

Acute Infarction in the Artery of Percheron Territory During Cerebral Angiography: A Case Report

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Abstract

We present a case of a 51-year-old man with a history of hypertension and diabetes who underwent cerebral angiography for evaluation of spontaneous subarachnoid hemorrhage. The procedure was unremarkable, but the patient did not wake up and remained minimally responsive afterward. Imaging studies showed bilateral medial thalamic and midbrain infarctions consistent with an artery of Percheron infarction. The patient received antiplatelet therapy and had minimal improvement in his cognitive function. He was discharged to a rehab center after one week of hospitalization. We shortly discuss this rare complication including the risk factor, clinical presentation, and the management.

Keywords: Cerebral angiography, Artery of Percheron, Bithalamic infraction.

Introduction

Cerebral angiography is a common and invasive diagnostic procedure used mainly in the etiological investigation of subarachnoid hemorrhage and other forms of brain hemorrhagic events. This exam is generally considered almost safe. The neurological complications related to this procedure have considerably decreased after the improvements in techniques and catheter design evolution. However, it is still associated with certain risks including stroke, hemorrhage, and vasospasm.^{1,2}

Artery of Percheron infarction is a rare but devastating subtype of thalamic stroke that results from occlusion of a single artery that supplies both thalami and the midbrain. The clinical presentation can vary widely, ranging from altered consciousness, vertical gaze palsy, and memory impairment to severe neurological deficits, such as hemiplegia, hemianopia, and quadriplegia. The diagnosis of artery of Percheron infarction requires high clinical suspicion and timely neuroimaging studies.³ Here, we report a case of a patient who developed artery of Percheron infarction after undergoing cerebral angiography for subarachnoid hemorrhage.

Anatomy

The artery of Percheron is a rare anatomic variant where a single artery arises from the proximal posterior cerebral artery (P1 segment) and supplies the bilateral medial thalami, the rostral midbrain, and the rostral paramedian tegmentum. This artery arises from the posterior cerebral artery (PCA) and bifurcates into two branches that supply the thalami and midbrain bilaterally. The territory of the artery of Percheron has been estimated to range from 5 to 18% of thalamic blood supply, and infarction in this territory is rare, accounting only for 0.1-2% of all ischemic strokes.^{3,4}

In general, the thalamus receives the blood supply from four main arteries: the posterior cerebral artery (PCA), thalamogeniculate artery, polar artery, and paramedian artery. However, in the case of the artery of Percheron, only one artery supplies both thalami, which makes it unique. This artery was first described in 1973 by Gerard Percheron, a French anatomist.⁴

Percheron has identified four different types of neurovascular anatomy in the thalami and midbrain. The most common is Variant I, where each perforating artery comes from both the left and right posterior cerebral arteries. Variant IIa is less common and asymmetrical, with perforating arteries coming directly from one of the posterior cerebral arteries. Variant IIb has bilateral perforating thalamic arteries that come from a single arterial trunk called the artery of Percheron, which comes from the P1 segment of one posterior cerebral artery [Figure 1]. This variant supplies the paramedian thalami and the rostral midbrain on both sides. Variant III is an arcade variant, where several small perforating branches come from a single arterial arc that bridges the P1 segments of both posterior cerebral arteries.^{4,5}

In addition to the studies mentioned above, several case reports and case series have described the anatomy and clinical presentation of the artery of Percheron infarction. Lazzaro et al. (2010) studied the imaging patterns and clinical spectrum of artery of Percheron infarction in a retrospective analysis of 15 patients. They found that the most common clinical presentations were altered mental status, behavioral changes, and oculomotor abnormalities³.

Overall, the anatomy of the artery of Percheron is a rare and complex anatomical variation that can lead to serious clinical consequences in the event of an infarction. Awareness of this anatomy is essential for proper diagnosis and treatment of patients with this infarction.

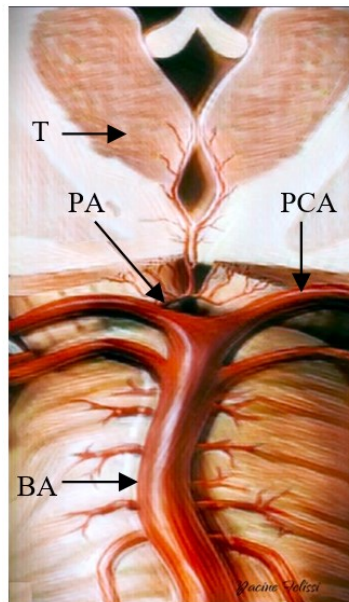


Figure 1: A drawing of the anatomic representation of type B artery of Percheron emerging from the right first segment of the posterior cerebral arteries. PA = type B artery of Percheron, T = thalamus, PCA = posterior cerebral artery, BA = basilar artery.

Case Presentation

A 51-year-old man with a history of hypertension and diabetes presented to the emergency department with sudden onset of severe headache and vomiting. A computed tomography (CT) scan of the brain showed evidence of subarachnoid hemorrhage [Figure 2A]. Medical treatment was initiated with nimodipine and he was transferred to the neurointensive care unit for further management. The patient was stable and conscious on admission, and his neurological examination was unremarkable except for mild left medial rectus palsy. Digital subtraction angiography (DSA) was performed to evaluate the cause of the subarachnoid hemorrhage, which was unremarkable. However, at the end of the procedure, the patient had waking up disorders and remained minimally responsive. The patient had a GCS of 10 /15. His pupils (left: 3mm and right: 2 mm) were minimally reactive to light with a left medial rectus palsy. His reflexes were normal, however a right hemiplegia was also noticed.

