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Case Report

Recurrent migraine with binocular transient vision loss associated with acute stroke: A case report

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ABSTRACT

Introduction: Amaurosis fugax (AF) refers to monocular transient vision loss (TMVL) or binocular transient vision loss (TBVL). TBVL is less common than TMVL and may be due to cortical lesions. TVL can be associated with stroke and thus merits urgent evaluation. Here, we report a case of recurrent migraine associated with TBVL in an adult patient.

Case presentation: A 45-year-old male presented at the eye clinic complaining of an acute episodic of TBVL lasting three consecutive days with complete spontaneous recovery. He had a history of hypertension with blood pressure 143/94 mmHg. While in the clinic, he experienced a TVL attack that persisted for 5 min. We immediately referred him to the hospital for a magnetic resonance angiogram (MRA) scan and laboratory workup. While waiting for the examination results the next day, the patient had a seizure and became unconscious. He was admitted to the emergency room and then to the intensive care unit (ICU). The MRA showed post-hemorrhagic encephalomalacia in the internal capsule's right basal ganglia/right anterior limb. Fundoscopy showed an empty vessel and cotton-wool spots, which were consistent with hypertensive retinopathy. The patient was diagnosed with bilateral AF due to hemorrhagic stroke and hypertensive retinopathy. He was treated by a neurologist, and 3 days after being discharged he presented at the eye clinic with a visual acuity of 20/25 in both eyes.

Conclusion: Recurrent migraine with TBVL can be associated with acute stroke. It thus merits urgent evaluation and referral to the relevant department for a better outcome.

1. Introduction

Amaurosis fugax (AF) refers to transient vision loss (TVL) that can affect either the monocular (TMVL) or binocular (TBVL) side [1,2]. TMVL is more common than TBVL and occurs secondary to ischemia in the retina, choroid, or optic nerve. The most common cause of TMVL is ipsilateral carotid artery disease (e.g., internal carotid artery dissection or atherosclerosis) with secondary thromboembolic disease. It can also be a symptom of vasculitis (e.g., giant cell arteritis) [1]. TMVL can be an indicator of an impending stroke and thus merits urgent evaluation. TBVL may be due to cortical lesions (e.g., migraine, seizure, or vertebrobasilar ischemia). AF caused by ischemia is considered a form of transient ischemic attack (TIA) and usually lasts from seconds to minutes, followed by full visual recovery [1,2].

TBVL with migraine is rare and predominantly has no history of aura [3]. In a Danish prospective study, the prevalence of AF was estimated to be around 14/100,000/year, or 25–30% of the estimated prevalence of transient ischemic events, based on comparing the age–incidence curves for cerebral and retinal ischemic attacks [4]. It is typically infrequent and may occur just once without recurrence. Migraine with TBVL may reflect an underlying clotting disorder, and factors such as a history of smoking, abnormal coagulopathy testing, and lupus anticoagulant positivity are associated with increased frequent episodes of blindness [3].

An accurate history is important to guide the differential diagnosis of AF. Complete ophthalmologic, temporal artery region, and cardiovascular examinations are mandatory, although most patients with AF have normal results. Additional examinations include inflammatory marker, neuroimaging, vascular imaging, electroencephalography (EEG), and cardiac evaluations to determine the etiology [5]. Here we report the diagnosis, management and follow-up of a rare case of recurrent migraine in an adult with TVBL associated with acute stroke according to the updated consensus-based Surgical CAse REport (SCARE)

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guidelines [6,7].

2. Presentation of case

A 45-year-old male was referred from a private ophthalmology practice to the eye clinic with a 3-day history of acute episodic TBVL and complete spontaneous recovery in about 10 min. Initially, the patient described seeing stars followed by immediate vision loss for 5 min. Normal vision returned 5 min later. He reported episodes of vision loss three times a day for three consecutive days. He did not report double vision or visual obscuration. He also had headaches, nausea, and vomiting. He had a history of hypertension and was taking captopril at 25 mg twice per day (BID). He had no history of hypercholesterolemia or seizure, no family history of stroke and did not consume cigarettes or alcohol.

