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Radiology

Occlusion of the Artery of Percheron: A Case Report

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Abstract **Case Report**

The vascularization of the paramedian thalamic territory is subject to anatomical variations, including the artery of Percheron, whose occlusion can lead to diagnostic challenges. This was the case with our patient, who presented with a normal CT scan, underscoring the importance of MRI in establishing a positive diagnosis, particularly in the acute phase, with diffusion-weighted sequences.

Keywords: Artery of Percheron, Thalamus, Infarction, CT scan, Diffusion MRI.

INTRODUCTION

Bilateral thalamic infarction results from the occlusion of the artery of Percheron, a rare anatomical variant of cerebral vascularization. Its clinical presentation is variable, often leading to diagnostic difficulties. We report a case of bilateral thalamic stroke in a patient initially evaluated with a CT scan and subsequently diagnosed via brain MRI.

CASE REPORT

The patient, a 79-year-old woman with a history of hypertension as a cardiovascular risk factor, presented to the emergency department with left-sided hemibody weakness that had developed 6 hours before admission. Neurological examination revealed left hemiparesis, facial paralysis, and mydriasis.

Given the clinical presentation and unavailability of urgent MRI, a perfusion CT scan was performed.

The first non-contrast acquisition showed no abnormalities aside from diffuse cortico-subcortical atrophy associated with age and nonspecific vascular leukoencephalopathy (Fig 1).

The patient was hospitalized in the neurology department, where her symptoms worsened, with the rapid onset of confusion and altered consciousness. This led to a delayed brain MRI, which revealed a bilateral thalamic diffusion-weighted imaging (DWI) hyperintensity with restricted ADC, confirming the diagnosis of stroke due to occlusion of the artery of Percheron (Fig 2).

The patient is currently under observation following the initiation of effective-dose anticoagulation therapy.

Fig 1: Axial non-contrast CT scan showing the two thalami

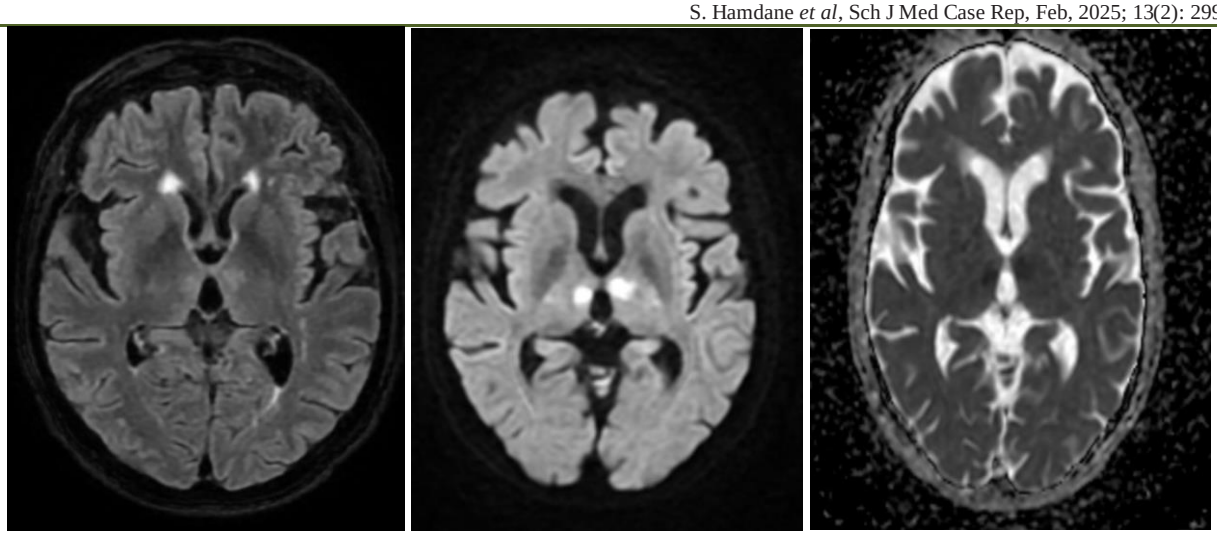

Fig 2: Axial brain MRI showing mild bilateral thalamic hyperintensity on FLAIR (A), distinct hyperintensity on diffusion-weighted imaging (B), and restricted ADC signal (C), confirming bilateral ischemic thalamic stroke

DISCUSSION

The two thalami are supplied by two perforating arteries originating from the proximal segments of the posterior cerebral arteries (P1). This vascularization is subject to anatomical variations, including the "artery of Percheron" (Fig 3), which is present in about one-third of cases [1].

