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Mechanical Thrombectomy for Cluster Transient Ischemic Attack: A Case Report

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ABSTRACT

The use of mechanical thrombectomy (MT) has become the gold standard for large vessels occlusion (LVO) related strokes in the anterior circulation since the publication of many randomized trials in 2015. It is now possible to determine that MT indicated for acute ischemic strokes resulted from occlusion of large vessels in the anterior circulation and when no more than 24 hours have passed since the onset of stroke. Nevertheless, the utility of this treatment remains unclear in some clinical situations. One of such is occlusion of LVO in patients with transient ischemic attack (TIA) or minor neurological symptoms. The case presented here shows that mechanical thrombectomy may be highly effectively in patients with cluster TIAs resulted from LVO occlusion. Further randomized trial should establish definitive treatment for this category of patients.

Keywords: *Recurrent TIA, Mechanical Thrombectomy, Acute Ischemic Stroke*

Introduction

Mechanical thrombectomy (MT) has become the reference treatment for large vessel occlusion (LVO) in patients with acute ischemic stroke of the anterior circulation with limited necrotic core. At present MT indicated for acute ischemic strokes in patients with LVO in the anterior circulation, less than 24 hours since the onset of stroke (Guo and Miao, 2021; Munoz *et al*., 2023; Liu *et al*., 2024). However, there are many clinical situations that are still uncovered by the randomized clinical trials and for which decision making is still case and operator based (Widimsky *et al*., 2023; Sarraj *et al*., 2024). The purpose of this case report is to describe one of such clinical situations in patient with cluster TIAs resulted from LVO occlusion.

Case Presentation

Sixty-two years old male was admitted to the emergency room because of transient left side severe weakness lasted five minutes. Then, in the ER the second and third episodes of transient left hemiplegia occurred and lasted 45 and 15 minutes correspondently. All three episodes resolved spontaneously. A computed tomography (CT) of the head showed no intracranial bleeding. Alberta stroke program early CT score (ASPECT) was 10 and computed tomography perfusion (CTP) revealed a large area of a penumbra of right middle cerebral artery (MCA) territory (Fig. 1). Computed tomography angiography (CTA), demonstrated a near occlusion in the right MCA (Fig. 2). The near occlusion was interpreted as either an intracranial stenosis or a margined thrombus.

The patient medical history included paroxysmal atrial fibrillation, biological mitral valve replacement because of severe mitral regurgitation on a rheumatic mitral valve one year before the actual event. The patient was treated with warfarin and an International normalized ratio (INR) in the ER was 1.9.

Thus, an embolic origin of MCA near occlusion was suggestive because of patient's background. Intravenous tPA treatment was contraindicated because of increased INR of 1.9. Because of three relatively long-lasting stereotypic TIAs, the large area of tissue in risk on CTP, and devastating consequences in case of stroke completion the decision was taken to perform mechanical thrombectomy. The patient was put under general anesthesia. A right femoral 6 French sheath was inserted. Selective angiography of his right internal carotid artery (ICA) revealed a saddle-shaped thrombus (Fig. 3) in the MCA bifurcation causing a very slow and delayed flow in all MCA territory. In the lower subdivision of the MCA, at the level of the supramarginal gyrus, a second saddle-shaped thrombus was seen (Fig. 4). The proximal thrombus was clearly responsible for the clinical symptoms and was decided to retrieve it. Since the thrombus was short a direct aspiration first pass technique (ADAPT) was used. A 9 French (9F) balloon guiding catheter (BGC) was advanced into the right ICA, a Sophia 5F aspiration catheter was advanced proximally to the thrombus upon a Rebar 18 microcatheter mounted with a Traxess guide wire. Special attention was given to avoid crossing the thrombus with any device. As soon as the thrombus was approached the BGC was inflated and a gentle aspiration was performed from the 9F guiding catheter to create a reverse flow. Once the Sophia catheter was at the contact with the thrombus the clot aspiration was initiated and concurrently the microcatheter and wire were removed in order to improve aspiration efficacy. The proximal clot was fully retrieved after the first pass (Fig. 5) with no evidence of distal embolization. The distal thrombus remained unchanged through the procedure. Since the thrombus was quite distal with probably no or minimal clinical effect it was decided not to remove it.

