

Case Report

# Thrombectomy of the Anterior Cerebral Artery Through a Trans-Anterior Communicating Artery Approach: A Case Report

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## Abstract

**Objective:** Acute anterior cerebral artery (ACA) occlusion is a rare condition and sometimes leads to significant neurological deficits. Mechanical thrombectomy through the ipsilateral carotid artery can achieve recanalization in most acute occlusions of the anterior cerebral artery. However, ipsilateral carotid artery occlusion will significantly increase the difficulty and risk of thrombectomy of the anterior cerebral artery. **Case presentation:** A 50-year-old man presented with a sudden onset of right hemiparesis, dysarthria, and symptoms of confusion. Computed tomographic angiography revealed acute left ACA occlusion and chronic occlusion of the ipsilateral internal carotid artery. Thrombectomy of the ipsilateral anterior cerebral artery via the occluded internal carotid artery is both difficult and time-consuming. We performed thrombectomy of the left anterior cerebral artery through the right internal carotid artery via the anterior communicating artery. The target vessel was successfully recanalized and the patient achieved good results. There is no report about thrombectomy of contralateral anterior cerebral artery through the anterior communicating artery. **Conclusion:** This case prompt that it is feasible to use the anterior communicating artery as the thrombectomy path for the contralateral anterior cerebral artery distal medium vessel occlusion.

## Keywords

Acute Ischemic Stroke, Thrombectomy, Anterior Cerebral Artery, Anterior Communicating Artery, Case Report

## 1. Introduction

Thrombectomy is a commonly used method for treating large vessel occlusion in acute ischemic stroke and recommended as an important treatment for acute cerebral infarction in many guidelines. There is no report on the acute occlusion of the anterior cerebral artery combined with chronic occlusion of the ipsilateral internal carotid artery. Thrombectomy of the ipsilateral anterior cerebral artery through the occluded internal carotid artery is both difficult and

time-consuming. We successfully performed thrombectomy of the left anterior cerebral artery through the right internal carotid artery via the anterior communicating artery. The case indicate that it is feasible to use the anterior communicating artery as the thrombectomy path for the contralateral anterior cerebral artery.

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## 2. Case Presentation

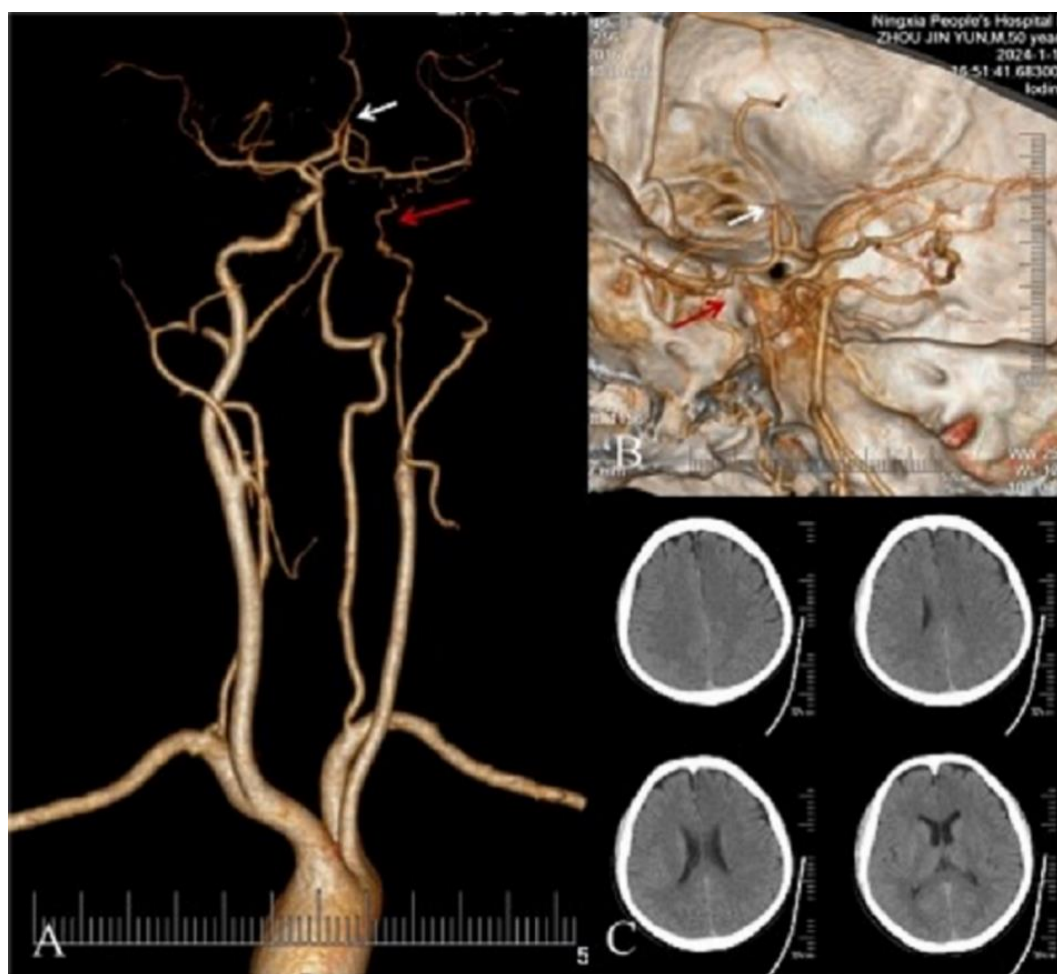
A 50 year old male of Chinese origin, with history of hyperhomocysteinemia, and smoking was admitted to the neurology department due to right limb weakness, articulation disorders, and blurred consciousness for 5.5 hours.