The patient was conscious with blood pressure 143/94 mmHg. Other vital signs were normal. The eyelid and anterior segments were normal. Visual acuity scores for the right and left eye were 20/40 and 20/50, respectively. Pupillary reflex and eye movement were normal. The fundoscopy test showed cotton-wool spots and a 1:3 artery-to-vein ratio consistent with hypertensive retinopathy (Fig. 1). We found no other neurological deficit.

The initial diagnosis was AF due to complex migraine. The patient suffered an episode of acute vision loss lasting for 5 min while in the eye clinic. He was immediately referred for an urgent head MRA scan and laboratory examination. The MRA scan was suggestive of post-hemorrhagic encephalomalacia in the right basal ganglia/right anterior limb of the internal capsule, a small amount of subarachnoid hemorrhage in the right central sulcus, cavum septum pellucidum, and bilateral maxillaries, and right sphenoidal sinusitis (Figs. 2–4). Laboratory examinations revealed mild leukocytosis (10,200/μL), neutrophilia (82.6%), high blood sugar (679 mg/dl), hyponatremia (127 mmol/l), high blood ferritin (386.90 ng/ml) and glycated hemoglobin (HbA1c) (12.6%) but were negative for C-reactive protein.

After the examinations, the patient experienced episodes of recurrent vision loss immediately followed by seizures lasting for 5 min. He became unconscious and was admitted to the intensive care unit (ICU). He was treated by a neurologist, internal medicine specialist, and ophthalmologist. The neurologist diagnosed subarachnoid hemorrhage and seizure. The patient was treated with oral phenytoin three times a day (TID) followed by BID, and oral tranexamic acid TID. The internal medicine specialist diagnosed epilepsy, type 2 diabetes mellitus, and hypertension. The patient was treated with long-acting and short-acting insulin regimens. Upon evaluation at the eye clinic 2 weeks after discharge, the patient reported no complaints and the visual acuity was 20/25 in both eyes. Humphrey visual field imaging showed tunnel vision in both eyes, despite high false-positive and unreliable results in the right eye; the left eye had false-negative and false-positive errors of less than 33% and a fixation loss of less than 20%, indicating reliable results (Fig. 5). The patient was given 500 mg of citicoline BID, and was evaluated 1 month later.

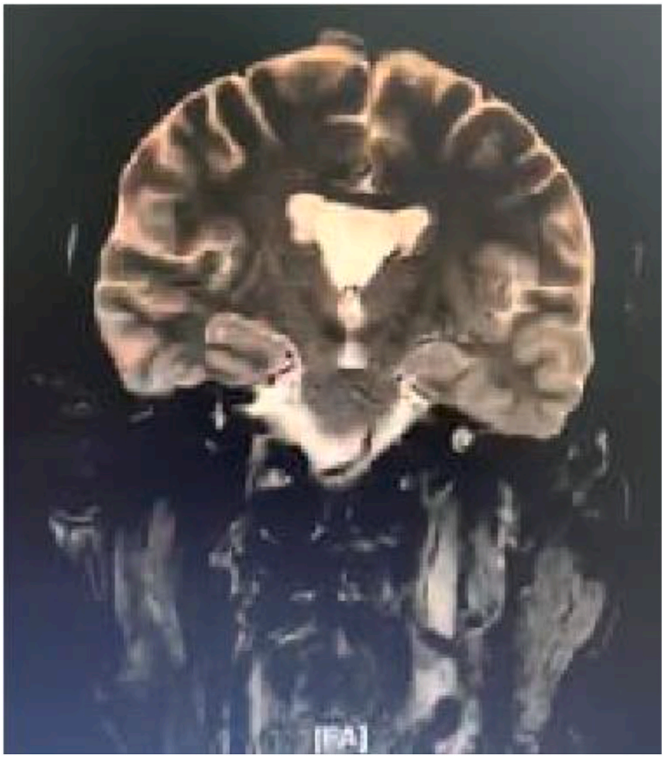

Fig. 2. Head MRA scan without contrast. The coronal view was suggestive of post-hemorrhagic encephalomalacia in the right basal ganglia (white arrow).

