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Case report Medical management of free-floating carotid thrombus

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A R T I C L E I N F O

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1. Introduction

Free floating thrombus of the carotid artery (FFT) is defined as an elongated thrombus attached to the arterial wall with circumferential blood flow at its distal most aspect, with cyclical motion relating to cardiac cycles. FFT is a rare condition and the actual incidence is not known. It is more frequently reported in men than women, with a ratio of nearly 2:1. The internal carotid artery is the most commonly affected (75%), with atherosclerosis being the most common associated pathology [1].

The guidelines for treatment of FFT are not clear due to the rarity of this condition and the lack of comparative studies between medical management (anticoagulation and/or antiplatelet) and surgical management (stenting, carotid endarterectomy or carotid bypass surgery). Anecdotal evidence supports early initiation of intravenous unfractionated heparin (IV-UFH) to prevent stroke recurrence in certain situations including acquired or inherited hypercoagulable states, extracranial cervicocephalic arterial dissection, and intraluminal arterial thrombus [2]. Urgent endarterectomy or endovascular embolectomy has both been reported as successful treatments for this condition [1,3]. In this report, we present 2 cases of FFT that were successfully treated with medical therapy and discuss the rationale for anticoagulation versus surgical intervention.

2. Case report

2.1. Case 1

A 63-year-old Caucasian male presented to the emergency department with complaint of dizziness, blurry vision, and leftsided weakness upon awaking. His past medical history was significant for sarcoidosis, which was diagnosed after splenic artery thrombosis due to circulating lupus anticoagulant. The patient was anticoagulated with warfarin therapy with a goal international normalized ratio (INR) of 2–3. His neurologic exam was significant for mild left hemiparesis involving the left face, arm, and leg. Initial studies revealed an INR of 2.3; all other laboratory testing was normal.

Magnetic resonance imaging (MRI) of the brain revealed punctate foci of acute infarction in the distal right MCA territory (Fig. 1A). A computed tomography angiography (CTA) of the head and neck demonstrated a luminal filling defect in the proximal right internal carotid artery (ICA), suggestive of acute thrombus with or without dissection (Fig. 1B). The patient was started on IV-UFH. Digital subtraction angiography (DSA) confirmed FFT in the proximal segment of right internal carotid artery without dissection (Fig. 1C). A repeat DSA one week later revealed complete resolution of the

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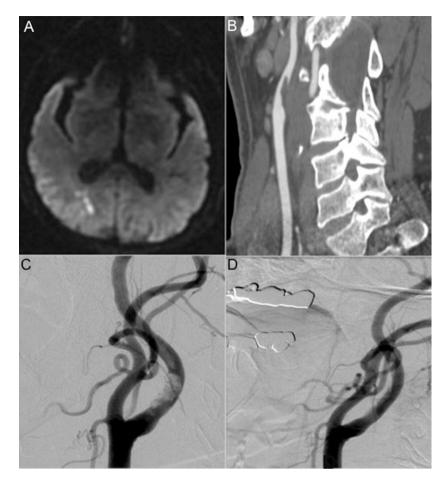


Fig. 1. (A) MRI DWI with small ischemic stroke; (B) CTA of neck with luminal filling defect; (C) angiogram of right CCA demonstrating FFT; and (D) repeat angiogram demonstrating resolution of thrombus.

carotid thrombus (Fig. 1D). As the patient developed this carotid thrombus despite being anticoagulated to his goal INR at presentation, this goal was increased to 2.5–3.5. The patient was discharged home on warfarin. At 3 months' follow-up, the patient was clinically stable with no new symptoms and a normal neurologic exam.

2.2. Case 2

A 37-year-old African-American male presented to an outside hospital with a history of 3 h of acute right hemiparesis and aphasia. He had a past medical history of hypertension, diabetes mellitus, and chronic renal insufficiency status post cadaveric renal transplant due to membranous glomerulonephropathy. The National Institute of Health Stroke Scale was 18 on presentation and he received IV-tPA. He was transferred to our institution for treatment. His neurologic exam was significant for global aphasia and severe right hemiparesis of the face, arm, and leg. He also had mild to moderate right hemi-anesthesia and hemi-inattention.

