

# Sudden Coma from Acute Bilateral M1 Occlusion: Successful Treatment with Mechanical Thrombectomy

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## Key Words

Stroke · Coma · Bilateral M1 occlusion · Mechanical thrombectomy

## Abstract

We report a case with acute small infarct of the left middle cerebral artery in a 72-year-old man with atrial fibrillation documented by MRI and MR angiography. One hour later, he lost consciousness and CT with CT angiography revealed bilateral hyperdense middle cerebral arteries due to occlusion of the M1 segments. Mechanical thrombectomy of the right middle cerebral artery was successfully performed. During that time, thrombosis on the left side had progressed to carotid T occlusion, which was recanalized as well. The patient had a good outcome with slight aphasia and mild paresis of the left hand and could be transferred to rehabilitation 2 weeks later.

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## Introduction

Bilateral acute occlusion of the carotid arteries leads to coma and neurological deficits resembling thrombosis of the basilar artery. This is reported to occur in less than 1% of the patients in stroke series [1]. There are only a few reports in the literature of acute bilateral occlusion of the M1 segments of the middle cerebral arteries, which carries a grim prognosis leading to coma, decerebrate status, or death [2, 3]. We present a 72-year-old man who was admitted with slight neurological symptoms and further on developed coma due to bilateral occlusion of the M1 segments of the middle cerebral arteries. Immediate mechanical thrombectomy was performed resulting in a favorable clinical outcome.

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## Case Report

A 72-year-old patient was admitted to our hospital with slight aphasia and weakness of the right leg after a fall, with normal CT scan. Cardiovascular risk factors were atrial fibrillation and hypertension. Two days later, MRI was performed, which showed small areas of decreased diffusion on DWI (fig. 1a). MR angiography revealed a diminished flow signal at the bifurcation of the left middle cerebral artery suggesting an intraluminal thrombus without major vessel occlusion (fig. 1b). Embolic middle cerebral artery infarction due to cardiogenic embolism was diagnosed. One hour later, neurological symptoms deteriorated during ward rounds, with severe dysarthria, left hemiparesis, and hemineglect progressing to coma and respiratory insufficiency. CT with CT angiography was planned in order to rule out secondary bleeding or major vessel occlusion. It was performed 3 h after MRI and showed bilateral hyperdense middle cerebral arteries (fig. 2a) and bilateral occlusion of the M1 segments (fig. 2b). The patient was directed immediately to the angiography suite. The latest, most acute occlusion seemed to be on the right side and was treated first. A long sheath was introduced and diagnostic injection of the right internal carotid artery showed an occlusion of the distal M1 segment (fig. 3a). A Navien intermediate catheter (EV3, Irvine, USA) was placed into the distal internal carotid artery and the occlusion was reopened with one pass using the Trevo ProVue (Concentric Medical, Mountain View, USA) retrieval system (fig. 3b). A road map on the contralateral left side did not only demonstrate M1 occlusion but also thrombotic material within the distal internal cerebral artery. Using the diagnostic catheter an attempt was made to aspirate these clots seen on the road map without success. Injection of the left carotid artery now showed an occlusion of the terminal of the artery (fig. 3c). One pass with the Trevo stent had been necessary to restore blood flow in the anterior cerebral artery and three passes for the middle cerebral artery (fig. 3d). The patient stayed in the intensive care unit for 2 days and then was transferred to the stroke unit. Neurologically he had a slight aphasia and mild paresis of the left hand. CT showed small infarcts of the left basal ganglia and of the centrum semiovale on the right. Two weeks later, he could be discharged for rehabilitation with just minor neurological symptoms and an excellent long-term prognosis.

## Discussion

Acute bilateral occlusion of the carotid arteries may be caused by atherothrombosis, dissection, or cardiac embolism. On the other hand, bilateral occlusion of the middle cerebral arteries usually results from cardiac disease, e.g. atrial fibrillation with or without atrial thrombus [4]. Clinically this condition presents with bilateral paresis, coma, and decerebrate rigidity related to sudden global ischemia. Only the presence of brainstem reflexes in the initial stage may differ this from severe brainstem stroke. In our patient, clinical deterioration happened 1 h after MRI had shown small infarctions in the territory of the left middle cerebral artery and open M1 segments of the middle cerebral arteries. As a consequence, secondary hemorrhage was the presumed diagnosis, but CT angiography showed bilateral M1 occlusion.

