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Case Report

Artery of Percheron Infarction Presenting with Deep Coma and Bilateral Thalamic Involvement: A Case Report

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Abstract

Artery of Percheron infarction is a rare type of stroke that affects both sides of the thalamus. It can present with sudden loss of consciousness and may be difficult to diagnose because initial CT brain imaging is often normal. We report the case of a 70-year-old male with a history of diabetes mellitus, hypertension, and previous stroke who presented to the emergency department in deep coma with a Glasgow Coma Scale of 3/15. He required immediate intubation and mechanical ventilation. At first, the CT brain showed no findings. However, the MRI brain then revealed a bilateral thalamic infarction, which resulted from the occlusion of the artery of Percheron. This magnifies the importance of taking such a rare diagnosis into consideration when dealing with comatose patients while excluding other differential diagnoses.

Keywords: *Artery of Percheron; Bilateral Thalamic Infarction; Coma; Ischemic Stroke; MRI*

Introduction

The Artery of Percheron (AOP) is a rare anatomical variant in which a single arterial trunk arises from the posterior cerebral artery's P1 segment to supply both paramedian thalami and occasionally the rostral midbrain [2]. Occlusion of this artery leads to bilateral paramedian thalamic infarction, which is an uncommon subtype of ischemic stroke with a distinctive clinical and radiological profile [1].

AOP infarction accounts for a small proportion of all ischemic strokes and a minority of thalamic strokes, making it a relatively rare condition [3]. The paramedian thalami are responsible for consciousness, arousal, memory, and ocular movement, which explains the diversity of neurological symptoms observed in AOP infarction [1,5].

Patients typically present with altered mental status, ranging from somnolence to deep coma, which may be accompanied by vertical gaze palsy, memory impairment, and behavioral changes [1,5,6]. However, the clinical presentation is highly variable, and some patients may present without focal neurological deficits, complicating early recognition [6].

Early computed tomography (CT) often fails to detect acute AOP infarction due to the subtle nature of thalamic lesions, particularly in the hyperacute phase [3,4]. In contrast, magnetic resonance imaging (MRI) with diffusion-weighted imaging (DWI) is highly sensitive for detecting these lesions and is considered the gold standard for diagnosis [4,7].

Due to the rarity of AOP infarction and its variable clinical presentation, the condition is frequently misdiagnosed or recognized late, which may delay appropriate management [3,7]. Awareness of this vascular variant is critical for clinicians evaluating patients with unexplained coma or sudden alterations in consciousness [5].

Case Presentation

Patient information

We present a 70-year-old bedridden male with multiple chronic medical conditions who was brought to the emergency department by the Saudi Red Crescent in a state of deep coma with abnormal breathing with a GCS of 3/15. Patients had history of hypertension, prostate surgery, type 2 diabetes mellitus, and a prior stroke resulting in residual bilateral lower limb weakness rendering the patient to be immobile. The patient had also been chronically catheterized due to urinary dysfunction. His regular medications included valsartan 80 mg once daily, metformin 500 mg, and aspirin.

Clinical findings

On arrival at the emergency department, he had a pulse but was unresponsive with bilaterally constricted pupils. The patient was immediately intubated and placed on mechanical ventilation.

History was taken from the patient's family; the patient had a sudden decrease in level of consciousness as well as repeated vomiting and an abnormal breathing pattern prior to his presentation to the emergency department. When he was brought to the emergency department by the Saudi red crescent, he was deeply unconscious with a Glasgow Coma Scale (GCS) score of 3/15 (E1V1M1).

The initial physical examination in the emergency department showed the patient had a palpable pulse but was unresponsive to both verbal and painful stimuli. Upon examining the pupils, he had bilateral pinpoints with non-reactive pupils. Due to the patients severely disturbed level of consciousness and high risk of aspiration, rapid sequence intubation was performed for airway protection, and the patient was placed on mechanical ventilation.

The rest of the physical examination was conducted and lung auscultation had good equal bilateral air entry with no crackles or wheezing. Cardiovascular exam showed regular first and second heart sounds with no murmurs, the abdomen was soft and lax, no tenderness or masses were elicited with superficial and deep palpation, there was no guarding or rigidity.

Diagnostic assessment

Meanwhile lab investigations were sent during initial resuscitation. Venous blood gas (VBG) analysis yielded metabolic acidosis, pH 7.19, bicarbonate (HCO_3) 16 mmol/L, an elevated lactate level of 6.1 mmol/L. Other significant lab findings were hyperkalemia 6.4 mmol/L, a random blood glucose level of 700 mg/dL. Urine analysis showed hematuria.

