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RETROSPECTIVE ANALYSIS OF RETINAL NERVE FIBRE LAYER THICKNESS ANALYSIS IN CASES OF POAG AFTER ADEQUATE IOP CONTROL IN CASES OF POAG

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ABSTRACT

Purpose: the study aims to investigate the retinal nerve fibre changes by utilizing Spectral domain Optical coherence tomography in cases of POAG after adequate IOP control. **Methods:** Retrospective analyses of all cases of primary open angle glaucoma between 2018 to 2020 were analyzed with respect to RNFL thickness and C: D ratio. The recordings of RNFL thickness and Optic nerve head changes as shown in the reports were analyzed using Zeiss 5000 spectral domain OCT machine. All reports with poor signal strength were discarded. **Result:** A total of 58 eyes of 32 patients of POAG were analyzed. Cases of other types of glaucoma were excluded. The serial OCT reports of the patients over a minimum period of 6 months were taken into consideration. The study showed that 33.89 percent of the cases showed more than 5 microns of increase in RNFL thickness. The rest either showed no changes or decrease in RNFL thickness. The improvement in the nerve fibre thickness was statistically significant. **Conclusion:** The above study gives evidence of resersibility of retinal nerve fibre thickness after adequate control of glaucoma leading to increase in nerve fibre thickness. This study gives hope of reversibility in glaucoma patient.

KEYWORDS: primary open angle glaucoma, retinal nerve fibre thickness, glaucoma progression.

INTRODUCTION

Spectral domain Optical coherence tomography is a useful equipment in the diagnosis and management of glaucoma which gives an objective assessment of both retinal nerve fibre thickness and optic nerve head.[4] Earlier these two parameters which form an important part of glaucoma diagnostics and prognosis were dependent only on clinical assessment and hence a possibility of interpersonal variation and inadequate documentation was seen. With the advent of OCT, these changes are very objectively assessed and documented. Traditionally the based on present evidence based knowledge the glaucomatous patients have a downhill course and the RNFL keeps becoming thinner over the years and the role of intervention is only to minimize this decrease. However in our study we have seen some other interesting findings and hence this study is the only such instance where increase in thickness of RNFL has been noticed and gives hope for future.

MATERIAL AND METHODS

This is a retrospective observational study. All tenets of Helsinki declaration have been adhered to. Institutional ethics committee clearance taken. Retrospective analysis of glaucoma patients visiting a tertiary care hospital in North East were analysed on two parameters- RNFL thickness and retinal nerve head analysis. Zeiss Cirrus HD-OCT 5000 system was used for all cases. This analysis is done to bring out the result of serial Oct RNFL done on glaucoma patients over a period of 3 months to 1 yrs. The RNFL thickness has been done on the same machine.

Inclusion criteria- diagnosed cases of POAG, absence of other ocular pathologies, adults (25-65) age group.

Exclusion criteria

Systemic ailments like Diabetes mellitus, HTN, Chronic infections, cataract or any other ocular pathology, previous eye surgery, cases of secondary glaucoma or primary angle closure glaucoma, POAG with uncontrolled IOP.

This analysis is done to bring out the result of serial Oct RNFL done on glaucoma patients over a period of 3 months to 1 yrs. The RNFL thickness has been done on the same machine and under the care of the same doctor. The exclusion criteria included patients where the IOP is not well controlled or patients who underwent surgical treatment for glaucoma.

The OCT RNFL reading and reports of the glaucoma patients was taken from the data base of the Oct machine. The readings were analyzed for C: D ratio, retinal nerve fibre thickness and compared with readings.

RESULTS

58 eyes of 32 patients who had Primary open angle glaucoma were evaluated for glaucoma and retinal nerve fiber layer thickness noted in two visits 3 months apart when the IOP was well controlled. The findings were analyzed statistically using paired t test.

In our study we noticed that there was in increase in the RNFL thickness on second visit when the IOP was well controlled. The positive change in the RNFL thickness is statistically significant.

