

## Case Reports &amp; Case Series

## Optical coherence tomography angiography in optic nerve sheath meningioma



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## ABSTRACT

This study describes Spectral Domain-Optical Coherence Tomography (SD-OCT) and Optical Coherence Tomography Angiography (OCTA) features of Optic Nerve Sheath Meningioma (ONSM).

A 22-year-old woman, diagnosed with meningioma encircling the right optic nerve inside the intraorbital segment optic canal at the magnetic resonance imaging, showed a normal fundus examination.

Instead, SD-OCT and OCTA revealed alterations in the neurostructure and microvascular network of the optic nerve.

Despite funduscopy and fluorescein angiography, SD-OCT and OCTA represent valid, non-invasive and reliable methods to evaluate neurostructural and vascular irregularities in this benign tumor of the optic nerve.

## 1. Case report

Optic nerve sheath meningioma (ONSM) is a benign tumor originated from arachnoid cells of optic nerve sheath; it accounts for about 2% of orbital tumors and 1%–2% of meningiomas [1–3].

Loss of vision, optic atrophy and optociliary veins are ONSM's typical clinical features [4].

The optociliary veins represent a compensatory mechanism for chronic venous compression caused by ONSM [5].

We present a 22-year-old woman referred for an optic nerve anomaly in the right eye.

Best-corrected visual acuity was 20/200, the anterior segment did not show any alteration, strabismus, exophthalmos and relative afferent pupillary defect were not present.

Fundus examination revealed a normal optic disc without oedema, blurred margin and optociliary shunt vessels (Fig. 1a,b).

The magnetic resonance imaging axial scan showed the meningioma encircling the right optic nerve inside the intraorbital segment optic canal (Fig. 1c).

At Spectral Domain-Optical Coherence Tomography (SD-OCT) ex-

amination, all Ganglion Cell Complex and Circumpapillary Retinal Nerve Fiber Layer parameters were reduced in all sectors (Fig. 1d,e).

Optical coherence tomography angiography (OCTA) scans of the peripapillary retina revealed a rarefaction of the microvascular network with a significant reduction of the vessel density without any microvascular abnormality (Fig. 1f,g).

Similarly, there was an important visual field defect that involved most of the quadrants (Fig. 1h).

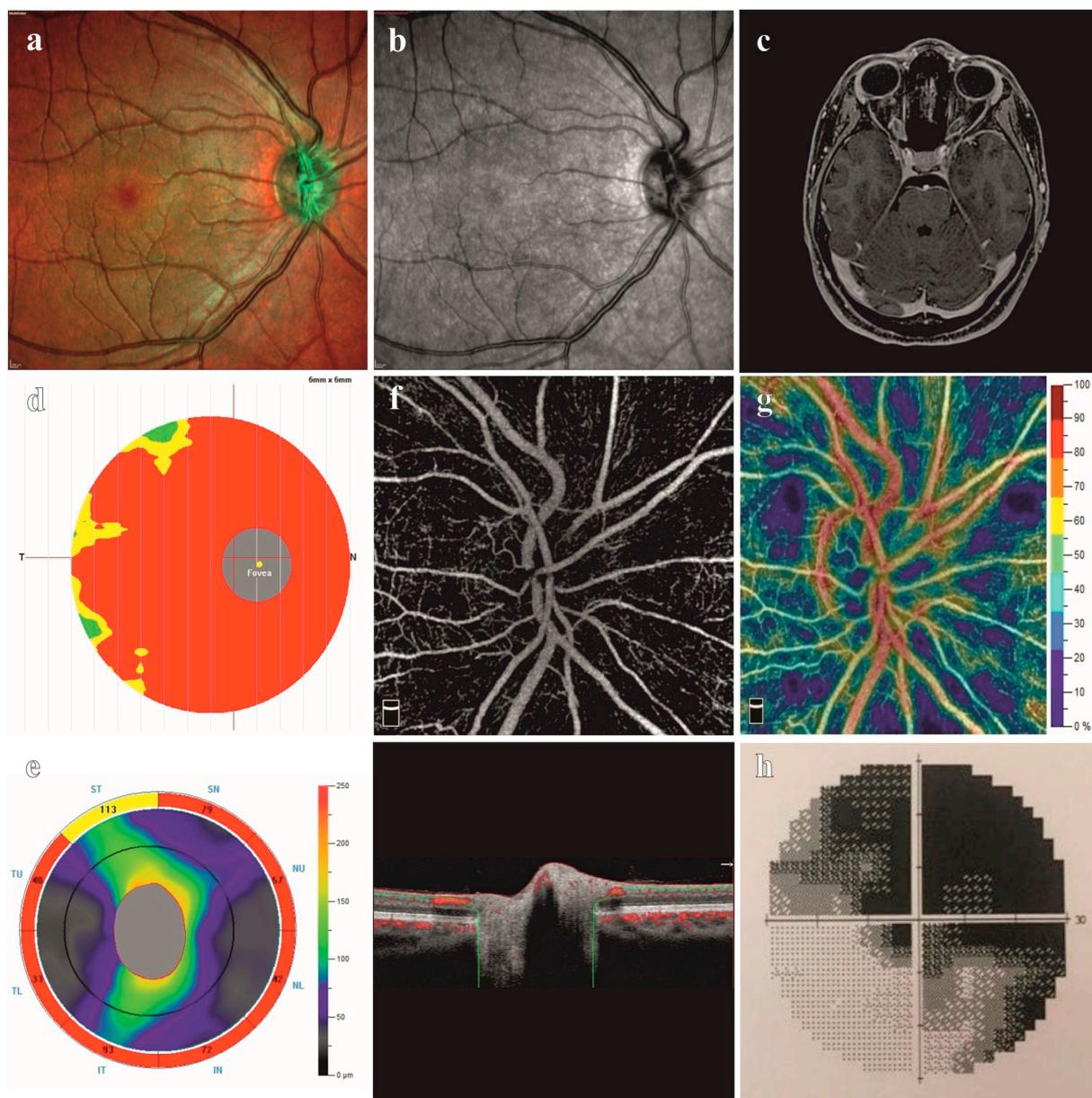
Although the fundus examination revealed a normal optic disc, OCTA and SD-OCT parameters suggested that both cellular layer and vasculature of the optic disc are altered in ONSM, probably due to the pathological compressive mechanism of the tumor.