Using CT, early signs of vessel occlusion are hyperdense arteries. If seen bilaterally, this could be referred to high hematocrit or diffuse vessel calcification and is usually not associated with vessel occlusion. MRI would have revealed restricted diffusion in the territory of the affected arteries, but there was no time for an additional examination. In

such emergency cases, CT angiography or MR angiography are mandatory to confirm vascular occlusion in order to direct proper treatment adapted to the clinical situation [5].

Intravenous thrombolysis using rt-PA has become a standard procedure in the treatment of acute stroke according to the NINDS trial. However, intravenous rt-PA has not been shown to be effective in large vessel occlusion because of a low recanalization rate [6]. In our case, intravenous thrombolysis has not been considered whereas endovascular therapy should be feasible in order to result in better vascular patency, which could improve clinical outcome.

Since 2004, endovascular treatment concepts have changed from intra-arterial administration of thrombolytic drugs to mechanical thrombectomy devices, like the Merci retriever or Penumbra system. Early studies, however, did not show the expected rates of clinical improvement, despite higher recanalization rates leading to the introduction of retrievable stents [7]. In 2008, the Solitaire stent, a retrievable stent developed for treatment of wide-neck aneurysms, was used as a device for mechanical thrombectomy for the first time [8]. The safety and efficacy of this procedure led to a widespread use of the device now called stent retriever [9, 10]. Many companies developed stents similar to the Solitaire. In our case, we used the Trevo ProVue stent system because we wanted to have a radiopaque device in order to control stent expansion in relation to the occluded vessel.

Studies show that stent retrievers are effective in achieving cerebral revascularization within a short time and with a low rate of complications. Clinical outcome differs in published studies influenced by clinical status, time window, and location of vessel occlusion [11]. Selection of patients and therapeutic methods is important for the outcome in acute ischemic stroke [12]. Acute bilateral occlusion of both middle cerebral arteries usually bears a bad prognosis. Kwon et al. [1] reported that all of their patients who developed coma due to acute bilateral carotid territory infarction died within 3 days despite early attempts of intra-arterial thrombolysis. Our patient was lucky because the bilateral vessel occlusion occurred during his hospital stay and therefore emergency thrombectomy could be started immediately. This ultra-early thrombectomy resulted in a complete revascularization of the bilateral occluded middle cerebral arteries and in an excellent patient outcome.

## Conclusion

Acute bilateral occlusion of intracerebral arteries bears a bad prognosis for functional outcome of the patients. In our case, bilateral M1 occlusion occurred during the presence of the neurologists who initiated immediate endovascular treatment. Bilateral thrombectomy using a stent retriever led to a good clinical outcome and also demonstrated the effectiveness of mechanical thrombectomy in an appropriate situation.

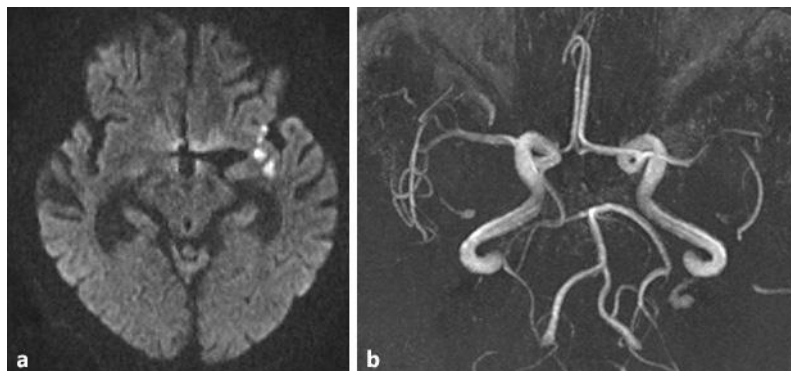
## Disclosure Statement

The authors certify that there is no actual or potential conflict of interest in relation to this article.

