



Optical Coherence Tomography-Angiography of a large retinal microaneurysm



J. Daniel Diaz, Patrick Oellers, Rebecca Silverman, John B. Miller*

Massachusetts Eye and Ear, Department of Ophthalmology, Harvard Medical School, Boston, MA, United States

ARTICLE INFO

Keywords:

Retinal microaneurysm
Optical coherence tomography-angiography

ABSTRACT

A 63-year-old healthy woman was referred for a retinal examination. Dilated fundus examination of the left eye revealed small retinal hemorrhage with surrounding exudation, most consistent with a large retinal microaneurysm, which was confirmed by fluorescein angiography and optical coherence tomography angiography (OCT-A). OCT-A has the potential to clearly delineate the anatomy of retinal aneurysms and could be used for diagnosis and surveillance, possibly replacing the current gold-standard fluorescein angiography.

1. Case report

A 63-year-old healthy woman was referred for a retinal examination. She denied any vision changes. On examination, best-corrected visual acuity was 20/20 OU. Biomicroscopy of the anterior segment was unremarkable apart from mild nuclear sclerosis of both eyes. Dilated fundus examination of the left eye revealed small retinal hemorrhage with surrounding exudation, most consistent with a large retinal microaneurysm, which was confirmed by fluorescein angiography and optical coherence tomography angiography (OCT-A) (Fig. 1). The patient was referred to her internist for workup of cardiovascular risk factors. The lesion was observed with plans for laser treatment for foveal threatening complications such as progression of lipid exudates or development of intraretinal fluid.

2. Discussion

Retinal microaneurysms, small saccular outpouchings that arise from the retinal capillary system, are most commonly seen in patients with underlying systemic conditions such as diabetes mellitus, hypertension, and atherosclerosis.¹ This case is interesting, since the aneurysm is fairly large, yet isolated without any other fundus abnormalities consistent with vascular disease. While microaneurysms can be visualized on fundus examination, further imaging modalities such as fluorescein angiography and OCT-A can be used to confirm the diagnosis, especially if they occur in the setting of hemorrhage and/or exudation.²⁻⁴ The recent development of OCT-A provides a quick and noninvasive option for the detection and monitoring of retinal microvasculature changes. As shown in this case, OCT-A has the potential to

clearly delineate the anatomy of retinal aneurysms and could be used for diagnosis and surveillance of such lesions, possibly replacing the current gold-standard fluorescein angiography in appropriate cases.

3. Conclusion

OCT-A imaging allows for efficient and noninvasive detection of a large retinal microaneurysms and provides detailed anatomical information.

3.1. Legend

Fundus photography demonstrates a small hemorrhage with surrounding intraretinal hard exudates (Fig. 1A). Fluorescein angiography showed correlating hyperfluorescence, consistent with a retinal microaneurysm (Fig. 1B). Optical Coherence Tomography-Angiography (OCTA; Avanti, Optovue, Fremont, CA) with segmentation of the superficial retinal layers accurately depicts the exact anatomy of the microaneurysm (Fig. 1C, with higher magnification inset). Structural *en-face* OCT (Fig. 1D) reveals exudation nearby. OCTA B-scan (Fig. 1E) indicates blood flow through the aneurysm (arrow) and a high resolution OCT image demonstrating hard exudates and focal retinal edema is shown in Fig. 1F.

Declaration of competing interest

The following authors have no financial disclosures: JDD, PO, RS, JBM.

* Corresponding author. Mass. Eye and Ear Infirmary, Harvard Medical School, 243 Charles St, Boston, MA, 02114, United States.

E-mail address: john_miller@meei.harvard.edu (J.B. Miller).

<https://doi.org/10.1016/j.ajoc.2020.100690>

Received 19 September 2017; Received in revised form 21 January 2019; Accepted 2 April 2020

