Case Report

A case of posterior cerebral artery occlusion that developed into an artery of Percheron infarction

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ABSTRACT

The thalamus is predominantly supplied by multiple small vessels originating from the posterior communicating artery and the P1 and P2 segments of the posterior cerebral artery (PCA). The artery of Percheron (AOP) is a rare anatomical variant of arterial supply to the thalamus. This single thalamic perforating branch supplies the bilateral thalamus so that occlusion results in a characteristic cerebral infarction. Herein, we report a case of posterior cerebral artery occlusion that developed into an AOP infarction. A 74-year-old man, who had undergone coronary artery bypass grafting 5 days previously presented with sudden consciousness disorder and tetraplegia, and was admitted to our hospital. Magnetic resonance imaging (MRI) revealed a hyper-intense area in the bilateral paramedian thalamus on diffusion-weighted imaging and a deficit of the left PCA on MR angiography (MRA). The patient was diagnosed with cardiogenic cerebral embolism, and immediately underwent mechanical thrombectomy (MT), thereby complete recanalization was obtained. Post-procedural MRI showed no new lesions, and the left PCA could keep patency. His consciousness disorder and tetraplegia improved; however, cognitive impairment and vertical gaze palsy persisted as sequelae. To the best of our knowledge, such cases have not been previously reported. Additionally, in this case, we were able to identify an AOP on digital subtraction angiography, which was considered to be the responsible artery.

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Introduction

The thalamus is predominantly supplied by multiple small vessels originating from the posterior communicating artery (Pcom) and the P1 and P2 segments of the posterior cere-
Fig. 1 – MRI findings are shown. Hyperintense area in the bilateral paramedian thalamus on DWI (A) and deficit of the left PCA on MRA (B) are revealed. MRI, magnetic resonance imaging; DWI, diffusion-weighted imaging; PCA, posterior cerebral artery; MRA, MR angiography.

Case report

A 74-year-old man, who was treated with coronary artery bypass grafting 5 days previously was admitted to our hospital because of sudden consciousness disorder and tetraplegia. On admission, his physical findings were as follows: blood pressure, 90/45 mmHg; heart rate, 54 bpm; atrial fibrillation; SpO₂, 98% (room air); body temperature, 36.7°C. Neurological findings were as follows: consciousness, deep coma (Glasgow Coma Scale score, E1V1M4); pupils, the same in each eye but with marked miosis; tetraplegia; National Institute of Health Stroke Scale score was 27. Anticoagulants were being discontinued after the cardiac surgery.

Magnetic resonance imaging (MRI) was performed, thereby a hyper-intense area in the bilateral paramedian thalamus on diffusion-weighted imaging and a deficit of the left PCA on MR angiography (MRA) was revealed (Fig. 1). The patient was diagnosed with cardiogenic cerebral embolism, and immediately underwent MT.

Intervention

A 6Fr FUBUKI Dilator Kit STR 80 cm (ASAHI INTEC, Nagoya, Japan) was navigated from the common femoral artery to the left vertebral artery under real-time fluoroscopy with road map guidance. A left vertebral artery angiogram revealed occlusion of the left PCA as well as above-mentioned MRA (Fig. 2A). In addition, we could detect an artery arising and perfusing from the proximal PCA to the bilateral thalamus, which was thought to be an AOP (Figs. 2B and C). Using a standard technique, a large-pore aspiration catheter, AXS Catalyst 6 (Stryker Neurovascular, Kalamazoo, MI), was advanced as close to the proximal aspect of the thrombus as possible. The catheter was connected to the source of continuous aspiration, and thrombus aspiration was performed. The device was then gently withdrawn without difficulty into the guiding sheath. The thrombus had been captured into the aspiration device. Post-procedural angiogram showed complete revascularization, and grade 3 flow according to the thrombolysis in cerebral infarction (TICI) scale was obtained (Fig. 3).

His consciousness disorder and tetraplegia improved rapidly after the procedure, but cognitive impairment and
Fig. 2 – DSA findings are shown. (A) Left vertebral artery angiogram revealed occlusion of the left PCA. (B, C) An artery arising and perfusing from the proximal PCA to bilateral thalamus was detected and suspected be an AOP. DSA, digital subtraction angiography; AOP, artery of Percheron.

vertical gaze palsy remained as sequelae. Post-interventional MRI showed no new lesions, and the left PCA maintained patency. After 42 days, he was transferred to a rehabilitation department in our hospital with a modified Rankin scale score of 2.

Discussion

Bilateral paramedian thalamic infarction is infrequently reported and represents only 0.6% of all ischemic strokes [1]. The thalamus is predominantly supplied by multiple small vessels originating from the PcoA and the P1 and P2 segments of the PCA. The thalamus has 4 major thalamic vascular territories, each with a predilection for supplying particular groups of nuclei; the tuberoinfundibular, paramedian, inferolateral, and posterior choroidal arteries [2]. Of these, paramedian arteries arise from the proximal PCA (P1 segment) between the basilar artery and the Pcom and usually supply the ipsilateral paramedian territory of the thalamus. However, there are significant variations and overlaps depending on the development of surrounding perforating arteries. As a rare variant, there is a single thalamic perforating branch known as the AOP [3]. This branch supplies the bilateral thalamus so that AOP occlusion, which is alleged to result from cardioembolism or arterioarterial embolism, gives rise to a characteristic pattern of bilateral paramedian thalamic infarcts, with or without rostral midbrain infarction (Fig. 4) [4,5]. The classic syndrome of AOP infarction can be quite variable and may include mental state
disturbances, hypersomnolence, aphasia/dysarthria, bilateral vertical gaze palsy, pupillary abnormalities, and anterograde or retrograde amnesic syndrome in different combinations [6]. Hence, AOP infarction could be overlooked, leading to delayed treatment.

Performing MT for anterior circulation emergent large vessel occlusion (AC-ELVO) has continued to increase since the efficacy of revascularization therapy using a stent retriever or an aspiration catheter was reported [7–10]. However, there is little information regarding if MT is useful for posterior circulation ELVO (PC-ELVO). The REVASK registry recently suggested that MT for PC-ELVO has a lower risk of symptomatic intracranial hemorrhage and similar effectiveness compared to AC-ELVO; however, this remains controversial [11].

An AOP is rarely identified on DSA or CTA because its vessel diameter is usually too narrow [12]. Lazzaro et al. analyzed 37 patients with AOP infarction, among whom only one was definitively identified as having an AOP on conventional angiography [13]. This was attributed to spontaneous resolution of the presumed embolus and probable luxury perfusion to the affected structures. In our case, it was assumed that the thrombus was obstructed at the proximal PCA first, and subsequent distal migration may have resulted in surged blood flow to the AOP, making it identifiable.

AOP infarction is infrequent and sometimes difficult to diagnose in the acute phase. This condition should be strongly suspected in patients who have cardio-embolic risk factors with mental state disturbances, ophthalmologic signs because of the possibility of symptomatic improvement with prompt therapeutic intervention.

**Conclusion**

We encountered a rare case of PCA occlusion that developed into an AOP infarction. In this case, MT could be safely and effectively performed.

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none
Patient consent

Informed consent was obtained from the patient and his family for publication.

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