Case Reports in Ophthalmology

Case Rep Ophthalmol 2022;13:141–146
DOI: 10.1159/000521839
Received: September 27, 2021
Accepted: December 26, 2021
Published online: March 17, 2022

Case Report

A Case of Diagnosis of Occipital Lobe Epilepsy Complicated by Right Hemianopsia Associated with Left Occipital Lobe Cerebral Infarction

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Keywords
Occipital lobe epilepsy · Occipital lobe cerebral infarction · Visual hallucination · Electroencephalography

Abstract
We report a case of occipital lobe epilepsy (OLE) in a patient with occipital lobe stroke whose diagnosis was complicated by homonymous hemianopsia. An 81-year-old woman presented with a complaint of "blurred vision" on the right side and was kept under outpatient observation at the Hirabayashi Eye Clinic for homonymous lower right hemianopsia, glaucoma, and post-cataract surgery. Her past medical history included hypertension, angina pectoris, atrial fibrillation, diabetes mellitus, and left occipital lobe cerebral infarction. The corrected visual acuity and intraocular pressure were 20/16 and 12 mm Hg and 20/20 and 13 mm Hg in the right and left eye, respectively, and no change was observed in the fundus and visual field defect; hence, the patient was placed under observation. Two days later, the patient voluntarily visited a neurosurgical hospital and underwent magnetic resonance imaging. No abnormalities were detected other than the left obsolete occipital lobe stroke. Five days later, she returned to our clinic because she felt "something wobbly" on her right side. Upon examination, we suspected a transient ischemic attack based on the wobbling, closed eyelids, and loss of consciousness, and referred her to the same neurosurgical hospital. Electroencephalography (EEG) revealed spikes and waves with occipital lobe predominance, and the diagnosis of OLE was made. The patient had right-sided homonymous hemianopsia owing to left occipital lobe cerebral infarction and "blurred vision" on the same side. Thus, it is inferred that EEG is imperative for ruling out epileptic seizures.

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Introduction

The incidence of epilepsy has a bimodal distribution with a high incidence in the elderly as well as in the young; the elderly constitute the most common age-group for epilepsy [1–4]. This is because the etiology of epilepsy in the elderly is often owing to age-related organic brain lesions, such as strokes, which are reported to account for 30–40% of epilepsy in the elderly [5, 6]. It is important for us ophthalmologists, who often treat elderly patients and evaluate their visual fields after occipital lobe infarction, to know about epilepsy.

Epilepsy is a chronic brain disease caused by excessive electrical excitation of nerve cells in the brain, resulting in paroxysmal disturbances of consciousness and convulsions [7]. Epilepsy can be divided into partial epilepsy (focal epilepsy) and generalized epilepsy, based on the location of the seizure. Based on the cause of the seizure, epilepsy can be divided into two categories: idiopathic, in which there is no apparent brain lesion, and symptomatic, in which a lesion is present. Symptoms vary depending on the location of the seizures. In occipital lobe epilepsy (OLE), visual seizures are a symptom that could lead to ophthalmologic consultation. Partial seizures can progress to generalized seizures with loss of consciousness; therefore, caution is necessary. However, it is difficult to diagnose non-convulsive epilepsy in the elderly since they are less responsive, and could easily be mistaken for dementia or depression [4]. In this report, we describe the experience of a patient who routinely visited an ophthalmology clinic, and whose epilepsy progressed from OLE to generalized epilepsy with loss of consciousness, but whose diagnosis was initially complicated owing to 1/4 hemianopsia.

Case Report

An 81-year-old woman presented with a complaint of " hazy feeling" on the right side. She had been kept under outpatient observation at the Hirabayashi Eye Clinic for homonymous lower right hemianopsia, glaucoma, and post-cataract surgery. Her past medical history included hypertension, angina pectoris, atrial fibrillation, diabetes mellitus, and left occipital lobe cerebral infarction from 3 years ago. Her corrected visual acuity and intraocular pressure were 20/16 and 12 mm Hg and 20/20 and 13 mm Hg in the right and left eye, respectively. The anterior segment of the eye was clear with an intraocular lens, and there were no significant changes in the fundus, except for a left papillary hemorrhage (Fig. 1). Visual field test results showed an MD, −6.65 dB; and PSD, 8.00 dB; in the right eye, and an MD, −8.73 dB; and PSD, 8.32 dB; in the left eye, indicating left lower 1/4 homonymous hemianopsia; however, no significant change was observed from previous examination (Fig. 2). The patient showed no change in visual function and was kept on follow-up. The patient voluntarily visited a neurosurgery hospital 2 days later and underwent magnetic resonance imaging, which revealed no other findings except for a left obsolete cerebral infarction with decreased blood flow in the arterial spin labeling (Fig. 3).

