Current Updates in Ophthalmology

Editorial Open Access

Choroid and Enhanced Depth İmaging Optical Coherence Tomography

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Original Submission

Received: December 22, 2016
Accepted: January 13, 2017
Published: January 20, 2017

Open Peer Review Status: Editorials, news items, analysis articles, and features do not undergo external peer review.

How to cite this article: Raşit Kılıç. Choroid and Enhanced Depth İmaging Optical Coherence Tomography. Curr Updates Ophthalmol. (2017) 1: 2.1

Choroid has a common vascular meshwork and therefore a vital importance for the blood supply of the outer retina and the retinal pigment epithelium. It is the only source for the photoreceptor cells in the avascular fovea that have high metabolic and oxygen exchange needs [1]. Choroidal blood flow changes can therefore unfavorably affect the fovea and visual acuity. Many disorders such as angioid streaks, central serous chorioretinopathy, age-related macular degeneration, polypoidal choroidal vasculopathy and degenerative myopia originate from the choroid. In addition, a lot of systemic diseases can affect choroidal structure by influencing hemodynamics. On the other part, the choroid could be a potential target for some inflammatory disorders such as Behçet's disease, Vogt-Koyanagi-Harada and sarcoidosis. Based on this information, understanding of choroidal physiopathology is essential for preventing chorioretinal disorders.

Optical coherence tomography is a non-invasive method that can provide sectional images from the eye structures such as cornea and retina. It has therefore become a significant device in the ophthalmology clinics. The recently developed enhanced depth imaging optical coherence tomography (EDI-OCT) has enabled more detailed assessment of the choroid [2]. The choroid could be imaged in a limited manner formerly but it has been possible to attain micrometer-level in vivo choroidal images with EDI-OCT. It can facilitate understanding the physiopathology of ophthalmic disorders such as age-related macular degeneration, degenerative myopia, polypoidal choroidal vasculopathy and glaucoma as well as impacts of systemic diseases such as hypertension and diabetes mellitus on choroid.

Normal choroidal thickness was evaluated in many studies for establishing normal data. It was shown that increasing age, axial length and myopia were significant factors influencing on choroidal thickness [3,4]. An increasing number of studies have also focused on identifying the relationship between choroidal thickness and many ophthalmic and systemic disorders. Choroidal thickness was found to be decreased in age related macular degeneration, whereas it was found to be increased in polypoidal choroidal vasculopathy [5,6]. Choroidal thickness was also evaluated after anti-VEGF treatment in these disorders [7]. Thickened choroid was observed in central serous chorioretinopathy in comparison with healthy eyes [8]. High myopia was correlated with reduced choroidal thickness [9]. On the other hand, increased choroidal thickness associated with inflammation was found in acute phase of Vogt-Koyanagi-Harada, sarcoidosis and Behçet's uveitis [10-12]. While a statistically significantly thicker choroidal thickness was found in many systemic immune-mediated inflammatory disorders such as ankylosing spondylitis and psoriasis, not found in others [13-15]. Vascular structures are affected by systemic diseases such as hypertension and diabetes mellitus and choroidal thickness was found to be decreased in patients with the diseases [16,17]. Consequently, it was shown using EDI-OCT that choroid could be affected by many systemic disorders. Moreover, it was also shown that significant choroidal changes could occur in many sight-threatening ocular diseases.

There is a limitation evaluating choroidal thickness with EDI-OCT that is the difficulties determining the exact choroidal border in some cases. However, it is possible to obtain more detailed information from choroid using swept-source optical coherence tomography that has longer wavelength, higher penetration and lower scattering laser source [18]. Although all the improvements in choroid imaging, the choroidal physiopathology is still not completely understood. Further investigations are therefore needed for fully understanding choroidal physiopathology.

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