e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(7); 299-307

Original Research Article

Study of Correlation of Retinal Nerve Fibre Layer Thickness and Optic Disc Parameters with Visual Field Indices in Normal Population, Glaucoma Suspect and Diagnosed Cases of POAG

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Received: 20-03-2023 / Revised: 11-04-2023 / Accepted: 05-05-2023

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Conflict of interest: Nil

Abstract:

Introduction: POAG is major worldwide cause health concern, because of its usually silent and progressive nature. It is one of the leading preventable causes of blindness in the world.

Aim: To study the correlation of retinal nerve fibre layer thickness and optic disc parameters with visual field changes in Normal Population, Glaucoma suspects and Primary Open Angle Glaucoma.

Materials and Methods: It was hospital based, prospective, non-randomised case study of 30 patients of POAG, 70 suspects of glaucoma, and 70 Normal Age matched controls for duration of one year.

Results: The mean age of patients in POAG group were 58.63±11.373. We found a correlation between VF global indices and OCT RNFL thickness parameters in the POAG. Statistically significant and positive correlation (.464) between MD and RNFL average thickness; negative correlation (-.441) between PSD and RNFL average thickness were defined in the POAG group. These correlations between MD, PSD and RNFL thicknesses are clinically important.

Conclusion: SD-OCT is capable of detecting early changes of glaucoma at the level of RNFL in glaucoma suspects with normal appearing discs and visual fields. OCT has been shown to obtain accurate and reproducible RNFL and retinal thickness measurements. OCT can help in timely diagnosis of pre perimetric glaucoma. OCT can serve as a useful tool in diagnosis, management, prognostication and research in glaucoma.

Keywords: POAG, SD-OCT, RNFL, visual field indices.

Introduction

Glaucoma is one of the leading causes of blindness in present day scenario. It is a chronic, bilateral and often asymmetrical disease in adults in whom acquired loss of optic nerve fibres and abnormality in the visual field occurs with an either open anterior chamber angle of normal appearance or closed angle and an intraocular pressure which is detrimental to the structural and functional integrity of optic nerve head.[1]

Traditionally, optic disc examination by ophthalmoscopy, slit-lamp biomicroscopy, or optic disc photography has been the only methods available to clinicians for structural assessment in the diagnosis of glaucoma. However, clinical evaluation of the optic disc provides scant quantitative information, is subjective, and is characterized by inter observer variability. These limitations have stimulated over the years not only the identification of other structural parameters, but also the development of new automated imaging methods for their quantitative analysis.

Examining and monitoring the optic nerve head and the RNFL, structurally and functionally, is important for diagnosis and treatment.

Functional loss recorded with automated static threshold perimetry is both sensitive and specific to early loss and provides quantitative data for the monitoring of change.[2]

Clinically, visual field loss often correlates with nerve fibre layer loss and optic nerve damage. The natural evolution of glaucoma implies the loss of ganglion cells and their axons in the retina. It is well established that significant amount of ganglion cell death (40%) occurs before any visual field defect is produced, thus giving rise to the concept

of pre- perimetric glaucoma.[3,4,5] Optical Coherence Tomography is newer non-invasive, non-contact technique of measuring thickness of retinal nerve fiber layer. It provides potential means for quantification of RNFL thickness and also for detection and documenting progression of RNFL loss. Careful evaluation of the optic nerve head and RNFL is crucial in glaucoma, not only for diagnosis, but also for providing information about the location and severity of visual field damage. OCT is useful in glaucoma screening in high risk group.[2,3,6]

Quantitative analysis of RNFL and ganglion cell layer parameters with OCT can be used for the early diagnosis of glaucoma.[7,8,9,10,11] Ganglion cell analysis (GCA) is developed as a tool for assessing structural change in glaucoma by detecting and measuring the thickness of the GCIPL. This is based on the histological observation that macular GCIPL is topographically less variable among normal individuals than RNFL and ONH [13], which makes normal macular GCIPL parameters easier to identify and deviations from normal easier to detect and quantify.

Screening of early glaucoma is important and problematic since intraocular pressure is a poor predictor, judging the optic nerve involvement is difficult and visual field changes occur later in disease process.

This study is done to measure the optic disc parameters, Average RNFL thickness, Average and Minimum IPGC thickness. In glaucoma patients and suspects and to correlate the findings with global indices of visual fields, which would help in early detection, help in decision making about management and also helps in prognostication.

