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Case Report

Bilateral middle cerebral artery occlusions: Case report detailing successful treatment with timely mechanical thrombectomy

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ABSTRACT

Bilateral middle cerebral artery occlusion is a very rare and dangerous pathology, accounting for less than 1% of stroke presentations. Unless treated, the natural course of the disease leads to coma or death and thus is extremely important to be detected early and managed appropriately. We present the case of a 69-year-old lady who woke with right-sided weakness and was found to have a left middle cerebral artery stroke on arrival to her local hospital, which progressed to bilateral paresis and dysarthria whilst on transfer to a tertiary hospital for definitive management. The patient underwent emergent mechanical thrombectomy of bilateral middle cerebral artery occlusions and made a complete recovery. This case emphasis the importance of the early recognition of rare bilateral middle cerebral artery occlusions and demonstrates that timely and effective treatment can have favorable outcomes for patients.

Introduction

In patients with an acute ischemic stroke, bilateral occlusion of the middle cerebral artery (MCA) is an extremely rare pathology with an incidence of less than 1% [1-3]. There are few literature reports of bilateral M1 segment occlusion of the MCAs, which carries a poor prognosis often leading to coma, or death [2,3]. We present the case of a 69-year-old female with acute right MCA M1 occlusion, detected on computed tomography (CT), computed tomographic angiography (CTA) and CT perfusion scan, which progressed to bilateral M1 occlusion on arrival from an external hospital. The patient underwent emergent bilateral endovascular mechanical thrombectomy with successful treatment and remarkable recovery. The purpose of this case report is to illustrate that timely management from arrival to intervention leads to favorable outcomes,

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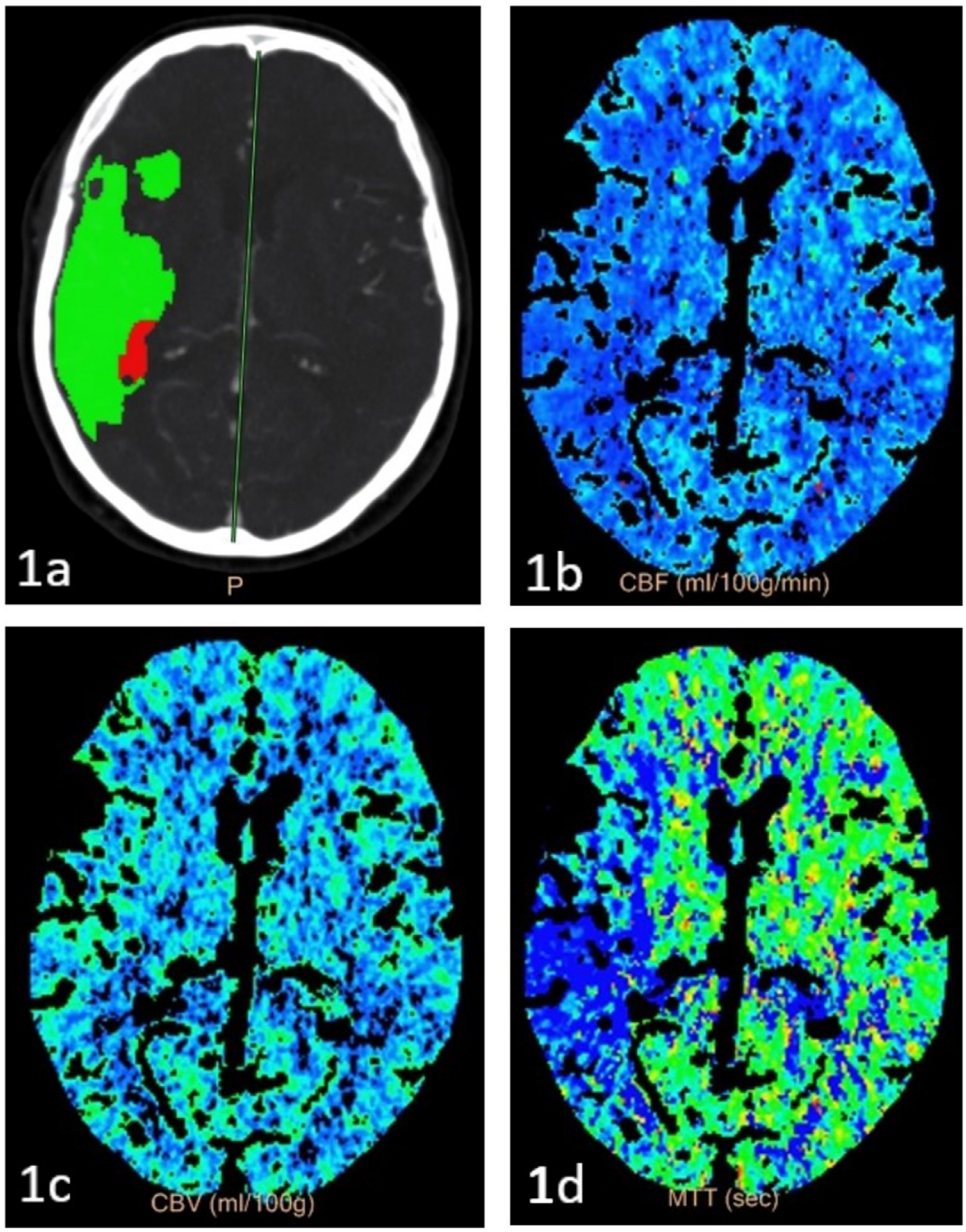

