

Carotid Web Syndrome: Two Cases Treated with Carotid Endarterectomy

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ABSTRACT

Up to one-third of ischemic strokes are classified as cryptogenic in etiology, with most cases occurring in younger patients. Carotid web, a shelf-like projections of the carotid bulb lumen, may be an underappreciated risk factor for stroke in young patients without cardiovascular risk factors. Although different treatments such as carotid stenting were proposed, carotid endarterectomy seems to be the most used approach in symptomatic cases. A limited number of studies have evaluated the best management of carotid webs to prevent ischemic stroke. We described two cases of symptomatic carotid web in young patients without cardiovascular risk factors. The first patient, admitted for transient ischemic attack, was treated with thromboaspiration and, later, with carotid endarterectomy plus bovine patch angioplasty. The second patient, admitted for stroke, underwent mechanical thrombectomy and eversion carotid endarterectomy. Both patients were discharged without complications; no recurrence of cerebrovascular events was seen during the follow up. These cases emphasize the feasibility and effectiveness of carotid endarterectomy to correct a carotid web and prevent further stroke or transient ischemic attack; we also underline the importance of carotid web as important cause of cerebral embolization.

Keywords: Carotid Web; Ischemic Stroke; Cryptogenic Stroke; Carotid Thrombosis; Transient Ischemic Attack; Carotid Embolization; Endarterectomy

Introduction

Carotid web is pathologically defined as an intimal variant of fibromuscular dysplasia, which appears radiographically as a shelf-like filling defect on the posterior aspect at the origin of the internal carotid artery. The prevalence of these lesions is estimated to be on the order of 1%, although they may be overlooked in clinical practice as they are not typically associated with significant vascular stenosis [1,2]. Up to one-third of all patients presenting with ischemic strokes lack an identifiable cause, and the strokes are classified as cryptogenic in etiology, with most cases occurring in younger patients without traditional vascular risk factors [2].

Carotid web may be an underappreciated risk factor for stroke: available literature indicates that carotid web leads to ischemic stroke in young patients (aged <60 years) without the typical vascular risk factors. There is an association between carotid artery web and ischemic stroke in patients who lack an alternative cause of stroke. [1,3]. Hemodynamic changes such as blood flow stasis and turbulence in the rostral aspect of the carotid web result in thrombus formation and dislodgement, which can provoke artery-to-artery embolism to the anterior circulation. [1] Depending of the clinical presentation and the anatomical features, patients with symptomatic carotid web can be managed

with different methods; in the literature the treatment include fibrinolysis, thromboaspiration, mechanical thrombectomy, carotid endarterectomy and carotid stenting. We present two cases of symptomatic carotid web associated carotid thrombosis treated with carotid endarterectomy.

Case 1

A forty-eight years old woman, with no cardiovascular risk factors and no history of cardiovascular events, presented for strength deficit of the right upper limb (NIHSS = 2). No brain acute lesions were observed on the CT scan, at the CT angiography the left carotid bifurcation presented an 85% stenosis caused by the presence of a floating thrombus (Figure 1). The same day the patient was treated with thromboaspiration with percutaneous right femoral artery access; the procedure had no complications and it was effective in removing most of the carotid thrombosis. However part of the thrombus remained in place. Meanwhile the neurological symptom had regressed. After 6 days the patient was treated with left carotid endarterectomy with bovine patch angioplasty that allowed to remove the thrombus and an underlying carotid web (Figure 2). Two days after surgery the patient was discharged without symptoms or complications with dual antiplatelet therapy and lipid-lowering therapy. No complications or neurological symptoms were detected in the 1-year follow-up.

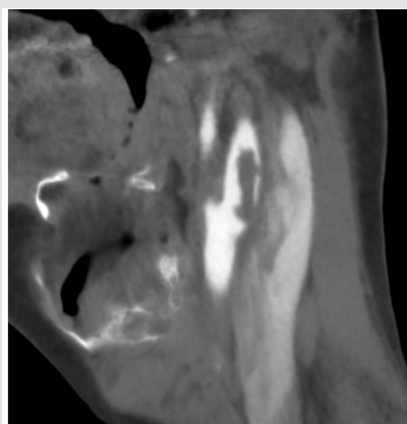


Figure 1: Case 1, left carotid floating thrombus at CT angiography.



Figure 2: Case 1, carotid bifurcation during endarterectomy.

Case 2

A fifty-five-year-old man, with no cardiovascular risk factors and no history of cardiovascular events, presented with left hemisome motor deficit. The brain CT scan and CT angiography detected M1-middle cerebral artery occlusion with left thalamic-insular ischemic lesion. Patients underwent mechanical thrombectomy. An improvement in symptoms was observed in the following days. After the exclusion of other embolic causes, patient was studied with a carotid doppler ultrasonography that detected the presence of a thrombus in right internal carotid artery (Figure 3); a new CT angiography was then performed (Figure 4). Ten days after the thrombectomy, patients was treated with right eversion carotid endarterectomy (Figure 5), the thrombus was removed and a carotid web was found and corrected. Five days after surgery the patient was discharged in stable conditions, mild weakness of the left upper limb without significant disability, no new neurological symptoms, with single antiplatelet therapy and lipid-lowering therapy. No complications or other neurological symptoms were detected in the 1-year follow-up.

