method of this study was cross-sectional research. The data was obtained from the medical records of patients with occipital stroke hospitalized in Dr. Yap Eye Hospital, a tertiary eye center hospital in Yogyakarta, Indonesia. The data from the patients was collected from January 2021 to December 2022.

The subject's inclusion criteria were: (1) adult patients (>18 years old), (2) diagnosis of occipital stroke, and (3) hospitalized in Dr. Yap Eye Hospital, Yogyakarta. The subject's exclusion criteria were the incompleted medical record data. The demography, clinical, and risk factors associated with occipital stroke data were obtained from medical records and recorded in the data record form. The ethical clearance for this research has been released from the Medical and Health Research Ethics Committee of the Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada, Yogyakarta, Indonesia.

For statistics analysis, descriptive statistics was performed to evaluate the risk factors for occipital stroke. Mean and standard deviation describe the continuous data. The categorical data was described by percentage.

Table 1. The characteristics of subjects of occipital stroke in Dr Yap Eye Hospital

Characteristics	Number (Percentage)
Sex, n (%)	
Male	44 (72%)
Female	17 (28%)
Age	
< 45 years	4 (6.5%)
≥ 45 years	57 (93.5%)

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Attack time	
Wake up	7 (11.5%)
Activity	54 (88.5%)
Laterality	
Right eye	8 (13 %)
Left eye	9 (15%)
Bilateral	44 (72%)
Visual field (n = 122, eyes of 61 subjects)	
Hemianopia Quadranopia	74 (61%)
Hemianopia bilateral	34 (28%)
	14 (11%)
Diagnosis	
Occipital strokeright	29 (48%)
Occipital stroke left	25 (41%)
Occipital stroke bilateral	7 (11%)
Risk factor (RF)	
l RF	29 (47%)
2 RF	23 (38%)
3 RF	8 (13%)
4 RF	1 (2 %)
5 RF	0
6 RF	0

RESULTS

As many as sixty-one (61) subjects were analyzed, comprised of 44 males (72%) and 17 females (28%). The majority of subjects are within the age of ≥45 years old (93%). The stroke attack occurred mainly during activity (n=54, 89%), and the minority was during wake-up (n=7, 11%). The involvement of the right eye was 13% (n=8), the left eye in 15% (n=9), and the majority had bilateral involvement in 72% (n=44).

From 122 eyes analyzed, 74 subjects had hemianopia (61%), 34 subjects had quadranopia (28%), and a minority of 14 subjects had bilateral hemianopia (11%). Twenty-nine subjects had right occipital stroke involvement (48%), 25 subjects had left occipital stroke involvement (41%), and seven subjects had bilateral occipital stroke (11%). According to the number of risk factors, most subjects had one risk factor (n=29, 48%) and two risk factors (n=23, 38%). Eight subjects had three risk factors (13%), and only one subject had four risk factors (2%). No subjects reported more than four risk factors. Table 1 shows the descriptive of subjects with occipital stroke and the risk factors.

DISCUSSION

This study indicated that in patients with occipital stroke hospitalized in Dr. Yap Eye Hospital, the majority involvement is in bilateral eyes (72%) and the majority of 61% had hemianopia. The involvement of right occipital stroke was 48%, and left occipital stroke was 41%. Only a minority had a bilateral occipital stroke (11%). The most important finding was that most subjects had one risk factor (48%) and two risk factors (38%). Eight subjects had three risk factors (13%), and only one subject had four risk factors (2%).

Occipital stroke greatly reduces the patient's quality of life, including declining independent living, ability to drive, disappearance of confidence, and depression.[2] Not only does it impact the patients but also the family and caregiver. The most common cause of occipital lobe infarction is posterior cerebral artery ischemia, also known as posterior circulation ischemic stroke, caused by a cardiac embolism and blocked local artery-to-artery vascularization.[4] Cardiac disease is the most common source of embolism and patients with a cardiac source of an embolism usually have pure posterior cerebral artery infarction.[2] A study by Subramanian (2009) reported that diabetes mellitus is associated with increased odds of posterior circulation ischemic stroke.[5] Another study by Kim et al. (2012) indicated that hypertension and diabetes mellitus were more related to posterior than anterior circulation ischemic stroke.[6] Anemia also poses a risk for occipital stroke.[7,8]

It has been shown in several studies that the distribution of etiology of cerebral infarction among young patients differs from the distribution among older patients.[9,10] This study showed that most patients were older subjects, i.e., more than 45 years old. It indicated that degenerative processes may associate with the occurrence of occipital stroke. Ischemic cerebrovascular accident or stroke can be caused by either thrombotic, embolic, or hemodynamic events interrupting the vascular supply to the brain and subsequent loss of brain function.[9] Approximately 25% of the cases occur in patients under 65 years old, despite most of them occurring in the elderly population. Hypertension and atherosclerosis are the most common causes of strokes.[9,10] Other etiologies include cardioembolic, hypercoagulability states, connective tissue disorders, dissections, arteriovenous malformations, systemic hypoperfusion, oral contraceptive use, or substance abuse.[9] In our study, most subjects had mono risk factors followed by double and multiple risk factors.

The limitations of this study were (1) the number of subjects was small; therefore, the generalization of the finding needs further study involving a larger subject number, (2) the center of this study was not a multicenter study, and (3) the data obtained were from secondary medical record data which may be not wholly being explored for unknown risk factors.

Therefore, further study is necessary to corroborate this study by performing a more extensive multicenter study.

CONCLUSION

Most risk factors of occipital stroke involve only single and double risk factors. Only a minority of subjects had multiple risk factors for occipital stroke.

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