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Infarction of Percheron artery: A rare case report

Percheron arter enfarktı: Nadir görülen bir olgu sunumu

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Abstract

The thalamus has strategic nuclei, which are divided into different functional classes and manage important cortical functions in harmony with each other. The mechanism proposed in the bilateral paramedian thalamic infarction is an occlusion of a single undifferentiated thalamo-perforating artery which is an anatomic variant. This artery, called the Percheron artery, appears from the first segment of the posterior cerebral artery and gives bilateral medial thalamic perforating branches. Bilateral paramedian thalamic infarction causes specific clinical signs and symptoms such as changes in consciousness ranging from lethargy to coma, vertical gaze paralysis, ocular congestion loss and amnesia. In this case we aimed to present clinical and radiological features of a rare condition with infarction of Percheron artery.

Keywords: Percheron artery, Infarct, Magnetic resonance imaging

Öz

Talamus farklı işlevsel sınıflara ayrılan ve önemli kortikal işlevleri birbiri ile uyum içerisinde yöneten stratejik çekirdeklere sahiptir. Bilateral paramedian talamik infarktta öne sürülen mekanizma bir anatomik varyant olan, santral ayrışmamış tek bir talamo-perforan arterin oklüzyonudur. Percheron arteri olarak isimlendirilen bu arter posterior serebral arterin ilk segmentinden çıkar ve bilateral medial talamik perforan dalları verir. Bilateral paramedian talamik infarkt letarjiden komaya kadar değişen bilinç değişiklikleri, vertikal bakış paralizileri, oküler konverjans kaybı ve amnezi ile karakterli spesifik klinik belirti ve bulgulara neden olur. Bu vakada, nadir görülen bir durum olan percheron arter enfarktının klinik ve radyolojik özelliklerini sunmayı amaçladık.

Anahtar kelimeler: Percheron arter, İnfarkt, Manyetik rezonans görüntüleme

Introduction

The thalami and midbrain arterial supply is provided by perforating branches from the posterior cerebral artery and the posterior communicating artery. Although there are significant variations and overlaps, the thalamic vascular supply is classically categorized into 4 territories: anterior, paramedian, inferolateral and posterior [1]. Gerard Percheron described four anatomical variants of arterial supply to the paramedian thalami, including the artery of Percheron (AOP), a rare variant of paramedian arterial supply in which a single dominant thalamoperforating artery arises from the P1 and bifurcates to supply both paramedian thalami and, in some cases, the rostral mesencephalon [2,3]. In addition to the paramedian thalami, the paramedian thalamic arteries supply the medial areas of the upper brainstem: the interpeduncular nucleus, the decussation of the superior cerebellar peduncles, the medial part of the red nucleus, the third and fourth cranial nerve nuclei and the anterior portion of the periaqueductual grey matter [2,3].

Typical symptoms of bilateral paramedian thalamic infarcts due to occlusion of AOP are vertical gaze palsy, memory impairment, akinetic mutism, confusion, drowsiness, hypersomnolence, or coma. Patients with bilateral paramedian thalamic infarcts accompanied by rostral midbrain lesions also have hemiplegia, cerebellar ataxia, movement dysfunctions and oculomotor deficits [4]. In this case we aimed to present clinical and radiological features of a rare condition with infarction of Percheron artery.

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Case presentation

A 70-year-old woman was brought to the hospital by her relatives because she could not wake up in the morning. On the physical examination of the patient, lethargy, power loss on the right side of the body compared to the left side and right central type facial paralysis were reported. The patient, who could walk, eat, dress herself, know his relatives and speak before, also was complaining about vision impairment. Intracranial hemorrhage was suspected in the patient with hypertension and brain computed tomography (CT) was performed. Brain CT was reported as normal (Figure 1). Diffusion-weighted magnetic resonance imaging (MRI) was performed on the patient who suspected of having a stroke (Figure 2). In the medial section of the bilateral thalamus, more prominent on the right side, the mesencephalon and the periaqueductal area, diffusion restriction consistent with acute infarction was observed by the diffusion weighted MRI (acute infarction in the field of Percheron artery irrigation). She was followed up for 1 day in intensive care unit and two days in a neurology service. When the patient's general condition improved, he was discharged with antiaggregant therapy. Written informed consent for this report was obtained from the patient.

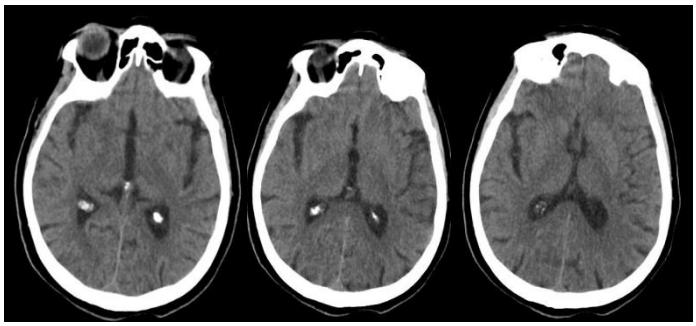

Figure 1: Brain computed tomography was normal.

