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OCT Angiography to Distinguish Choroidal Neovascularization from Macular Inflammatory Lesions in Multifocal Choroiditis

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Purpose

To characterize the macular lesions in multifocal choroiditis (MFC) using multimodal imaging (MMI) and to evaluate optical coherence tomography angiography (OCTA) in distinguishing neovascular from inflammatory lesions.

Methods

Patients diagnosed with MFC and macular involvement underwent MMI, including fundus color photography, fundus autofluorescence (FAF), fluorescein angiography (FA), and spectral domain-optical coherence tomography (SD-OCT)- and OCTA. Multimodal imaging and OCTA characteristics of inflammatory active/inactive lesions and active/inactive choroidal neovascularization (CNV) were compared.

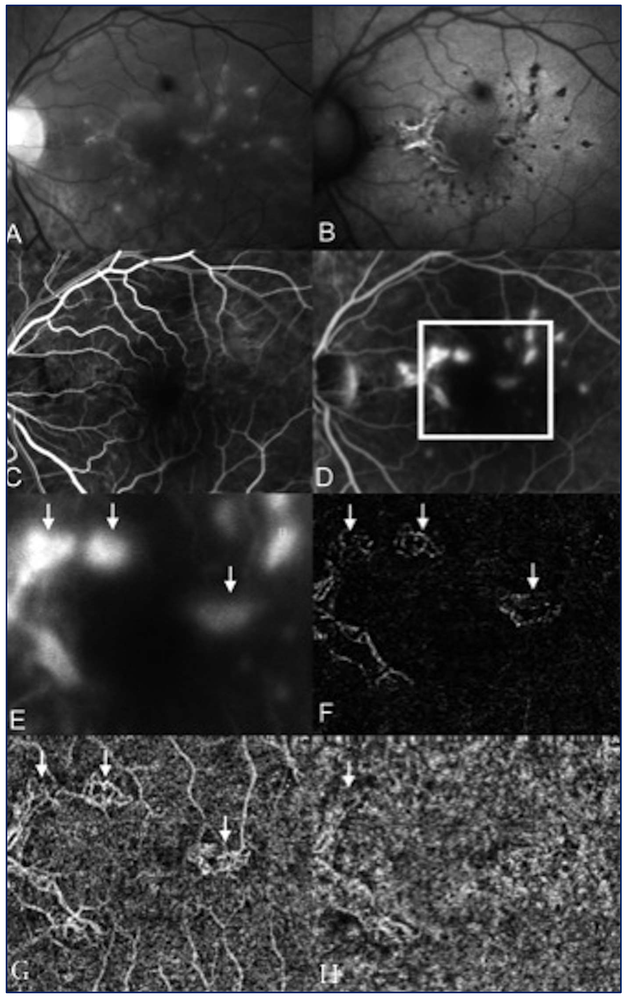

Figure 1. Multimodal imaging (MMI) and OCTA of inflammatory spots and neovascularization in MFC.
MMI of a 31 year-old myopic woman with a MFC of her left eye at first visit. Red-free fundus photography (A).The FAF (B) shows that lesions are hypoautofluorescent and that some lesions appear with a hyperautofluorescent ring (B). Fluorescein angiography at the early phase (C) shows that nearly all the lesions are hyperfluorescent. The linear larger lesion nasal to the fovea appears with a different pattern, showing an early well-demarcated hyperfluorescent lacy area and dark halo very suggestive of CNV (C). At the late phase (D), all lesions show late leakage. Based on conventional MMI, it was difficult to differentiate inflammatory lesions and CNV among all the lesions located temporally and superiorly to the fovea. A comparison of the magnified views of the fovea on FA (E) and OCTA (F) segmented at the level of the outer retina (F), 0-30 microns sub-RPE manual segmentation (G) and the choriocapilaris (H) shows the superiority of OCTA to distinguish between 3 highly organized, dense, high flow neovascular networks.

Results

Eighteen eyes of 13 patients (11 female) were analyzed. The mean age was 42.9 ± 13.4 years. Using OCTA, an abnormal blood flow was observed in all active CNV (9/9), most inactive CNV (5/6) but also in 2/14 lesions previously classified as active inflammatory lesions. On the contrary, no case of inactive inflammatory lesions showed abnormal blood flow. Therefore, the use of OCTA allowed a diagnosis of CNV that was not made through conventional MMI in 14% of cases of active inflammatory lesions. Nevertheless the comparison of OCTA features (collaterals, peripheral arcade, loops, dilated vessels, feeder trunk, dark halo) of active and inactive CNV were not statistically different.

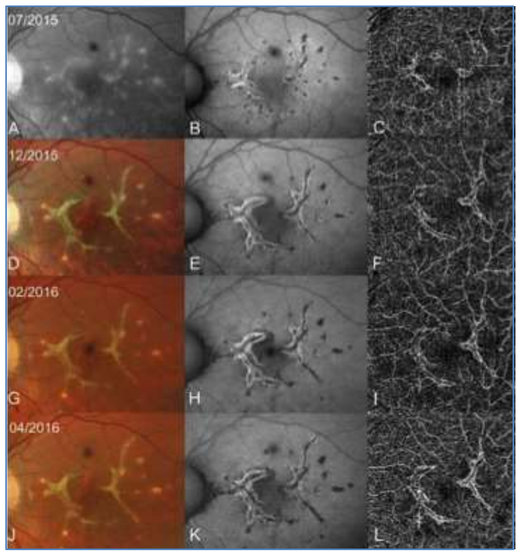

Figure 2: Extension of neovascular lesions into preexisting inflammatory spots in multifocal choroiditis.
Longitudinal color fundus photography, autofluorescence and OCTA imaging at baseline (A, B, C), 5 months (D, E, F), 7 months (G, H, I) and 9 month-follow-up (J, K, L) of the patient displayed in Figure 1. Note the extension of the 2 initial neovascular networks at baseline into preexisting inflammatory spots adjacent to them over time. The extension of the two neovascularizations can be best appreciated on OCTA 6 mm macular scans segmented at the level of the outer retina. It also corresponds to the extension of linear lesions extending on fundus autofluorescent imaging with hyperautofluorescent borders. Note that CNV are multifocal.

Conclusion

The combined findings of conventional imaging and OCTA demonstrate distinctive features of inflammatory lesions and CNV in MFC, allowing an appropriate management of these sight-threatening lesions. However, OCTA alone did not distinguish between active and inactive CNV and should be integrated into a MMI approach.

References

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