Recent history revealed that the patient experienced sudden right limb weakness, dysarthria, and symptoms of confusion at home 5.5 hours ago. 1 hour 30 minutes after the onset of symptoms, the patient was first sent to the local county hospital and underwent brain CT scan without any bleeding. 2 hour 45 minutes after the onset of symptoms, the

patient received intravenous thrombolysis with 65 mg of alteplase. But, the clinical efficacy was not significant. The patient was immediately transferred to our hospital.

Neurological examination revealed enunciation unclear, right facial palsy and hemiparesis of the right limbs with a National Institutes of Health stroke scale (NIHSS) score of 10.

Cerebrovascular CT imaging showed slender of left internal carotid artery with C7 segment occlusion; Left anterior cerebral artery A2 segment occlusion (see Figure 1A, 1B). Brain CT had minimal early infarct changes, with an Alberta Stroke Program Early CT Score of 8 (see Figure 1C).

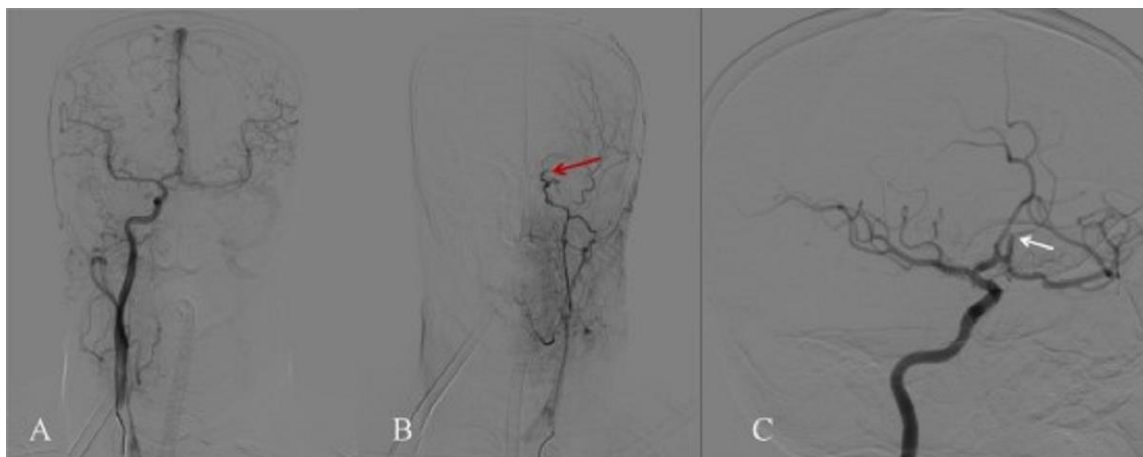


**Figure 1.** A: Chronic occlusion of the left internal carotid artery (red arrow); B: Left anterior cerebral artery A2 segment occlusion (white arrow); C: Preoperative CT plain scan indicates a local low-density lesion in the left frontal lobe.

