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## Case report

# Acute bilateral vision loss in emergency department: A case report



Ceren sen Tanrikulu\*, Hilal Hocagil, Ural Kaya, Abdullah Cuneyt Hocagil

Bulent Ecevit University, Faculty of Medicine, Emergency Medicine Department, Zonguldak, Turkey

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## ABSTRACT

Stroke occurs due to the interruption of blood flow to the brain and it is divided into ischemic and hemorrhagic. In the ischemic strokes, while the most commonly affected vessel is median cerebral artery (MCA), it is particularly affected bilateral posterior cerebral artery (PCA) is very rare condition. In this study, a case of sudden loss of vision and bilateral occipital infarct associated with bilateral vertebral system pathology and methylene tetrahydrofolate reductase (MTHFR) gene mutation were reported. A 62-year-old man was admitted with sudden loss of vision complaint starting 10 h before applying to emergency department. The patient was oriented and cooperative. On neurological examination, there was complete loss of vision in the right eye and only a response to light in the left eye. On the brain computerized tomography (CT), ischemic lesions were observed in the bilateral occipital areas and on magnetic resonance imaging (MRI), there were foci showing diffusion limitation in cortico-subcortical areas of bilateral parieto-occipital region. On the detailed examination at the clinic, MTHFR (a1298c) gene mutation was detected. Bilateral occipital infarction is rare and its diagnosis can be difficult because of its atypical symptoms. Therefore, occipital infarction should be suspected when the only sign is isolated vision loss in patients with risk factor for thromboembolism in their history and detailed visual-neurological examination of these patients should be performed.

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## 1. Introduction

Stroke occurs due to interruption of blood flow to the brain and it is the third most common cause of deaths. Stroke is one of the major causes of morbidity and loss of labor.<sup>1,2</sup> Basically, stroke is classified as ischemic and hemorrhagic stroke. Ischemic strokes constitute the majority of cases. In the etiology of ischemic stroke, thromboembolic events often take place. The most important factors that increase susceptibility to thromboembolism are malignancies, trauma and gene mutations. In ischemic stroke, while the most commonly affected vessel is middle cerebral artery, particularly bilateral PCA involvement is a very rare condition. Clinical process may vary depending on the affected vessel. In patients with posterior cerebral artery infarct, as occipital lobe which contains the primary visual cortex is usually affected, patients may present with visual impairment only.<sup>1</sup> In patients admitted with isolated visual symptoms to emergency department, diagnosis can be

delayed or the patient may be misdiagnosed unless a careful physical examination is performed. In this study, bilateral occipital infarct associated with MTHFR gene mutation is presented in a patient that was admitted with bilateral visual field defect to our emergency department.

## 2. Case report

A 62-year-old man admitted to emergency clinic with sudden loss of vision complaint starting 10 h ago. The patient did not have any complaints other than minimal headache. The patient was oriented and cooperative and there was no comorbid disease in medical history. Arterial blood pressure was 170/90 mmHg, pulse was 80 rpm, respiratory rate was 14 bpm, temperature was 36.6 °C, and oxygen saturation was 98%. On neurological examination, there was complete loss of vision in the right eye and only a slight light reflex. Pupils were bilaterally isochoric and light reflex was bilaterally positive. The patient's eye movements, fundoscopic examination, cranial nerve examination and other neurological examination findings were normal. There was no motor and sensory deficit and facial asymmetry. But, cerebellar examination (dysdiadochokinesis, finger-to-nose test, heel-to-shin test,

\* Corresponding author. Tel.: +90 0505 887 1387.

E-mail address: [cerensen81@hotmail.com](mailto:cerensen81@hotmail.com) (C. Tanrikulu).

