Case Report

A Rare Manifestation of Posterior Circulation Stroke: Artery of Percheron Infarction with Thalamic and Midbrain Involvement

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Abstract

Background: Stroke can manifest through a range of neurological symptoms, including visual impairments, and is frequently linked to considerable disability. Strokes affecting the posterior circulation are particularly noted for their unusual and diverse presentations. This case emphasizes the critical need for the prompt identification of ocular and neurological signs, which may signal an impending stroke.

Case Report: A 50-year-old male with a medical history of hypertension and type 2 diabetes mellitus arrived at the emergency department exhibiting sudden right-sided weakness, slurred speech, and visual difficulties. MRI of the brain indicated a recent ischemic stroke located in the right thalamus, cerebral crus, and posterior lobe, accompanied by a cuneate lesion in the bilateral paramedian midbrain. Color doppler imaging of the carotid arteries showed atherosclerotic plaques with mild stenosis, indicating a possible source of ischemia. The patient received immediate treatment with antiplatelet agents, statins, antihypertensive drugs, and supportive care.

Conclusion: This case highlights the importance of being alert to stroke symptoms, particularly in individuals with risk factors such as hypertension and diabetes. Timely recognition and intervention can mitigate further neurological decline and enhance patient outcomes.

Keywords: Visual disturbance, Stroke, Posterior circulation.

Introduction

Stroke ranks among the leading causes of mortality and long-term disability globally. The impact of a stroke can differ significantly based on the specific area of the brain that is affected. Notably, strokes involving the posterior circulation may manifest as visual disturbances, which can be subtle or temporary.[1] These symptoms, often resulting from lesions in areas such as the thalamus, occipital lobes, or brainstem, may be dismissed as simple visual impairments. Nevertheless, they can act as early indicators of a potentially serious vascular incident.[2]

The thalamus is crucial for sensory processing, including the interpretation of visual stimuli, and lesions in this region can interfere with normal visual processing and perception. Strokes in the posterior circulation typically impact areas like the brainstem and occipital cortex, resulting in symptoms such as hemianopia, visual neglect, and transient visual deficits. Since these symptoms may not always be immediately associated with a stroke, prompt clinical assessment and neuroimaging are essential for early detection.[3]

This case report discusses a 50-year-old male with a medical history of hypertension and diabetes who exhibited visual disturbances, weakness, and slurred speech. MRI scans indicated a recent stroke affecting the thalamus and midbrain, which are frequently involved in posterior circulation strokes. This case underscores the necessity of recognizing visual symptoms in stroke patients and the urgency of timely intervention to mitigate further neurological impairment.

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Case Report

Clinical Presentation

A 50-year-old male arrived at the hospital exhibiting visual disturbance, a sudden onset of weakness on the right side of his body, and slurred speech. He reported no headaches, seizures, or loss of consciousness during his visit. His medical history included untreated type 2 diabetes mellitus and hypertension for the past two years. He also acknowledged occasional alcohol use but denied any history indicative of chronic alcohol abuse or associated complications.

Upon initial evaluation, the patient was alert, conscious, and oriented to time, place, and person, demonstrating the ability to follow verbal instructions effectively. His vital signs were stable, with an oxygen saturation (SpO_2) of 99%, a respiratory rate of 18 breaths per minute, blood pressure recorded at 140/90 mmHg, a normal temperature, and a random blood glucose level of 141 mg/dL. A systemic examination indicated normal cardiovascular function, with clearly audible S1 and S2 heart sounds and no murmurs detected. The respiratory assessment revealed bilateral normal vesicular breath sounds and the abdominal examination showed a soft, non-tender abdomen without any signs of organ enlargement.

