



(RESEARCH ARTICLE)



Carotid endarterectomy for symptomatic carotid web: A case report and review of the literature

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Abstract

Introduction: A carotid web is a shelf-like intraluminal projection located in the carotid bulb, considered a rare variant of fibromuscular dysplasia. It is increasingly recognized as an important cause of recurrent ischemic strokes, particularly in young patients without traditional vascular risk factors.

Materials and Methods: We report the case of a 50-year-old patient with recurrent transient ischemic attacks despite antiplatelet therapy. Initial cerebral computed tomography was unremarkable. Doppler ultrasound of the supra-aortic trunks demonstrated approximately 70% internal carotid artery stenosis. Subsequent angiographic evaluation identified a carotid web.

Results: Following multidisciplinary discussion, carotid endarterectomy was performed the patient underwent carotid endarterectomy, with no postoperative complications or recurrence of neurological events over a three-year follow-up period.

Conclusion: This case highlights the potential role of surgical intervention in preventing recurrence of cerebrovascular events in patients with symptomatic carotid web, supporting emerging evidence favoring interventional management strategies over medical therapy alone. Further studies are needed to establish standardized treatment guidelines.

Keywords: Carotid web; Cryptogenic stroke; Transient ischemic attack; Fibromuscular dysplasia; Carotid endarterectomy; Endovascular treatment

1. Introduction

A carotid web, also known as a carotid artery diaphragm, is a shelf-like, intraluminal projection located typically in the posterolateral wall of the carotid bulb. Classified as a non-atherosclerotic and non-inflammatory lesion, it is considered a rare variant of intimal fibromuscular dysplasia (FMD) [1].

A growing body of literature has refined our understanding of carotid web (CaW) epidemiology, imaging characteristics, hemodynamic mechanisms, and treatment outcomes. Reported prevalence estimates vary by population and imaging modality, with some recent cohort studies and systematic reviews finding CaW in approximately 0.6–2.0% of patients undergoing vascular imaging, and higher rates among selected cryptogenic stroke cohorts [2]. These differences likely reflect variation in case ascertainment, imaging resolution, and the proportion of stroke versus general screening populations [2].

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Pathophysiologic ally, carotid webs are believed to predispose to thrombus formation due to alterations in laminar flow resulting from the membrane-like projection into the lumen [3]. Recent work by Chen and Colasurdo (2024) further characterizes carotid webs as distinct intimal lesions capable of generating turbulent flow and blood stasis, thereby serving as a nidus for thromboembolism [4]. Their study, along with emerging radiological advancements, has underlined the growing utility of high-resolution imaging techniques such as computed tomography angiography (CTA) and magnetic resonance angiography (MRA) in distinguishing webs from atherosclerotic plaques or arterial dissections [5].

Given the association between carotid webs and recurrent ischemic events, clinical attention has shifted toward evaluating the most effective management strategies. While medical therapy with antiplatelet agents may be considered in selected cases, there is mounting evidence supporting the role of carotid endarterectomy (CEA) or endovascular stenting in preventing recurrent stroke [6,7]. Nevertheless, optimal treatment remains a topic of ongoing debate, requiring further prospective trials to guide evidence-based decision making.

2. Materials and methods

A 50-year-old patient was admitted to our facility for the management of internal carotid artery stenosis. He had been followed in the internal medicine department for a previous transient ischemic attack (TIA) and was placed on antiplatelet therapy, then referred to us after experiencing a second TIA, during which a Doppler ultrasound of the supra-aortic trunks revealed carotid artery stenosis.

3. Results

The clinical examination upon admission was normal. A cerebral CT-scan revealed no abnormalities. However, a Doppler ultrasound of the supra-aortic trunks demonstrated an estimated 70% stenosis of the carotid artery. Further evaluation through angiography identified a carotid diaphragm (Figure 1).

Following a multidisciplinary clinical discussion, the decision was made to perform a carotid endarterectomy.

