Choroidal macrovessel: a multimodal imaging analysis

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The authors declare no conflict of interest on this study.

Purpose: Choroidal macrovessel (CMV) is a vascular anomaly characterized by a large serpiginous choroidal vessel with early filling on indocyanine green angiography (ICGA). According to the several reports on CMV, the etiology of CMV seems to be stagnations of choroidal veins due to blood flow obstruction or local vasodilation; however, little is known about the choroidal circulation and hemodynamics. The aim of this study is to analyze the choroidal circulation and hemodynamics in a case with CMV using laser speckle flowgraphy (LSFG).

Methods: A 39-year-old woman with CMV was examined by funduscopy examination, swept-source optical coherence tomography (SS-OCT), fluorescein angiography (FA), ICGA, and LSFG.

disease spectrum.

Results: SS-OCT showed a dilated hollow configuration in the Haller’s layer, and retinal pigment epithelium (RPE) elevation corresponding to the choroidal lesion. ICGA displays a focal warm-color pattern, consistent with the abnormal choroidal lesion (F).

Discussion

In the present case, ICGA showed initial hyperfluorescence and late hypofluorescence corresponding to the CM site in synchronization with the dynamics of choroidal circulation. LSFG showed a warm-color pattern indicating hyper-perfusion, consistent with the lesion's hollow structure. These imaging modalities indicated that the CM lesion is a choroidal vascular dilatation with ample blood flow. Therefore, this study demonstrated for the first time that CM is characterized by the hemodynamics of focal hyper-perfusion.

In contrast to inflammatory diseases exhibiting choroidal hypo-perfusion, we have shown that the opposite state of choroidal hyper-perfusion is the characteristic hemodynamics of central serous chorioretinopathy (CSC) [6], a typical non-inflammatory disease. As shown in the present case, CM and pachychoroid spectrum diseases (i.e., CSC, pachychoroidal neovasculopathy, and polyoidal choroidal vasculopathy) manifest similar fundus findings such as choroidal reddish lesions with RPE elevation, Haller’s layer vein dilatation, and choroidal thickening. However, pachychoroid spectrum diseases are complicated by RPE detachment and CNV, both of which involve separation between Bruch’s membrane and RPE [7], unlike the present case of CM. In addition, ICGA findings in CNV-associated pachychoroid diseases include branching vascular networks and choroidal vascular hyperpermeability [7], whereas the present case of CM showed neither of them on ICGA. Therefore, there are features which distinguish CM from pachychoroid spectrum diseases.

Conclusions: CMV is a morphological vascular change showing hyper-perfusion, but not stagnations of choroidal veins. Although there are some common morphological features between CMV and pachychoroid spectrum diseases, our multimodal imaging analysis indicated that the two disorders should be a different

References


Figure 1. Photographs of the left eye in a patient with CM at the initial visit (A-F).
Fundus shows an elevated choroidal reddish lesion (A). FA shows hyperfluorescence as a window defect (B). ICGA reveals hyperfluorescence and hypofluorescence in the lesion during the initial and late phases, respectively (C, D). SS-OCT showed a dilated luminal structure with low reflectivity localized in Haller’s layer. The luminal structure elevates the RPE together with Bruch’s membrane (E, white arrows). LSFG displays a focal warm color pattern, consistent with the abnormal choroidal lesion (F).