Electrocardiogram indicates sinus rhythm. Transthoracic echocardiography found left-atrial dilatation. Laboratory work-up revealed a blood homocysteine of 16 mmol/L, a Triglycerides 0.54 mmol/L, a low-density lipoprotein cholesterol 2.38 mmol/L.

The patient was further examined through Cerebral angiography which revealed that the right internal carotid artery

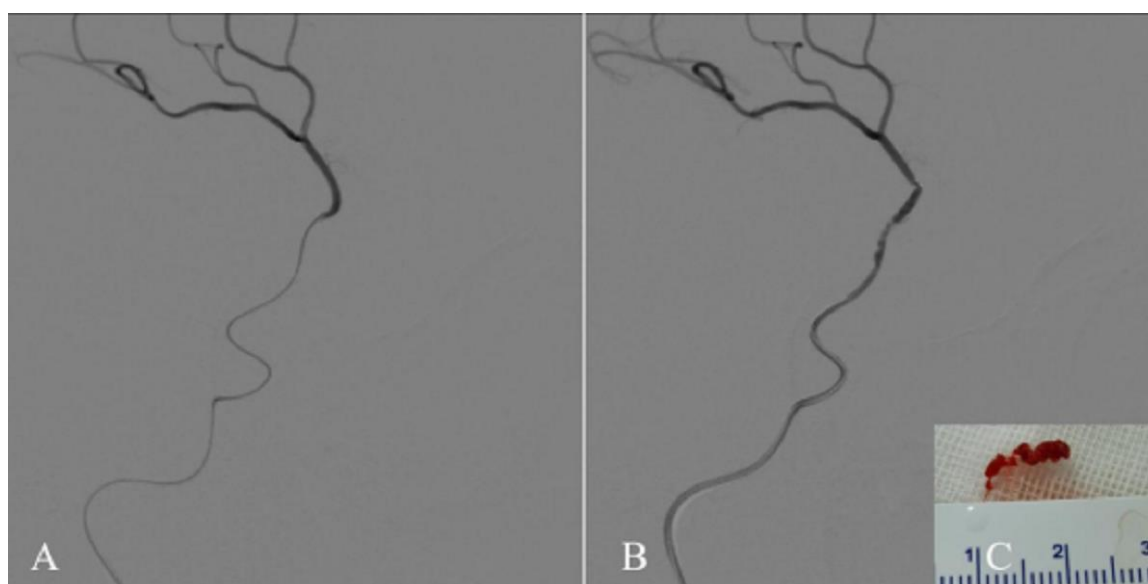
supplied blood to the left anterior cerebral artery and middle cerebral artery through the anterior communicating artery. The left anterior cerebral artery A2 segment was occluded. The blood vessels in the right carotid artery system were unobstructed. The left middle cerebral artery was unobstructed (see Figure 2).



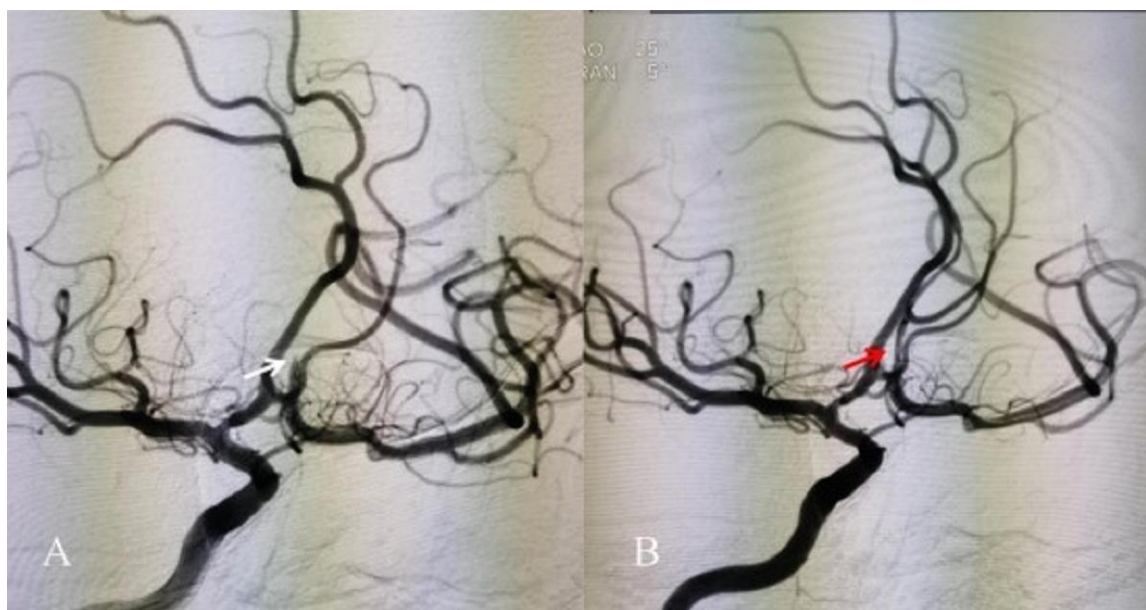
**Figure 2.** A: The right internal carotid artery is unobstructed, supplying blood to the contralateral cerebral hemisphere through the anterior communicating artery; B: The entire left internal carotid artery is slender and chronic occlusion (red arrow); C: Left anterior cerebral artery A2 segment occlusion (white arrow).

