VIII- Summary

Primary open-angle glaucoma is one of the leading causes of blindness world wide . The death of retinal ganglion cells in POAG is reflected by increased cupping of the optic disc, loss of nerve fiber layer and functional visual field defect.

Conventional clinical tools (e.g ophthalmoscopy) are subjective and show great variability even with experienced observers. The interpretation of nerve fiber layer photographs is influenced by the examiner experience and the amount of melanin in the patients pigment epithelium. It also depends on the age of the patient. The shiny looks of the retina prevent viewing of the RNFL reflex in younger individuals. Blue light improves the visualization of the retinal NFL, but in older patients with yellow discoloration of the lens, the clinical evaluation of the NFL is limited because of filtering of blue light through cataractous lens. The neuro-retianl rim and the optic disc show considerable inter individual variability .

Perimetry has been considered to be the global standard in the diagnosis of glaucoma. However a disadvantage of standard perimetry is that the first visual field defects appear only after the death of a significant proportion (25% - 40%) of ganglion cells and nerve fibers **.**

Therefore more sensitive tests that detect early retinal ganglion cell changes in glaucoma would be useful **.**

Optical coherence tomography OCT is one promising technology that has been developed to access tissue thickness in vivo, such as that of the retinal nerve fiber layer . OCT permits high resolution cross sectional

imaging of biological tissue using light. OCT utilizes low coherence interferometry and near infrared low coherence light to achieve a resolution of approximated 10 microns in the eye. OCT enables non contact and non invasive imaging of the optic nerve head (OHN) and nerve fiber layer **.**

The latest generation of OCT (Stratus OCT) also provides objective, quantitative and reproducible measurements of the retina, RNFL thickness and ONH. The stratus OCT delineated intra retinal and cross sectional anatomy with an axial resolution of 10um and transverse resolution of 20 um. It includes 3.4 mm circular scan to determine RNFL thickness and a fast ONH radial scan to measure optic disc topography .

Multifocal ERG technique is a relatively new technique allowing the clinician to evaluate electrical responses from small localized segments of the retina. the mfERG technique developed by **Sutter** has made it possible to obtain a topographic representation of retinal function in analogy to the topographical representation of the light sensitivity by perimetry.

We studied 65 eyes of 60 subjects.. The eyes were classified into normal eyes (n=20 eyes), glaucoma suspect eyes (n = 25 eyes) and glaucomatous eyes(n = 20 eyes). All eyes underwent a full field ophthalmic, OCT (stratus) and mfERG.

OCT results showed significant reduction of RNFL thickness in glaucoma and glaucoma suspect eyes in the majority of quadrants as well as in the average RNFL thickness $p < 0.001$. Also rim volume and area $p < 0.001$.

mfERG examination showed that there is a significant difference in amplitude of P1and amplitude N1 between normal eyes, glaucoma suspect and glaucomatous patients .The SOK-mfERG response showed higher amplitude p1 and amplitude N1 in normal than in glaucoma suspect and higher in glaucoma suspect than in glaucoma .The SOK-mfERG response also showed that the implicit time is more delyed in glaucoma than in glaucoma suspect and more delayed in glaucoma suspect than normal .The mfPERG response showed higher amplitude P1 and amplitude N1 in normal eyes than glaucoma suspect and higher in glaucoma suspects than glaucomatous patients $p< 0.001$.The mfPERG also showed more delyed implicite time in glaucoma than in glaucoma suspect and more delayed in glaucoma suspect than normal $p<0.001$. The three and two dimensional topography shows characteristic changes similar to standerd perimetry in glaucoma . Stratus OCT and mfERG are more sensitive than standerd perimetry for early detection of glaucoma.