Once stabilized an urgent CT scan of the brain was obtained to evaluate for acute infarctions as seen in figure 1.

Initial CT imaging showed Bilateral thalamic hypodensity that needed confirmation by MRI. An MRI was then performed to provide further diagnostic clarification as seen in figure 2.

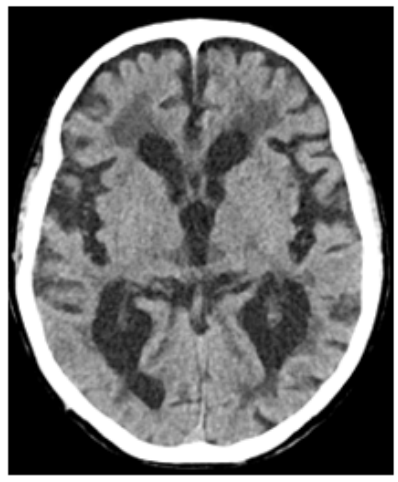


Figure 1: *Correlating with the clinical presentation, initial CT imaging showed Bilateral thalamic hypodensity that needed confirmation by MRI.*

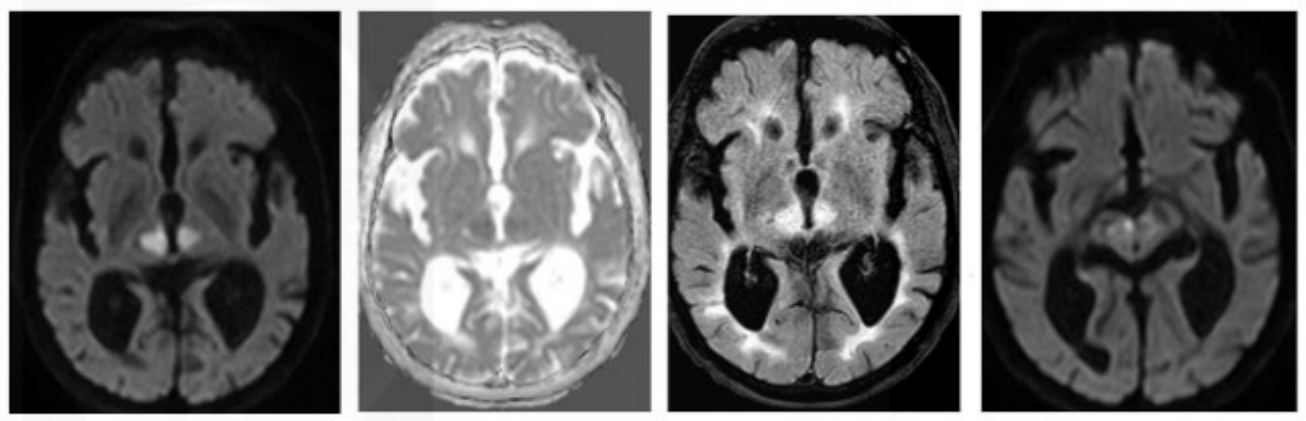


Figure 2: *MRI demonstrates diffusion restriction in the bilateral paramedian thalami extending to the midbrain, with corresponding hyperintense signal on FLAIR sequence, with no apparent edema. Bilateral diffusion restriction involving the paramedian thalami, particularly when associated with rostral midbrain involvement, is highly suggestive of Artery of Percheron infarction. Recognition of this characteristic pattern is essential, as vascular imaging may appear unremarkable and early diagnosis relies primarily on MRI findings.*

Additionally, another CT brain was done to further confirm the diagnosis as seen in figure 3.

Ct angiography and venography were both performed to exclude arterial occlusion, and venous sinus thrombosis was negative. Hence to establish the diagnosis magnetic residence imaging was done revealing symmetric bilateral paramedian thalamic diffusion restriction characteristic of Artery of Percheron Infarction.

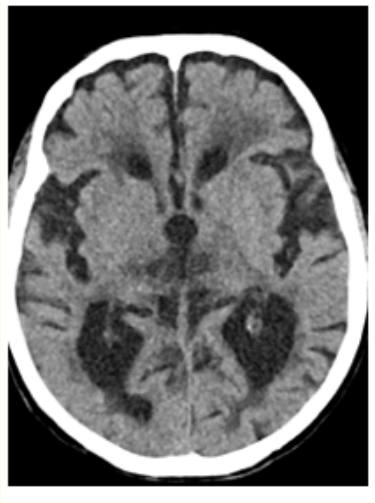


Figure 3: *Follow-up CT demonstrated evolutionary changes, reinforcing the suspicion of an artery of Percheron infarction.*

A supporting factor for this diagnosis was the exclusion of the expected differential diagnosis, such as; deep cerebral venous thrombosis, Wernicke encephalopathy metabolic abnormalities, toxic processes, infections, and neoplasms. Another supporting factor is that it does not follow the territory of the basilar artery.