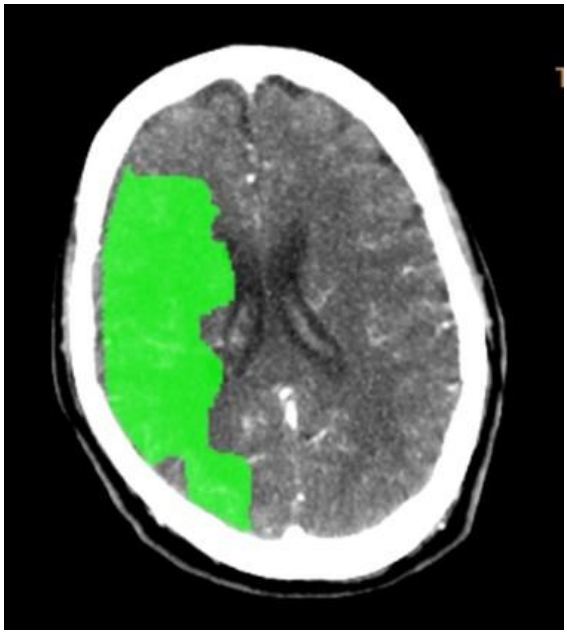

Figure 1: CTP summarized map showing a large area of prolonged mean transient time in the right MCA territory.

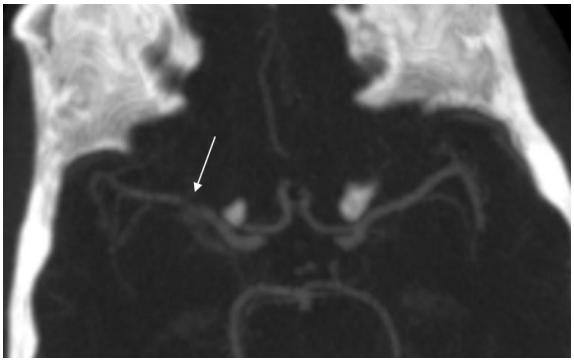

Figure 2: CTA showing the presence of right MCA narrowing (arrow) suggestive of intracranial stenosis or marginized thrombus.

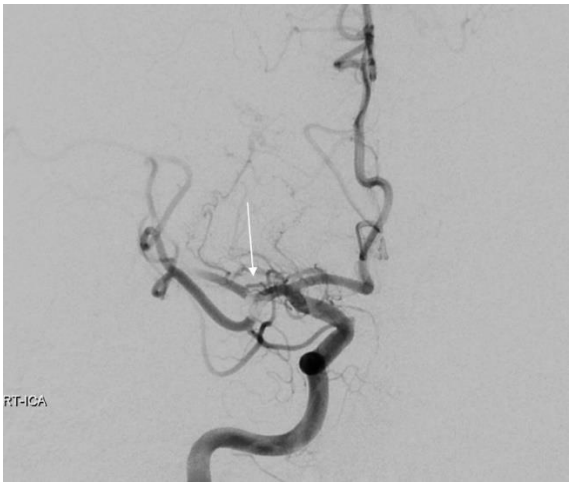

Figure 3: DSA AP view of the right carotid artery shows a sub-occlusive saddle shaped thrombus in the proximal right MCA (arrow).

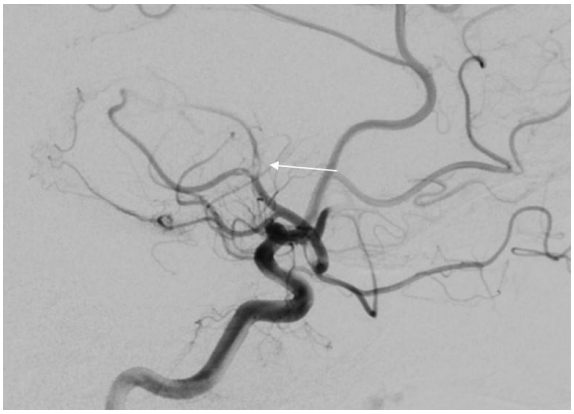

Figure 4: Second distal thrombus in the inferior division of the right MCA (arrow).

