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Recanalization and Remarkable Outcome after Subocclusive Thrombus: A Case Report

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Abstract

Minimal literature exists regarding subocclusive thrombi and their management in acute ischemic stroke, and no randomized trials or guidelines are currently available. We present the case of an 83-year-old man with multiple vascular risk factors and recent cardiac surgery who presented with a severe left middle cerebral artery (MCA) syndrome due to a subocclusive thrombus. Intravenous (IV) tissue plasminogen activator was contraindicated given the patient's recent surgery, and endovascular therapy was deferred given improvement in symptoms. He was placed on IV heparin. His symptoms improved with recanalization of the MCA. Optimal management of subocclusive thrombi, which appear to have better outcomes than occlusive thrombi, has yet to be elucidated. Acute anticoagulation and endovascular therapy may both be reasonable; however, there are minimal data supporting the use of either and further studies are needed to develop the most favorable treatment algorithm. In the meantime, management decisions should be made on a case-by-case basis by multidisciplinary care teams.

Keywords

Acute ischemic stroke; subocclusive thrombus; intraluminal thrombus; anticoagulation; endovascular therapy; computed tomography

Introduction

Optimal management of subocclusive thrombi is unclear. We describe a stroke patient who improved significantly along with resolution of a subocclusive middle cerebral artery (MCA) thrombus.

Case Report

An 83-year-old man with hypertension, hyperlipidemia, and recent cardiac surgery presented to an outside hospital less than 1 hour after the onset of aphasia and right-sided weakness. The patient's National Institutes of Health Stroke Scale (NIHSS) score was 24. Intravenous (IV) tissue plasminogen activator was deferred given recent surgery. He was transferred to our hospital for consideration for endovascular therapy.

On arrival, the patient's NIHSS score was 17. Computed tomography angiography of the head showed a subocclusive left MCA thrombus (Fig 1, A,B) and diffusion-weighted magnetic resonance imaging demonstrated a left MCA infarct (Fig 1, C). Electrocardiogram showed atrial fibrillation. Endovascular treatment was deferred given his improving exam and subocclusive thrombus.

IV heparin was started; warfarin was later added for presumed cardioembolic stroke. On hospital day (HD) 2, the NIHSS score improved to 2 then to 0 on HD 4. Repeat computed tomography angiography showed resolution of the thrombus (Fig 1, D). On HD 5, the patient was discharged on enoxaparin to bridge to warfarin.

Discussion

Subocclusive thrombi, also called intraluminal and nonocclusive thrombi, cause partial vessel obstruction, although no Thrombolysis in Cerebral Infarction definition exists. These thrombi have varying etiologies, including atherosclerosis, dissection, and embolism.¹⁻⁴

Best management of subocclusive thrombi in stroke is unclear. Anticoagulation was chosen for our patient. Not enough high-quality studies exist to recommend treatment with heparin,⁵ but limited evidence supports its possible benefit. In 1 study, all patients achieved at least partial recanalization and 75% favorable outcomes after IV heparin.⁶ Thrombus resolved after IV heparin in at least 6 of 8 patients who underwent repeat angiography,⁷ and after IV heparin plus ticlopidine in another patient.² Some observational studies suggest that antiplatelets may also be helpful in treating subocclusive thrombi.^{1,2,7}

Even fewer studies address surgical management. Thrombus was present during endarterectomy and/or thrombectomy in 13 of 16 patients, but 6 perioperative strokes or TIAs occurred.⁷

After endovascular therapy, 95% or more of lesions consistent with subocclusive thrombi were at least partially recanalized in contrast to other clot morphologies.^{3,8} The clot outline sign (antegrade contrast distal to thrombus) predicts recanalization.⁹ Our patient's thrombus demonstrated similar characteristics as in these studies^{3,8,9} (Fig 1, B) and similarly resolved. Criteria for endovascular therapy and risk of distal embolization are unknown.

As in our patient, outcomes in subocclusive thrombi are generally good^{1,2,4,6,7} as compared to occlusive thrombi.^{3,8}

Treatment of subocclusive thrombi is unclear. Given their infrequency and good prognosis, prospective studies may not be feasible, so collecting cases is important to elucidate optimal management.

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Figure 1.

Resolving subocclusive thrombus. (A) CTA showing distal left MCA subocclusive thrombus with contrast seen distally, (B) detail of CTA showing thrombus in the left MCA, (C) diffusion-weighted MRI sequence demonstrating subtle hyperintensities in the left MCA territory, and (D) detail of CTA on HD 3 showing recanalization of the left MCA.

Abbreviations: CTA, computed tomography angiography; HD, hospital day; MCA, middle cerebral artery; MRI, magnetic resonance imaging.