3. Discussion

TVBL can be a differential diagnosis for vascular (thromboembolic), occipital epilepsy, and complex migraine [8]. Initially, this patient presented with recurrent acute TVBL followed by headache, nausea, and vomiting. The visual symptoms were described by multiple scintillating scotomas, vision loss of 10-min duration, and complete resolution between attacks. According to the Second Edition of the International Classification of Headache Disorders, migraine headache with aura has to fulfill the following criteria [9]: (1) at least two attacks of fully reversible visual symptoms, sensory symptoms, and/or dysphasic speech

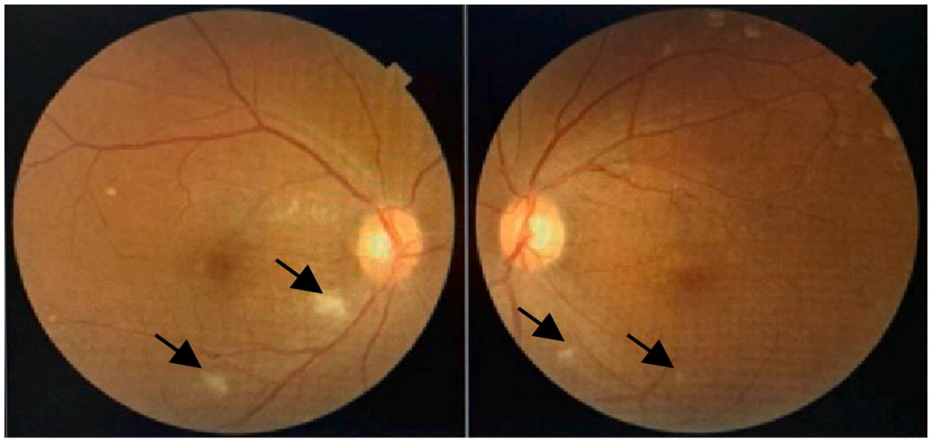

Fig. 1. Funduscopic examination showing cotton-wool spots in the inferior of the fundus (black arrow) and a 1:3 artery-to-vein ratio.

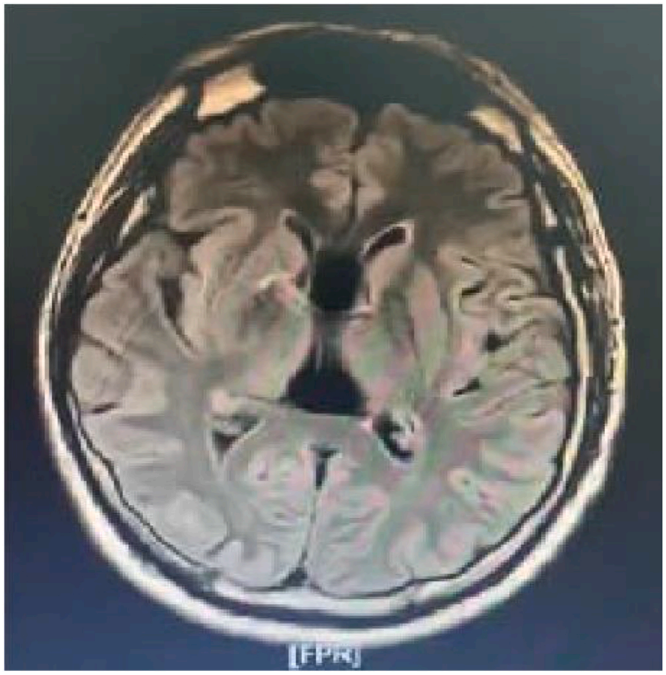

Fig. 3. Head MRA scan without contrast. The axial view was suggestive of post-hemorrhagic encephalomalacia in the right anterior limb of the internal capsule (white arrow).

