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Clinical Image

Optical coherence tomography angiography of conjunctival and episcleral vessels in carotid cavernous fistula

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CASE REPORT

A 44-year-old man, who had craniofacial trauma due to a motorcycle accident 1 month ago and cerebral arteriography that revealed a right carotid-cavernous fistula, presented with unilateral proptosis and diplopia. On ocular examination, the best-corrected visual acuity was 20/20 in both eyes. In the right eye, examination revealed restricted ocular motility, mild ptosis, 2-mm proptosis, dilation of the conjunctival and episcleral vessels in a medusa's head (Fig. 1A). Intraocular pressure was 30 mmHg in the right eye. Dilated fundus examination showed dilated retinal veins but no venous stasis retinopathy, intraretinal hemorrhages, central retinal vein occlusion, choroidal folds, choroidal effusion, choroidal detachment or optic disk swelling. The left eye examination was within normal limits.

Swept source optical coherence tomography angiography (SS-OCTA) in the nasal quadrant of the right eye showed increased blood flow in the conjunctival (0–150 μm) (Fig. 1B) and episcleral venous plexus (150–300 μm) (Fig. 1C) and in both of them (0–300 μm) (Fig. 1D). The increased blood flow is mostly detected on the B-scan (shown in the red area on the B-scan) (Fig. 1E).

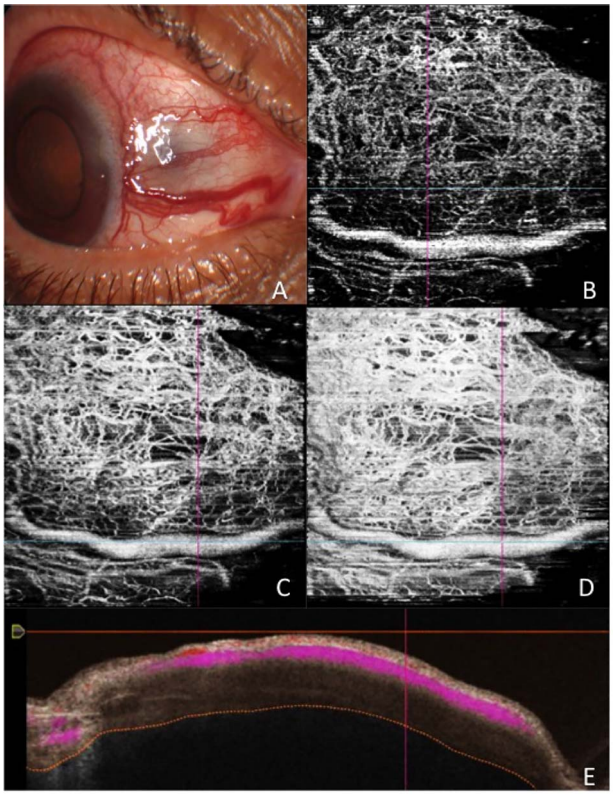

Figure 1. Conjunctival and episcleral vessels in a 'medusa's head'. Slit-lamp image (**A**) and SS-OCTA (**B**–**E**).

DISCUSSION

Episcleral venous pressure is a crucial determinant of intraocular pressure. It is described as a backpressure against which aqueous humor must flow. And intraocular pressure can be thought of as the pressure required to move aqueous humor out of the eye against the pressure in the episcleral vessel [1]. In the case of carotid cavernous fistula, there is an increased episcleral venous pressure that may cause raised intraocular pressure [2].

Here, we used SS-OCTA as a non-invasive and important method for an in-depth assessment of episcleral vasculature [3]. These non-contact imaging systems detect variations or changes in reflectivity to detect vascular flow. This allows for rapid, non-invasive evaluation of ocular pathologies with their associated

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vessels. Currently, SS-OCTA systems are optimized for the retina and optic disc. We adapted the SS-OCTA to perform scans in the anterior segment for corneal and limbal vessels by modifying the focal point on the ocular surface [4].

SS-OCTA showed increased blood flow and engorged episcleral vessels, which can explain the rise in intraocular pressure and secondary glaucoma. Randomized comparative studies with a larger number of patients are needed to confirm these observations.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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ETHICAL APPROVAL
STUDY APPROVAL STATEMENT

Study approval statement was not required for this study in accordance with local and national guidelines. Consent was obtained from the patient for publication of the details of his case report and any accompanying images.

GUARANTOR

Ahmed Bennis is the guarantor of the paper.

REFERENCES

1. Sit AJ, McLaren JW. Measurement of episcleral venous pressure. *Exp Eye Res* 2011;**93**:291–8. https://doi.org/10.1016/j.exer.2011.05.003 Epub 2011 May 20. PMID: 21621536.
2. Miller NR. Diagnosis and management of dural carotid-cavernous sinus fistulas. *Neurosurg Focus* 2007;**23**:E13. https://doi.org/10.3171/FOC-07/11/E13 PMID: 18004961.
3. Ang M, Sng C, Milea D. Optical coherence tomography angiography in dural carotid-cavernous sinus fistula. *BMC Ophthalmol* 2016;**16**:93. https://doi.org/10.1186/s12886-016-0278-1 PMID: 27387034; PMCID: PMC4936270.
4. Ang M, Cai Y, MacPhee B, Sim DA, Keane PA, Sng CC *et al.* Optical coherence tomography angiography and indocyanine green angiography for corneal vascularisation. *Br J Ophthalmol* 2016;**100**:1557–63. https://doi.org/10.1136/bjophthalmol-2015-307706 Epub 2016 Jan 28. PMID: 26823396.