

Bilateral Medial Medullary Infarction Demonstrated by Diffusion-Weighted Imaging : Case Report

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— Abstract —

A 78-year-old woman presented with weakness of the extremities, dysarthria, dizziness, and sensory impairment. Magnetic resonance imaging showed acute bilateral medial medullary infarction. Contrast enhanced magnetic resonance angiography demonstrated stenosis or occlusion of both intracranial vertebral arteries. We present a rare case of bilateral medullary infarction seen on diffusion-weighted imaging.

Key Words: Brain, Infarction, Magnetic resonance (MR), Diffusion study

Introduction

Acute bilateral medial medullary infarction (MMI) using magnetic resonance imaging has been still rarely reported since Toyoda's first report in 1992.¹⁾ The classic clinical features of bilateral MMI are tetraparesis, lemniscal tetrahyperesthesia, and ipsi-, contra-, or bilateral lingual palsy. Nystagmus, somnolence, respiratory difficulties, bladder disturbances, and dysarthria-dysphoria- dysphagia can be detected.²⁻⁴⁾ We describe the rare

case of bilateral MMI demonstrated by diffusion-weighted imaging (DWI).

Case Report

A 78-year-old woman was admitted to our hospital due to sudden onset of both extremities weakness. She had a history of smoking. Five days prior to admission, she suffered from a sudden onset of dizziness. On neurological examination, she was alert and she had dysarthria and paraesthesias in