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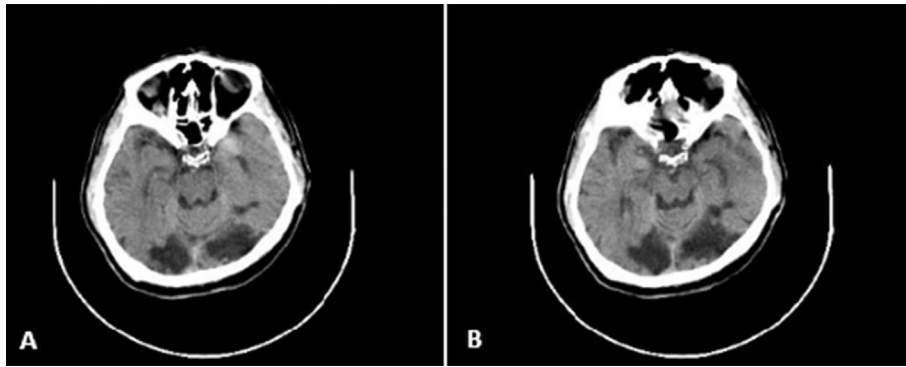


Fig. 1. The foci showing diffusion limitation on brain CT.

cerebellar ataxia) of patient could not be performed due to bilateral visual loss. On patient's laboratory, complete blood count, renal-liver function test, electrolytes, cardiac enzymes were normal. Electrocardiogram was normal sinus rhythm. Unenhanced brain CT scan was performed on the patient on presentation, and ischemic lesions were observed in the bilateral occipital areas (Fig. 1). On MRI, the foci showing diffusion limitation in cortico-subcortical areas of bilateral parieto-occipital region and cerebellar hemisphere were seen (Fig. 2). Antiplatelet agent aspirin and unfractionated heparin were given to the patient during the treatment in the emergency department. The patient was consulted to the neurologist with the preliminary diagnosis of ischemic stroke, and the patient was hospitalized. During the detailed examination at the clinic, on the MRI angiography, moderate to severe stenosis at the level output of internal cerebral artery and hypoplasia of the right vertebral artery were detected, and MTHFR (a1298c) gene mutation was detected. Anticoagulant therapy was given to the patient during the hospitalization period. The patient who had neither any improvement in vision nor any new onset pathology was discharged.

### 3. Discussion

Stroke is a common disease in the community and is one of the major causes of mortality and morbidity. Stroke induced bilateral occipital infarct is a rare condition and its diagnosis may be difficult due to atypical symptoms. In this study, a case of bilateral occipital infarct associated with bilateral vertebral system pathology and MTHFR gene mutation were discussed with literature.

Age is an important risk factor for stroke and the incidence of the stroke increases with age.<sup>3</sup> Yoneda et al<sup>4</sup> have found that the

mean age was  $70 \pm 11$ . Similarly, Reganon et al<sup>5</sup> have found that the mean age was  $65.3 \pm 8.2$ . Our case was 62 years old male and these demographic features were consistent with the literature.

The etiology of stroke is basically divided into two: ischemic and hemorrhagic. 87% of cases are ischemic stroke. 10% of hemorrhagic strokes are intracerebral hemorrhage, 3% are nontraumatic sub-arachnoid hemorrhage.<sup>1</sup> Common causes of ischemic stroke are thrombotic events (atherosclerosis, vasculitis, hypercoagulation status), embolic events (septic embolism, fat embolism and cardiac tumors), and hypoperfusion (causes of systemic hypotension).<sup>1</sup> Hypercoagulable states may be acquired or inherited. One of the acquired hypercoagulable states is MTHFR gene mutation which appears frequently in recent years. The MTHFR gene mutation leading to vascular thrombosis is rare and thrombosis occurs especially in patient with homozygous mutations.<sup>6</sup> In our case, type 1 gene MTHFR a1298c mutation with ischemic stroke was present.

In ischemic stroke, the most commonly affected vessel is MCA. Other vessels such as PCA, anterior cerebral artery (ACA) and vertebra-basillary artery (VBA) are more rarely affected.<sup>1</sup> PCA obstructing embolism generally arises from internal cerebral artery (ICA). Clinical presentation varies according to the region of the brain damage. The clinical picture such as facial weakness, motor deficits in limb can be obvious, but the symptoms might be obscure such as dizziness. Although patients with PCA infarction usually suffer from unilateral headache, clinical signs are visual defects with contralateral homonymous hemianopia and unilateral cortical blindness.<sup>7</sup>

