

Case Report

# Early Thrombectomy of a Proximal Middle Cerebral Artery Occlusion Leading to Complete Recovery with No Infarct

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## Keywords

Ischemic stroke · Intracranial thrombus · Mechanical thrombectomy · Endovascular treatment

## Abstract

Many recent trials show the benefit of mechanical thrombectomy in acute ischemic stroke caused by thrombi lodged in large arteries. We report the case of a 55-year-old patient who developed sudden-onset right-sided hemiplegia and aphasia. Computed tomography angiography showed a thrombus in the M1 segment of the left middle cerebral artery. The thrombus was removed by mechanical thrombectomy 85 min after the onset of symptoms. A magnetic resonance imaging (MRI) scan showed no infarct, and the patient was discharged symptom free. To the best of our knowledge, this is the first report of thrombectomy of a symptomatic proximal middle cerebral artery occlusion leading to complete rescue, both clinically and radiologically assessed by MRI. Our case report shows that an early thrombectomy can provide an excellent outcome.

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## Introduction

Stroke caused by a thrombus occluding a large artery has potentially devastating outcomes. Most stroke patients with a visible thrombus on computed tomography angiography (CTA) have moderate to severe neurological deficits at the time of presentation, with a median National Institute of Health Stroke Scale (NIHSS) score of 17–18 at admission [1]. Immediately following the occlusion of an artery, the brain areas supplied by the feeding artery go into a state of oligemia. However, the eventual death of the tissue (infarct) happens over many hours. The tissue at risk of dying (penumbra) may be rescued by early recanalization [2]. Recent randomized trials show that mechanical thrombectomy subsequent to intravenous thrombolysis is beneficial for achieving recanalization [3]. Many other factors are also important, including age, collateral circulation, physiological parameters, and the area of the brain that is affected [4, 5]. Recanalization and the timing of recanalization from the onset of symptoms remain to be the most important factors [6]. We describe a stroke patient who received early treatment with thrombolysis within 32 min and thrombectomy within 85 min from symptom onset, leading to complete recovery with no infarct.

## Case Description

A 55-year-old man developed sudden-onset right-sided hemiplegia and aphasia. His colleagues at work immediately called the emergency services. The patient had several cardiovascular risk factors, including hypertension, hyperlipidemia, and previous myocardial infarct.

He arrived at the CT lab in our emergency room (ER) 17 min after symptom onset. The NIHSS score was 19. The blood pressure was 149/93 mm Hg, and plasma glucose level was 92 mg/dL (76–113 mg/dL). CT showed “dense artery sign”. CTA revealed a thrombus in the M1 segment of the left middle cerebral artery and preserved blood flow in the peripheral part of the middle cerebral artery due to collaterals.

We do not wait for the results of all the blood tests before performing thrombolysis, unless there is a specific reason to do so. Intravenous thrombolysis could therefore be initiated with a door-to-needle time of 15 min. The patient was immediately taken to our angiography suite for a mechanical thrombectomy.

He was slightly agitated, and general anesthesia was considered necessary to safely perform the procedure. Onset-to-groin puncture time was 62 min. We gained access from the right groin, and angiography confirmed a total occlusion of the proximal left M1 segment (Fig. 1a). A microcatheter was advanced into and presumably beyond the occlusion. A Solitaire 2 (6 × 30 mm) revascularization device was introduced through the microcatheter and expanded with the proximal part of the device aligned with the proximal part of the occlusion. The Solitaire device was kept in place for 5 min for the radial forces of the device to work through the thrombus. The thrombus was successfully removed 85 min after symptom onset. The following angiography showed full recanalization of the left middle cerebral artery (Fig. 1b).

On waking up from general anesthesia, the patient could move all 4 extremities and had regained normal language function. NIHSS score shortly after the procedure was 0. A brain magnetic resonance imaging (MRI) scan performed on the same day was completely normal, with no signs of infarct on diffusion-weighted imaging (Fig. 1c). The patient underwent further investigations to identify the etiology of stroke. Blood tests for thrombophilia were

normal – no factor V (Leiden) or prothrombin mutation, no lupus anticoagulant, and normal protein S and C. Carotid duplex ultrasound revealed a small calcified plaque at the carotid bifurcation on the left side, without significant stenosis. Transthoracic echocardiography showed hypertrophic left ventricle with inferolateral hypokinesia and ejection fraction around 50%. Three-day Holter monitoring was normal. Accordingly, we concluded that the patient had stroke with a “cardioembolic etiology” based on TOAST criteria [7]. The patient was discharged symptom free 5 days later with appropriate secondary prevention according to the guidelines.

