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Images of Interest / Imagens de Interesse

Basilar Artery Web Detected on CT Angiography: A Focal Intimal Pathology

Web da Artéria Basilar Detectada na AngioTC: Uma Patologia Intimal Focal

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Abstract

A 40-year-old woman with severe headache and a family history of cerebral aneurysm underwent non-contrast head CT, which did not demonstrate any acute abnormalities. Intracranial CT angiography revealed a small focal filling defect in the proximal third of the basilar artery, consistent with a thin intraluminal membrane, characteristic of a basilar artery web. The patient was managed conservatively and remains under clinical follow-up.

Keywords

Basilar artery; Intracranial arterial diseases; Headache; Angiography; Computed tomography.

Resumo

Doente de 40 anos, com cefaleia intensa e história familiar de aneurisma cerebral, realizou TC crânioencefálica sem contraste, a qual não evidenciou alterações agudas. A angiotomografia computorizada intracraniana revelou um defeito luminal focal no terço proximal da artéria basilar, correspondente a uma membrana intraluminal fina, compatível com web da artéria basilar. A doente foi mantida em tratamento conservador e permanece em seguimento clínico.

Palavras-chave

Artéria basilar; Doenças arteriais intracranianas; Dor de cabeça; Angiografia; Tomografia computorizada.

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Case Presentation

A 40-year-old woman presented with a sudden onset of severe headache. She denied focal neurological deficits or previous similar episodes. Her medical history was unremarkable, but she reported a family history of cerebral aneurysm. Non-contrast head CT showed no evidence of hemorrhage or infarction (not shown). Intracranial CT angiography (Fig. 1) revealed a small focal filling defect along the anterior wall of the proximal third of the basilar artery, characterized by a thin membrane protruding into the vascular lumen, consistent with a basilar artery web. No aneurysm, dissection, or significant stenosis was identified. The patient was managed conservatively with antiplatelet therapy and remains under clinical and imaging follow-up.

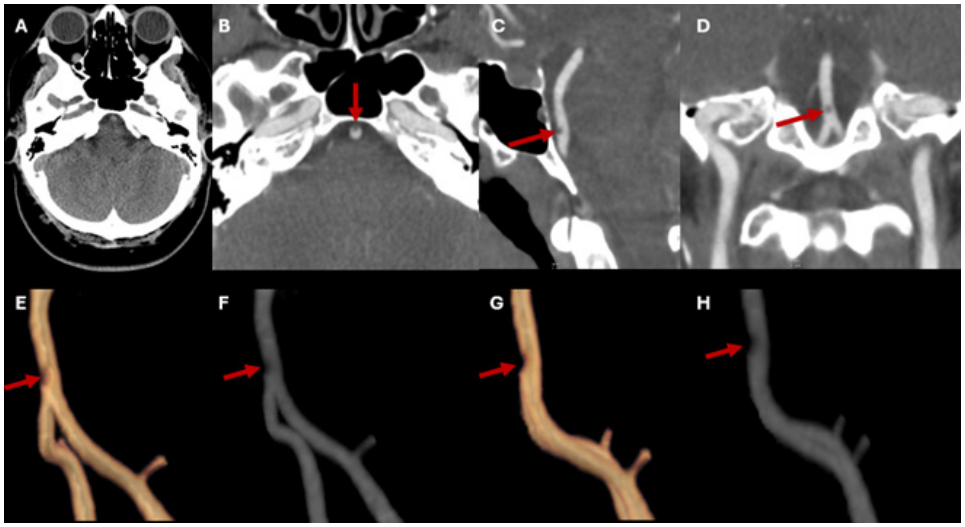

Figure 1 – Non-contrast head CT (A) and CT angiography (B–H) of the posterior circulation. The non-contrast CT shows no hyperdense abnormalities. On CTA (B), a small focal intraluminal filling defect is seen along the anterior wall of the proximal basilar artery (arrow). Zoomed-in views in sagittal, coronal, and oblique reconstructions (C–H) better demonstrate this focal luminal defect, whose appearance is consistent with a thin membranous web.

Discussion

The basilar artery web (BAW) is a rare and likely under-recognized pathological intimal lesion of the posterior circulation. It is characterized by a thin, smooth, membranous projection extending into the arterial lumen. Histologically, it is considered part of the fibromuscular dysplasia (FMD) spectrum, representing focal intimal hyperplasia without evidence of atherosclerosis or inflammation. Although carotid webs are more extensively documented, this entity is increasingly reported as potential sources of ischemia in young or middle-aged individuals lacking conventional vascular risk factors.

From a pathophysiological perspective, the shelf-like intimal projection may disturb laminar flow, generating areas of stasis and turbulence that predispose to local thrombus formation or distal embolization.[1,2,3] In addition, the membrane may compromise perfusion of perforating branches, contributing to brainstem ischemia. Computational fluid dynamics studies support these mechanisms by demonstrating regions of low wall shear stress, recirculation flow patterns, and steep wall shear stress gradients adjacent to the web.[4] These hemodynamic alterations may increase the likelihood of thrombosis or occlusion of perforating arteries. Some authors have also hypothesized that certain BAWs may represent variants within the spectrum of basilar artery fenestration—typically congenital and asymptomatic—but with potential clinical relevance when associated with ischemic events.[5]

Imaging plays a central role in diagnosis. On CT angiography (CTA) or digital subtraction angiography (DSA), a BAW typically appears as a smooth, small focal filling defect along the proximal/mid-basilar artery. Because our patient remained clinically stable, without focal neurological deficits or recurrent symptoms, no additional imaging studies—such as high-resolution MRI, digital subtraction angiography, or transcranial Doppler—were performed at that time. The CTA findings were considered sufficient to characterize the lesion and excluded immediate differential diagnoses, and further evaluation was reserved for follow-up should new symptoms arise. High-resolution black-blood MRI (HR-MRI) improves visualization of the membranous structure and aids in differentiating webs from thrombus, atherosclerotic plaque, or arterial dissection, in appropriate clinical scenario. Time-of-flight MRA (TOF-MRA) may demonstrate focal narrowing but is less sensitive for direct membrane depiction. In select anatomical investigations, intravascular angioscopy and histological analysis have confirmed layered vessel wall elements, supporting a congenital or developmental origin.

Although evidence remains scarce, current reports suggest that BAW management generally parallels carotid web treatment due to similar flow-related thromboembolic mechanisms. Most symptomatic patients have been successfully treated with antiplatelet therapy, including cases of brainstem infarction managed with aspirin alone.[1] Anticoagulation may be considered in the presence of recurrent embolic events or intraluminal thrombus, although supportive data for basilar lesions are limited. Endovascular approaches such as angioplasty or stenting have been described only in selected refractory cases, with no consensus favoring routine intervention. Given our patient's stability and absence of ischemia, conservative management with single antiplatelet therapy and follow-up was deemed appropriate.

Conclusion

Basilar artery web is a rare but important vascular anomaly potentially associated with posterior circulation ischemia. It should be considered in patients presenting with cryptogenic neurological symptoms or headache, particularly when imaging shows intraluminal abnormalities of the basilar artery. Early recognition is crucial for appropriate management and to avoid misdiagnosis, especially in distinguishing BAW from thrombus, dissection, or anatomical variants.

Ethical Disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

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Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

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