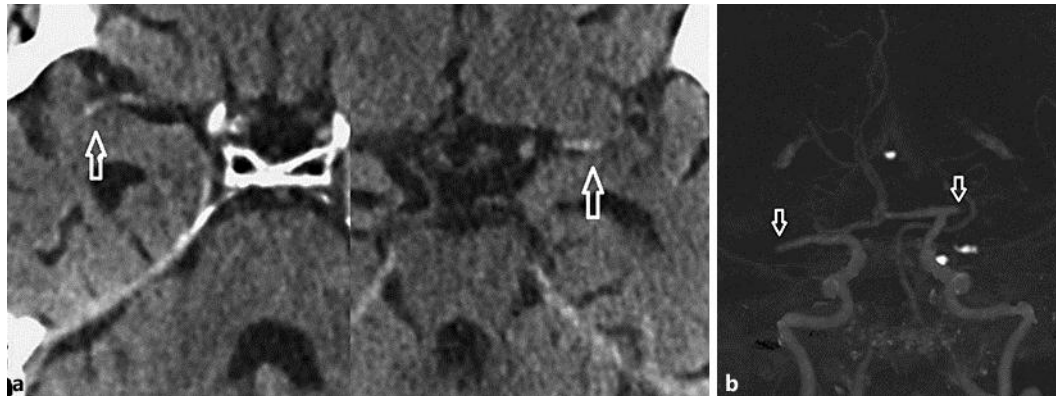
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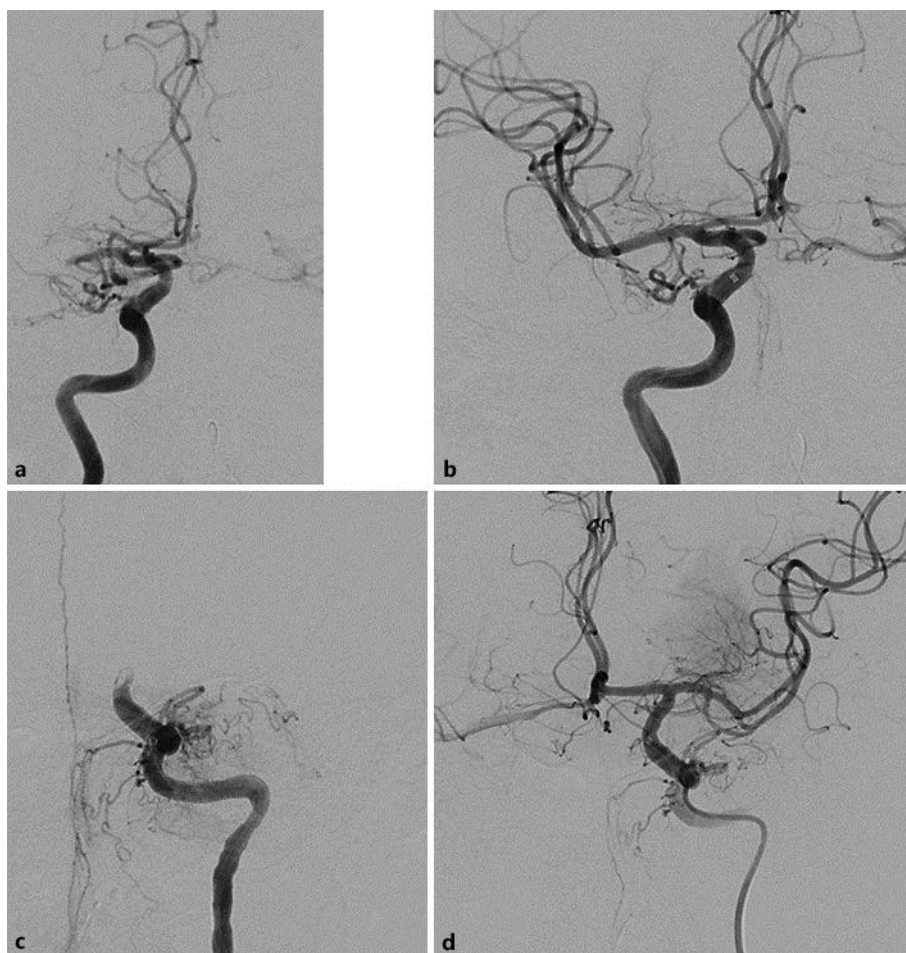
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**Fig. 1.** **a** MRI 2 days after the clinical onset of symptoms reveals small acute infarcts of the left frontal operculum on DWI. **b** TOF angiography shows lack of flow enhancement in the bifurcation of the left middle cerebral artery suggesting intraluminal thrombus.



**Fig. 2.** Three hours later, the patient was in a coma and bilateral hyperdense middle cerebral arteries were seen on nonenhanced CT scans (arrows, **a**) with bilateral M1 occlusion confirmed by CT angiography (arrows, **b**).



**Fig. 3.** Angiography of the right internal cerebral artery shows M1 occlusion (**a**) and revascularization after thrombectomy (**b**). Angiography of the left side revealed carotid T occlusion with intraluminal thrombotic material (**c**) and the final result after four passes with the stent retriever (**d**).