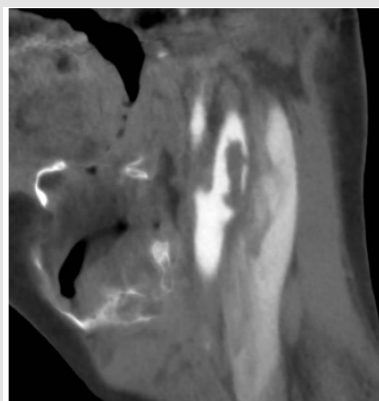


Figure 3: Case 2, doppler ultrasonography with thrombus in right internal carotid artery.

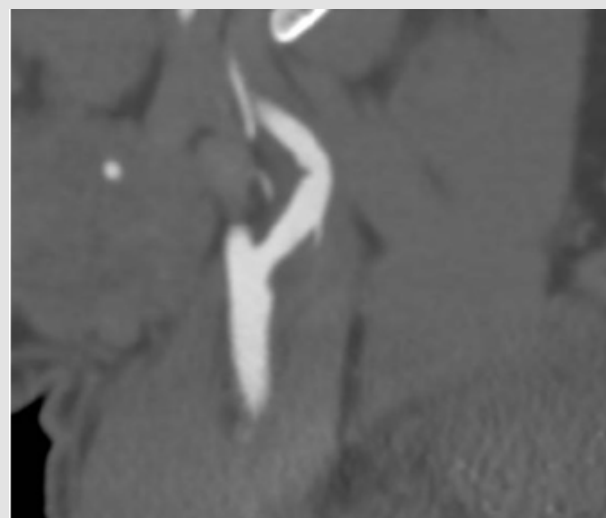


Figure 4: Case 2, right carotid thrombus at CT angiography.

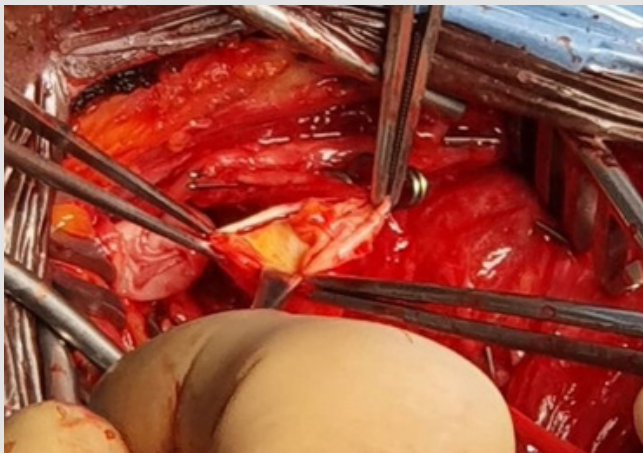


Figure 5: Case 2, eversion carotid endarterectomy.

Discussion

We presented two cases of carotid web associated with floating thrombus in young patient without cardiovascular risk factors. Even after extensive diagnostic workup, up to 30% of stroke cases are classified as undetermined, leaving these patients without specific treatment. [4] In their case-control study, Coutinho JM et Al. found an association between carotid artery web and ischemic stroke in patients who lack an alternative cause of stroke [3]. In a retrospective review performed by Hu H. et Al, incidence of carotid web in patients with transient ischemic attack (TIA) was 8.9% [5]. It seems clear that carotid web can be an important cause of cerebral ischemic events especially in young patients. While there is no evidence of a potential benefit in treating asymptomatic carotid web, literature suggest that medical management alone may not provide sufficient protection for patients with carotid web and ipsilateral ischemic stroke or TIA without other causes. A comparative cohort study that used data from the MR CLEAN trial (2010-2014) and MR CLEAN Registry (2014-2017) identified 30 patients with carotid web and ipsilateral stroke. These patients were not treated with carotid endarterectomy or carotid stenting, 93% received medical management and were compared with 168

patients without carotid web in the same registry: 17% of patients with carotid web had a recurrent stroke compared with 3% of patients without carotid web [6].

Although different treatments such as carotid stenting were proposed, carotid endarterectomy seems to be the most used approach to this pathology with good results. We described two cases of symptomatic carotid web treated with carotid endarterectomy plus bovine patch angioplasty and eversion carotid endarterectomy without complications and with no recurrence of cerebrovascular events during the follow up (one year for each patient). This may help to provide more evidence in order to figure out the best management of these patients. More data and studies are needed to understand the best treatment of symptomatic carotid web and whether a treatment of asymptomatic cases can give a benefit.

Conflict of Interest

The authors have no financial or proprietary interest in the subject matter of this article.

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