Under general anesthesia, using a right femoral artery approach, we placed a 6-F guiding catheter (Neuron Max, Penumbra, USA) into the right internal carotid artery C1. A triaxial system using the 5F thrombotic suction catheter (SOFIA MicroVention, Inc), Rebar-18 microguide (EV3, Irvine, USA), and a 0.014 inch Micro guidewire (Aivgo, Kehui Medical Equipment Co, Ltd, USA) was advanced to the A3 segment of the left anterior cerebral artery (see Figure 3A) through the anterior communicating artery. A SolitaireAB 4.0

mm x 20 mm stent retriever (EV3, California, USA) was then deployed (see Figure 3B). Under the suction of the suction catheter, the thrombectomy stent was removed from the body, 7 hours and 5 minutes after the onset of symptoms, a deep red thrombus was removed from the left anterior cerebral artery (see Figures 3C, 4). Cerebral angiography showed localized stenosis in segment A2 of the left anterior cerebral artery. 6 hours later, the patient's consciousness became clear.

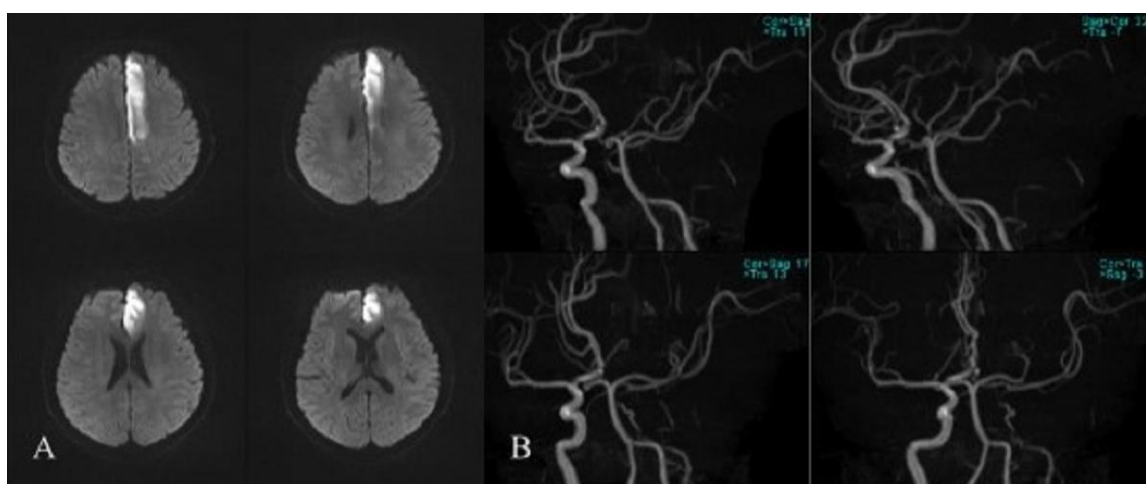


**Figure 3.** 5F sofia middle catheter followed to the proximal end of occlusion, microcatheter followed to the distal end of occlusion, microwire was removed, and 4.0 mm x 20 mm SolitaireAB thrombectomy stent was delivered along the microcatheter to the occlusive lesion for release. Angiography showed blood flow recovery. A: The microcatheter was pushed through the thrombus B: After deploying a 4.0 mm x 20 mm SolitaireAB, the blood flow unobstructed; C: the thrombus.



