Preventing glaucoma progression or detecting progression well in advance is fundamental to preserving visual function in the glaucoma patients.

- Detection of progression is usually on the basis of visual fields (VF) using the visual field index (VF index) or Glaucoma Progression Analysis (GPA).

- Humphrey's Visual Field Analyzer (HFA).

- Retinal nerve fiber layer thickness measurement and its progressive thinning have been used as a measure of structural progression.

- We compared functional and structural progression across the spectrum of glaucoma over a 5-year period using the GPA and VF indices and the Guided Progression Analysis of the Cirrus OCT (GPA Cirrus).

**OBJECTIVES**

- To evaluate the Cirrus®-OCT as a tool for assessing glaucoma progression and to compare progression detected by Cirrus®-OCT to that detected by standard visual field examination.

- To perform a longitudinal study to compare the structural and functional progression of glaucoma and simulate the future progression of the examined eyes.

**PATIENTS AND METHODS**

**Patients included:**

- Adult glaucoma suspects, and glaucoma patients.

- Had undergone baseline RNFL thickness measurement on Cirrus OCT and reliable automated visual field (VF) examination by VF prior to 2009.

- Baseline VF was to have been using the 24-2 testing protocol by STAs Standard strategy. Only reliable (~20% fixation losses and ~15% false positive and negative rates) field examinations were included.

- Zeiss Optical Coherence Tomograph Cirrus HD-SD OCT Version (Carl Zeiss Ophthalmic Systems, Dublin, CA) was employed for OCT scans.

- The peripapillary RNFL thickness was scanned using the optic disc cube protocol.

- Baseline images with clear optic disc and scan circle or spores, even colour saturation, red colour visible in the retinal epiretinal epithelium and RNFL. The signal strength of at least 5 and above were included in the study.

- All patients with 5 year follow-up were prospectively recruited for the study and VF and OCT repeated using the same protocol as at baseline.

- Patients were analyzed as Glaucoma suspects and Glaucoma patients.

- Glaucoma patients were further divided in to subgroups based upon glaucoma severity as Early (HD -6.0 Db), Moderate (HD -6.0 -12.0 Db) and Advanced Glaucoma (>12.0 Db).

**Parameters studied:**

- Progression on VF determined by GNF and VF on the Humphrey's HAFA software (GNF and VF).

- For Event Analysis, commercial software (HFA GNF, Carl Zeiss Meditex) was employed.

- Trend Analysis (Te) was computed automatically as a linear regression slope in visual field index (VF index) data. Trend analysis detect change in a test parameter (VF index) over time. A significantly negative slope (p<5%) indicate VA progression.

- Structural progression determined by RNFL changes defined by GNF Cirrus estimation generated by the Cirrus® OCT.

- Guided Progression Analysis (Cirrus-GPA) overlays serial RNFL thickness profile and performs linear regression analysis of average RNFL thickness against the duration of follow up.

- The software takes average of first 2 visits to be the baseline value and then the test: retent variability of the pixel is coded in yellow and red if the variability is exceeded for first and second follow up scans, respectively.

- Three RNFL parameters (RNFL thickness map, RNFL thickness profile and average RNFL thickness) are employed to detect progression of glaucoma.

- For Trend Analysis the software computes the R.O.C (rate of change) plots of average, superior and inferior RNFL after the completion of follow-up.

**Outcome Measures:**

- RNFL thickness change and visual field changes over the same time period.

- Trend analysis and Event Analysis estimated by both functional and structural methods.

**STATISTICAL ANALYSIS**

- SPSS Version 20, IBM, New York, USA used.

- Normality of the Quantitative data checked by Kolmogorov Smirnov test.

- Descriptive data presented by Mean ± SD along with Median changes in VF, intrasubject variability (IFD), and RNFL thickness and sensitivity, of detection of glaucoma progression using Cirrus SD-OCT GNF software was assessed.

- Parameters between the groups compared by Mann Whitney U Test

- GNF and advanced glaucoma analysis as the reference standard, the sensitivity, and specificity, of detection of glaucoma progression using Cirrus SD-OCT GNF software was assessed.

- The extent of agreement between Cirrus SD-OCT GNF data and VF analysis in terms of progression detection was measured using Cohen's Kappa.

- A "p" value of <0.05 was considered significant in all the tests.