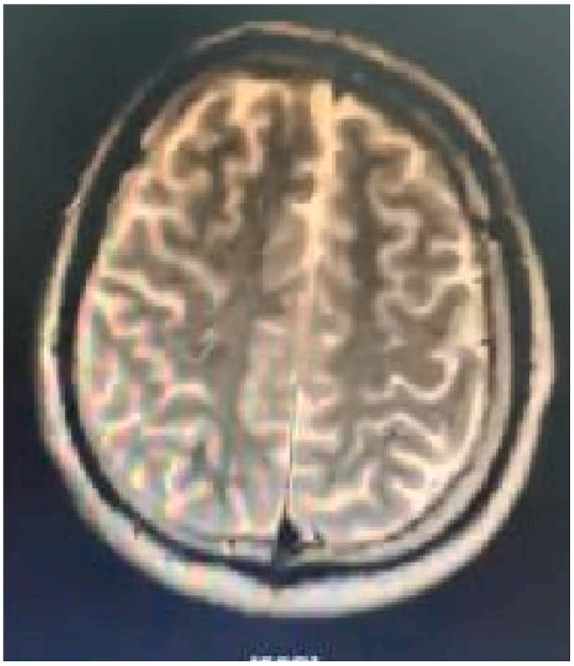

Fig. 4. Head MRA scan without contrast. The axial view section of the cerebral hemisphere showed a small amount of subarachnoid hemorrhage in the right central sulcus (white arrow).

disturbance without motor weakness; (2) at least one aura symptom or homonymous visual symptom lasting between 5 and 60 min; and (3) symptoms not attributed to another disorder.

Based on clinical presentation, the patient fulfilled the diagnostic criteria for migraine headache with aura. The patient had mild hypertension and so underwent examinations to rule out any vascular disease etiology.

Fundoscopy examination showed hypertensive retinopathy, which suggested a thromboembolic event in the retinal vasculature. TBVL may be due to posterior circulation ischemia due to vascular (thromboembolic) disease. This typically causes complete bilateral TVL (i.e., cortical blindness) or homonymous hemianopia, often associated with brainstem and cerebellar symptoms such as dizziness, unilateral limb weakness, dysarthria, headache, nausea, or vomiting. The most frequent signs are unilateral limb weakness, gait ataxia, unilateral ataxia, dysarthria, and nystagmus [10]. Older patients with migraines and visual aura followed by headache are at increased stroke risk, and thus merit urgent evaluation [4].

The patient suffered an episode of acute TVL that persisted for 5 min while in the eye clinic. This was suggestive of thromboembolic disease. He was immediately referred to a private hospital for a head MRA scan and laboratory examination. Imaging the cerebral circulation is mandatory for such patients to help detect vertebral stenosis, atheroma, or dissection. Contrast-enhanced MR angiography and computed tomography (CT) angiography have good sensitivity and high specificity for detecting vertebral artery stenosis [4].

After having a seizure and becoming unconscious, the patient was admitted to the emergency room and then the ICU. MRI showed a hemorrhagic lesion in the right basal ganglia/right anterior limb of the internal capsule and right central sulcus. Laboratory results revealed a very high blood-sugar level (679 mg/dL). Finally, the patient was diagnosed with bilateral AF due to hemorrhagic stroke and hypertensive retinopathy. AF is usually associated with an ischemic rather than hemorrhagic stroke [11,12]. Although AF has a lower incidence of stroke, concomitant occluded or narrowed proximal internal carotid artery may increase the risk of subsequent episodes [11]. By contrast, dural arteriovenous malformation (AVM) is rarely associated with AF and can present with epilepsy, subarachnoid hemorrhage, permanent neurological deficit without hemorrhage, and dementia [12]. Evidence of subarachnoid hemorrhage in this patient was suggestive of AVM rupture as an underlying etiology. Further examinations were necessary to validate this possibility.

In this patient, recurrent migraine with TVBL could be associated with acute stroke. The direction of causation between migraine and acute stroke remains unclear. A recent literature review found that ischemic stroke in people with migraine was strongly associated with aura, young age, female gender, use of oral contraceptives, and smoking habits. The suggested underlying mechanisms included cortical spreading depression, endovascular dysfunction, vasoconstriction, neurogenetic inflammation, hypercoagulability, increased prevalence of vascular risk factors, shared genetic defects, cervical artery dissection, and patent foramen ovale [13,14]. In this patient, the hyperglycemic state may have increased the risk of stroke after migraine with aura. Therefore, any persistent visual-field defect should be investigated as an occipital infarct, whether or not it is associated with migraine visual phenomena [4].

Although the patient had confirmed thromboembolic disease, further examinations were required to rule out any definitive etiology. Abnormal atherosclerotic plaque on carotid arteriogram can increase the incidence of stroke in AF patients [15]. To reveal any hypercoagulability state, it was necessary to perform laboratory examinations such as coagulation tests of prothrombin time/internationalized normalized ratio (INR) and homocysteine levels [3].