Available online 03 April 2020

2451-9936/© 2020 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

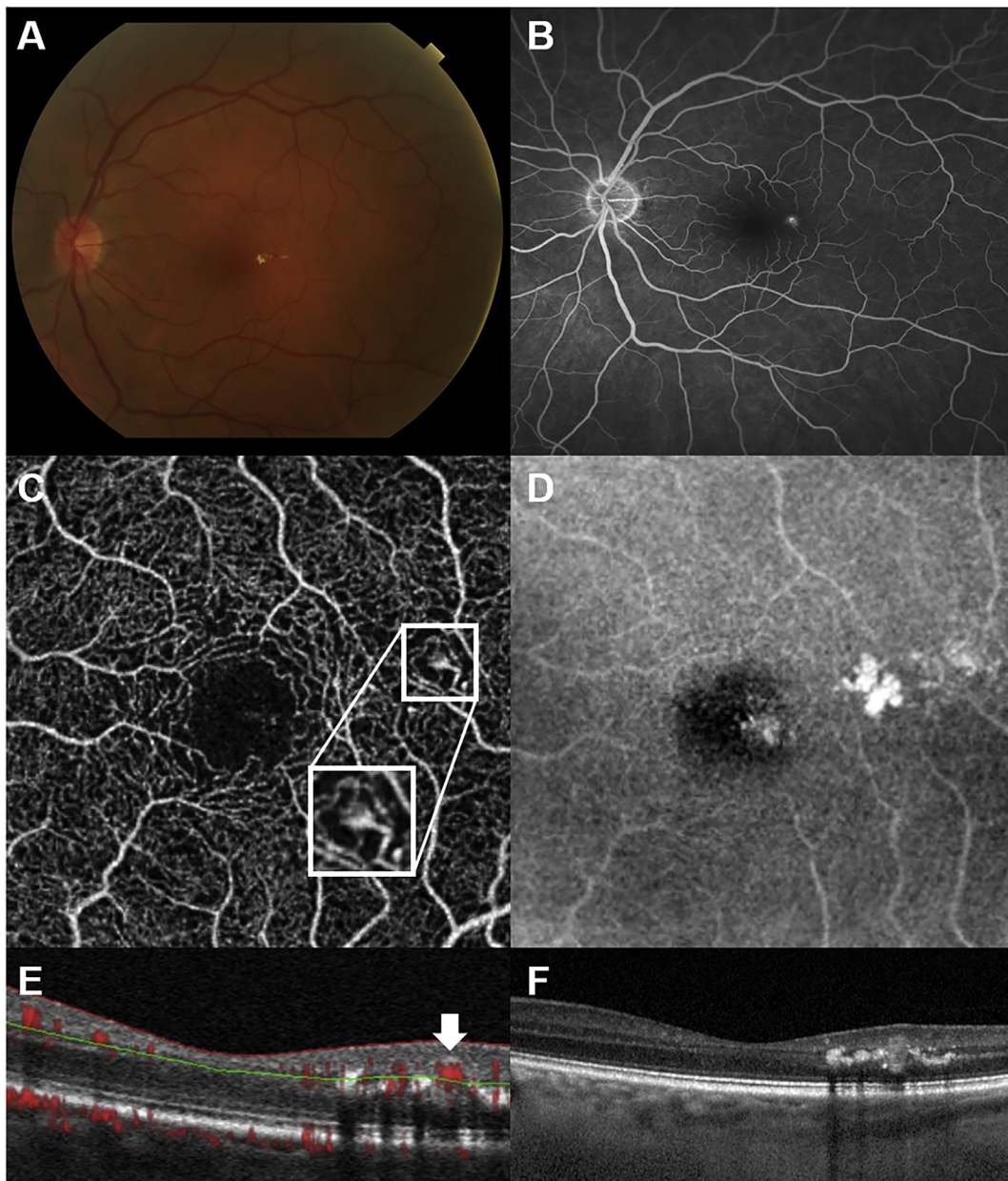


Fig. 1. Multimodal imaging of large retinal microaneurysm.

Acknowledgements

Acknowledgements: None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajoc.2020.100690>.

Funding

No funding or grant support.

Authorship

All authors attest that they meet the current ICMJE criteria for

Authorship.

References

1. Ishibazawa A, Nagaoka T, Takahashi A, et al. Optical coherence tomography angiography in diabetic retinopathy: a prospective pilot study. *Am J Ophthalmol.* 2015 Jul;160(1):35–44.
2. Parravano M, De Geronimo D, Scarinci F, et al. Diabetic microaneurysms internal reflectivity on spectral-domain optical coherence tomography and optical coherence tomography angiography detection. *Am J Ophthalmol.* 2017 Jul;179:90–96.
3. Schreur V, Domanian A, Liefers B, et al. Morphological and topographical appearance of microaneurysms on optical coherence tomography angiography. *Br J Ophthalmol.* 2018. <https://doi.org/10.1136/bjophthalmol-2018-312258> June 2018, pii: bjophthalmol-2018-312258, [Epub ahead of print].
4. Nesper PL, Soetikno BT, Zhang HF, Fawzi AA. OCT angiography and visible-light OCT in diabetic retinopathy. *Vis Res.* 2017 Oct;139:191–203.