

Single Case – General Neurology

# DWI/FLAIR Mismatch during Hyperacute Infarction of the Percheron Artery: Time Is Thalamus!

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## Keywords

Percheron infarct · Hyperacute infarction · DWI/FLAIR mismatch · Intravenous thrombolysis

## Abstract

The artery of Percheron (AOP) is a single dominant thalamo-perforating artery that supplies bilaterally the medial thalami with variable contribution to the rostral midbrain. Occlusion of the AOP causes indeed variable and unspecific clinical symptoms due to this complex anatomy, and very often this diagnosis is delayed with the impossibility of recurring to intravenous thrombolysis (rTPA). Here, we report a case of AOP stroke that received a prompt diagnosis and therapy, owing to the availability of MR brain scan, showing a DWI/FLAIR mismatch typical of hyperacute infarctions. This case points out the importance of a high level of suspicion of AOP stroke, together with the correct implementation of imaging studies.

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## Introduction

In 1973, Gerard Percheron described an uncommon cerebrovascular anatomic variant, where a single dominant thalamo-perforating artery bilaterally supplies the medial thalami with variable contribution to the rostral midbrain, the artery of Percheron (AOP) [1]. There is no consensus regarding true prevalence of the AOP in the general population, and it is not known whether AOP stroke is rare or highly underdiagnosed [2]. Occlusion of the AOP causes indeed variable and unspecific clinical symptoms due to complex anatomy and function of the thalamus in addition to the possible overlap with midbrain signs [3]. The typical triad of symptoms consists of altered mental state, vertical gaze palsy, and memory deterioration. Other phenotypic manifestations can include speech disorders, hemiparesis or cerebellar ataxia, and other defects of ocular motility [4].

## Case Report

A 60-year-old man with a history of migraine with aura was admitted to the Emergency Department because of a left shoulder dislocation caused by an accidental fall while jogging. While waiting for the X-ray, he had a sudden onset of confusion, disorientation, and slurred speech. At prompt neurological examination, he had a full left third cranial nerve palsy with anisocoria and a rapidly progressive deterioration of consciousness resulting in coma (Glasgow Coma Scale 3). CT brain scan and CT angiography were normal. A brain MR scan was then performed. The DWI sequences showed restricted diffusion in bilateral paramedian thalami extending to the left rostral midbrain and a small analogous alteration in the left cerebellum; no alterations were visible in FLAIR sequences, and a diagnosis of hyperacute AOP infarction was made (Fig. 1). 120 min from symptom onset, intravenous thrombolysis was administered with prompt anisocoria regression. On the second day, he had no consciousness disturbances, only mild confusion and horizontal diplopia in the right gaze, without evident oculomotor deficits or ptosis. The 24-h CT scan confirmed small hypodensities in medial thalami bilaterally and within the left cerebellum. The patient further improved, and the modified Rankin Scale score at 90 days was 0.

## Discussion

AOP infarction is often associated with delayed diagnosis due to the varying possible presentations and the wide differential diagnosis. This often results in the impossibility of performing intravenous thrombolysis within the correct time frame. The prompt availability of MRI with demonstration of the DWI/FLAIR mismatch allowed the diagnosis of hyperacute infarction and rTPA administration with a favorable neurological outcome. This is the first report of such mismatch available in the literature. Thus, our case supports the importance of a high level of suspicion of this entity, together with the correct implementation of imaging studies.

### Statement of Ethics

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki, and the patient gave written informed consent to this publication, including to the use of the MR images.

### Disclosure Statement

The authors declare that they have no conflicts of interest.

### Funding Sources

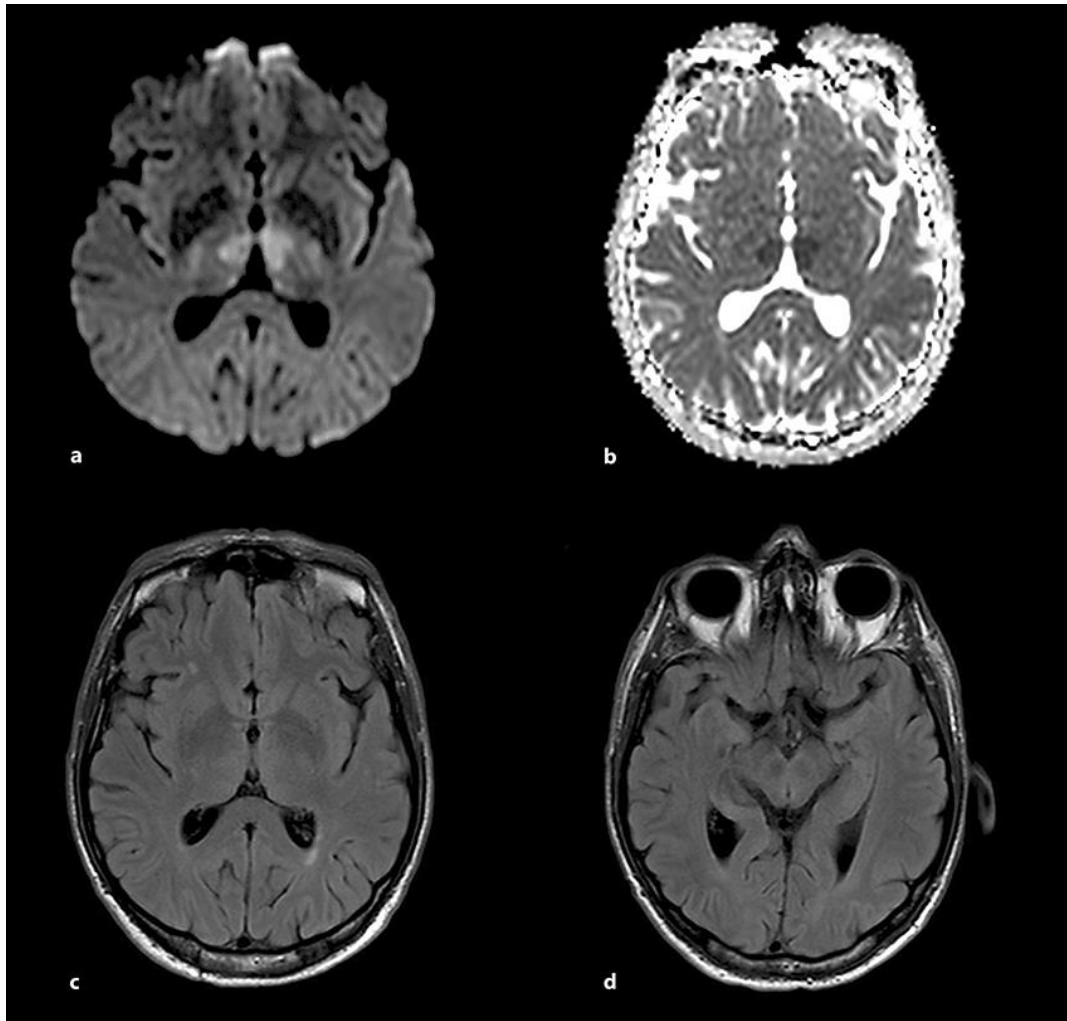
None.

### Author Contributions

*All authors:* direct management of the case and ongoing extensive discussion; *V.F., L.T.:* writing of the manuscript; *G.D.A.:* image preparation; *all authors:* further comments on the manuscript.

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**Fig. 1.** MR brain images showing the mismatch between positive DWI (a, b) and negative FLAIR (c, d), consistent with hyperacute stroke of the AOP vascular territory.