Objectives

1. To categorically state the role of SD OCT in various types of glaucoma and glaucoma suspects.
2. To compare and correlate Visual Field (VF) indices like Mean Deviation (MD) and Pattern Standard Deviation (PSD) with SD-OCT parameters like Average RNFL thickness, Average and Minimum GC+IPL thickness, Average Cup Disc Ratio in diagnosed glaucoma patients, suspects and controls.
3. To detect early structural changes in glaucoma suspect.
4. To use this study for evaluation, prognostication and management of various types of glaucoma patients and glaucoma suspects.
5. To use this study as bench mark for further diagnostic and prognostic endeavor in field of glaucoma and relevant use of SD-OCT.

Material and Method

All the patients attending the glaucoma clinic of Out Patient Department of Upgraded Department of Ophthalmology in NSCBMC, Jabalpur in the duration from july 2020 to july 2021 were evaluated. 30 patients of POAG, 70 suspects of glaucoma, and 70 Normal Age matched controls were included in this study. Informed consent was obtained from all subjects. All patients were subjected to detailed history taking regarding following points.

- Relevant history : diminution of vision, pain, redness, watering, photophobia , coloured halos, headache, vomiting
- History of surgery: example cataract surgery, filtering surgery, posterior segment surgery
- History of associated systemic illness like diabetes mellitus, hypertension, bleeding disorders or any other.
- History of trauma.
- Family history
- Personal history

All patients underwent a detailed clinical evaluation including:

Ocular Examination:

1. Snellen's visual acuity testing. aided and unaided with pinhole.
2. Refraction.
3. Evaluation of intraocular pressure by Non-Contact Tonometry.
4. Slit lamp biomicroscopy of anterior segment.
5. Gonioscopy using Goldmans 3 and 4 mirror lens
6. Dilated Fundus examination by direct ophthalmoscopy, 90D examination,
7. Automated Perimetry by Humphrey field analyzer.
8. 8.Carl Zeiss Spectral Domain Optical Coherence Tomography.

All subjects underwent Automated Perimetry on the Humphrey's Field Analyzer using the 30-2 testing protocol by SITA strategy. In the control group, to minimize the learning effect, the second reliable VF result obtained was included. We used two of VF global indices, Mean Deviation (MD) and Pattern Standard Deviation (PSD), in this study.

The diagnosis of early glaucoma was based on a visual field mean deviation of —6 dB or more.[14]

Visual field global indices and RNFL thickness measurements (Average thickness) obtained by SD-OCT were compared statistically.[12]

All included subjects were scanned with the SD-OCT by a single operator. Scan protocol of Cirrus HD-OCT called 'optic disc cube 200 x 200 is used for measurement of RNFL thickness. Three scans were taken. Three sessions of macular scanning

using the macular cube 516x258 protocol was used for measurement of GCIPL thickness.

These scans were taken by making the patient to sit comfortably on stool, adjust chinrest and keeping patient head in place. Finding the pupil and focus the image in iris view port. Capture the fundus image and high density scan.

Review the captured image then save or try again. One of the 3 scans, obtained the same day, with maximum signal strength was included. The results were analyzed. All OCT scans were performed through a dilated pupil.Some patients had mild cataract which did not affect examination or prevent to perform visual field test. Subjects not suitable for the study were excluded based on the following criterias:

Exclusion Criteria:

1. Age less than 18 years.
2. Retinal or Choroidal Pathology
3. History of trauma
4. History of Glaucoma surgery
5. Macular Degenerations
6. Optic Neuropathies and optic neuritis
7. Unreliable and uncooperative patients for OCT and Perimetry.
8. In perimetry, fixation losses of more than 20%
9. In perimetry, false-positive and false-negative rates of more than 33%.
10. OCT Image with signal strength of < 4/10 was excluded.
11. High refractive error > 5 diopters of sphere or 3 diopters of cylinder

Selected subjects are included and grouped in three groups of diagnosed (group A),suspects (group B) and controls (group C) as per following criteria:

Inclusion Criteria:

1. All patients diagnosed as POAG as per below mentioned criteria.
2. All subjects diagnosed as suspects as per below mentioned criteria.
3. All normal age matched controls.

The POAG patients were included if all the following criteria were met:

- elevated intraocular pressure (IOP) (greater than 21mm Hg)
- without treatment on at least two separate visits
- glaucomatous optic disc appearance
- VF damage (two or more contiguous points with a pattern deviation sensitivity loss of P<0.01, or three or more contiguous points with a sensitivity loss of P<0.05 in the superior or inferior arcuate areas, or a 10 dB difference across the nasal horizontal midline at two or more adjacent locations and an abnormal result in glaucoma hemifield test)
- Wide and open angle on gonioscopy
- No other obvious causes for these changes.