An ultra-early MRI scan implies a risk of false-negative diffusion-weighted imaging in acute ischemic stroke [8]. The MRI of our patient was performed within 24 h of symptom onset. We therefore performed a follow-up MRI scan 6 weeks after the event. The follow-up scan was also normal, with no signs of infarct on FLAIR imaging. At that time, the patient had returned to his work.

## Discussion

To the best of our knowledge, this is the first report of thrombectomy of a symptomatic proximal middle cerebral artery occlusion leading to complete rescue from a potential infarct. Our case report shows that a very early thrombectomy can provide an excellent outcome even in patients with large thrombi occluding major arteries. The onset-to-thrombectomy time in our patient was only 85 min, which is considerably shorter than the median time in most recent trials, which ranges from 210 to 269 min [9, 10]. Moreover, the patient had several parameters that are favorable for a good outcome, including good collateral blood flow, slightly elevated blood pressure (around 150 mm Hg systolic), and normal blood glucose level. His relatively young age and the absence of nonspecific white matter changes on the MRI scan are also associated with a better outcome [4, 5, 11, 12]. On the other hand, he had a severe neurological deficit, which is possibly a less favorable factor for outcome.

The modern stroke management involves early triage and rapid imaging with CT and CTA followed by early thrombolysis and/or mechanical thrombectomy for eligible patients. In our hospital, patients with stroke-like symptoms who reach hospital within the “time windows” for reperfusion therapies are triaged prior to hospital arrival and taken directly to the CT scan in the ER. Subsequent thrombolysis and mechanical thrombectomy are performed in the same building attached to the ER, thereby avoiding delay in transporting patients from one place to another. Another favorable local factor was the presence of a “stroke alarm”, which goes off prior to the arrival of stroke patients. The alarm notifies the neurologist and radiologist on call, ER nurses, and stroke nurses, who all assemble in the ER before the patient arrives.

Successful treatment of stroke patients with large proximal thrombi requires rapid and effective reperfusion therapies, which may include mechanical thrombectomy. The key to success is the proper selection of patients and the establishment of a well-organized system where unnecessary delays are avoided throughout the chain of care. However, all these efforts would be fruitful only with a good public awareness about stroke.

### Statement of Ethics

The patient has consented to the publication of this article.

### Disclosure Statement

The authors report no conflicts of interest.

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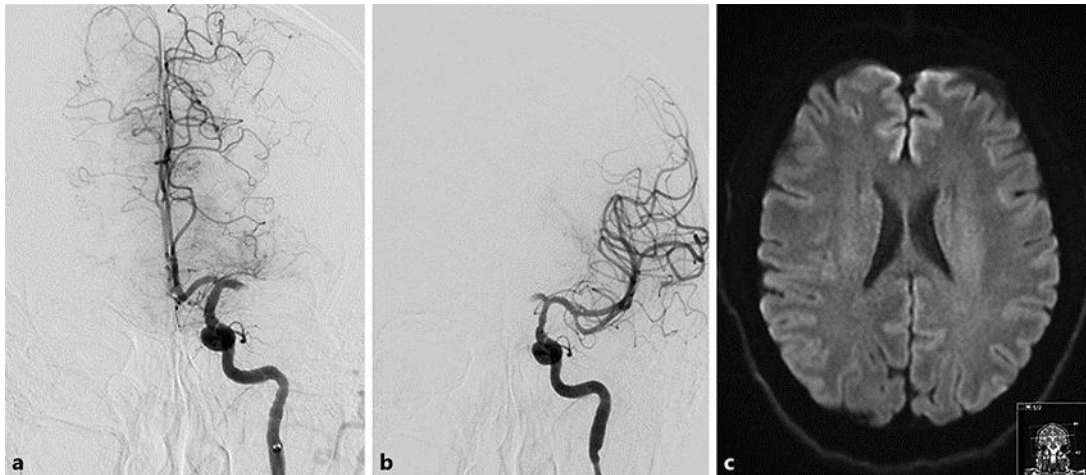
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**Fig. 1.** **a** Angiography confirming a total occlusion of the proximal M1 segment of the left middle cerebral artery. **b** Angiography showing full recanalization of the left middle cerebral artery. **c** Magnetic resonance imaging scan performed on the day of the event. Normal scan with no signs of infarct on diffusion-weighted imaging.