Bilateral medial medullary infarction: a case report

Rehmani Aniqah Jawad,[1] Atif Iqbal Rana,[2] Fahad Sultan,[3] Muhammad Azhar Saeed[4]

Abstract

We present the report of a young male patient who was diagnosed with acute bilateral medial medullary infarction (MMI) on Diffusion-Weighted Magnetic Resonance Imaging (DW-MRI). Corroboration with the Apparent Diffusion Co-efficient (ADC) map enabled timely and accurate diagnosis of the rare stroke syndrome. On follow up 9 months after the diagnosis and subsequent treatment, the patient showed significant improvement on all fronts.

Keywords: Bilateral Medial Medullary Infarction, Diffusion-Weighted Magnetic Resonance Imaging.

Introduction

Bilateral medial medullary infarction (MMI) is a rare stroke syndrome and only a handful of cases have been described. The classical signs of MMI consist of contralateral hemiparesis, lemniscal sensory loss, ipsilateral lingual palsy[1] and contralateral pharyngeal palsy.[2] Patients with bilateral MMI syndrome often present with tetraparesis, bilateral loss of deep sensation, dysphagia and speech difficulties. Diagnosis of bilateral MMI has become easily possible with the advent of Diffusion-Weighted magnetic resonance imaging (DW-MRI). We report the case of a young patient who was diagnosed with bilateral MMI based on clinical and MRI features.

Case Report

A 35-year-old man presented to the emergency with sudden onset tetraparesis that started 5 hours back. According to the patient, he was at his office when he felt a 'pins and needles' sensation all over his body. Within the next 5 minutes, he felt mild weakness in his arms and legs which progressively worsened, and within 10 minutes of the onset of symptoms, he was completely tetraplaegic. The patient was taken to a local hospital where an MRI brain was performed and reported normal, after which the patient was shifted to Shifa International Hospital, Islamabad.

1,2Department of Diagnostic and Interventional Radiology, 3,4Department of Neurology, Shifa International Hospital, Islamabad.

Correspondence: Rehmani Aniqah Jawad. Email: aniq5@hotmail.com

Figure-1: T2 weighted axial image through the medulla showing heart-shaped hyperintense area.

The patient underwent an MRI C-spine with contrast which demonstrated a sharply demarcated 'heart-shaped' area of hyperintense signal in bilateral antero-medial medullae on axial T2WI (Figure-1) which was imperceptible on T1WI, fluid attenuated inversion recovery (FLAIR) and showed no post contrast enhancement. Diffusion Weighted Images (DWI) demonstrated a corresponding area of restricted diffusion (Figures-2a, 2b). On the basis of these findings, he was diagnosed to have acute bilateral MMI. He then underwent a cerebral computed tomography (CT) angiography and perfusion study which demonstrated no abnormality.