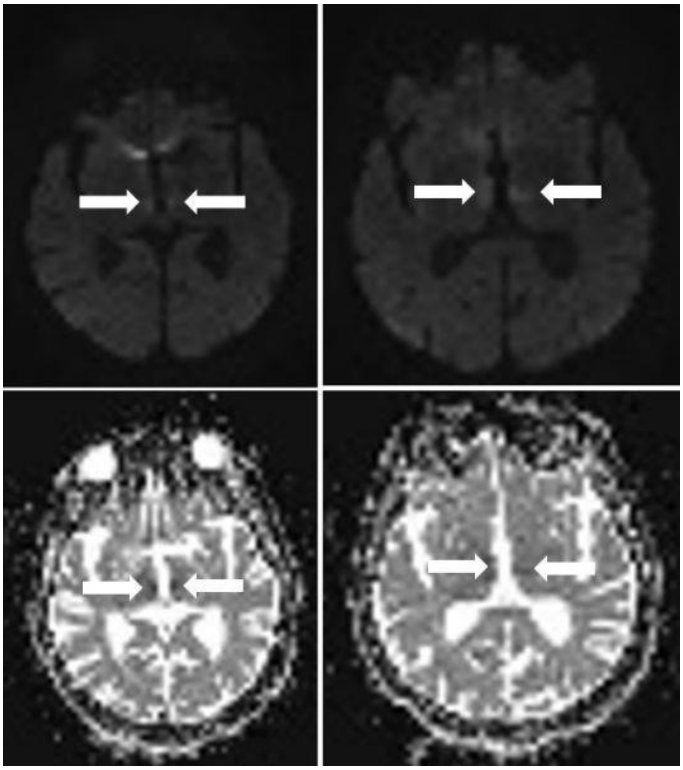

Figure 2: Diffusion-weighted magnetic resonance imaging shows bilateral restriction on medial section of thalami

Discussion

Lazzaro et al. [5] identified 4 ischemic patterns in the Percheron artery occlusion. Approximately 43% of patients showed ischemic damage in bilateral paramedian thalamus and midbrain. In 38% of patients, only the paramedian thalamus was shown to be affected with no damage in the midbrain. Up to 14% of patients have shown that anterior thalamic nuclei are also affected by ischemic damage in addition to paramedian thalamus and upper midbrain. In the least common pattern (5%), bilateral thalamus and anterior thalamus were ischemically affected however midbrain was protected. They also found a sign ("V" sign) which was previously undetected and recognized as a supporting factor in the AOP infarcted cases with midbrain involvement by fluid attenuated inversion recovery (FLAIR) and in the DWI sequences. The "V" sign appears as a distinct pattern of V-shaped hyperintensity on axial FLAIR and / or DWI along the pial surface of the midbrain adjacent to the interpeduncular fossa [2,5]. Treatment of AOP infarction involves thrombolysis and intravenous heparin therapy followed by prolonged anticoagulation [2,6]. However, because of the frequent delay in the diagnosis of AOP infarct, thrombolysis treatment is not available because the therapeutic window is narrow. This is a clear indication that early detection is important for the application of treatment [6]. Among the vascular etiologies of bilateral thalamic lesions, there are the ‘top of the basilar’ syndrome and deep cerebral venous thrombosis [6-8]. Deep cerebral thrombosis may result in bilateral symmetric involvement of the thalamus and basal ganglion in some rare cases [8-10]. Wernicke's encephalopathy, neoplasms, infections, Wilson's disease and osmotic myelinolysis should also be considered in differential diagnosis [8,11]. Several researchers have reported that CT scanning in AOP infarction is normally assessed [3,6,12,13]. However, it has also been reported that the initial MRI is normal. This is an indication that normal MRI at the beginning cannot exclude the diagnosis [13,14]. Therefore, it may be valuable to repeat the radiological evaluation in patients with normal baseline evaluations of suspected AOP occlusion [14].The prognosis of thalamic infarcts in general is relatively good in terms of mortality and permanent motor deficits. A study of the long-term prognosis of 15 patients with AOP infarcts described positive outcomes when the Modified Rankin Scale (mRS) score was ≤2. In this study, 67% of patients with bilateral paramedian thalamic infarction without midbrain involvement received a positive outcome. In contrast, only 25% of patients with combined bilateral thalamic and rostral midbrain infarction had positive results. This suggests that the prognosis of the AOP infarcts, which do not have midbrain involvement, are generally good [15].

Percheron artery is a rare anatomic variant with a single dominant thalamoperforator artery. In addition, involvement of the anterior thalamus is rare. Symptoms of AOP may vary depending on the size and distribution of the infarct. Therefore, these differences in clinical symptoms as well as the presence of radiological difficulties make it difficult to diagnose. In addition, the fact that doctors do not have enough knowledge and awareness about the diagnosis of this condition is another factor that makes it difficult to recognize. Repeated CT and MRI may be important in clinically suspected cases of AOP infarction. We

also believe that case reports such as ours will contribute significantly to the literature in raising awareness about such rare occurrences.

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