

## Isolated carotid webs – An uncommon cause of recurrent strokes

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### Abstract

Carotid webs are an evolving diagnosis made more often now, than before the advent of angiography. The webs are defined as a small intimal outgrowth that forms an obstruction to the streamlined flow of blood in the carotid artery. Angiographically they are defined as a filling defect seen in the bulb of the ICA just after the bifurcation of the ICA. These webs by virtue of their disruption of the laminar flow of blood give rise to slow eddy currents that result in thrombosis and thrombo-embolism.

We present a patient who complained of recurrent strokes who was investigated extensively elsewhere without result. An angiogram of the carotid circulation showed a carotid intimal web at the posteromedial aspect of the ICA bulb, just distal to the common carotid artery bifurcation. The web was treated with an endovascular stent placement, which collapsed the web and its pocket of eddy currents completely thereby eliminating the danger posed by it.

The report highlights the difficult nature of diagnosis while looking at prevalence and incidence of webs in the carotid system. The therapeutic options as well as prognosis in the short and long term are also addressed in the accompanying literature review.

**Keywords:** Carotid webs, Stroke, Self expanding stent.

### Introduction

Carotid webs are an infrequently encountered cause of recurrent strokes. The diagnosis is in a process of evolution due to the improvement of angiography and its regular usage in diagnostic batteries involving recurrent stroke patients.<sup>1</sup> The knowledge of such structures obstructing the laminar flow of blood in the carotid artery has been around for decades. Momose and New first described the structure as a 'web' in 1973 and distinguished from intimal and medial diseases such as fibromuscular dysplasia.<sup>1</sup> Since then multiple diagnoses of webs as well as its association with strokes and localized thrombosis have been reported.<sup>2</sup> We report an isolated carotid web that caused recurrent strokes and was treated endovascularly. The patient had complete resolution of symptoms and is being followed up at regular intervals.

### Case Report

A 54-year-old male presented to the out patient clinic with history of recurrent strokes for the last 4 years. His strokes involved the ICA territory over the right side. Due to his young age and his recurrent strokes in the same territory on the same side, he was investigated in detail for the probable cause. The Doppler scan of the carotids didn't reveal anything structural but did detect eddy current at the ampula of the ICA just distal to the CCA bifurcation. A confirmatory DSA under antiplatelet and anticoagulant cover showed the web in situ. Deployment of a stent across the web compressed the region and stopped the eddy currents responsible for the thrombosis and

embolization. The patient was discharged the next day free from any cerebral ischemia or deficits.



**Fig. 1: A web seen at the carotid bulb with eddy currents and stasis of blood seen distally**

### Discussion

Carotid webs are defined as a small intimal outgrowth that forms an obstruction to the streamlined flow of blood in the carotid artery. Angiographically they are defined as a filling defect seen in the bulb of the ICA just after the bifurcation of the ICA.<sup>2</sup>

These webs by virtue of their disruption of the laminar flow of blood give rise to slow eddy currents that result in thrombosis and thrombo-embolism as illustrated in these diagrams. Recurrent thrombosis and embolism caused the infarcts as shown by the pre-procedure MRIs also appear to get larger and more critical. Simple anticoagulation and antiplatelet usage may not suffice, as the physical cause of the disease is still untreated.<sup>3</sup>

Treatment modality is often considered debatable as surgical endarterectomy and endovascular stenting both have comparable success rates.<sup>4</sup> The advantage of endarterectomy is that associated thrombi and atheroma are removed along with the web. The procedure is difficult in FMD where the web maybe calcified or involving other layers of the vessel wall necessitating bypass or even a resection and anastomosis of the affected segment, something that may not always be possible.<sup>5,6</sup>

Endovascular management, while not fully occluding the web and the distal eddy current zone of the flow achieves its aim in diverting the majority of the flow of blood away from the collapsed web thereby preventing thrombosis and embolism. The eventual thrombosis and internalization of the post web segment away from the blood flow completes a seemingly hassle free treatment of the disease. Continued antiplatelet and anticoagulant usage is on extreme importance in this modality as thrombosis of the stent can lead to devastating complications, which this procedure was meant to prevent in the long run. A similar study in 2015 shows the benefits of early therapy in treating this uncommon disease.<sup>7</sup>

Obstructive lesions in the carotid arteries responsible for strokes and TIAs are generally atherosclerotic plaques that lead to stenosis of the lumen. The management of such pathologies involves either an endovascular stenting of the stenotic segment or a carotid endarterectomy. Here however, an obstructive lesion here merely altered the flow of blood in the lumen leading to stagnation and thromboembolism. Hence not all strokes are associated with stenosis of the carotid lumen.

Thus, Luminal compromise alone doesn't determine the risk for strokes and TIAs in patients. Lesions such as webs need to be considered when investigating recurrent strokes/TIAs in patients.

## Conclusion

Carotid webs still remain an under diagnosed and hence undertreated cause of recurrent strokes. Regular use of conventional angiography and familiarity with the different techniques are key to their treatment and long-term success.

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