Fig. 1 – (a) Computer generated map showing a small right-sided core with large surrounding penumbra. (b) Cerebral blood flow (CBF) map showing reduced flow and the right cerebral cortex and basal ganglia. (c) Cerebral blood volume (CBV) map showing marginally increased blood volume within the right cortex. (d) Mean transit time (MTT) displaying reduced MTT within the right cortex. These images were taken at 06:30 AM.

and demonstrates the effectiveness of mechanical thrombectomy amongst front-line clinicians and the interventional radiology community.

Case report

A 69-year-old lady with known persistent atrial fibrillation (AF) and variable adherence to anticoagulation use presented to her local hospital via ambulance at 06:50 AM after waking at 04:00 AM with left-sided weakness. She had no past history of transient ischemic attacks or stroke. She had no other cardiovascular risk factors and was well before bed at midnight. A CT brain, CTA, and CT perfusion scan was performed on arrival and reported by 06:30 AM. It showed acute right-sided distal M1 occlusion with a small core and large surrounding penumbra (Fig. 1a-d, Fig. 2). The cause was thought to be cardioembolic in nature as the patient had self-ceased her dabigatran 3 days prior for abdominal pain.

The patient was transferred via helicopter to the nearest tertiary hospital with neurointervention, arriving at 08:45 AM. Near the end of transfer, the patient began developing right-sided arm weakness and dysarthria. On arrival, the patient

Fig. 2 – CT angiogram of the brain showing reduced contrast within the right M1 branch of the MCA (arrow). This image was taken at 06:30 AM.

was NIHSS 12 and taken directly to the neurointerventional suites for mechanical thrombectomy, which was completed by 09:15 AM. The impression was initial right MCA stroke with new left MCA signs on arrival.

In the interventional suites, an on-table CT brain was performed which showed no new hemorrhage, mass effect or substantial infarct 3 hours after initial presentation (9 AM). Initial cerebral angiography demonstrated bilateral mid M1 segment occlusions (Fig. 3a-d). Initially a guide catheter was placed in the left internal carotid artery and penumbra aspiration Sophia and TREVO devices were used to obtain complete clearance of the left MCA thrombus in a single attempt. There was complete reperfusion of the left hemisphere, with no discernible defect (TICI 3) (Fig. 3b). The guide system was then transferred to the right internal carotid artery and the procedure repeated again with complete clearance of the occlusions in a single pass (TICI 3) (Fig. 3c). There were no technical complications and the right femoral artery access was closed using an 8 French angioseal device. The time taken from discovery of symptoms to clot retrieval is estimated to be approximately 5 hours and 15 minutes.

On neurology review postprocedure, the patient had improved remarkably, with only subtle right facial droop and mild clumsiness of her left hand (NIHSS 1). Postprocedure CT brain showed no changes of stroke. Transthoracic echo did not identify a cardiac source of emboli, however it was a technically difficult study due to habitus and poor acoustic windows.