Five days after her visit to our clinic, she complained that she saw many colored spherical objects, such as water balloons moving from her right shoulder downward (Fig. 4). She returned to our clinic with a sketch of her complaints. After examination, she presented with staggering, eyelid closure, and seizures with loss of consciousness, and was referred to the neurosurgery hospital on suspecting a transient ischemic attack.

An electroencephalogram (EEG) was performed upon suspicion of epileptic seizures. The EEG revealed a predominantly occipital lobe spike and wave, followed by a generalized spike and wave (Fig. 5). The patient was diagnosed with OLE and admitted at the hospital for treatment. The patient was treated with levetiracetam, and the subjective symptoms of visual abnormalities disappeared.

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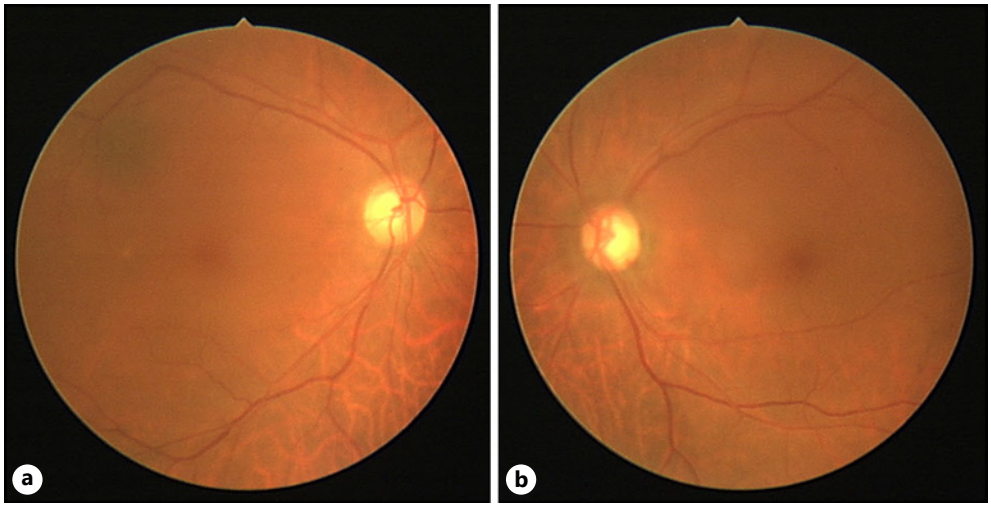

Fig. 1. Fundus photographs at the time of re-examination. Right eye (**a**), Left eye (**b**). No significant changes other than glaucomatous optic nerve papillary cupping and disc hemorrhage were observed.

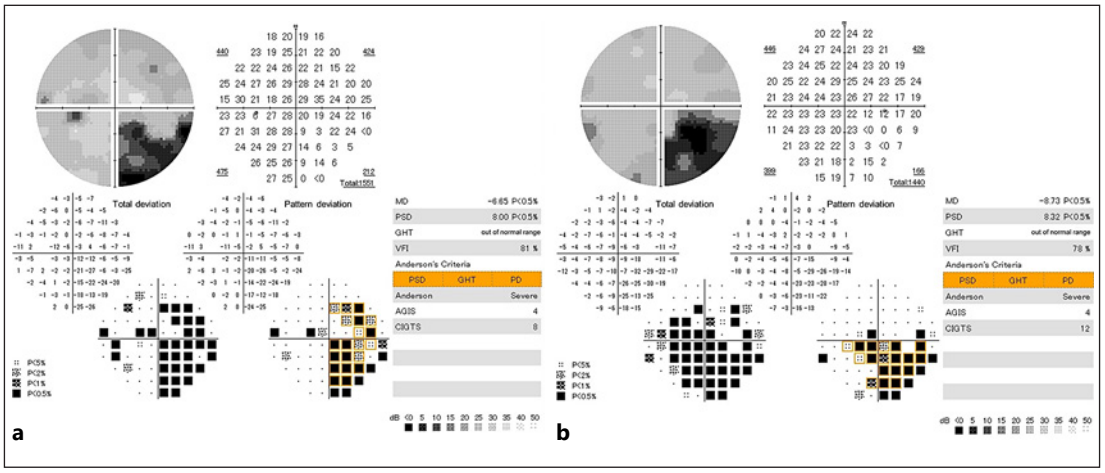

Fig. 2. Automatic visual field meter at re-examination. Visual field test results showed an MD, −8.73 dB; and PSD, 8.32 dB; in the left eye (**a**), and an MD, −6.65 dB; and PSD, 8.00 dB; in the right eye (**b**), indicating left lower 1/4 homonymous hemianopsia; however, no significant change was observed from previous examination.