Therapeutic intervention

In the emergency department the patient received initial 2-liter intravenous crystalloid bolus fluid resuscitation and maintained. Due to the patient's critical neurological status and need for ventilation, He was transferred urgently to the intensive care unit for close monitoring and continued management.

Follow-up and outcomes

The patient survived the acute phase of the illness. Yet despite supportive management in the intensive care unit, the patient's level of consciousness did not improve. He stayed in a persistent comatose state and never regained consciousness. Neurological status remained unchanged and he needed ongoing supportive care; he was transferred to a long-term care facility for continued management and was still there after three months of his illness.

Results and Discussion

The Artery of Percheron was first presented by neurologist Gérard Percheron in 1973, who illustrated the alternative anatomical variation where a single branch emerges from the posterior cerebral artery to supply both paramedian thalami and the rostral midbrain [2]. Occlusion of the artery of Percheron results in bilateral paramedian thalamic infarction, an infrequently observed presentation of ischemic stroke possessing unique clinical features [1].

A variety of neurological symptoms can arise from an infarction inside the thalamus, a central relay structure involved in awareness, alertness, memory, and eye movements. According to one study, altered mental status, hypersomnolence, vertical gaze palsy, and memory impairments are the most prevalent clinical symptoms of AOP infarction [1]. Similar to this, Arauz., *et al*. reported the relationship between the location of the infarct and neurological symptoms, demonstrating that coma and aberrant ocular movement are common in cases of

paramedian thalamic involvement [5]. Despite these common presentations, patients may come with nonspecific symptoms, and the illness is uncommon; therefore, diagnosis is frequently missed or delayed [3].

Lamot., *et al*. and Matheus and Castillo reported that early CT scans frequently appear normal, particularly within the first 24 hours of symptom onset [3,4]. This was also observed in the current case, where initial CT imaging did not reveal any acute changes [4]. MRI with diffusion-weighted imaging (DWI) is the most sensitive tool for detecting AOP infarction, revealing bilateral symmetric hyperintensities in the paramedian thalami, sometimes extending to the rostral midbrain [4,7]. Xu., *et al*. highlighted that MRI is crucial for verifying the diagnosis, especially in cases when CT is non-diagnostic, but the clinical presentation is severe [7].

Clinical correlation and imaging are crucial for an appropriate diagnosis of bilateral thalamic lesions because the differential diagnosis is wide and includes deep cerebral venous thrombosis, Wernicke encephalopathy, metabolic abnormalities, toxic processes, infections, and neoplasms [10,11]. Patients may appear with isolated altered mental status without specific neurological symptoms, which can mask the diagnosis, according to case studies like the one by Kara., *et al*. [6].

The promptness of detection and supportive care determines the prognosis [12] and early diagnosis and treatment may improve outcomes, while delayed detection may result in long-term neurological damage [5]. In a similar study, Xu., *et al*. emphasized the need for early MRI examination and high clinical suspicion because clinical progression is frequently unpredictable [7]. In this instance, the patient was in a deep coma and had no acute alterations on CT, which is consistent with previous cases of AOP infarction [1,3]. Bilateral paramedian thalamic infarction was verified by MRI, demonstrating the significance of sophisticated neuroimaging in making a diagnosis [7,9].

Conclusion

It is crucial to consider the artery of Percheron infarction in cases of bilateral paramedian thalamic stroke. While a rare occurrence, it often presents with a triad of altered mental status, vertical gaze palsy, and memory loss. CT imaging on initial presentation shows no ischemic changes complicating diagnosis. MRI with diffusion-weighted imaging is the most sensitive modality for confirming the diagnosis. Early recognition is essential to guide supportive care and to inform prognosis. Clinicians should maintain a high index of suspicion for this rare vascular variant in patients with unexplained coma or bilateral thalamic dysfunction.

Conflict of Interest

The authors declare that they have no financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Consent

Written informed consent was obtained from the patient's legally authorized representative for publication of this case report and accompanying imaging.

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