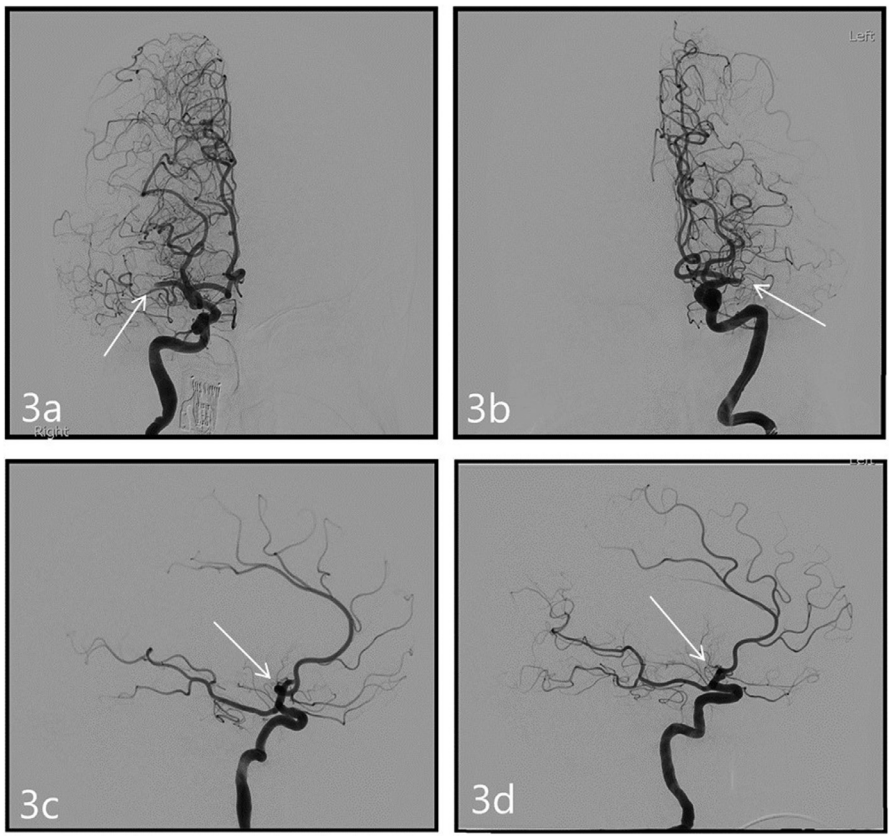

Fig. 3 – AP and lateral cerebral angiography images displaying abrupt cut-off of the M1 branch of the right MCA (a, c) and left MCA (b, d). The following images were taken between 09:00 and 09:15 AM.

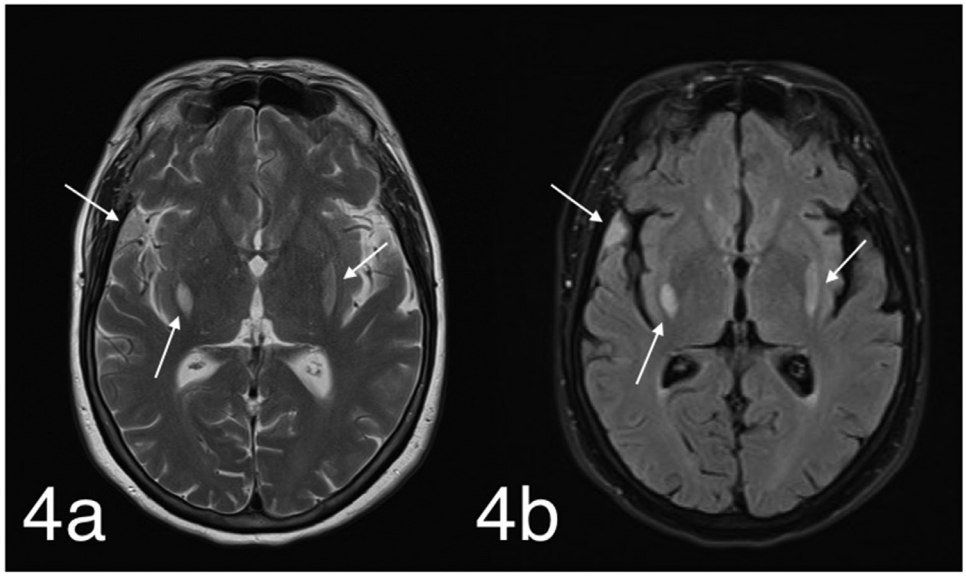

Fig. 4 – T2 (a) and T2 FLAIR (b) MRI images displaying small residual regions of infarction within the left and right putamen. The below images were taken the following day at 09:00 AM.

Her post-op stay was complicated by AF with RvR which was managed by increasing metoprolol to 50 mg BD. Day 1 MRI brain showed small volume acute bilateral ganglionic infarcts and tiny foci of acute embolic infarcts in the right frontal operculum (Fig. 4a and b). There was no residual thromboembolus. She was discharged on day 3 of her admission with a remarkable recovery, having a NIHSS of 0 and only mild left hand clumsiness persisting.

Discussion

Acute bilateral occlusion of both MCAs is usually due to cardiac disease, such as AF although dissection, cardiac embolism, and atherothrombosis are other possible causes [1-3]. This condition clinically presents with bilateral paresis, coma, decerebrate rigidity, and preserved brainstem reflexes [6]. MCA occlusion with bilateral involvement is therefore associated with a high mortality rate [1,2]. In this case study, our patient initially demonstrated left-sided symptoms, which then became bilateral. The decision was made to proceed directly to intervention, which detected bilateral M1 occlusions.

Endovascular treatment with mechanical thrombectomy devices are now the preferred treatment for patients with ischemic stroke, compared with thrombolytic drugs, which were previously used [3–5]. In this case study, the Sophia catheter and TREVO stentriever were selected, with this radiopaque stenting device allowing for increased control of stent expansion bilaterally [3,5]. As this patient demonstrated right- and left-sided paresis on arrival to our tertiary hospital, bilateral emergent thrombectomy was performed by interventional radiology. This procedure resulted in the complete revascularization of both occluded MCAs and a NIHSS of 0.

Conclusion

Although rare, bilateral MCA needs to be considered in patients presenting with unilateral stroke like symptoms that acutely worsen to bilateral symptoms. Imaging is imperative for the diagnosis and therefore radiologists need to be familiar with the diagnosis. This case report illustrates that importance of early recognition of bilateral MCA occlusion and that immediate endovascular treatment can lead to a favorable outcome. Without time-efficient mechanical thrombectomy, patients with bilateral occlusion of their MCAs have a poor prognosis with likely catastrophic consequences.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2020.01.007.

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