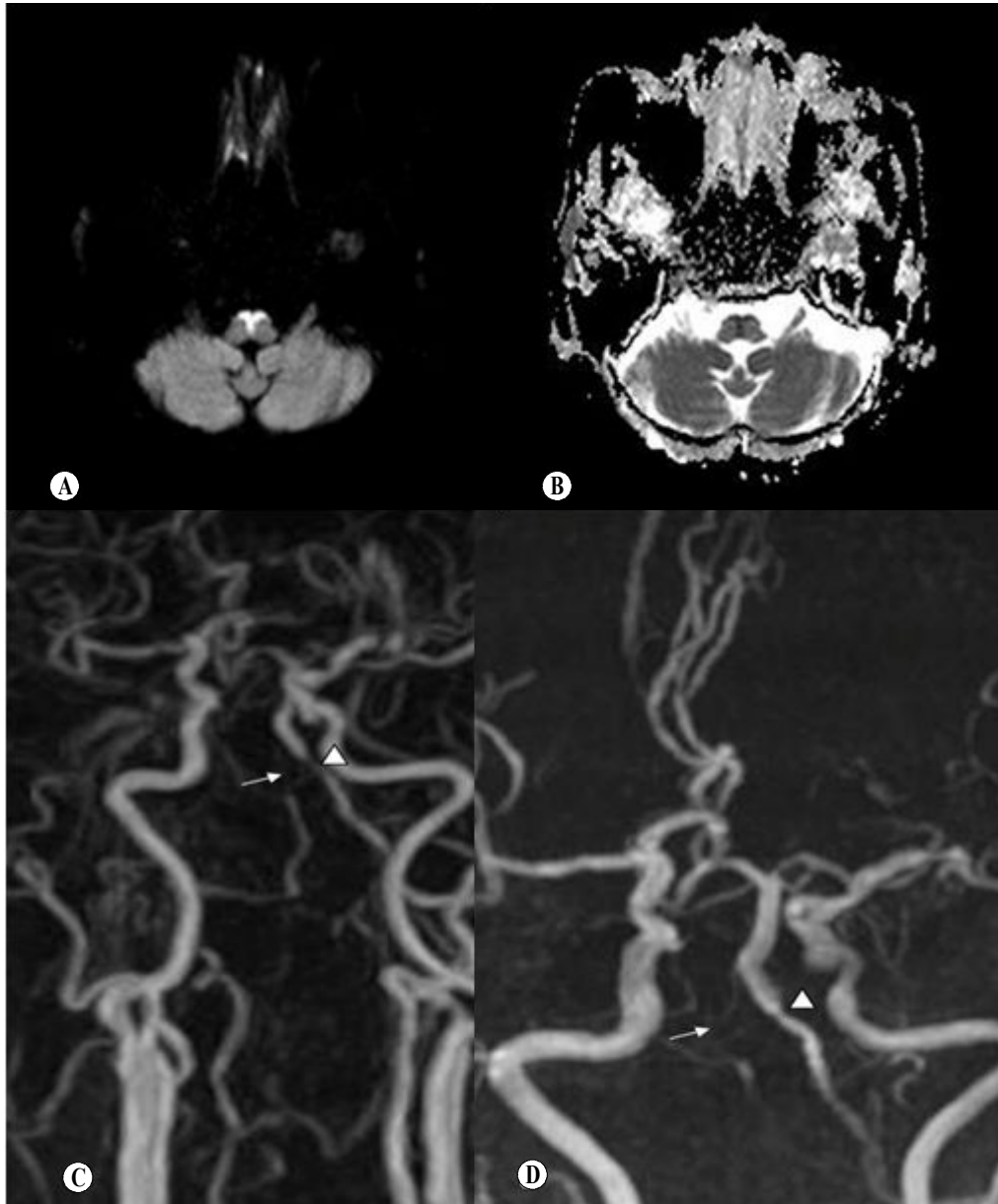


Fig. 1. Magnetic resonance imaging of a 78-year-old woman with sudden onset of tetraparesia. Diffusion-weighted imaging shows a hyperintense lesion at the medulla oblongata which demonstrates a classic “Heart appearance” (A). Apparent diffusion coefficient map demonstrates reduced diffusion (B). Contrast-enhanced (C) and time-of-flight magnetic resonance angiography (D) show an occlusion or a severe stenosis of the right vertebral artery (arrow) and a stenosis of the left vertebral artery (arrowhead).

extremities. The visual fields and extraocular movement were intact, and pupils were isocoric. DWI was performed immediately after neurological examination revealed high signal intensity which was located in the medulla oblongata (Fig. 1A). The apparent diffusion coefficient (ADC) map showed that the lesion demonstrated decreased diffusion (Fig. 1B). Acute bilateral MMI was confirmed by DWI and ADC. Contrast-enhanced and time-of-flight magnetic resonance angiography showed an abrupt cut-off of the right vertebral artery, which means there exist severe stenosis or occlusion of the right vertebral artery, and a stenosis of the left vertebral artery (Fig. 1C, 1D). Three months after the symptom onset, tetraparesis and sensory impairment were improved.

Discussion

The clinical triads of MMI are ipsilateral lingual palsy, contralateral hemiparesis, and contralateral lemniscal sensory loss of the entire hemibody, but the clinical findings are heterogeneous as the extent of the medullary ischemic lesion.^{2, 5, 6)}

The most common cause of stroke is atherosclerosis of the vertebral artery (VA) or the anterior spinal artery (ASA), which cause occlusion or stenosis of small penetrating branches at their origin in the vessel.^{2, 3)} Thromboembolic occlusions of intraparenchymal branches of the ASA, which are presumed

to artery-to-artery emboli from a severely stenotic ASA, dissection of the VA, dolichoectasia of the vertebrobasilar arteries, arterial compression by fusiform aneurysm and drug abuse can cause MMI.^{5, 7)} Suggestive cause of the bilateral MMI is occlusion of the distal part of an unpaired ASA as an anatomical variation, but bilateral thromboembolic occlusions of medullary and leptomeningeal branches of the anterior spinal artery were reported in an autopsy case.^{3, 4, 8, 9)} Bilateral MMI was found to more likely affect the caudal parts of the medulla, because vascular supply to caudal part of anteromedial medulla oblongata is the ASA, unlike the vascular supply to cranial part of that is the VA.^{2, 7, 9)} We postulate that an occlusion or a stenosis of both distal vertebral arteries by the atherosclerosis or thromboemboli, which is the origin of ASA, was the cause of bilateral MMI in our patient.

Katoh and Kawmato⁶⁾ classified 13 cases of bilateral MMI into 2 groups using previously reported bilateral MMI: one was the ischemic lesion developed from the medullary pyramid to medial longitudinal fasciculi, which shows typical “heart appearance” on DWI, while the other is the lesion confined to the medullary pyramid. The former is caused by the occlusion of the ASA and the latter involves the arterial branch to the pyramid, which can be differentiated by its clinical features and

DWI.^{6, 9, 10)} Our case is classified as the former category.

Limited unilateral MMI, particularly when associated with VA and ASA, has a better prognosis than bilateral MMI or hemimedullary infarctions.³⁾ MMI in the upper medulla oblongata seem to carry a better prognosis than MMI in the lower medulla oblongata, possibly because of a lower frequency of respiratory disturbances and bilateral involvement. Respiratory infection is the main cause of death.²⁾

In conclusion, bilateral MMI can cause heterogeneous symptom and prognosis according to disease extent and involving artery. Also, early detection of typical “heart appearance” in the medulla oblongata using DWI and a proper management, especially of respiration, raise the survival rate during acute stage.

요 약

사지의 운동 감소, 구음 장애, 어지럼증, 감각 이상을 보인 78세 여성에서 자기공명영상 촬영 결과 양측 척추 혈관의 협착 혹은 폐색을 보인 급성 양 내측 연수 경색을 문헌 고찰과 함께 보고한다.

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