These OCTA findings could support the hypothesis that are present significative impairments of the microvascular network in the peripapillary region before the appearance of the vascular compensatory mechanism, as the optociliary veins.

We suggest that OCTA may be useful to evaluate vascular irregularities in this tumor of the optic nerve.

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**Fig. 1.** Multicolor (a) and infrared (b) image of the optic disc in right eye showed a normal optic disc without oedema, blurred margin and optociliary shunt vessels. The retinal vessels arose from the disc margin in normal number with regular course. The magnetic resonance imaging axial scan showed the meningioma encircling the right optic nerve inside the intraorbital segment optic canal (c). Optical coherence tomography angiography (OCTA) scans (d) of the peripapillary retina revealed a rarefaction of the microvascular network with a significant reduction of the vessel density (e). Spectral domain optical coherence tomography (SD-OCT) showed a reduction of the Ganglion Cell Complex (GCC) and Circumpapillary Retinal Nerve Fiber Layer (cpRNFL) parameters in all sectors (f,g). Significant defects at the visual field involved most of the quadrants (h). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

#### Declarations of interest

None.

#### References

- [1] J.E. Wright, N.B. Call, S. Liaricos, Primary optic nerve meningioma, *Br. J. Ophthalmol.* 64 (8) (1980) 553–558.
- [2] R.T. Parker, C.A. Ovens, C.L. Fraser, C. Samarawickrama, Optic nerve sheath meningiomas: prevalence, impact, and management strategies, *Eye Brain* 10 (2018) 85–99.
- [3] S. Beccari, L. Cima, I. Posenato, F. Sala, C. Ghimenton, M. Brunelli, A. Eccher, Pediatric optic nerve sheath meningioma, *J. Neuro-Oncol.* 34 (3) (2014) 315–316.
- [4] D.M. Jacobi, Optic nerve sheath meningioma, *Clin. Exp. Optom.* 102 (2) (2019) 188–190.
- [5] R. Muci-Mendoza, J.F. Arevalo, M. Ramella, D. Fuenmayor-Rivera, E. Karam, P.L. Cardenas, M.V. Recio, Optociliary veins in optic nerve sheath meningioma. Indocyanine green videoangiography findings, *Ophthalmology* 106 (2) (1999) 311–318.