

# Carotid-Cavernous Fistulas: The Utility of Ocular Echography in Their Differentiation [Response to Letter]

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## Dear editor

We appreciate the discussion of Graziano et al on the use of ocular ultrasonography in the differentiation between direct and dural carotid-cavernous fistulas (CCFs). We agree that it can be a useful tool in the evaluation of CCFs. Although it is not the primary diagnostic modality, it can provide valuable information that aids in the diagnosis of these conditions. Ocular ultrasonography can demonstrate ocular findings associated with CCFs, such as proptosis, globe enlargement, thickened extraocular muscles, dilation of the superior ophthalmic vein, and abnormal pulsations. Moreover, intraocular tumors, scleritis, and endocrine myopathy can be excluded.<sup>1</sup> Ophthalmologists may use ocular ultrasonography as part of the diagnostic evaluation for CCFs, but it is not typically the primary or sole diagnostic modality.

Differentiating between direct CCFs (high-flow) and dural CCFs (low-flow) is crucial as it impacts the management approach. Additional imaging modalities such as computed tomography angiography (CTA) or magnetic resonance angiography (MRA) are typically used to provide more comprehensive assessment of the arterial anatomy, blood flow patterns, and potential venous drainage abnormalities. They can indicate the location of the shunts and confirm the type of CCFs.<sup>1,2</sup> If an intervention, such as endovascular embolization, is planned for CCFs treatment, more precise imaging modalities such as digital subtraction angiography (DSA) are often necessary to guide the procedure and ensure accurate embolization.<sup>3</sup>

The purpose of our retrospective study<sup>4</sup> is to compare the clinical characteristics of patients with direct and dural CCFs. The results show that patients with direct CCFs were younger, associated with trauma, and had more visual impairment at presentation. Chemosis, proptosis, bruit, and dilated retinal vessels were detected more in the direct CCF than in the dural CCF. Since ocular ultrasonography is not a routine diagnostic modality of CCFs in our setting, therefore the data is incomplete and not included in the analysis. However, information on the difference in clinical characteristics may help clinicians to initially discriminate the urgent direct CCFs and promptly refer the patients for further investigation and definite treatment.

## Disclosure

The authors report no conflicts of interest in this communication.

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