MRI of the brain demonstrated acute infarction of the left temporal, parietal and frontal lobes – not shown. MRA of the neck (Fig. 2) demonstrated an irregular thrombus in the left common carotid artery (CCA) concerning for FFT. The MRA of the head demonstrated an occluded distal left MCA. DSA (Fig. 3) confirmed the presence of FFT proximal to the carotid bifurcation and occlusion of the inferior division of the left MCA. He was started on IV-UFH after FFT was confirmed by DSA. Repeat MRA (Figs. 2 and 3) at 5 days demonstrated almost complete resolution of the left FFT as well as a revascularization of the inferior division of the left MCA. The cause of the stroke was cryptogenic as both the transesophageal echocardiogram and hypercoagulability evaluation were normal. Underlying arterial dissection could not be completely ruled-out given the presence of residual thrombus. He was then transitioned to oral anticoagulation and discharged to inpatient rehabilitation. Upon discharge his receptive qualities of language improved with minimal improvement in strength and resolution of sensory deficits.

3. Discussion

The diagnosis of FFT may be challenging with non-invasive cross sectional imaging. Intraluminal thrombus may be misinterpreted as primarily due to atherosclerotic stenosis or as an arterial dissection. CTA and MRA often fail to make these distinctions in a large number of cases. In both cases, the location of the thrombus in the carotid bulb and the proximal common carotid artery would be atypical for spontaneous dissection and prompted DSA [4]. High-resolution carotid wall imaging with CT and MRI may be helpful as they can distinguish between hematoma, lipid, and calcium; however, these techniques remain investigational and are of limited availability.

These 2 cases highlight the importance of considering this condition in patients with flow defects in the cervical arterial vasculature when non-invasive cross sectional imaging is not conclusive. We believe DSA remains the gold standard test in cases of suspected FFT [1]. Determining the underlying etiology for the FFT has important implications for both acute and chronic treatment in these cases.

Acute treatment may involve both medical and surgical/endovascular management, which have both been previously

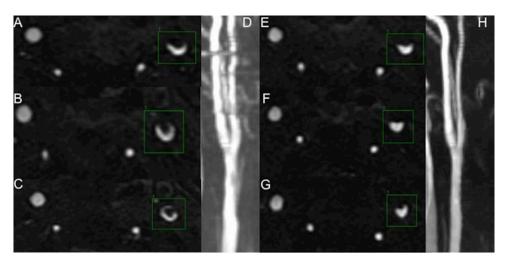


Fig. 2. Axial 2D time of flight MR images taken on admission (A–C) and on the 5th day (E–G). Reconstructed oblique views at admission (D) and at 5 days (H). Demonstrate luminal filling defect in left CCA and partial resolution at day 5.

shown to have successful results [1]. Our decision to treat these patients medically in the acute phase was due primarily to their stable neurologic condition upon presentation. Important radio-graphic predictors of clinical deterioration were also absent in both cases; specifically, a lack of flow limitation due to the thrombus in the cervical region (both cases) and the absence of proximal occlusion in the intracranial circulation (case 1) [5]. Addition-

ally, in the second case a large completed infarction was present and therefore acute reperfusion of the left MCA was contraindicated. We suspected that these 2 patients – one with known hypercoaguability and the other with suspected hypercoagulability – would both be refractory to anti-platelet medications, and that the thrombi would not embolize or propagate further with anticoagulation.

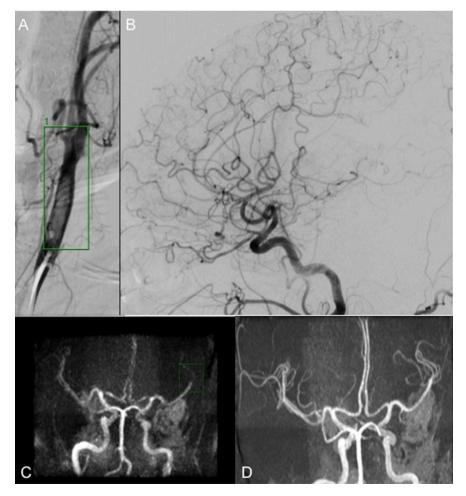


Fig. 3. DSA of left CCA lateral view: (A) demonstrating FFT in the distal CCA; (B) lateral view demonstrating left CCA demonstrates occluded L MCA inferior division; (C) 3D TOF MRA at presentation with L MCA branch occlusion; and (D) resolution at 5 days.

4. Conclusion

References

- There are reports of surgical treatment of FFT with endovascular embolectomy under flow reversal and endarterectomy. These strategies carry a real risk of distal embolization and stroke [3]. Both patients described in this report remained clinically stable on IV-UFH, had radiographic evidence of thrombus resolution (one partial and the other complete), and were successfully converted to long-term anticoagulation with warfarin to prevent recurrence. This report highlights the effectiveness of medical therapy in selected patients with FFT who are clinically stable and have low risk radiographic profile in regards to early recurrence of symptoms.
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