The surgical procedure (figure 2) was uneventful, and the patient remained recurrence-free during a three-year follow-up period.



Figure 1 angiography image of the carotid web

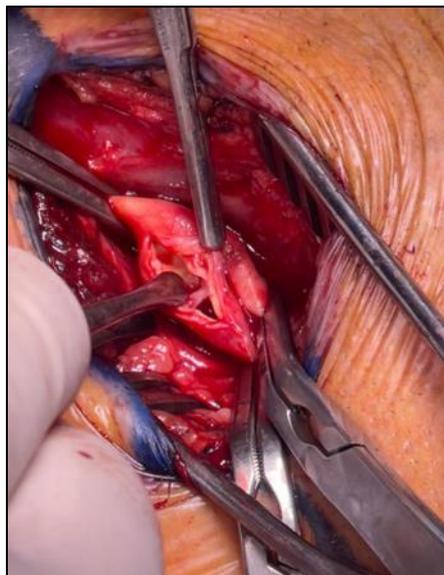


Figure 2 Perioperative image of the carotid web

4. Discussion

The carotid web was first described in 1968 as a subtle, shelf-like protrusion located at the posterolateral wall of the carotid bulb [1]. This case highlights the diagnostic and therapeutic complexities surrounding carotid webs, particularly in young patients presenting with embolic stroke and otherwise unremarkable vascular risk profiles. Our findings are consistent with prior observations, which suggest that carotid webs are frequently under-recognized and may contribute to a substantial proportion of strokes classified as cryptogenic [3,4].

The pathophysiological mechanism of stroke in patients with carotid webs has been extensively described in recent literature. Chen and Colasurdo (2024) have reviewed the histological characteristics and hemodynamic effects of carotid webs, noting their potential to disrupt distal flow and promote thrombogenesis [4]. Their conclusions reinforce growing sentiment that webs should be considered part of the differential diagnosis in younger stroke patients, especially when conventional stroke workup is inconclusive.

Clinical manifestations vary widely, from ischemic stroke or transient ischemic attack, to non-specific symptoms such as intermittent dizziness, as illustrated in a recently reported case successfully managed with stenting [6].

Regarding management, there remains no consensus on the most effective treatment strategy. Conservative management with antiplatelet therapy may provide some protection; however, recurrent strokes have been reported in patients managed medically [7]. Interventional approaches, particularly carotid endarterectomy, have shown promising outcomes with reduced rates of ischemic recurrence and acceptable post-procedural risks [6,7]. Endovascular stenting may also be considered, though its efficacy relative to surgery is still under investigation [6].

Clinical outcome data—primarily derived from retrospective series, systematic reviews, and single-center cohorts—indicate a substantially higher rate of recurrent ischemic events when symptomatic CAW is treated medically versus when treated with endovascular or surgical intervention. Several systematic reviews and recent cohort analyses report recurrence rates in medically managed symptomatic patients in the range of ~20–56%, whereas those managed with carotid artery stenting (including dual-layer stents) or carotid endarterectomy (CEA) demonstrate markedly lower recurrence and favorable short-term safety profiles in published series [4]. Nevertheless, the evidence is limited by selection bias, heterogeneous case definitions, and relatively small samples; randomized data are lacking [8].

Future research should focus on multicentric, prospective studies aimed at validating standardized diagnostic criteria and comparing long-term outcomes across different treatment strategies. Improved awareness and early detection of carotid webs could serve as a critical step toward reducing morbidity and improving quality of life in affected individuals.

5. Conclusion

Carotid webs are an underrecognized cause of embolic stroke, especially in patients without typical vascular risk factors. Although medical therapy may be considered initially, growing evidence favors interventional treatment such as carotid endarterectomy or stenting to minimize the risk of recurrent ischemic events. Future multicenter studies and dedicated registries are essential to establish evidence-based management guidelines for this vascular entity.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

All the procedures were carried out after the agreement of all individual participants included in the study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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