Imaging Studies: A non-contrast CT scan of the brain was obtained immediately, which showed no acute hemorrhage or infarction. A subsequent magnetic resonance imaging (MRI) scan of the brain revealed bilateral medial thalamic and midbrain infarctions consistent with an artery of Percheron infarction [Figure 2 B,C]. The imaging studies confirmed the diagnosis of artery of Percheron infarction, which was likely caused by a thromboembolic phenomenon after the catheterism procedure.

Treatment and Outcome: The patient was continued on antiplatelet therapy and had slow improvement of his cognitive function. He became verbal and communicative but still not fully oriented. The limitation in vertical gaze movement was persistent. He was discharged after one week of hospitalization to a rehab center.

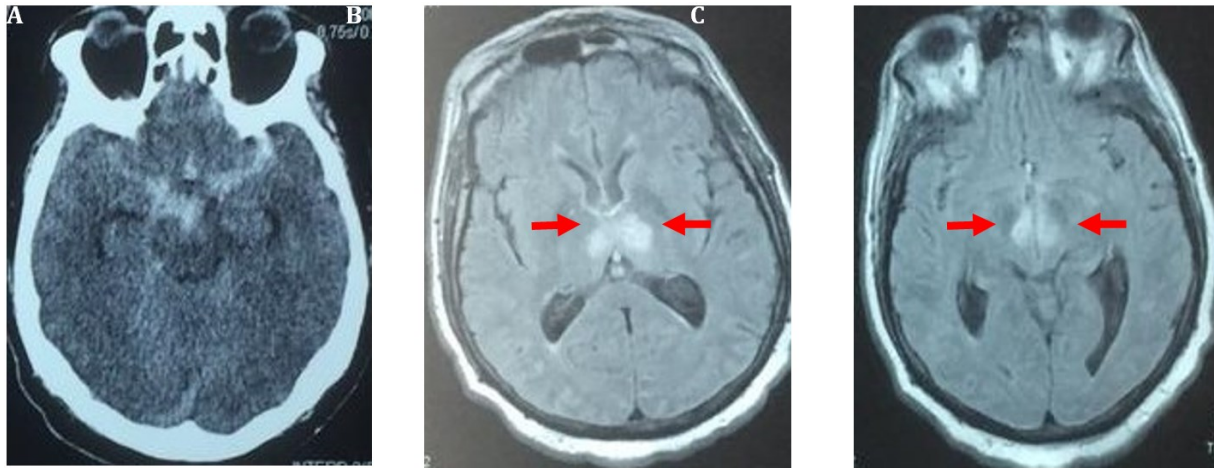


Figure 2: Imaging studies A: non contrast brain CT showing a diffuse subarachnoid hemorrhage in the basal cisterns. B: T1/FLAIR signal weighed axial MRI demonstrating hyperdensities of bilateral paramedian thalami and C: Hyperdensities of bilateral midbrain consistent with bilateral thalamus and midbrain infarction [red arrow].

Discussion

Artery of Percheron infarction is a rare subtype of thalamic stroke that results from occlusion of a single artery that supplies both thalami and the midbrain. The artery of Percheron arises from the proximal posterior cerebral artery and supplies the paramedian thalami, the rostral midbrain, and the rostral one-third of the substantia nigra.⁴ The incidence of artery of Percheron infarction is estimated to be 0.1% to 2% of all ischemic strokes.³ The clinical presentation of artery of Percheron infarction can vary widely, ranging from altered consciousness, vertical gaze palsy, and memory impairment to severe neurological deficits, such as hemiplegia, hemianopia, and quadriplegia⁶. The diagnosis of artery of Percheron infarction requires high clinical suspicion and timely neuroimaging studies.^{7,8}

In our case, the patient developed artery of Percheron infarction after undergoing cerebral angiography for subarachnoid hemorrhage investigation. Although cerebral angiography is a relatively safe and effective diagnostic tool for evaluating the cerebral vasculature, it is associated with a risk of complications, such as arterial dissection, embolism, and thrombosis.¹ The use of an arterial sheath during cerebral angiography can increase the risk of thromboembolic events, especially if the sheath is inserted into a noncompressible site or if the patient has preexisting risk factors for thromboembolism, such as hypertension and diabetes.^{2,9,10} In our case, the patient had a history of hypertension and diabetes, which could have increased the risk of stroke post-angiography.

The management of artery of Percheron infarction is challenging and requires a multidisciplinary approach, including neurology, neuroradiology, and critical care.^{3,5} The use of antiplatelet agents may be considered in the management of artery of Percheron infarction, but the efficacy and safety of this approach were not well established. A study of Percheron infarction showed that antiplatelet therapy was associated with a nonsignificant trend toward improved outcomes, but the studies size were not significant to conclude into a strong management protocol.^{8,11} The optimal duration and dose of antiplatelet therapy for artery of Percheron infarction were also unclear.

In our case, the patient received antiplatelet and had slow improvement in his cognitive function. He became verbal and communicative but not fully oriented. The limitation in vertical gaze movement was persistent. He was discharged after one week of hospitalization to a rehab center. The long-term prognosis of artery of Percheron infarction is generally poor, with a high mortality rate and significant morbidity.³

However, some patients may have a good recovery with intensive rehabilitation and supportive care.

Conclusion

Artery of Percheron infarction is a rare but serious complication of cerebral angiography that can result in severe neurological deficits and long-term disability. The diagnosis of artery of Percheron infarction requires high clinical suspicion and timely neuroimaging studies. The use of antiplatelet agents may be considered in the management of artery of Percheron infarction, but the efficacy and safety of this approach were not well established. Further studies are needed to determine the optimal management strategy for this rare and challenging condition.

Conflict of Interest

The authors declare no conflict of interest.

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