




Radial Access Mechanical Thrombectomy: Bail-Out Approach in Patients with Total Abdominal Aorta Occlusion—A Case Report

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Abstract

Radial artery access for mechanical thrombectomy is emerging as a viable alternative to femoral access, particularly in patients with challenging vascular anatomy. This case report describes a successful mechanical thrombectomy via the radial approach in a patient with an acute ischemic stroke. The technical feasibility, procedural outcomes, and potential advantages of this approach are discussed.

Keywords

- ▶ transradial approach
- ▶ mechanical thrombectomy
- ▶ ischemic stroke
- ▶ neurointervention
- ▶ radial artery
- ▶ case report

Introduction

Traditionally, mechanical thrombectomy (MT) is performed via transfemoral access (TFA). However, TFA may be challenging in patients with significant aortoiliac tortuosity, aortic arch anomalies, or obesity. The transradial approach (TRA) has gained popularity in interventional cardiology and neurointervention due to its lower risk of access-site complications, shorter recovery time, and improved patient comfort.¹ This case report highlights the application of TRA for MT in a patient with unfavorable femoral access.

Case Report

A 64-year-old gentleman with underlying ischemic heart disease, hypertension, dyslipidemia, and atrial fibrillation was initially admitted for atrial fibrillation with heart failure. He was treated with subcutaneous fondaparinux.

The following day, the patient developed left lower limb and tongue numbness. On examination, motor strength in the left lower limb was 3/5. The patient's pre-stroke modified Rankin Scale (mRS) was 1, indicating minor symptoms without significant disability. On initial neurological assessment, the National Institutes of Health Stroke Scale (NIHSS) was 10. A noncontrast computed tomography (CT) brain was performed, revealing a dense right middle cerebral artery (MCA) sign, suggestive of large vessel occlusion. The Alberta Stroke Program Early CT Score (ASPECTS) was 7, indicating early ischemic changes predominantly in the right temporal and insular cortex. However, no intracranial hemorrhage or established infarct was seen.

An urgent magnetic resonance imaging (MRI) brain was then obtained, which confirmed a right MCA occlusion with areas of hyperacute infarction in the corresponding vascular territory. Magnetic resonance angiography time of flight demonstrated right MCA occlusion, while diffusion-weighted

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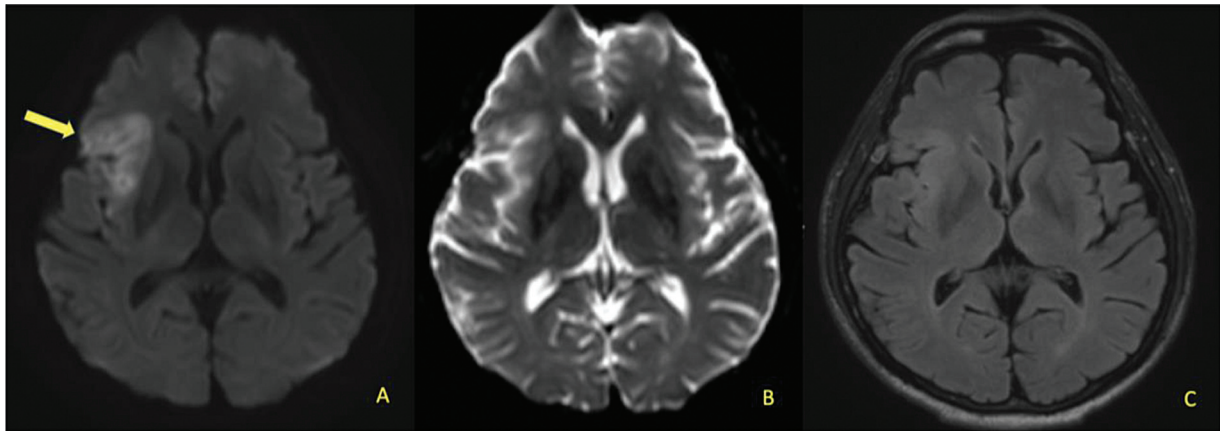


Fig. 1 (A) Diffusion weighted imaging (DWI); (B) apparent diffusion coefficient (ADC); and (C) fluid attenuated inversion recovery (FLAIR) images. Hyperintensity at right temporal region (yellow arrow) on DWI is shown, which is not apparent on FLAIR (mismatch) in keeping with hyperacute infarction.

imaging (DWI)/ADC (apparent diffusion coefficient) sequences confirmed infarction with a fluid-attenuated inversion recovery (FLAIR) mismatch, indicative of a hyperacute stroke. The DWI–SWI (susceptibility-weighted imaging) correlation showed a prominent susceptibility vessel sign along the right MCA, consistent with a red blood cell-rich thrombus and corresponding to the hyperintense signal on DWI. The ASPECTS score was 7 on DWI and 9 on FLAIR, indicating early ischemic changes predominantly in the right temporal and insular cortex. Given these findings, a decision was made to proceed with MT.

