



Foveal avascular zone (FAZ) assessment with optical coherence angiography in patients with multiple sclerosis

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To the Editor:

We have read with great interest the article entitled “Assessments of Vessel Density and Foveal Avascular Zone Metrics in Multiple Sclerosis: An Optical Coherence Tomography Angiography Study” by Yilmaz et al. [1]. They reported that vessel densities (VD) of both macular and peripapillary areas were reduced in multiple sclerosis (MS) patients, but the foveal avascular zone (FAZ) metrics (area, perimeter and circularity index-CI) did not significantly differ between the MS and healthy groups.

We have just analyzed the OCT results yielded by Cirrus AngioPlex (Carl Zeiss Mediatec, Dublin, CA, USA) in 12 MS patients with monocular optic neuritis recruited before COVID pandemic. Similar to Yilmaz et al. [1], the VDs were significantly reduced in comparison with 12 healthy controls matched by age and gender, and the mean area and perimeter of FAZ did not differ between MS and controls. By contrast, the mean CI of FAZ was significantly reduced in the MS (0.68 ± 0.06) compared to controls (0.73 ± 0.06 ; $p = 0.012$) despite the small size sample.

Although Yilmaz et al. did not investigate differences between MS + ON and healthy eyes, (0.47 vs 0.49, respectively), this difference was small (0.02). We like to emphasize that the mean CI for healthy eyes obtained by Yilmaz et al. was 0.24 smaller than ours (0.49 vs 0.73). This discrepancy could be attribute to differences between OCT-A devices (Cirrus AngioPlex vs RS-3000 Advance

Nidek). Although both OCT-A devices have shown good reproducibility in the FAZ assessment, their measurements are not interchangeable [2]. Differences in values and diagnostic accuracy in MS between several OCT devices are well known [3, 4].

A decrease in circularity index represents a disruption of the parafoveal capillary network with focal losses and could be a marker of early vascular damage. Despite the small sample size evaluated, as the other structural and vascular parameters are consistent with previously reported findings [1, 5], we consider that a significant reduction of CI in the FAZ deserves more research. Larger longitudinal studies are required to improve our knowledge about the role of CI as a potentially useful tool in MS patients.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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References

1. Yilmaz H, Ersoy A, Icel E. Assessments of vessel density and foveal avascular zone metrics in multiple sclerosis: an optical coherence tomography angiography study. *Eye (Lond)*. 2020;34:771–8.
2. Corvi F, Pellegrini M, Erba S, Cozzi M, Staurengi G, Giani A. Reproducibility of vessel density, fractal dimension, and foveal avascular zone using 7 different optical coherence tomography angiography devices. *Am J Ophthalmol*. 2018;186:25–31.
3. Rebolleda G, González-López JJ, Muñoz-Negrete FJ, Oblanca N, Costa-Frossard L, Álvarez-Cermeño JC. Color-code agreement among stratus, cirrus, and spectralis optical coherence tomography in relapsing-remitting multiple sclerosis with and without prior optic neuritis. *Am J Ophthalmol*. 2013;155:890–7.
4. González-López JJ, Rebolleda G, Leal M, Oblanca N, Muñoz-Negrete FJ, Costa-Frossard L, et al. Comparative diagnostic

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accuracy of ganglion cell-inner plexiform and retinal nerve fiber layer thickness measures by Cirrus and Spectralis optical coherence tomography in relapsing-remitting multiple sclerosis. *Biomed Res Int.* 2014;2014:128517.

5. Feucht N, Maier M, Lepenmetier G, Pettenkofer M, Wetzlmair C, Daltrozzo T, et al. Optical coherence tomography angiography indicates associations of the retinal vascular network and disease activity in multiple sclerosis. *Mult Scler.* 2019;25:224–34.