Glaucomatous optic disc appearance was defined as vertical cup disc ratio >0.5, focal or diffuse thinning of the neuroretinal rim and asymmetry of the cup disc ratio ≥ 0.2 between two eyes without asymmetric refraction.

Glaucoma suspects were included if a subject have a normal appearing open angle by gonioscopy, and one of the following in at least one eye:

1. IOP consistently above 21 mmHg
2. Appearance of optic disc or retinal nerve fibre layer suggesting of glaucomatous damage
3. Diffuse or focal narrowing or sloping of the disc rim
4. Diffuse or localized abnormalities of nerve fibre layer,specially at superior or inferior pole.
5. Disc hemorrhage
6. Asymmetric appearance of the disc or the rim between fellow eyes (cup to disc ratio difference greater than 0.2) suggesting loss of neural tissue.
7. Visual Fields suspicious for early glaucomatous damage.

Control subjects were included if they had:

1. IOP measurements less than 21smm Hg on at least two separate occasions
2. Absence of glaucomatous optic nerve head
3. A normal visual field
4. No family history of glaucoma.

Statistical Analysis:

The results were analyzed using the SPSS for Windows software,Version 20 and relationships were considered significant if P<0.05. Data were reported as mean ± standard deviation (SD). The intergroup differences were analyzed by the chi-square test statistics. The difference between groups was defined by oneway ANOVA.

Pairs were compared with Bonferroni test statistics. We used an Analysis of Covariance (ANCOVA) with age as continuous covariate, because our patient groups did not represent age-matched groups.
We also used ANCOVA with VF and OCT parameters as the covariate to test differences between the 3 groups. The Pearson correlation coefficient was used to estimate correlations between different parameters.

Observation and Result

Table 1: Age Distribution of the Studied Subjects

	Diagnosed (n=30)	Suspects (n=70)	Controls (n=70)
<20	0 0.0%	2 2.9%	2 2.9%
20-29	0 0.0%	4 5.7%	2 2.9%
30-39	0 0.0%	8 11.4%	5 7.1%
40-49	10 33.3%	21 30.0%	21 30.0%
50-59	2 6.7%	7 10.0%	5 7.1%
60-69	11 36.7%	21 30.0%	26 37.1%
>70	7 23.3%	7 10.0%	9 12.9%
Mean SD	58.63 ±11.373	50.01 ±14.625	53.51 ±14.254

The summary of the age distribution table showed that the suspects of glaucoma are comparatively younger as compared to diagnosed patients. The higher mean age of diagnosed patients as compared to suspects indicates that the disease is more prevalent in higher age group and was statistically significant ($p<0.01$).

Table 2: Gender Distribution of the Studied Subjects.

	Diagnosed (n=30)	Suspects (n=70)	Controls (n=70)
Male	21 70.0%	47 67.1%	48 68.6%
Female	9	23	22
	30.0%	32.9%	31.4%
Total	30	70	70

Distribution of the studied subjects on the basis of gender revealed that this was predominantly a male study.

Table 3: Comparison of Intraocular Pressure in Different Studied Groups

	Diagnosed	Suspects	Controls	F Ratio	Significance individual comparisons (post Hoc test)
IOP (mmHg)	23.27±3.102 (22.47-24.07)	19.88±2.474 (19.47-20.29)	18.01±2.858 (17.53-18.48)	F=77.130;p <0.0001	D v/s S;p<0.001 D v/s C;p<0.001 S v/s C;p<0.001

(Mean ±SD and 95% Confidence Interval)

Diagnosed group cases were found with significantly higher observation in terms of mean IOP with a significant F ratio and individual comparison with their other counterpart groups i.e. suspect and controls. ($p<0.001$)

Table 4: Comparison of Fundus Findings in Different Studied Groups

	Diagnosed	Suspects	Controls	Significance individual comparisons (post Hoc test)
CUPPING	0.725+_0.1002 (0.699-0.751)	0.581+_0.0845 (0.567-0.596)	0.452+_0.0640 (0.441-0.463)	Dv/sS;p<0.001, Dv/sC;p<0.001, Sv/sC;p<0.001

The above table shows cupping in three groups, which is significantly higher as compared to suspects and controls.