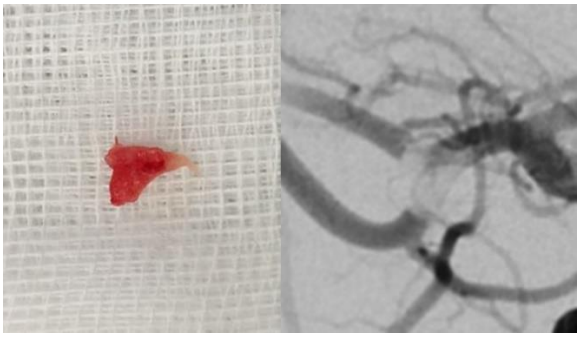

Figure 5: The exact same shape of the retrieved thrombus (left) and the angiographic view of thrombus (right) pointing on complete thrombus removal.

There were no further neurological episodes and no residual deficit after the intervention. The patient did not present any symptoms suggestive for endocarditis. Therefore, the retrieved material was not sent for histological analysis. Transesophageal echocardiography performed later revealed a mobile mass (less than a centimeter) on the atrial aspect of the prosthetic biological mitral valve, and a small thrombus in the left atrial appendage. Endocarditis work-up was negative. A conservative treatment was recommended with INR levels maintained on 3-4. At one month follow up the patient was good, without any neurological deficit. Verbal informed consent for publication was obtained then from the patient.

Discussion

The use of MT has become the gold standard for LVO in the anterior circulation since the publication of 5 randomized trials in 2015 (Campbell *et al*., 2015; Jovin *et al*., 2015; Berkhemer *et al*., 2015; Saver *et al*., 2015; Goyal *et al*., 2015). Nevertheless, the utility of this treatment remains unclear in some clinical situations. One of such is occlusion of LVO in patients with TIA or minor neurological symptoms, when collateral cerebral circulation is sufficient for some time to maintain cerebral perfusion at normal or almost normal level in the ischemic area. In such scenario, mechanical intervention is counterbalanced by the risk

of possible deterioration and completion of a large infarction but is counter-balanced by the possible procedural complications. Bhogal, *et al*. (2016) examined a cohort of patients with low NIHSS (<5) and confirmed M1 occlusion, and showed that MT achieved 75% of good clinical outcome (mRs 0-2) with 87.8% revascularization rate. To prove the benefit of mechanical intervention in such clinical scenario one should know the natural history, of a TIA or minor stroke caused by LVO. Some data may be found in the literature. For example, Haussen, *et al*. (2017) compared patients with LVO and NIHSS ≤ 5 treated conservatively or by MT. Forty-one percent of patients in the medical arm had clinical deterioration. A shift towards a lower NIHSS in patients who underwent primary thrombectomy as compared with those who received best medical therapy alone was demonstrated. And finally, 23% of patients primarily given medical treatment did not achieve independence at 90 days, whereas all patients in the thrombectomy group achieved mRs ≤ 2. On the other hand, recently published meta-analysis including data of eleven observational scomprising a total of 2019acute ischemic stroke patients with NIHSS score ≤ 5 treated with MT versus 3171 patients treated with best medical treatment showed that MT appears equivalent to BMT for patients with anterior circulation large-vessel occlusion AIS with low baseline NIHSS (Safouris *et al*., 2023). As for TIA, Thang Huy Nguyen, *et al*. (2020) described case when successful MT was done in patient with TIA and proximal middle cerebral artery occlusion followed by patients recovery. The author concludes that this case suggests that MT in LVO patients, even with NIHSS score of 0, on presentation is potentially a safe and effective treatment.

Conclusion

In conclusion, we present here the patient with three episodes of complete left hemiplegia that resolved spontaneously. Thus, it was high concern about imminent permanent deficit, when the best medica treatment options were absent. During the procedure, we were mainly worried about the risk of distal embolization. To minimize this risk, we used a BGC with reverse flow technic and carefully avoided crossing the thrombus with any of devices. Our case shows that MT may be highly effectively in patients with cluster TIAs resulted from LVO occlusion. Further randomized trial should establish definitive treatment for this category of patients.

Conflicts of Interest: The authors certify that there is no conflict of interest with any financial or other organization regarding the material discussed in the manuscript.

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