Journal Article Review

Comparison of the abilities of SD-OCT and SS-OCT in evaluating the thickness of the macular inner retinal layer for Glaucoma diagnosis

Lee KM, Lee EJ, Kim T-W, Kim H. PLoS ONE 11: e0147964, 2016

[Click here to view this Open Access article in full](#)

Purpose

In detecting glaucoma damage, retinal nerve fiber layer thickness (RNFLT) has traditionally been measured in the circumpapillary area around the optic disc. The measurement of the perifoveal ganglion cell layer has emerged as a diagnostic parameter in glaucoma. This study compared the ability of SPECTRALIS® SD-OCT and Topcon DRI-OCT1 Atlantis® swept-source device (SS-OCT) to use macular retinal layer thickness measurements to distinguish between healthy controls and patients with primary open-angle glaucoma (POAG).

Methods

This study included 60 patients with POAG and 60 healthy control subjects. The macula was scanned on both devices on the same day. Scans were automatically segmented to measure the macular RNFL thickness, the ganglion cell layer plus inner plexiform layer (GCIPL) thickness, and total retinal thickness. Based on each of these measurements, the investigators determined the ability of each device to discriminate POAG and healthy controls.

Discussion

Both devices successfully distinguished POAG patients from healthy controls, but the SPECTRALIS SD-OCT performed better than the Topcon DR-OCT1 Atlantis SS-OCT device for GCIPL and mRNFL in certain sectors. The authors hypothesize a few reasons for the superior performance of the SPECTRALIS. 1) The longer imaging wavelength of the SS-OCT (1050 nm, compared to 870 nm for the SPECTRALIS) decreases the axial resolution. When measuring small changes in the thinner macular layers, the lower resolution may decrease sensitivity of disease detection. 2) The SPECTRALIS SD-OCT active eye tracking and automatic real-time frame averaging increases image quality and reduces artifacts, which may improve segmentation accuracy compared to the single frames captured with the SS-OCT device.

Conclusions

The SPECTRALIS performed as well or better than the SS-OCT device in accurately measuring the perifoveal inner retinal layers. As OCT-based analysis of the macula improves, it will become a valuable diagnostic clinical tool for glaucoma and other optic neuropathies. The combination of perifoveal macular imaging, optic nerve head and retinal nerve fiber layer thickness analysis with the SPECTRALIS Glaucoma Module Premium Edition (GMPE) software offers clinicians a reliable diagnostic battery of tests to help them make a confident clinical diagnosis.

HEIDELBERG ENGINEERING