Discussion

OLE is a type of symptomatic partial epilepsy that presents with visual seizures called visual hallucinations [8]. Visual hallucinations are reported as mainly colored small circular spots, circles, or spheres in a pattern that was consistent with our patient's sketch [9]. There is also a report of a postoperative epileptic seizure following neurosurgery of the occipital lobe, in which the complaints of visual hallucinations predominated over visual field defects [10].

Based on the results of the visual field test, it was initially judged that the patient did not possess vision on the lower right side, and the patient was placed on observation. The occipital lobe infarction prevented the patient from responding to external stimuli by visual field

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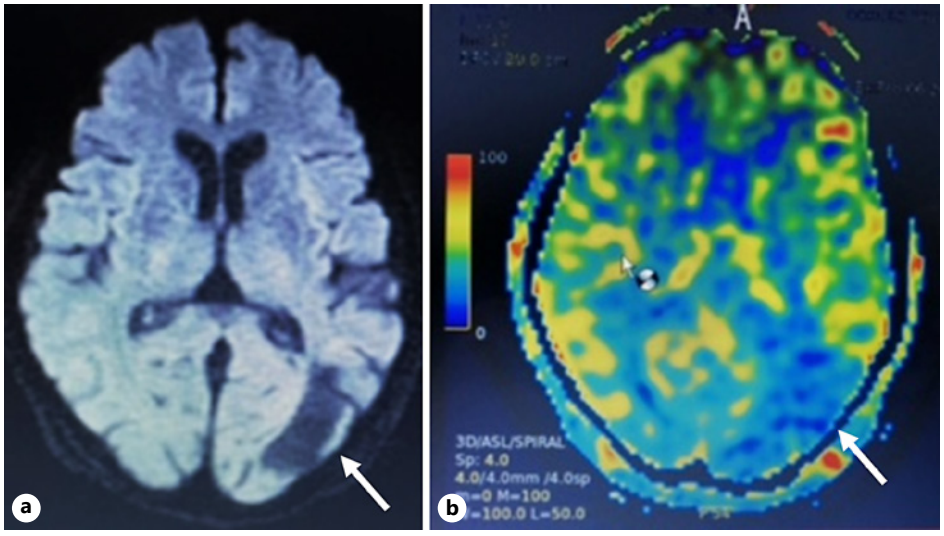

Fig. 3. a MRI image performed at the neurosurgical hospital revealing a left obsolete occipital lobe infarction (arrow). **b** ASL image showing decreased blood flow in the same region (arrow). ASL, arterial spin labeling; MRI, magnetic resonance imaging.

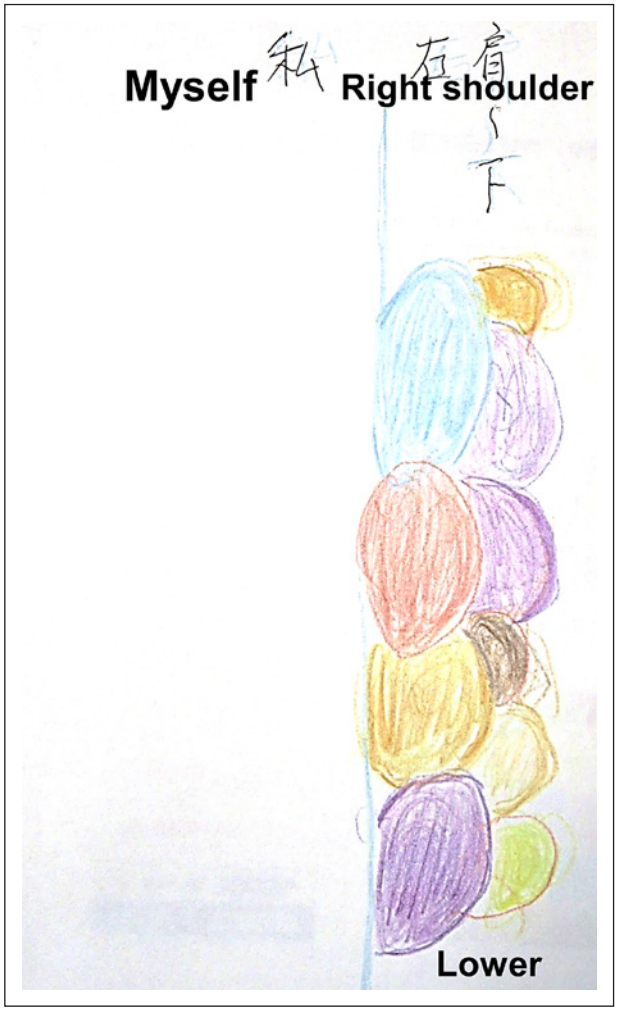

Fig. 4. A sketch of the visual hallucination brought by the patient. The patient stated that she saw colorful globular objects like polka dots swirling from her right shoulder downward. This is very similar to a previous report of visual hallucinations in OLE [7].