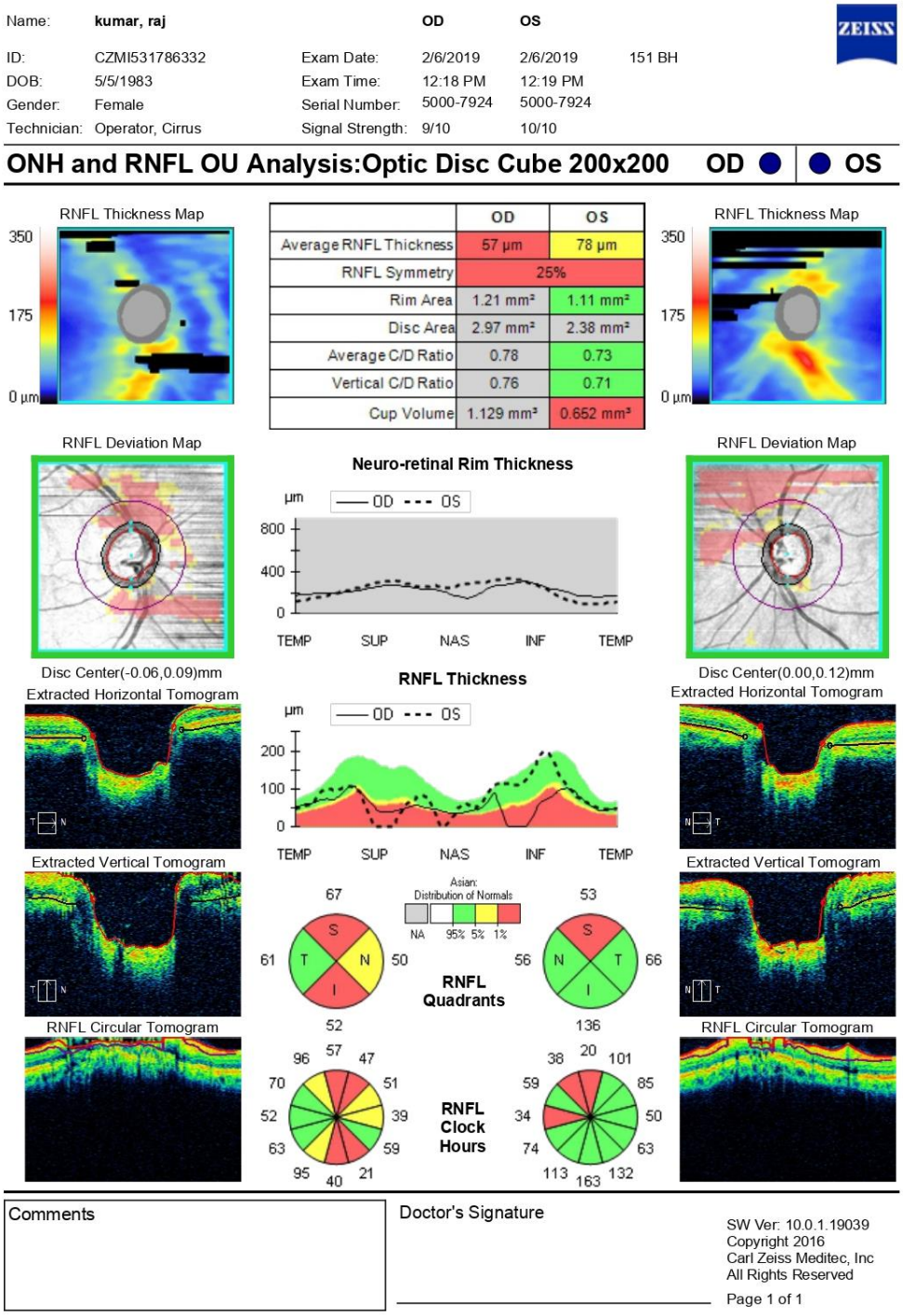


Figure 1