His complete blood count (CBC) showed mildly raised

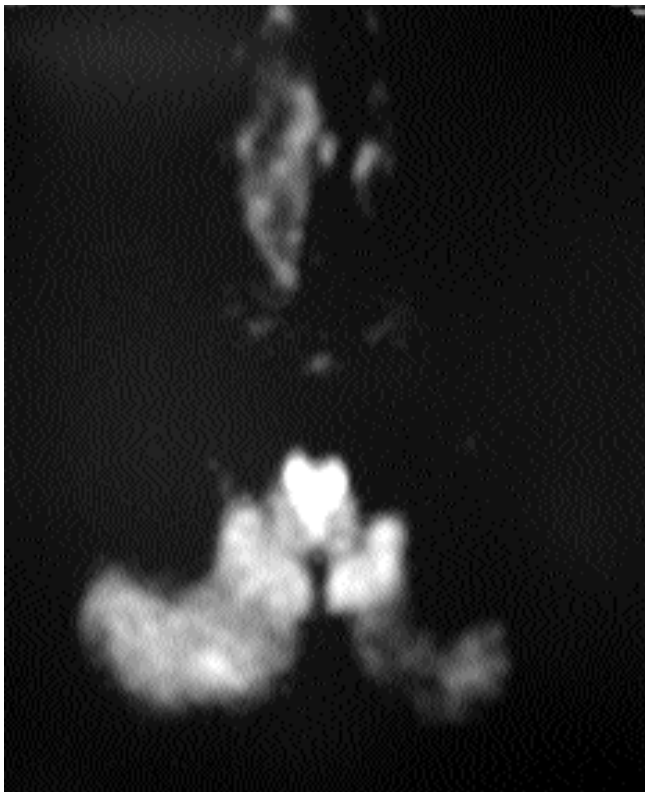

Figure-2a: Diffusion-weighted image showing corresponding areas of bright signal.

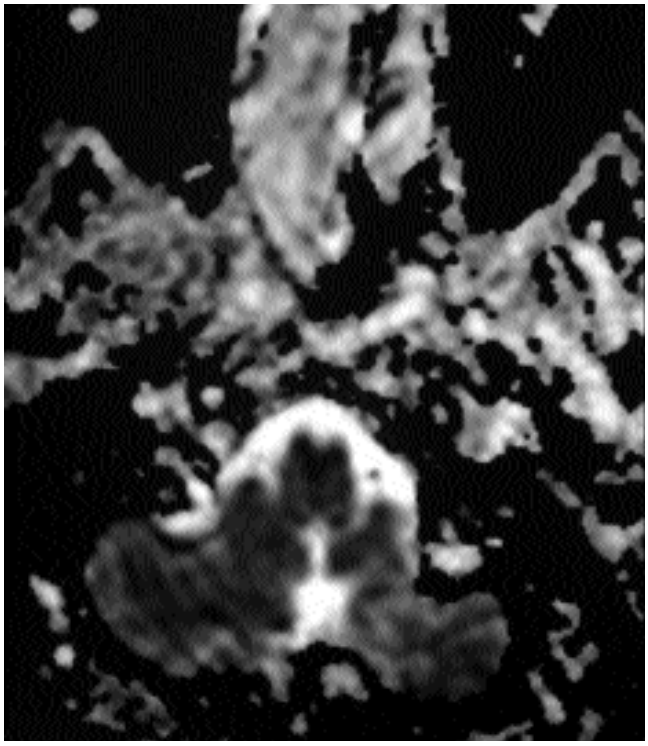

Figure-2b: Corresponding apparent diffusion co-efficient (ADC) map showing hypointense signal suggestive of acute infarct.

total leukocytes count (14700), normal haemoglobin, lipid profile and HbA1c (Glycosylated Haemoglobin). His fasting serum homocysteine level was raised 29.73µmols.

Discussion

MMI account for fewer than 1% of vertebrobasilar strokes and rarely occur bilaterally.[3] Patients with bilateral MMIs often present with quadriplegia as the initial symptom and carry a poor functional prognosis.[4,5] If not clinically suspected, the condition can be misdiagnosed as Guillain-Barré Syndrome (GBS) in the early stages.[6]

The medulla oblongata has a vast and unique vascular network and its arterial supply arises from the anterior and posterior spinal arteries in addition to the perforating arteries and the long circumferential artery that arise from the basilar or vertebral arteries.[7] Infarcts involving the medulla oblongata are categorised on the basis of its vascular supply into four territories: anterior-medial territory, anterior-lateral territory, lateral territory, and posterior territory.[7,8] The 'heart-sign' is believed to appear when the former two regions are involved.[6]

A variable number of causes for MMIs have been previously described including vertebral artery dissection,[9] stenosis/occlusion of vertebral artery and the occlusion of anterior spinal arteries.[10]

Often the lesion has been described in elderly patients[11] with known co-morbids. In our case, however, a young healthy patient with no known co-morbids who presented with the classical symptom of quadriplaegia was diagnosed to have bilateral MMI on MRI. His laboratory work-up, however, demonstrated mildly elevated serum homocysteine levels. Modest elevations of serum homocysteine levels have previously been associated with acute myocardial infarction, stroke and aortic atherosclerosis.[12]

DW-MRI is the current gold standard in the diagnosis of acute ischaemic stroke[13] and can detect ischsaemic changes within minutes of the onset of symptoms.[14] Within minutes of ischaemia, infarcted areas show up as hyperintense signal areas on DWI with corresponding hypointense signal areas on apparent diffusion co-efficient (ADC) map consistent with restricted diffusion.