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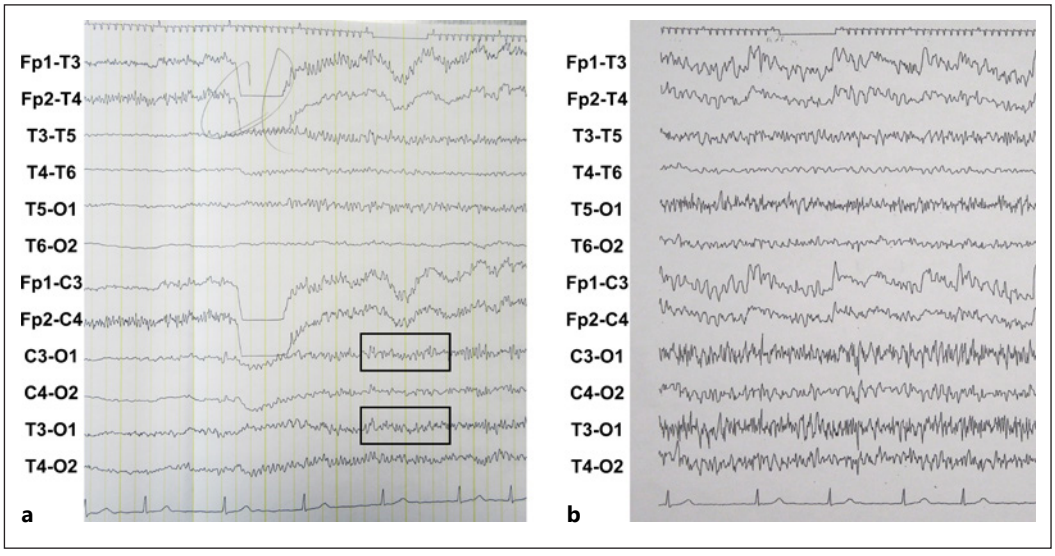

Fig. 5. EEG. **a** During the seizure, spike and wave were noted predominantly in the occipital lobe. **b** Later, the seizure became generalized, and spike and wave were noted in the whole area.

testing; however, the EEG abnormality could have led to the perception of the visual hallucinations. The visual field deficit and the area where the hallucination was felt were in the lower right 1/4 of the brain, which is consistent.

As far as we can find, there is no report of a case of OLE turning into generalized epilepsy with loss of consciousness seizures in an ophthalmology clinic, which is novel. However, since the incidence of post-stroke epilepsy is reportedly 2–4% [11], and the incidence of convulsive status epilepticus is 0.9–2.0% [12], and the number of patients with epilepsy over the age of 61 who present with status epilepticus has been reported to be 62.5/100,000 [13], this situation is likely to prevail in the future. As shown in this case, partial seizures may progress to generalized seizures and loss of consciousness, which is a very dangerous condition. This case was considered symptomatic epilepsy of the occipital lobe owing to an occipital lobe infarction.

If left untreated, there is a risk of progression to generalized epilepsy with loss of consciousness. Therefore, we ophthalmologists, who often perform visual field examination and follow-up after occipital lobe infarction, should be cautious of the patient's complaint of "seeing something" even if they have a visual field defect, and it is important to suspect OLE and perform EEG examination as soon as possible to make a diagnosis.

Statement of Ethics

This study adhered to the tenets of the Declaration of Helsinki. The patient provided written informed consent for the publication of this case report and any accompanying pictures. This study protocol was reviewed, and the need for approval was waived by the Shinshu University School of Medicine.

Conflict of Interest Statement

The authors have no conflicts of interest for this study.

Funding Sources

No financial support was provided.

Author Contributions

H.H., K.H., M.W., and T.M. treated the patient and collected the clinical data. H.H. and K.H. wrote the manuscript, and M.W. and T.M. revised the manuscript. All authors approved the final version of the manuscript. The authors agree to be responsible for all aspects of this study.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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