**Figure 4.** Comparison of preoperative and postoperative oblique imaging of the right internal carotid artery. A: Preoperative occlusion of the A2 segment of the left anterior cerebral artery (white arrow); B: After surgery, the blood flow of the left anterior cerebral artery was restored and unobstructed (red arrow).

24 hours after surgery, brain MRI display a new local infarction in the left frontal lobe of the patient (see Figure 5A); MRA shows that the left anterior cerebral artery remains unobstructed (see Figure 5B).



**Figure 5.** Brain MRI 24 hours after surgery. A: DWI sequence shows: acute infarction in the left frontal lobe; B: MRA shows that the blood flow of the left anterior cerebral artery remains unobstructed.

After 1 week, the muscle strength of the right limb returned to normal, with a NIHSS score of 1 point and no obvious clinical symptoms or positive signs. After 3 months of discharge, the modified Rankin Scale (mRS) score was 0.

### 3. Discussion

The acute occlusion of anterior cerebral artery (ACA) can cause severe disability. [1-3] Thrombectomy is an effective method for treating large vessel occlusion in acute ischemic

stroke and recommended as an important treatment for acute cerebral infarction in many guidelines. [4, 5]

In this case, the patient had acute occlusion of the A2 segment of the left anterior cerebral artery and chronic occlusion of the left internal carotid artery. Considering the presence of a history of smoking, and untreated hyperhomocysteinemia, the presumed cause of the internal carotid artery chronic occlusion is atherosclerosis, and the acute anterior cerebral artery occlusion mechanism may be in situ thrombosis based on intracranial atherosclerosis. Although the



skills of thrombectomy have been improving, difficult vascular anatomy may complicate prompt access to the occluded vessel during thrombectomy. It would be difficult and time-consuming to recanalize the left anterior cerebral artery through the left internal carotid artery. We successfully performed left anterior cerebral artery thrombectomy by crossing the anterior communicating artery through the right internal carotid artery pathway. As far as we know, there is no research on the thrombectomy of the anterior cerebral artery through the anterior communicating artery pathway at the present time. [6-8]

The anterior communicating artery is the only pathway connecting the anterior cerebral circulation vessels on both sides of the Willis ring. The good existence of the anterior communicating artery not only compensates for blood supply to the distal contralateral vessels in the event of poor blood flow in the contralateral internal carotid artery, but also provides an alternative pathway when the treatment device cannot pass through the contralateral vascular pathway. [9, 10] However, not all patients have their anterior communicating artery in an open state, and there are also variations. [11] Accurate evaluation cerebral artery angiography is necessary before anterior communicating artery can be cautiously used as a treatment pathway. The diameter of the anterior communicating artery is usually around 1.0-3.5 mm. If it is decided to remove thrombi through the anterior communicating artery, it is advisable to use a softer intermediate catheter with a size of 4F or 5F and a smaller thrombus removal stent as much as possible. The advantage of using a 5F thrombotic suction catheter (SOFIA MicroVention, Inc) in this example is its soft texture and good passability. [12]

## 4. Conclusions

In the case of acute occlusion of anterior cerebral artery combined with chronic occlusion of the ipsilateral internal carotid artery, after comprehensive evaluation, appropriate device selection, and careful intraoperative operation, it is feasible to use the anterior communicating artery as the thrombectomy path for the contralateral anterior cerebral artery.

## Abbreviations

ACA	Anterior Cerebral Artery
MT	Mechanical Thrombectomy
NIHSS	National Institutes of Health Stroke Scale
mRS	Modified Rankin Scale

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Thanks Tingjie Ma for his help with operation on the patients. Tingjie Ma contributed to collecting case and drafted the manuscript. Dong Xu contributed to the manuscript writing and editing.

## Ethics Approval and Consent to Participate

As this is a case report, no ethical clearance was required.

## Consent for Publication

All the authors gave consent for the publication of this review.

## Availability of Data and Materials

No datasets were generated or analysed during the current study.

## Conflicts of Interest

The authors declare no conflicts of interest.

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