Table 5: Comparison of Fundus Findings in Different Studied Groups

	Diagnosed	Suspects	Controls
Disc Haemorrhage	25%(15/60)	2.9%(4/140)	0%(0/140)
Laminar Dot Sign	88.3%(53/60)	15.0%(21/140)	0%(0/140)
Bayonneting Sign	75%(45/60)	8.57%(12/140)	0%(0/140)
Notching And Saucerisation	60%(36/60)	5.71%(8/140)	0%(0/140)

The above two tables shows the different optic nerve head parameters on fundus examination.

Table 6: Comparison of Parametric Indices in Different Studied Groups

	Diagnosed	Suspects	Controls	F Ratio	Significance Individual Comparisions (Post Hoc Test)
Mean Deviation (Md)	-9.921+_-6.8427 (-11.689-(-)8.153	-4.196+_-1.5567 (-4.456-(-)3.936	-3.361+_-0.6417 (-3.469-(-)3.254	F=102.108:P<0.0001	D V/S S;P<0.001 D V/S C;P<0.001 S V/S C;P<0.01
Patern Standard Deviation (Psd)	6.340+_4.1129 (5.278-7.403)	2.173+_0.9008 (2.023-2.324)	1.763+_0.2839 (1.715-1.810)	F=143.619:P<0.0001	D V/S S;P<0.001 D V/S C;P<0.001 S V/S C;P<0.01

Comparision of perimetric indices in different studied group showed that the mean MD in diagnosed,suspects and controls was found to be highly significant (p<0.001).Similiarly the PSD was found to be significantly higher in diagnosed and suspects,when compared to controls (p<0.001,p<0.01) .

Table 7: Comparison of Different Oct Parameters in Different Studied Groups

	Diagnosed	Suspects	Controls	F Ratio	Significance individual comparisions (post Hoc test)
AvgRNFL	56.30+_20.193 (51.08-61.52)	75.46+_15.947 (72.79-78.12)	83.22+_7.288 (82.00-84.44)	F=76.816:P<0.0001	Dv/sS;p<0.001 Dv/sC;p<0.001 Sv/sC;p<0.001
AvgCDR	0.732+_0.1250 (0.700-0.764)	0.692+_0.0933 (0.677-0.708)	0.640+_0.1121 (0.628-0.652)	F=160.671:P<0.0001	Dv/sS;p<0.001 Dv/sC;p<0.001 Sv/sC;p<0.001
Avg GCL+IPL	48.88+_22.042 (43.19-54.58)	72.80+_14.517 (70.37-75.23)	76.81+_7.018 (75.64-77.99)	F=89.276:P<0.0001	Dv/sS;p<0.001 Dv/sC;p<0.001 Sv/sC;p<0.001
Mean GCL+IPL	28.05+_23.453 (21.99-34.11)	58.36+_19.201 (55.15-61.57)	71.54+_6.022 (70.53-72.54)	F=150.807:P<0.0001	Dv/sS;p<0.001 Dv/sC;p<0.001 Sv/sC;p<0.001

Comparision of different OCT parameters in different studied groups depicted very interesting and important findings. There was a significant (p<0.001) decrease in value of Average RNFL in diagnosed patients and suspects as compared to controls. Also,there was a statistically significant decrease (p<0.001) in Average GCL+IPL and Mean GCL+IPL parameters in diagnosed and suspects when compared with controls.

Average Cup Disc Ratio values also showed a statistically significant increase in diagnosed and suspects (F=160.671; p<0.001).

Correlations of Parametric Indices with Oct Parameters

Table 8: Correlations of MD with Different Parameters

Group			PSD	ARNFL	ACDR	AIPGC	MIPGC
D	MD	Pearson Correlation	-.911**	.464**	-.426**	.389**	.331**
		Sig. (2-tailed)	.000	.000	.001	.002	.010
		N	60	60	60	60	60
S	MD	Pearson Correlation	-.862**	.454**	-.288**	.367**	.316**
		Sig. (2-tailed)	.000	.000	.001	.000	.000
		N	140	140	140	140	140
C	MD	Pearson Correlation	.006	-.151	.068	-.096	-.058
		Sig. (2-tailed)	.945	.075	.427	.258	.495
		N	140	140	140	140	140

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The above mentioned correlation table showed that in diagnosed patients and suspects the MD is inversely related to PSD and ACDR with a highly significant p value. In contrast, MD is directly related to ARNFL thickness ,AIPGC thickness and MIPGC thickness in both diagnosed patients and suspects with a statistical significance. In controls, the correlation is not significant.

