Caught Red-Handed: Angiography Reveals Large Thrombus in Carotid Web of Stroke Patient

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A 61-year-old man with no vascular risk factors presented with a devastating stroke syndrome (left hemiplegia and left hemi-neglect) caused by occlusion of the right middle cerebral artery (RMCA) (Figure 1A). Following an urgent thrombectomy, the artery was recanalized (Figure 1B) and the patient recovered full neurological function within 24 h. Right common carotid artery (CCA) angiography (Figure 1C) showed a shelflike protrusion into the lumen of the right internal carotid artery (ICA), consistent with a carotid web. Delayed phase imaging after contrast injection demonstrated severe stasis of contrast in the web pocket (Figure 1D).

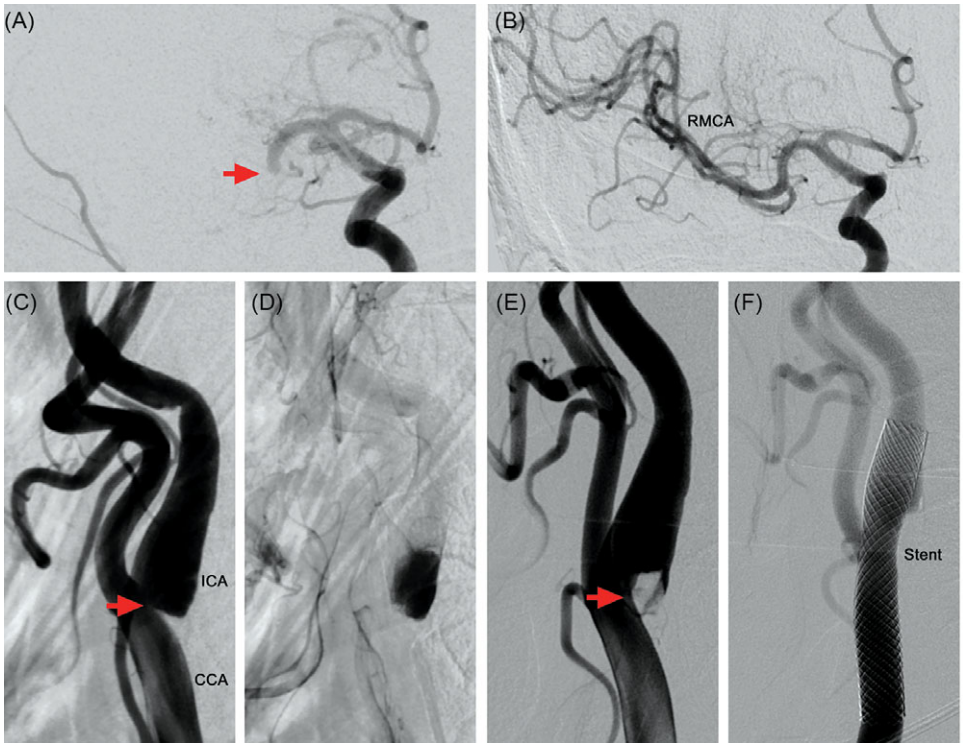

Figure 1: *Right carotid artery digital subtraction angiography (DSA). DSA showed complete occlusion (arrow) of the right middle cerebral artery (RMCA) (A), with full distal recanalization (TICI3) of the RMCA territory after thrombectomy (B). (C) DSA of the right internal carotid artery (ICA) showed a shelf-like protrusion into the lumen of the artery (arrow). (D) DSA of the common carotid artery (CCA) with delayed phase imaging showed severe contrast stasis in the carotid web pocket. (E) Repeat DSA 4 days later showed a large filling defect corresponding to the area of contrast stasis. (F) A stent was deployed to cover the web pocket and the thrombus, and prevent further embolization.*

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The patient was discharged home on antiplatelet therapy (aspirin). Two weeks later, he represented with an almost identical stroke syndrome. The CT angiogram showed a new RMCA occlusion and he underwent successful thrombectomy a second time. The carotid web was re-demonstrated during this second thrombectomy procedure and was found to be equally prominent and causing a similar stasis phenomenon as was seen when his first stroke occurred. Extensive cardiac testing including a Holter monitor and transesophageal echocardiogram did not identify a cardioembolic source. He also had no appreciable arterial atherosclerosis. Thus, we suspected the web to be the cause of his recurrent embolic strokes. As he had failed antiplatelet management, we booked him for carotid stenting. Thus far, each contrast injection of the right carotid artery showed stasis in the web pocket but no thrombus. Four days after his second stroke presentation, at the time of the stent procedure, the first angiographic run showed a large thrombus in the web pocket (Figure 1E) that had formed despite dual antiplatelet therapy. A stent was deployed across the thrombus to prevent future embolic strokes (Figure 1F). At a 3-month follow-up, he had no recurrent strokes, and the stent is shown to be patent on carotid Doppler (Figure 2).

The carotid web is a form of idiopathic fibromuscular dysplasia characterized by a "shelf" protruding into the lumen of the proximal ICA.[1] It is a putative mechanism of cryptogenic stroke.[2] As the web does not typically cause flow-limiting stenosis of the ICA, the most likely mechanism of stroke is blood flow stasis, leading to thrombus formation, and subsequent embolization to the intracranial vessels. This case report suggests the significant thrombogenicity of the carotid web due to stasis of blood flow in the web pocket. Carotid stenting for the treatment of symptomatic carotid webs is an area of ongoing research. Registry data suggest carotid stenting is safe and possibly favored over medical management.[3,4]

Statement of Authorship

JH, RF, GW wrote the manuscript and prepared the images. RF and GW assisted in writing the manuscript and guidance for the manuscript. AW was involved in patient care and creating Figure 2. JH, RF, GW, AW, RB all made significant contributions to the design and conception, and review of the manuscript. JH, RF, GW, AW, RB agree to be held accountable for the accuracy of all aspects of the manuscript.

Figure 2: *Carotid Doppler reveals patent stent. Doppler imaging of the right ICA, performed 3 months after stent placement shows a fully patent stent in the lumen of the artery (arrow), and no recurrence of the carotid web.*

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Disclosures

The authors have no conflicts of interest to declare.

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