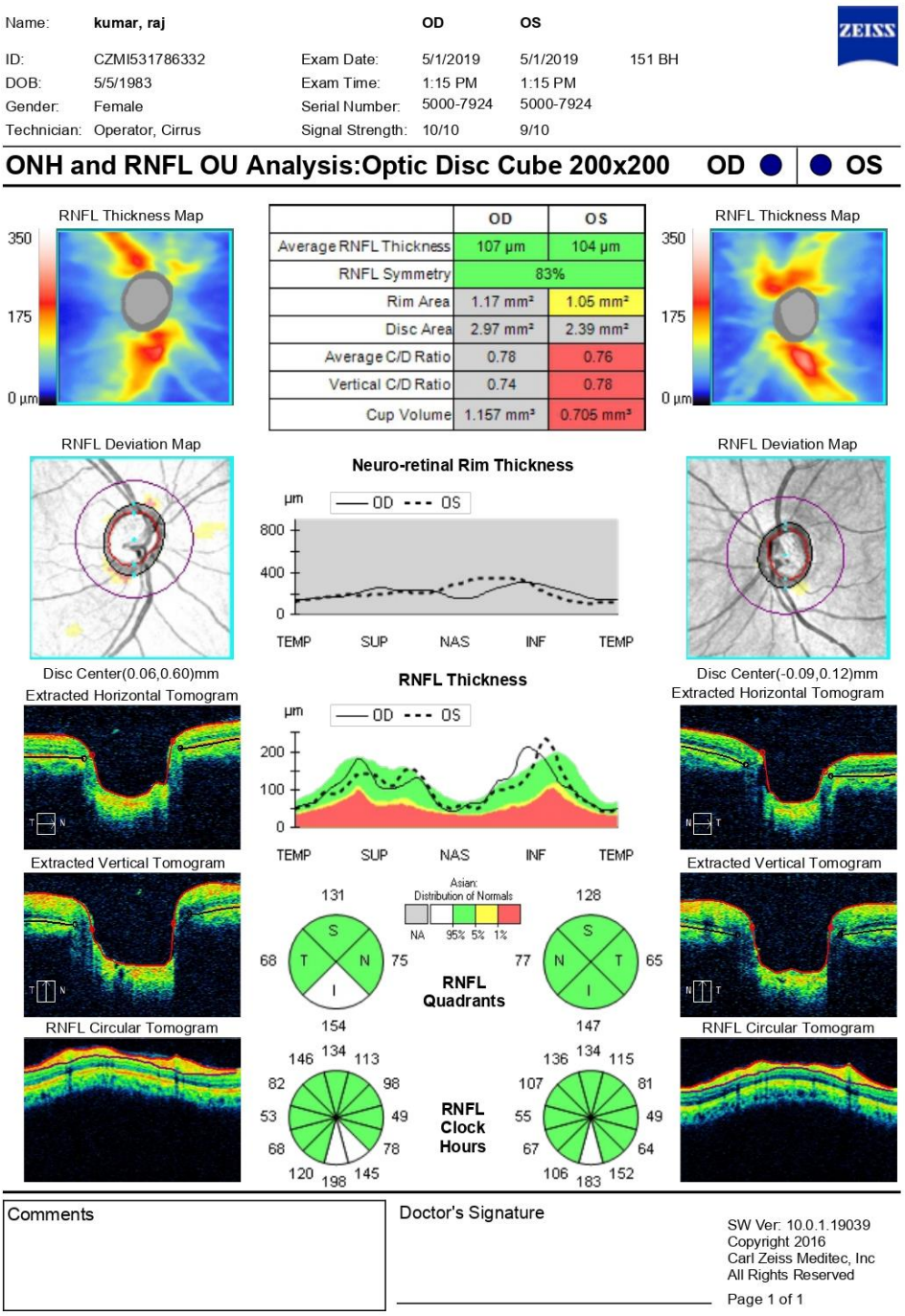
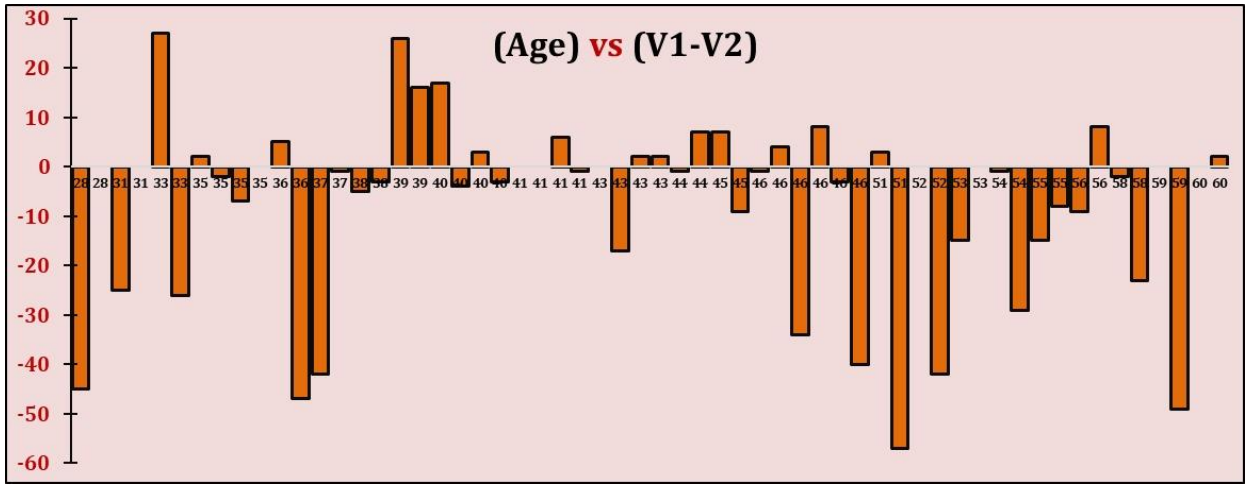


