Journal of Biosciences and Medicines, 2026, 14(8), 186-190
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Bi-Thalamic Ischemic Stroke: Artery of Percheron Variant. Case Report

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How to cite this paper: Dibwe, G., Kamate, O., Ngindu, F., Badria, A., Mohamed, F. and Mohammed, M. (2026) Bi-Thalamic Ischemic Stroke: Artery of Percheron Variant. Case Report. *Journal of Biosciences and Medicines*, **14**, 186-190.
https://doi.org/10.4236/jbm.2026.148017

Received: July 14, 2026
Accepted: August 15, 2026
Published: August 18, 2026

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Abstract

Bilateral thalamic infarction results from the occlusion of the artery of Percheron, a rare anatomical variant of cerebral vascularization. The occlusion of this artery leads to a characteristic pattern of bilateral paramedian thalamic infarctions, with or without midbrain involvement. We report a case of bilateral thalamic infarction due to artery of Percheron occlusion in a 67-year-old female patient with a known history of diabetes, who was admitted for a sudden onset of altered consciousness. A brain MRI revealed ischemic strokes in the territories of the posterior cerebral artery and with bilateral thalamic ischemic involvement suggestive of an artery of Percheron variant. Healthcare providers' lack of familiarity with this type of stroke is mainly explained by the variable extension of the infarcted territories, which leads to a highly polymorphic and often non-specific clinical presentation. Despite existing awareness efforts, our case highlights the importance of performing a brain magnetic resonance imaging (MRI) early on for the characterization of this type of lesion, which is sometimes not detected by computed tomography (CT).

Keywords

Infarction, Bithalamic, Percheron

1. Introduction

Bilateral thalamic infarction results from the occlusion of the artery of Percheron, a rare anatomical variant of cerebral vascularization. Classically, the vascular supply of the thalamus is divided into four territories: tuberothalamic, inferolateral,

paramedian, and posterior choroidal [1]. The paramedian territory is supplied by the paramedian arteries, also known as thalamoperforating arteries, which arise from the proximal segment of the posterior cerebral artery [1].

Gérard Percheron described four anatomical variants of the arterial supply to the paramedian thalami, including the artery of Percheron (AOP). This is a rare variant of the paramedian arterial supply in which a single dominant thalamoperforating artery arises from one posterior cerebral artery and bifurcates to supply both paramedian thalami and, in some cases, the rostral midbrain [2]-[4]. Occlusion of this artery thus results in a characteristic pattern of bilateral paramedian thalamic infarctions with or without midbrain infarctions [5]-[7].

We report a case of bilateral thalamic infarction due to artery of Percheron occlusion, diagnosed at the Emergency and Trauma Center of the Ibn Rochd University Hospital in Casablanca.

2. Case Report

A 67-year-old female patient with insulin-dependent diabetes was admitted to the emergency department of the Ibn Rochd University Hospital in Casablanca for a sudden onset of an acute decline in her level of consciousness. According to her family, the clinical history dated back approximately 12 hours prior to admission.

Upon admission, she was comatose with an estimated Glasgow Coma Scale (GCS) score of 12/15; there was no spontaneous eye opening, the pupils were dilated and sluggishly reactive, and no focal motor deficits were objectified, subject to her neurological status. Her blood pressure was 160/80 mmHg, heart rate was 96 beats per minute, and oxygen saturation was 98% on room air with an eupneic respiratory rate of 20 breaths per minute.

Capillary blood glucose was 200 mg/dL, and urine ketones were negative. The remainder of the laboratory workup was unremarkable, including a toxicology screen; furthermore, the clinical history revealed no prior history of substance abuse or suicidal ideation.

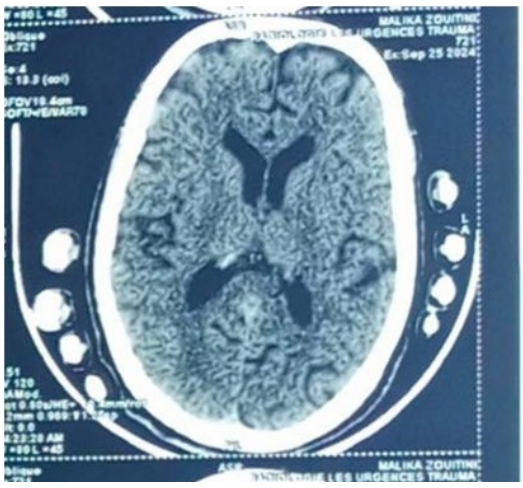

Figure 1. Brain computed tomography (CT) scan showing two nodular bi-thalamic hypodensities.