In our case, DW-MRI with corresponding ADC map enabled the timely and accurate diagnosis of bilateral MMI. The patient's last follow-up was in April 2012,

about 9 months from his initial symptoms. He was on physiotherapy and rehabilitation and had significantly improved. He could move all four limbs voluntarily and could walk and stand for long periods with little support. His slurred speech was slow to recover, but had also shown significant improvement by then.

Conclusion

Bialteral MMI is a rare stroke which can also be seen in young patients with no known co-morbids. Modest elevation of serum homocysteine levels may play a role in the development of stroke in such patients. MRI with diffusion-weighted imaging is an accurate way of diagnosing bilateral MMI in the acute setting leading to timely diagnosis and treatment and consequently decreasing the possibility of long-term disability.

References

1. Kumral E, Afsar N, Kirbas D, Balkir K, Ozdemirkiran T. Spectrum of medial medullary infarction: clinical and magnetic resonance imaging findings. J Neurol 2002; 249: 85-93.
2. Nakajima M, Inoue M, Sakai Y. Contralateral pharyngeal paralysis caused by medial medullary infarction. J Neurol Neurosurg Psychiatry 2005; 76: 1292-3.
3. Zickler P, Seitz RJ, Hartung HP, Hefter H. Bilateral medullary pyramid infarction. Neurology 2005; 64: 1801.
4. Jagiella WH, Sung JH. Bilateral infarction of the medullary pyramids in humans. Neurology 1989; 39: 21-4.
5. Kleinet G, Fazekas F, Kleinert R, Schmidt R, Payer F, Offenbacher H, et al. Bilateral medial medullary infarction: magnetic resonance imaging and correlative histopathologic findings. Eur Neurol 1993; 33: 74-6.
6. Tokuoka K, Yuasa N, Ishikawa T, Takahashi M, Mandokoro H, Kitagawa Y, et al. A case of bilateral medial medullary infarction presenting with "heart appearance" sign. Tokai J Exp Clin Med 2007; 32: 99-102.
7. Tatu L, Moulin T, Bogousslavsky J, Duvernoy H. Arterial territories of human brain: brainstem and cerebellum. Neurology 1996; 47: 1125-35.
8. Duvernoy HM, Vannson JL. Human Brain Stem Vessels: Including the Pinal Gland and Information on Brain Stem Infarction. 2nd ed. New York, Springer-Verlag 1999.
9. Leppert D, Radue E. Medial medullary syndrome due to vertebral artery dissection. J Neurol Neurosurg Psychiatry 2001; 70: 130-1.
10. Roh JK, Lee YS. Bilateral medial medullary infarction manifested as sensory ataxia: a case report and review of the literature. J Korean Med Sci 1996; 11: 193-6.
11. Kameda W, Kawanami T, Kurita K, Daimon M, Kayama T, Hosoya T et al. Lateral and medial medullary infarction: a comparative analysis of 214 patients. Stroke 2004; 35: 694-9.
12. Burke AP, Fonseca V, Kolodgie F, Zieske A, Fink L, Virmani R. Increased serum homocysteine and sudden death resulting from coronary atherosclerosis with fibrous plaques. Arterioscler Thromb Vasc Biol 2002; 22: 1936-41.
13. Löve A, Siemund R, Andsberg G, Cronqvist M, Holtås S, Björkman-Burtscher I. Comprehensive CT Evaluation in Acute Ischemic Stroke: Impact on Diagnosis and Treatment Decisions. Stroke Res Treat 2011; 2011: 726573.
14. Fiebach J, Jansen O, Schellinger P, Knauth M, Hartmann M, Heiland S, et al. Comparison of CT with diffusion-weighted MRI in patients with hyperacute stroke. Neuroradiology 2001; 43: 628-32.