Figure 2: Second visit optical coherence tomography of the same patient.

	V1	V2
Mean	73.76	81.02
SD	19.6	17.7
Observations	58	58
Correlation	0.52	
t Stat	-3.01	
P(T<=t) two-tail	0.004	
t Critical two-tail	2.002	

Statistical paired t- test



Increase in nerve fibre thickness (comparison between visit 1 and visit 2).

X axis- age of the patient of POAG
Y axis- change in RNFL (retinal nerve fibre thickness) between 2 visits.

DISCUSSION

Spectral domain optical coherence tomography allows visualization of cross section of anterior segment and three dimensional view of the retina. Retinal scans with SD-OCT are highly reproducible.[5,6] It allows clinical observation, measurement and identification of structures that are not commonly visible and shows various lesions with altered morphology or reflectivity.

Numerous studies have shown correspondence between OCT measurements and histological measurement. Clinicians are studying RNFL thickness to aid in early diagnosis of glaucoma and get accurate assessment of disease progression.[2]

The RNFL normative database helps in identifying defect in RNFL thickness RNFL analysis for glaucoma evaluation has become a powerful and important tool in the glaucoma diagnostics and prognosis. Several researches have established that the retinal nerve fibre layer is thinned out in progressive glaucoma. Many protocols recommend 3 monthly or 6 monthly evaluation of retinal nerve fibre layer.

IN multiple studies it has been demonstrated that OCT retinal nerve fibre layer analysis is both diagnostic and prognostic in management of POAG.[1] RNFL thinning reflects the axonal loss within the retina and the optic nerve. Average RNFL thickness is found to be between 82-119 microns[3], while the range in glaucoma is much lower. As the age progresses the RNFL also decreases.[7] More than 0.98 microns loss of RNFL per year for Cirrus to -2.12 microns per year is considered as significant.

In our analysis we found that the retinal nerve fibre layer has actually shown an increase in thickness which is statistically significant.

This is highly encouraging as it gives hope to glaucoma patients. If the RNFL changes are reversible, it implies that early detection of glaucoma can be reversed and glaucoma is no longer an untreatable illness.

CONCLUSION

In conclusion, as is evident in our study, a significant number of primary open angle glaucoma cases may show reversal with good IOP control and stringent monitoring. A larger sample size and extension into other types of glaucoma may throw better insight in this direction. This is a ray of hope for glaucoma patients. This is first study which has demonstrated a significant improvement in retinal nerve fibre layer thickness after treatment.

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