Table 9: Correlations of PSD with Different Parameters

Group			MD	ARNFL	ACDR	AIPGC	MIPGC
D	PSD	Pearson Correlation	-.911**	-.441**	.400**	-.416**	-.324*
		Sig. (2-tailed)	.000	.000	.002	.001	.012
		N	60	60	60	60	60
S	PSD	Pearson Correlation	-.862**	-.418**	.297**	-.371**	-.300**
		Sig. (2-tailed)	.000	.000	.000	.000	.000
		N	140	140	140	140	140
C	PSD	Pearson Correlation	.006	.043	.011	.045	.118
		Sig. (2-tailed)	.945	.614	.898	.598	.165
		N	140	140	140	140	140

This table shows that in diagnosed patients and suspects the PSD is inversely related to MD, ARNFL,AIPGC and MIPGC with a highly significant p value.Also, PSD is directly related to ACDR in both diagnosed patients and suspects with a statistical significance. In controls,the correlation is not significant.

Table 10: Correlations of ARNFL with Different Parameters

Group			MD	PSD	ACDR	AIPGC	MIPGC
D	ARNFL	Pearson Correlation	.464**	-.441**	-.405**	.467**	.423**
		Sig. (2-tailed)	.000	.000	.001	.000	.001
		N	60	60	60	60	60
S	ARNFL	Pearson Correlation	.454**	-.418**	-.296**	.438**	.424**
		Sig. (2-tailed)	.000	.000	.000	.000	.000
		N	140	140	140	140	140
C	ARNFL	Pearson Correlation	-.151	.043	-.184*	.232**	.214*
		Sig. (2-tailed)	.075	.614	.030	.006	.011
		N	140	140	140	140	140

This correlation table depicts that in diagnosed patients and suspects the ARNFL is inversely related to PSD and ACDR with a high statistical significance.In contrast, ARNFL is directly related to MD, AIPGC and MIPGC in both diagnosed patients and suspects

Table 11: Correlations of ACDR with Different Parameters

Group			MD	PSD	ARNFL	AIPGC	MIPGC
D	ACDR	Pearson Correlation	-.426**	.400**	-.405**	-.257*	-.194
		Sig. (2-tailed)	.001	.002	.001	.048	.137
		N	60	60	60	60	60
S	ACDR	Pearson Correlation	-.288**	.297**	-.296**	-.149	-.158
		Sig. (2-tailed)	.001	.000	.000	.078	.062
		N	140	140	140	140	140
C	ACDR	Pearson Correlation	.068	.011	-.184*	-.075	-.104
		Sig. (2-tailed)	.427	.898	.030	.379	.221
		N	140	140	140	140	140

This correlation table depicts that in diagnosed patients and suspects the ACDR is inversely related to MD,ARNFL,AIPGC and MIPGC with a high statistical significance.In contrast, ARNFL is directly related to PSD in both diagnosed patients and suspects with a statistical significance. In controls, the correlation is not significant.

Table 12: Correlations of AIPGC with Different Parameters

Group			MD	PSD	ARNFL	ACDR	MIPGC
D	AIPGC	Pearson Correlation	.389**	-.416**	.467**	-.257*	.788**
		Sig. (2-tailed)	.002	.001	.000	.048	.000
		N	60	60	60	60	60
S	AIPGC	Pearson Correlation	.367**	-.371**	.438**	-.149	.709**
		Sig. (2-tailed)	.000	.000	.000	.078	.000
		N	140	140	140	140	140
C	AIPGC	Pearson Correlation	-.096	.045	.232**	-.075	.761**
		Sig. (2-tailed)	.258	.598	.006	.379	.000
		N	140	140	140	140	140

The above mentioned correlation table showed that in diagnosed patients and suspects the AIPGC is inversely related to PSD and ACDR with a highly significant p value. In contrast, AIPGC is directly related to MD, ARNFL thickness and MIPGC thickness in both diagnosed patients and suspects with a statistical significance. In controls, the correlation is not significant.

Table 13: Correlations Of MIPGC With Different Parameters

Group			MD	PSD	ARNFL	ACDR	AIPGC
D	MIPGC	Pearson Correlation	.331**	-.324*	.423**	-.194	.788**
		Sig. (2-tailed)	.010	.012	.001	.137	.000
		N	60	60	60	60	60
S	MIPGC	Pearson Correlation	.316**	-.300**	.424**	-.158	.709**
		Sig. (2-tailed)	.000	.000	.000	.062	.000
		N	140	140	140	140	140
C	MIPGC	Pearson Correlation	-.058	.118	.214*	-.104	.761**
		Sig. (2-tailed)	.495	.165	.011	.221	.000
		N	140	140	140	140	140

The above mentioned correlation table showed that in diagnosed patients and suspects the MIPGC is inversely related to PSD and ACDR with a highly statistical significance. In contrast, MIPGC is directly related to MD, ARNFL thickness and AIPGC thickness in both diagnosed patients and suspects with a statistical significance. In controls, the correlation is not significant.