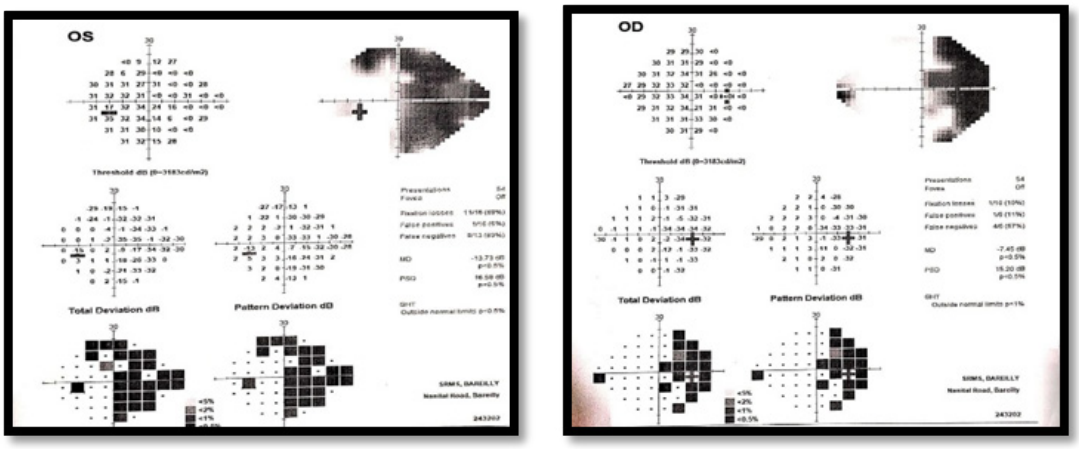
On initial ophthalmologic examination, the patient's bedside visual acuity was recorded as 3/60. Intraocular tension was assessed digitally and found to be within normal limits. A relative afferent pupillary defect (RAPD) was noted in the right eye. Confrontation visual field testing revealed temporal and superior field restriction in the right eye, along with superior and nasal constriction in the left eye. On follow-up examination, best corrected visual acuity (BCVA) improved to 6/18. However, the patient presented with severe dry eye involving the cornea reduced contrast sensitivity, and defective color vision. Extraocular movements (EOM) were full and unrestricted in all directions. Fundus examination showed papilledema and formal visual field testing confirmed a hemianopic defect, suggesting involvement of the visual pathway at or beyond the optic chiasm, consistent with retro chiasmal pathology or raised intracranial pressure Fig 1a and 1b

The neurological assessment indicated weakness on the right side, with motor strength rated at 3/5 in the upper limb and 4/5 in the lower limb, while the left side exhibited full strength at 5/5 in both limbs. Sensory functions were preserved, there was no neck stiffness, and the pupils showed sluggish reactivity to light, suggesting potential involvement of the brainstem.

Magnetic resonance imaging (MRI) of the brain identified an acute infarct affecting the left thalamus, cerebral crus, and posterior lobe, along with a cuneate lesion in the bilateral paramedian region of the midbrain Figure 2. These findings are indicative of an acute ischemic stroke impacting the posterior circulation. A 2D color Doppler ultrasound of the carotid arteries revealed mild atherosclerotic changes, with a 30 to 35% stenosis in the right common carotid artery and a non-significant plaque on the left side.

Laboratory tests, including complete blood count (CBC), thyroid function tests, liver function tests, and serum electrolytes, returned normal results. However, the HbA1c level was elevated at 8%, indicating inadequate diabetes management. The lipid profile showed increased levels of high-density lipoprotein (HDL), while other lipid parameters remained within normal ranges. Cardiac biomarkers, including troponin T, were recorded at less than 0.010 µg/L, and NT-proBNP was below 70 ng/L, effectively excluding acute cardiac ischemia or heart failure.

We commenced supportive treatment with methylcobalamin (Cap Neurokind) for neuroprotection, nepafenac eye drops to address ocular inflammation, artificial tears (Carboxymethylcellulose), and hyaluronic acid 0.18% eye ointment for lubrication of the ocular surface.



(a) (b)

Figure 1: a: Humphrey visual field analysis – Left eye (OS), b: Humphrey visual field analysis – right Eye (OD)

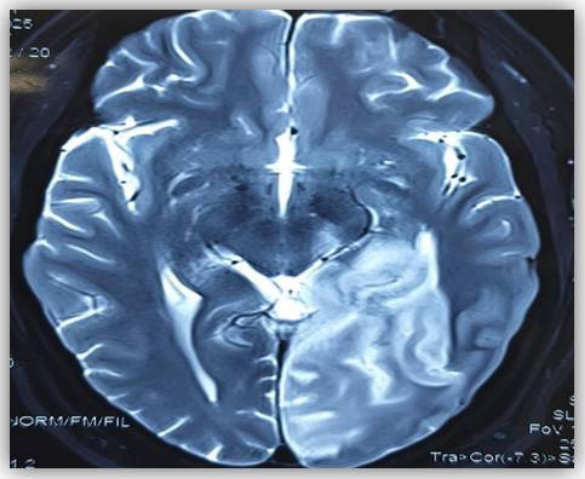


Figure 2: T2-Weighted axial MRI of the brain showing thalamic and occipital structures