This anatomical variant is characterized by a single thalamic perforating artery originating between the basilar artery and the posterior communicating artery, supplying the paramedian region of both thalami. Bilateral paramedian thalamic infarction results from the occlusion of this common trunk [1].

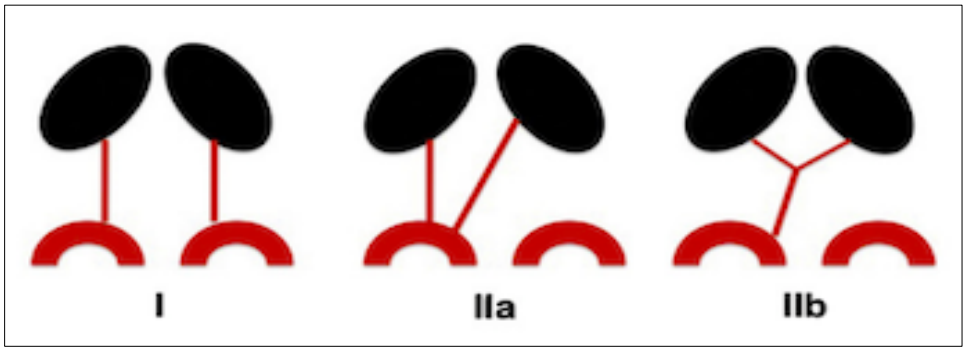

Fig-3: Variants of paramedian thalamic arterial vascularization according to the classification established by Percheron [2]

- **I: The paramedian arteries originate separately from the P1 segments of the posterior cerebral arteries (PCAs).**
- **IIa: Both paramedian arteries arise from the same P1 segment.**
- **IIb: The paramedian arteries originate from a common trunk known as the "artery of Percheron."**

Clinical Presentation:

The clinical manifestations are highly variable. The most frequently reported symptoms include altered consciousness (coma, hypersomnia), memory disturbances, psychiatric symptoms (confusion, behavioral and mood changes), and oculomotor disorders (vertical gaze palsy, convergence issues, diplopia) [4]. Vertical gaze palsy or Parinaud syndrome is the most commonly observed symptom, often with upward gaze limitation. Depending on the extent of the infarction, symptoms such as dysarthria, ataxia, or motor deficits may also occur [4]. Cardiovascular manifestations, including sinus bradycardia and hypotension, have also been reported [5].

Despite this variability, a classic triad—Parinaud syndrome, memory impairment, and altered consciousness—can guide the diagnosis [6]. Symptom evolution ranges from complete recovery to death, with potential cognitive, motor, and oculomotor sequelae [4,8].

Role of Imaging:

Bilateral thalamic infarction may appear on CT as paramedian hypodensities in both thalami, which can

be missed during the acute phase. MRI plays a crucial role, particularly in the acute phase, revealing hyperintensities on FLAIR and diffusion sequences, with ADC restriction. Occasionally, mesencephalic involvement is also observed [7].

Cerebral angiography may visualize the artery of Percheron and enable intra-arterial thrombolysis.

Differential Diagnosis:

Key differentials include Wernicke's encephalopathy, thrombosis of the internal cerebral veins, and Creutzfeldt-Jakob disease [9].

Management:

Treatment is an emergency and should be conducted in specialized centers to consider intravenous thrombolysis and/or endovascular treatment [9].

CONCLUSION

Bilateral thalamic infarction represents a rare and ambiguous pathological entity that can lead to diagnostic errors. Awareness of this anatomical variant, the artery of Percheron, is essential for accurately interpreting MRI findings, enabling precise diagnosis and appropriate therapeutic management.

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