Inner retinal layer comparisons of eyes with exudative age-related macular degeneration and eyes with age-related macular degeneration and glaucoma

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Abstract

BACKGROUND:

The incidence of glaucoma increases with age, as does age-related macular degeneration (AMD), with the reported incidence of glaucoma among AMD subjects being 5.4 %. Optical coherence tomography (OCT) can detect glaucomatous changes in the inner retina with high sensitivity. The purpose of this study was to compare ganglion cell complex (GCC) parameters and the thickness of the peripapillary retinal nerve fiber layer (RNFL) in normal eyes to that observed in eyes with age-related macular degeneration (AMD) and eyes with both AMD and glaucoma.

METHODS:

The GCC components [GCC thickness, focal loss volume (FLV), and global loss volume (GLV)] and peripapillary RNFL thickness were measured using RTVue spectral-domain OCT (SD-OCT). The GCC and RNFL parameters of normal eyes, AMD eyes treated with different types of therapy, and AMD eyes with and without glaucoma were evaluated using nonparametric tests. Univariate and multivariate analyses were used to determine whether the GCC and RNFL parameters could be used to differentiate AMD eyes with glaucoma from those without glaucoma.

RESULTS:

Seventy-one normal eyes, 120 eyes with AMD, and 23 eyes with AMD and glaucoma were studied. The values of all GCC components were significantly different in the normal eyes from those observed in the eyes with AMD, except for the RNFL thicknesses. The GCC and RNFL parameters were not significantly different between the eyes receiving different types of therapy among the AMD groups. The RNFL thickness was significantly correlated with glaucoma diagnosis in AMD eyes.

CONCLUSIONS:

These findings indicate that there is damage to the inner retinal layers in eyes with AMD. The RNFL thickness can be a useful parameter for differentiating eyes with AMD from eyes with both AMD and glaucoma.

Width of abnormal ganglion cell complex area determined using optical coherence tomography to predict glaucoma

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Abstract

PURPOSES:

We examined the relationships of ganglion cell complex (GCC) parameters determined on spectral-domain optical coherence tomography (SD-OCT), especially the width of abnormal areas, and its ability to detect various stages of glaucoma.

METHODS:

OCT parameters of glaucomatous and normal eyes were determined with the RTVue SD-OCT. Widths of abnormal GCC areas marked by either red or yellow on the OCT significance map were quantified with image J software. The relationships between the abnormal GCC area and other GCC parameters [thickness, focal loss volume (FLV), and global loss volume (GLV)] and the peripapillary retinal nerve fiber layer (RNFL) thickness were determined using regression analyses. The potential of using the GCC and RNFL parameters to discriminate between glaucomatous and normal eyes was examined using the area under the curve (AUC) of receiver operating characteristics (ROC).

RESULTS:

One hundred and eighteen glaucomatous eyes and 45 normal control eyes were studied. Nonlinear models best described the relationships between abnormal GCC area and other GCC parameters. Scatter plots showed changes in the average thickness of the GCC and RNFL, and the average sizes of the GLV preceded changes of abnormal areas of the GCC. The width of the abnormal areas on the GCC thickness map was comparable with other parameters for diagnosing glaucoma.

CONCLUSIONS:

OCT thickness parameters appeared to decrease faster than the area parameter at the initial stage of glaucoma. The sizes of abnormal areas of the GCC were the most pertinent parameters for detecting glaucoma.