Management

The patient received medical management through a multidisciplinary approach. The treatment regimen included Citicoline 500 mg, a neuroprotective agent designed to promote neuronal repair and recovery; Levetiracetam 500 mg, an antiepileptic medication to avert post-stroke seizures; sustained-release metformin for glycemic control; amlodipine 10 mg for blood pressure management; and a combination of atorvastatin 10 mg and aspirin 75 mg to tackle lipid abnormalities and provide antiplatelet therapy. This thorough treatment plan aimed to stabilize the patient, prevent secondary complications, and facilitate neurological recovery.

Discussion

This case illustrates a rare manifestation of a posterior circulation stroke, likely resulting from the occlusion of the artery of percheron (AOP), an uncommon anatomical variant that supplies blood to the bilateral paramedian thalami and the rostral midbrain. The patient exhibited sudden right-sided weakness, slurred speech, and visual disturbances but did not show signs of cortical involvement such as aphasia or hemineglect, which aligns with a diagnosis of a thalamic-midbrain infarct.[4]

Infarcts of the AOP present a diverse clinical picture and are frequently underdiagnosed due to their varied and nonspecific symptoms. Lazzaro *et al*. conducted a thorough review of 37 cases, highlighting the broad clinical range of AOP infarction, which can include altered mental status, ocular movement disorders, hemiparesis, and memory issues. In this patient, the primary symptoms were motor deficits and visual disturbances, likely indicating midbrain involvement.[5]

Neuroimaging, especially MRI, is essential for accurate diagnosis in such cases. Conventional CT scans may overlook small or early lesions in the posterior circulation, whereas MRI can effectively identify infarcts in the thalami and midbrain with high sensitivity. The lesion distribution observed in our patient—affecting the left thalamus, cerebral crus, and bilateral paramedian midbrain—corresponds to the typical imaging characteristics associated with AOP infarction.[6]

Pre-existing vascular risk factors, such as poorly controlled diabetes and hypertension, significantly contributed to the development of this condition. The ARIC study has shown that both factors markedly elevate the risk of ischemic stroke by promoting small vessel disease and atherosclerosis. Additionally, the presence of mild carotid atherosclerosis in this patient further suggests an embolic or microangiopathic origin.[7]

Visual disturbances associated with posterior circulation strokes are frequently attributed to central factors rather than issues related to the eyes. This assertion is supported by the findings of Lee *et al*.,[8] who noted that lesions in the midbrain and thalamus can lead to visual field deficits, gaze abnormalities, or impairments in visual processing, all without involvement of the anterior segment.[9]

From a treatment perspective, the patient was administered citicoline, a neuroprotective agent with evidence supporting its efficacy in enhancing recovery following ischemic strokes. The administration of antiplatelet agents (such as aspirin), statins, and antihypertensive medications is consistent with the guidelines set forth by the American Heart Association (AHA) and the American Stroke Association (ASA) for the prevention of secondary strokes. Additionally, managing diabetes with metformin contributes to the modification of vascular risk factors.[10]

This case highlights the necessity of considering uncommon stroke syndromes, such as AOP infarction, in patients who exhibit atypical or mixed neurological symptoms. Prompt MRI and a multidisciplinary approach are crucial for optimizing outcomes in these intricate cases.

Conclusion

This case highlights the importance of identifying uncommon types of strokes, such as Artery of Percheron (AOP) infarction, particularly in patients who exhibit atypical symptoms. The use of early MRI was instrumental in achieving an accurate diagnosis and informing treatment strategies. Proper management of risk factors, including diabetes and hypertension, along with timely therapeutic measures, is vital for enhancing patient outcomes. A comprehensive understanding of posterior circulation strokes, even in the absence of classic symptoms, is critical for precise diagnosis and effective management in clinical settings.

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