

# Repeated Mechanical Thrombectomy of Recurrent Large Vessel Occlusion: Case Report and Brief Review of the Literature

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## Case report

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# Abstract

**Background** Endovascular mechanical thrombectomy (MT) can significantly improve the prognosis of patients with Large Vessel Occlusion (LVO) stroke. It is still unclear whether it is safe and effective to perform MT again in patients with renal failure and atrial fibrillation (AF) in a short period of time. **Case presentation** We present the case of a LVO patients with concomitant AF and uremia who was successfully treated by MT for M1 segment occlusion of right middle cerebral artery (MCA) with good outcome. 15 days after the first MT, the patient's stroke recurred, angiography again revealed M1 segment and branch occlusion of right MCA, and repeated MT were performed. The recurrent strokes might attributed to no anticoagulant therapy. In an 4-months follow-up, no further vascular events occurred. **Conclusions** Repeated MT for recurrent LVO appears safe and effective. In patients with uremia and AF, it might be beneficial to give anticoagulant therapy after careful assessment of the patient's condition, which needs further evidence.

## Background

LVO (Large vessel occlusion ) is the most severe ischemic stroke with higher disability and mortality. Fortunately, endovascular mechanical thrombectomy (MT) can significantly improve the prognosis of patients with LVO stroke[1, 2]. In addition, for LVO recurring in the short term, it is possible to perform repeated MTs[3]. However, patients with end-stage renal disease undergoing maintenance dialysis have a higher incidence of both ischemic and hemorrhagic stroke than the general population[4, 5], there have been no reports of repeated MT for LVO patients with dialysis.

We report a patient with renal failure who has a history of atrial fibrillation(AF). She suffered twice cardioembolism strokes within half a month, and after repeated MT she finally get a good outcome. This article reports the patient's treatment and literature review of MT perioperative management and secondary prevention in acute ischemic stroke (AIS) patients with renal failure and AF.

## Case Presentation

A 54-year-old woman was admitted to the hospital on Aug 11, 2018, due to "left limb weakness for 2 hours ". Computed tomography(CT) showed no intracranial hemorrhage, and local density increased of right middle cerebral artery and electrocardiogram (ECG) showed AF. National Institute of Health stroke scale (NIHSS) score at admission was 13 points (language 2 points, gaze 1 point, facial palsy 2 points, limb 8 points) and creatinine was 479 umol/L. She had a left nephrectomy for left renal atrophy and a stent placement for the contralateral renal artery stenosis. She was treated with hemodialysis for 4 years ago and maintained dialysis three times a week. She had a AF history for 4 years and had not been treated.

The patient underwent cerebral angiography (prepare for endovascular treatment) under general anesthesia and was punctured at 65 min after admission. The common carotid artery angiography

showed M1 segment occlusion of right middle cerebral artery, and then the doctor took MT. The blood vessels were recanalized 85 min after admission (205 min after stroke onset) with thrombolysis in cerebral infarction (TICI) III. Two days after the onset, her head magnetic resonance imaging (MRI) showed the right temporal lobe, hippocampus, basal ganglia and radial crown were acute infarction. The third day after onset, her symptoms disappeared completely and the NIHSS score was 0. After 9 days of hospitalization, the patient was discharged. Anticoagulant therapy was recommended at discharge while the family members were worried about the bleeding risk and refused oral warfarin.

The sixth day after discharge (15 days after the last stroke) the patient was admitted to the hospital again due to "left limb weakness for 1 hour". NIHSS score was 8 points (language 2 points, facial palsy 2 points, limb 4 points). Another Cerebral angiography (preparation for endovascular treatment) under local anesthesia was done. She was punctured at 87 min after admission. The common carotid artery angiography showed M1 segment and branch occlusion of right middle cerebral artery, and followed by MT. 105 min after admission (165 min after stroke onset) the blood vessels were recanalized with TICI III. Two days after the onset, she had no symptom and the NIHSS score was 0. Head MRI showed acute stroke under the right frontal cortex. Anticoagulant therapy was suggested during hospitalization. The family members adopted and supervised the patient to continue oral warfarin after discharge. At present, the regular monitoring of international normalized ratio (INR) was ranged from 2 to 3, and no thromboembolic events had occurred.