At the 2-week follow-up after discharge, Humphrey visual field imaging showed tunnel vision in both eyes. This visual impairment is a typical finding in early post-stroke patients, ranging from 5.5% to 57%. Recovery of visual-field loss varied between 0% and 72% [16].

Based on ophthalmology and systemic examination, the patient was diagnosed with bilateral AF due to hemorrhagic stroke and hypertensive retinopathy. This bilateral AF could have been associated with acute stroke. Urgent referral to related departments could ensure adequate treatment and better outcome.

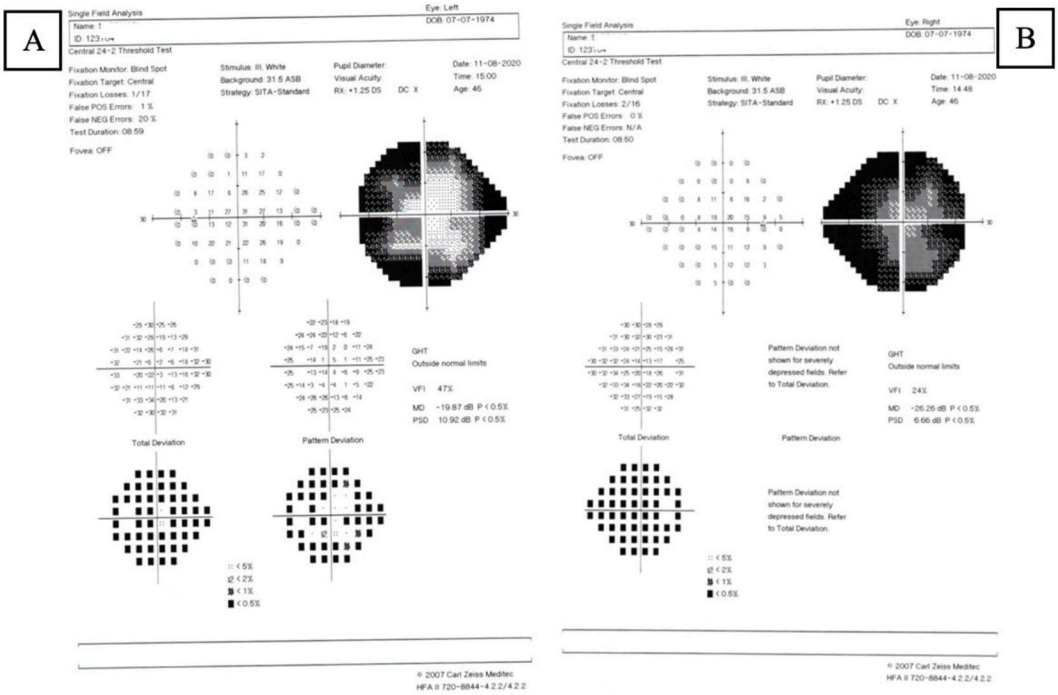

Fig. 5. Humphrey visual field imaging of **A)** the left eye and **B)** the right eye (down) 1 week after discharge from the hospital.

4. Conclusion

Recurrent migraine with TVBL can be associated with acute stroke. It therefore necessitates a comprehensive investigation including history taking, physical examination, and other diagnostic modalities, such as imaging and laboratory evaluations. Furthermore, collaboration with related departments is essential to determine the cause and give comprehensive treatment for a better outcome.

Ethical approval

The study is exempt from ethical approval in our institution.

Sources of funding

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Author contribution

Nabita Aulia, researched the literature and wrote the manuscript. Batari Todja Umar, Yunita Mansyur, and Anastasia Vanny Launardo study concepts and manage therapy for this patient. Yunita Mansyur, Batari Todja Umar, and Anastasia Vanny Launardo checked the manuscript and made corrections. Nabita Aulia and Yunita Mansyur provided the overall guidance and support. All the authors read and approved the final manuscript.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Registration of Research Studies

None.

Guarantor

Nabita Aulia.

Provenance and peer review

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Declaration of competing interest

The authors declare that they have no conflict of interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.103062.

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