Given the clinical presentation, neuroimaging was performed. Initially, a brain computed tomography (CT) scan revealed two nodular bi-thalamic hypodensities within the anterior nuclei (Figure 1). For better characterization, a secondary brain magnetic resonance imaging MRI with angiographic sequence (MRI) was performed, demonstrating ischemic strokes in the territories of the posterior cerebral artery with bilateral thalamic ischemic involvement highly suggestive of an artery of Percheron variant (Figure 2).

The neurology team was contacted, and the patient was transferred to their department for further management after being started on anticoagulation. She did not undergo thrombolytic therapy as she was outside the therapeutic time window.

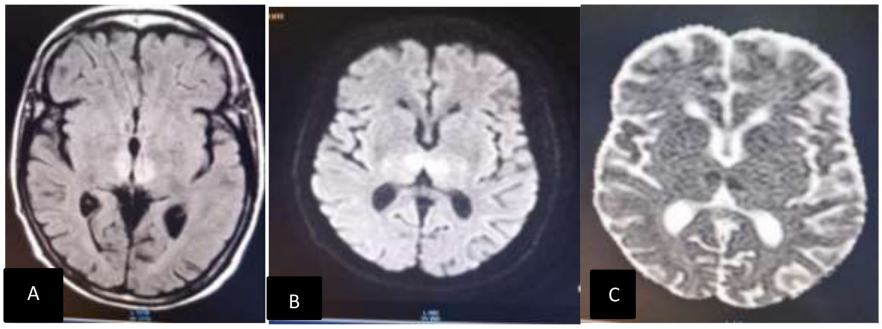

Figure 2. Brain MRI showing hyperintensity on FLAIR sequence (A), hyperintensity on DIFFUSION sequence (B), and restriction on the ADC map (C).

3. Discussion

Both thalami are vascularized independently by two perforating arteries arising from the proximal posterior cerebral arteries. This vascularization can exhibit several variants, including the "artery of Percheron," which is present in one-third of cases. First described in 1973, this anatomical variant is characterized by the presence of a single thalamic perforating artery, located between the basilar artery and the posterior communicating artery, which supplies the medial portion of both thalami. Consequently, the occlusion of this common trunk leads to paramedian bithalamic infarction [8].

Accounting for 0.1% to 2% of all ischemic strokes and 4% to 18% of thalamic strokes, bilateral thalamic infarction shares its main etiologies with conventional strokes, namely cardioembolic diseases and inflammatory small vessel diseases [8]. This type of stroke predominantly affects adults over the age of 50, although cases have been described in children and pregnant women [9] [10].

A frequent lack of familiarity with this type of stroke among healthcare providers has been noted [11], which can be primarily explained by two reasons. First, the variable extension of the infarcted territories leads to a highly polymorphic and often non-specific clinical presentation [12].

Despite this high clinical variability, a frequently encountered triad of symptoms stands out and can guide the diagnosis.

This triad consists of the combination of Parinaud's syndrome (61%), memory disorders (63%), and altered consciousness (47%), which can progress to coma [13]. Nevertheless, these clinical features are relatively non-specific and can be challenging to detect depending on the patient's state of consciousness, as was the case with our patient.

This wide diversity of non-systematized clinical signs can naturally point toward alternative differential diagnoses.

Second, initial neuroimaging, such as a brain computed tomography (CT) scan, is frequently normal in the majority of cases, necessitating the use of magnetic resonance imaging (MRI).

However, in our case, CT was contributory in this case because it showed bithalamic hypodensities, whereas MRI provided lesion characterization.

The differential diagnosis of bilateral thalamic lesions is mainly based on four major categories: vascular causes (arterial and venous, such as paramedian infarction due to occlusion of the artery of Percheron, deep vein thrombosis), metabolic and toxic causes, infectious and inflammatory causes, and finally, tumoral and degenerative causes. In our case, a vascular origin was very likely given the clinical context, the medical history, the lab work, and the contribution of imaging, which allowed us to rule out other causes [14].

4. Conclusions

Artery of Percheron infarctions are rare, meaning that physicians are often unfamiliar with the diagnosis; case reports are therefore the most valuable means to help raise awareness about this uncommon pathological entity.

Its very polymorphic and non-specific clinical presentation can cause a delay in diagnosis. Being part of the differential diagnoses for bithalamic ischemic lesions, an MRI is necessary for characterization in front of a polymorphic neurological picture, with a CT scan possibly being normal or showing bithalamic hypodensities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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