Discussion

The main goal of glaucoma management is to diagnose this disease when it is asymptomatic. Visual field testing is essential in the diagnosis and monitoring of glaucoma. However it is known that standard perimetry cannot detect VF defects until 20% - 40% of ganglion cells have been lost .[15,16] Efforts to detect glaucoma early have resulted in recent years in the development of OCT, the introduction of which has enabled methods for measuring the retinal thickness.[21,22,23]

The recent studies showed [24,25]the usefulness of RNFL and GCIPL thickness for glaucoma diagnosis. Measuring RNFL and GCIPL thickness by OCT enables an objective and quantitative assessment of glaucomatous structural loss.[17] Study by Badlani Vandana[26] el al. analysed glaucoma patients and controls. They found that RNFL thickness and MD were linearly correlated in the early and advanced hemifields. RNFL thinning was also found to be present in 43% of hemifields with no to early VF loss(MD = -17±24detibels.[26] Study by Sanjay Asrani[27] el al. evaluated observational ease series of patients from the glaucoma service who either presented with a diagnosis of glaucoma or were referred for evaluation of suspected glaucoma. The RNFL thickness and ONH parameters were more strongly correlated (r = 0.75). the corresponding regression co-efficient was also highly significant (P<.00I). In suspects, the severity of ONH cupping and the RNFL thickness were correlated less strongly.[27] Study by Sujata subbaih[28] et al. analysed the results of normal controls and glaucoma patients. In the glaucoma group, mean RNFL showed correlation with VF indices.[28] Study by Yalvac et al.[29] analysed glaucoma patients with normal age matched controls. PSD and MD VF Zones and corresponding OCT RNFL thickness sectors were significantly correlated at specific sectors in the glaucoma group (P<0.01).[29]

Jeoung et al.[30], scanning of the ONH using spectral-domain OCT has improved the clinician's approach to the optic disc assessment. Because structural changes to the ONH are a hallmark of glaucoma and may precede detection of perimetric damage, the diagnostic performance of GCIPL may be optimized if used in combination with ONH assessment,[30] Mwanza et al.[18] and Hong et al.[19]. showed that Cirrus OCT had an excellent intravisit and intervisit reproducibility of RNFL thickness and ONH parameters. Mwanza et al.[18] reported that, in the POAG patients, RNFL thickness loss was found.

In our study, we found that RNFL average thickness, was significantly lower in POAG patients and suspects Schulze et al.[12] evaluated the diagnostic ability of retinal ganglion cell complex, macular thickness, peripapillary RNFL thickness and optic nerve head parameters with SD-OCT in open angle glaucoma patients and normal subjects. Taliantzis et al [20] found a moderate correlation between RNFL thickness measured by OCT and VF indices (mean sensitivity, mean defect, loss variance). The correlation became stronger when the structural alterations became deeper in OCT.

We found a correlation between VF global indices and OCT RNFL thickness parameters in the POAG. Statistically significant and positive correlation between MD and RNFL average thickness; negative correlation between PSD and

RNFL average thickness were defined in the POAG group. These correlations between MD, PSD and RNFL thicknesses are clinically important. Determination of the correlations between MD and global average thickness made us think that we can use and evaluate these tests together. There was no correlation between MD or PSD and OCT parameters in the control group.

Early diagnosis of glaucoma and early initiation of treatment is so important, therefore further vision loss can be stopped or slowed down. RNFL measurement with SD-OCT could provide important information for detection and evaluation of glaucoma.

The evaluation by SD-OCT is not superior to ophthalmologist. SDOCT is not the end point of technology. Because of this data acquired from SD-OCT, which can be a guide for us, must be evaluated with the clinical findings of glaucoma patients together.

Conclusion

- OCT is capable of detecting early changes of glaucoma in glaucoma suspects with normal appearing discs and visual fields.
- OCT has been shown to obtain accurate and reproducible RNFL and retinal thickness measurements.
- OCT can help in timely diagnosis of pre perimetric glaucoma.
- OCT can serve as a useful guideline in diagnosis, management, prognostication and research in glaucoma.

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