## Discussion And Conclusions

To our knowledge there are reports of repeated MT in patients with AIS[3, 6]. However, no patients with AIS complicated with uremia undergoing repeated MT treatments in a short time were reported. We report this uremia patient who underwent MT twice in 15 days, hoping to provide a reference for the clinic.

This patient was admitted to the hospital twice in the time window of intravenous thrombolysis (IVT), but no IVT was performed. Studies show patients with renal failure has higher occurrence of spontaneous intracerebral hemorrhage[7], cerebral microbleeds[8], or hemorrhagic transformations after AIS[9]. There is still controversy about whether to give IVT for AIS patients with renal dysfunction. The Japanese guidelines state that stroke patients with severe renal disorder should be given IVT cautiously[10]. Because further evidence of IVT safety in patients with renal failure is needed, and the clinical presentation of patients suggest LVO, we skip IVT and directly underwent MT.

Renal clearance is the main elimination route of contrast, however, for patients with renal failure, their kidneys do not have the function of metabolic contrast agents. Due to renal failure of the patient, the metabolism of the contrast must rely on hemodialysis, so it is still necessary to pay attention to the dose of contrast, meanwhile control the drip rate and rehydration volume, to prevent excessive cardiac load. Despite that repeated thrombectomy may lead to more severe disruption of the vascular endothelium, thereby increasing the risk of complications such as vasospasm, arterial dissection as well as intracranial

hemorrhage[11] and renal failure also increases the risk of intracranial hemorrhage, MT may still be a better choice due to the benefits of opening blood vessels.

Anticoagulant therapy is the key to preventing thromboembolic events in patients with AF. However, there are still controversies about anticoagulant therapy in patients with concomitant AF and chronic renal failure[12]. Giving anticoagulants to elderly with AF and renal failure was related to higher risk of ischemic stroke and haemorrhage but a paradoxical lowered rate of all cause mortality[13]. Therefore, the treatment must be carefully selected according to the patient's condition. The patient is not older and has two thromboembolic events in a short period of time, so the benefits of anticoagulant therapy may be greater than the risk of bleeding. The patient was finally given oral warfarin to maintain INR fluctuations of 2-3, and no thromboembolic events and adverse bleeding reactions occurred during 4 months follow up.

In conclusion, it may be safe and effective to perform two MTs in patients with uremia and AF who have two cardiogenic strokes in a short period of time. For these patients, it may be beneficial to give anticoagulant therapy after careful assessment of the patient's condition, which needs further evidence from large sample studies.

## **Abbreviations**

MT: mechanical thrombectomy; LVO: large vessel occlusion; AF: atrial fibrillation; MCA: middle cerebral artery; AIS: acute ischemic stroke; CT: computed tomography; ECG: electrocardiogram; NIHSS: national institute of health stroke scale; TICI: thrombolysis in cerebral infarction; MRI: magnetic resonance imaging; INR: international normalized ratio; IVT: intravenous thrombolysis.

## **Declarations**

### **Ethics approval and consent to participate**

The authors declare that ethics approval was not required for this case report.

### **Consent for publication**

The written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

### **Availability of data and material**

All datasets supporting the conclusions of this article study are included within the article.

### **Competing interests**

The authors declare that they have no competing interests.

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## Authors' contributions

Conception and design:YL,JLN, LM, YLD; Data Collection: YL, YLD, JLN, TTZ, ZQG; Writing the manuscript: YLD, JLN; Critical Revision:All; Approval of the manuscript: All.