Therefore, in bilateral visual defect, if eye and pupil examinations are normal "cortical blindness" that is the partial or complete loss of vision in the normal-appearing eye and occurs due to damaged visual field in the occipital cortex of the brain should be

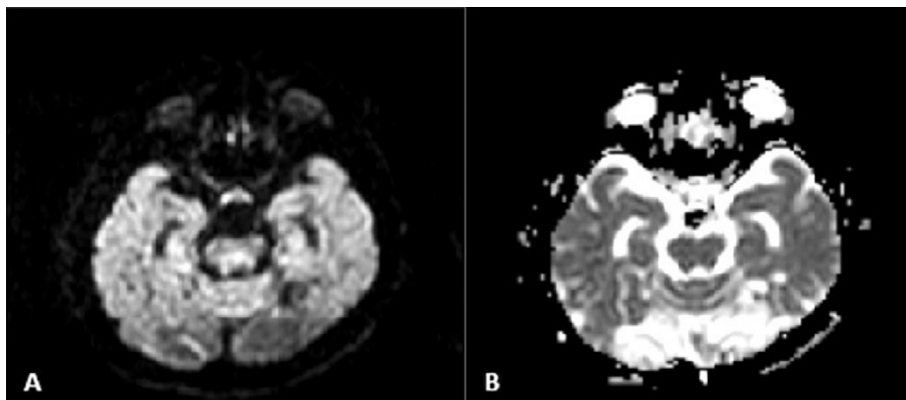


Fig. 2. Density reduction on brain MRI.

considered.<sup>8</sup> There were similar findings in our patient.<sup>1</sup> In a comprehensive study conducted Geddes et al<sup>9</sup> found that the rates of right and left visual field defects associated with stroke are 0.5% and 0.7%, respectively. In other study<sup>10</sup> carried out with 474 patients (402 patients with ischemic stroke and 72 patients with hemorrhagic stroke) with stroke diagnosed at the end of an observation period of over 9 years, it was found that the most common complaints among patients was weakness (80%), hemianopia (14.6%) and diplopia (5.5%). Among the causes of cerebral blindness, other than occipital infarction, there are traumas of occipital region, migraine, occipital seizures, invasive cardiac procedures, and the preeclampsia.<sup>11</sup>

Early diagnosis is very important in all kinds of ischemia. In the emergency department, non-contrast brain CT is the most appropriate tests terms of accessibility and cost. MRI is more preferable if diffusion weighted MRI is easily accessible and the lesion is presumed to be in the posterior fossa.<sup>12</sup> On CT of our patient, ischemic lesions were observed in the bilateral occipital area because our patient was admitted after 10 h from onset of symptoms. On the MRI angiography, moderate to severe stenosis at the level output of internal cerebral artery and hypoplasia of the right vertebral artery were detected, and homozygous MTHFR (a1298c) gene mutation was detected.

Thrombolytic therapy administered during first 3 h provides significant clinical improvement in patients with acute ischemic stroke. Therefore, early application and diagnosis is very important for initiation of thrombolytic therapy at the appropriate time. However, studies indicated that up to 21–48% of patients are admitted to emergency department in the first 3 h. In patients with stroke, the period between detection of visual field defects and to confirm the diagnosis is quite long. Therefore, in this group of patients, early detection of visual field defects is very important because long-term functional outcomes of these patients are worse than other stroke patients.<sup>13</sup> Thrombolytic therapy was not given to our patient because of late admission to the emergency department.

Causes of late presentation of patients are inability to recognize of the symptoms of cerebrovascular event (SVE) by patients, ignoring symptoms, and status can't be determined due to unconsciousness induced SVE.<sup>14</sup> The causes of admission of our patient after about 10 h from the onset of his complaints were transportation difficulties and hope that his complaints will be resolved.

As a result, stroke patients who present to the emergency department with a loss of vision and who have risk factors for

thromboembolism should be evaluated more carefully and detailed neurological and visual examination should be performed. Because early diagnosis and treatment are important factors in terms of mortality and morbidity. Even if the only sign is isolated loss of vision, in addition to ocular problems occipital infarction should be considered.

### Conflict of interest

The authors declare that there is no potential conflict of interest.

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