For arterial access, the right common femoral artery was initially punctured under ultrasound guidance. However, advancement of the guidewire and catheter beyond the right common iliac artery was unsuccessful. Angiography revealed proximal right common iliac artery occlusion and distal abdominal aortic stenosis with multiple collateral vessels. Left common femoral artery access was considered next, but ultrasound assessment showed left iliac artery stenosis as well.

Due to these anatomical challenges, right radial artery access was chosen. Under ultrasound guidance, the right radial artery was successfully punctured, and a radial introducer arterial sheath (4F) was placed. Angiographic runs of the internal carotid and vertebral arteries were obtained to evaluate the site of occlusion and collateral circulation. The angiogram confirmed satisfactory collateral perfusion to the affected MCA territory.

MT was then performed using a special radial access guide (0.079" × 105 cm) catheter and a selective catheter (5.5 F × 130 cm) (RIST RADIAL ACCESS SYSTEM), which facilitated navigation through the small radial artery and the acute angulations of the vasculature. Once the guide catheter was positioned in the right internal carotid artery, a reperfusion catheter (5 F × 138 cm) was advanced to the occlusion site in the right MCA. Suction aspiration was initiated after the aspiration catheter was engaged to the clot, and complete recanalization (TICI 3) of the right MCA was achieved after a single pass.

The total duration from symptom onset to radiological diagnosis was approximately 90 minutes, and from onset to reperfusion was 170 minutes. The NIHSS score on post-

intervention Day 1 improved to 5. At discharge, the NIHSS was 3, reflecting substantial neurological recovery. At 90-day follow-up, the patient's mRS was 2, indicating slight disability but functional independence (► **Figs. 1,2,3,4,5,6**).

Discussion

Radial access for neurointervention procedures, particularly MT, has evolved with the introduction of specialized guide catheters.² These catheters provide flexibility and stability, facilitating navigation through the radial artery's small caliber and the acute angulations of cerebral vasculature while minimizing vessel trauma.

Radial access offers several advantages over femoral access. Studies have demonstrated reduced access-site

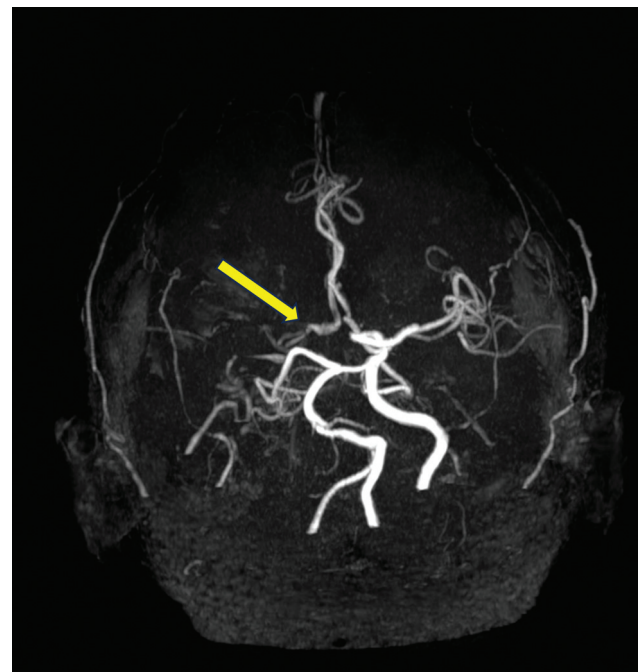


Fig. 2 MRA TOF 3D—absence of the right ICA, terminal ICA, and right MCA (yellow arrow). ICA, internal carotid artery; MCA, middle cerebral artery; MRA, Magnetic resonance angiography; TOF, time of flight.