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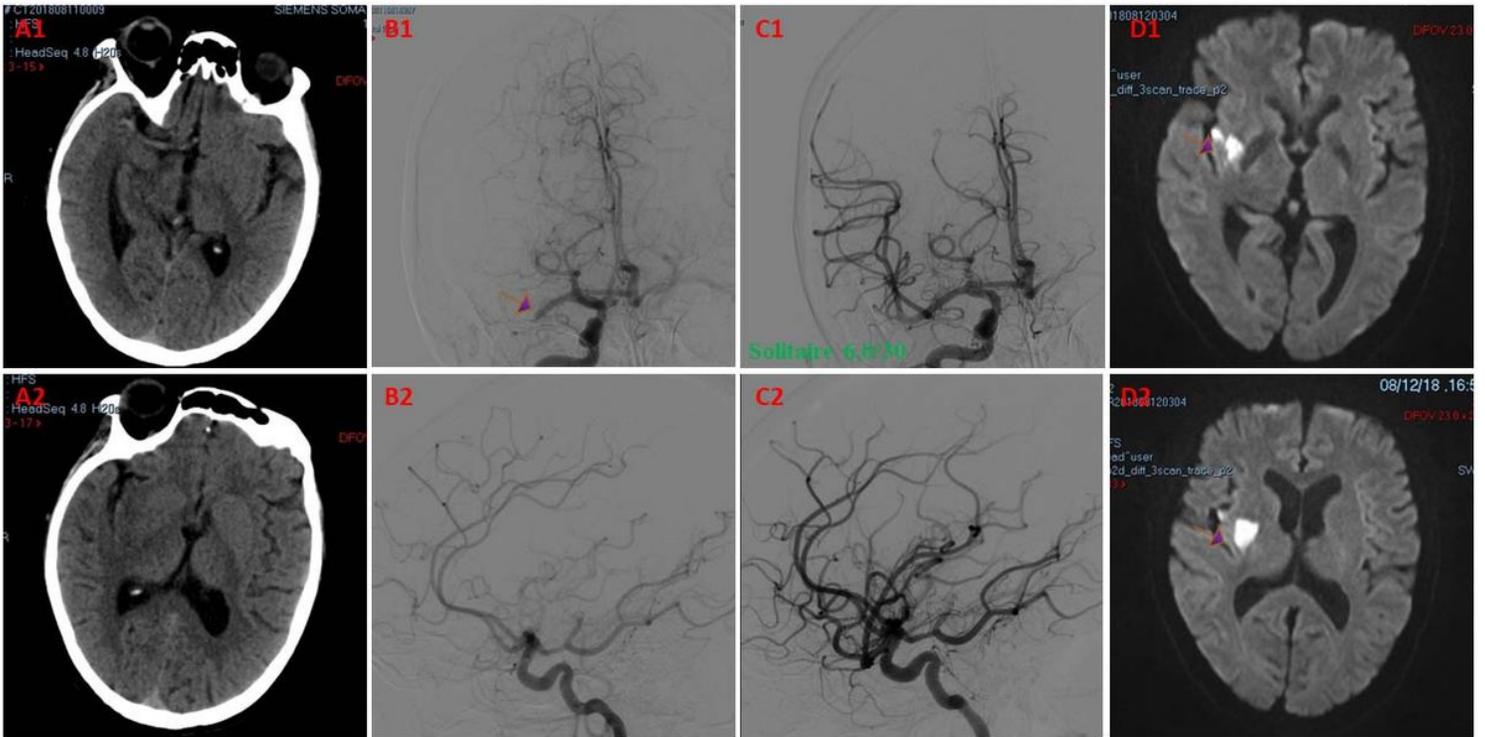
None.

