Fundus Autofluorescence (FAF) in the Diagnosis of Glaucoma

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Introduction
Progressive choroidal atrophy is seen in glaucoma in the parapapillary region. Zone beta is an area of visible sclera and large choroidal vessels, adjacent to the optic disc border. Zone alpha is a more peripheral area of irregular hypo- and hyper-pigmentation. This classification into alpha- and beta-parapapillary atrophy (β-PPA and α-PPA) has now been accepted to have an association with glaucoma (1).

β-PPA atrophy has been reported to be associated with both the prevalence and progression of open-angle glaucoma (OAG), the presence of β-PPA and its enlargement over time have been reported to precede and predict the onset of glaucoma in ocular hypertensive eyes. Progression of β-PPA (α-PPA turns into β-PPA) is correlated with progression of the morphologic glaucomatous damage and visual field loss (2).

Purpose
To assess the role of fundus auto fluorescence (FAF) in detection of parapapillary atrophy as a biomarker for glaucoma diagnosis and progression.

Methods
Uncontrolled cross-sectional prospective analysis of 30 cases referred for automated perimetry and OCT to confirm or exclude diagnosis of glaucoma were included.

• Eyes with retinal disease were excluded from the study
• Modified Topcon digital fundus camera using an exciter filter of wavelength range of 535-585 nm and a barrier filter of 605-715 nm was used.
• Colored fundus images (30°) and FAF of the optic disc in all studied eyes were obtained and correlated to field (Humphrey) and OCT (Optovue or Cirrus Zeiss) changes for glaucoma.

Results
Autofluorescent areas were detected at the edges of α-PPA in 4 cases out of 7 cases with OHT and in all cases of OAG with significant affection of Ganglion Cell Complex or atrophy of RNFL thickness in OCT, even when there are early field defects (12 cases) (Figure 4 & 5). No autofluorescent areas were detected in the 11 cases referred as glaucoma suspect that correlated with the normal OCT findings in 4 of them (Figure 6) while the other 7 cases showed early OCT changes giving a negative correlation with FAF.

Discussion and Conclusions
In this limited series, autofluorescent areas at the edges of the parapapillary atrophic zone were detected in some cases of ocular hypertension (OHT) and in all cases of open angle glaucoma (OAG). The negative correlation found in cases of glaucoma suspects was limited to early cases and need larger series to confirm its role. Viezentz et al., 2003 investigated FAF in different stages of glaucomatous optic disc atrophy and found a correlation between the circular extension of autofluorescent area in the parapapillary region and the stage of optic disc atrophy. They also detected larger areas (glaucoma suspect) and the stages of glaucomatous optic nerve head atrophy with no significant difference between the types of glaucoma whether OAG, normotensive glaucoma (NTG) or pseudoxfoliation glaucoma (PFXG) (3).

In conclusion, parapapillary autofluorescence (FAF) analysis, being a non invasive objective imaging modality, may provide an indicator and biomarker for predicting development of glaucoma and progression.

References