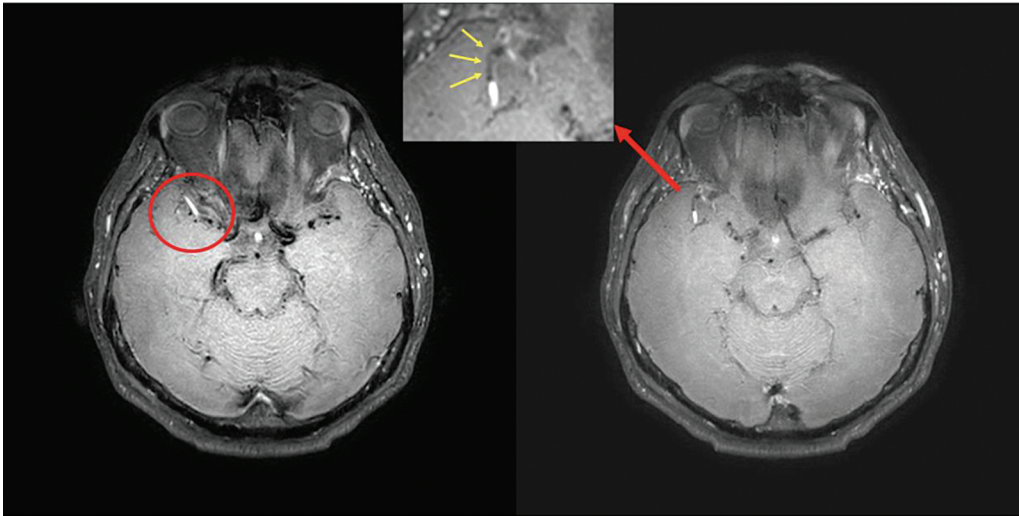


Fig. 3 Post-contrast MRI black blood sequence. Hyperintense right MCA (red circle) indicating stagnant vessel. Hypointense clot (yellow arrows). MCA, middle cerebral artery; MRI, magnetic resonance imaging.

complications, such as hematoma and pseudoaneurysm formation, with radial access compared to femoral access.¹ Additionally, radial access may be preferable in cases where femoral access is limited due to aortic occlusion, as seen in this case. However, challenges exist, including catheter length limitations and technical difficulties in navigating tortuous anatomy.

Recent studies comparing transradial and transfemoral approaches for MT suggest that while procedural success rates are similar, radial access may reduce procedural complications and improve patient comfort.³ Additionally, radial artery access has been associated with lower risks of access-

site infections and reduced procedural-related delays, making it a viable alternative in high-risk patients.⁴

Another crucial aspect is the role of technological advancements in enhancing the feasibility of radial access thrombectomy. The introduction of longer and more flexible guide catheters, along with low-profile aspiration catheters, has significantly improved procedural success rates. Further innovations, such as robotic-assisted interventions, are being explored to enhance precision and overcome the technical challenges associated with radial access.⁵

MRI plays a vital role in stroke diagnosis and management. DWI is highly sensitive to ischemic stroke and detects abnormalities within minutes of onset. Post-contrast black-blood vessel wall imaging is part of our standard acute stroke protocol. This sequence is particularly helpful in assessing thrombus composition and evaluating vessel wall pathology,



Fig. 4 Angiogram from the right femoral sheath showing right common iliac artery occlusion.



Fig. 5 Right internal carotid angiogram showing terminal internal carotid artery occlusion (yellow arrow).



Fig. 6 Retrieved clot.

especially in the differential diagnosis of vasculitis or dissection. Acquisition time is approximately 3 to 4 minutes and is integrated without delaying overall workflow. Advanced MRI sequences, including perfusion imaging, help differentiate between salvageable tissue (penumbra) and irreversibly damaged tissue, guiding thrombectomy decisions.⁶

Conclusion

Radial access is a safe and effective approach for MT in acute stroke with large cerebral vessel occlusion. The availability of specially designed radial access guide catheters has made the introduction of large-bore reperfusion catheters possible via the radial artery for MT. Further studies comparing radial

and femoral access in large vessel occlusion stroke are warranted to refine patient selection and optimize procedural outcomes.

Statement of Ethics

Written and informed consent for data publication was obtained from the patient and family.

Author Contributions

All authors reviewed and approved the final manuscript.

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None.

Conflicts of Interest

None declared.

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