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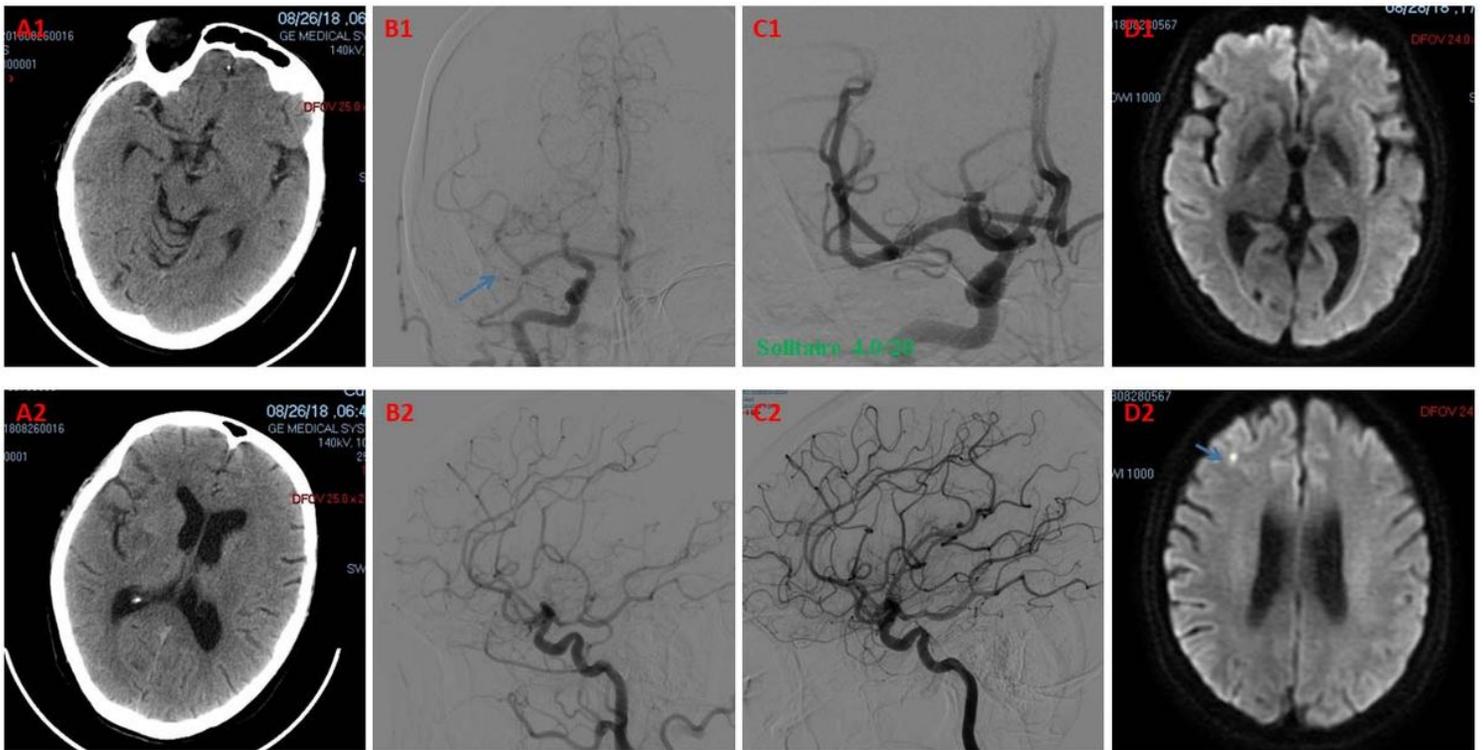
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## Figures



**Figure 1**

Patient's imaging examination at first admission. A. Computed tomography(CT) at admission showed no intracranial hemorrhage, and local density of right middle cerebral artery increased. B. The carotid artery angiography showed M1 segment occlusion of right middle cerebral artery. C. The blood vessels were recanalized 85 min after admission (205 min after stroke onset) with TICI III. D. MRI (2 days after the onset) showed the right temporal lobe, hippocampus, basal ganglia and radial crown were acute infarction.



**Figure 2**

Patient's imaging examination at second admission. A. Computed tomography(CT) at admission showed no intracranial hemorrhage, and local density of right middle cerebral artery increased. B. The carotid artery angiography showed M1 segment occlusion of right middle cerebral artery. C. The blood vessels were recanalized 105 min after admission (165 min after stroke onset) with TIC1 III. D. MRI (2 days after the onset) showed acute stalk under the right frontal cortex.

## Supplementary Files

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- [supplement1.pdf](#)