STUDY OF MACULAR THICKNESS IN MYOPIC EYE IN RAJASTHANI POPULATIONTaruna Chowdhary¹, D. S. Chowdhary², Anju Choudhary³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: PURPOSE: To find out relationship between Macular thickness and Myopia. Methods: A total of 250 myopic eyes were analyzed. Macular thickness in different quadrants were measured with OCT (Optical Coherence Tomography) and compared between the two diagnostic groups. Simple Linear Regression analysis was performed to evaluate the relationship between degree of myopia and Macular thickness in different quadrants. **RESULT:** Macular Thickness of Fovea is more in group A (Low myopia group) in comparison to group B (High myopia group). In Superior Outer, Temporal Outer, Nasal Outer, Superior Inner, Temporal Inner, Inferior Inner and Nasal Inner quadrants macular thickness is more in group A in comparison to group B. Only in Inferior Outer quadrant macular thickness is lower in group A then group B. Conclusion: Our study demonstrate that increasing myopia is associated with reduced macular thickness and refraction is important ocular biometric determinants of macular thickness.

KEYWORDS: Myopia, macular thickness, OCT.

INTRODUCTION: Myopia is a highly significant problem, not only because of its high prevalence, but also because it can contribute to visual morbidity and increase the risk for vision-threatening conditions like retinal breaks and detachment and glaucoma. Near epidemic level of myopia (Up to 80%) has been reported in Asian countries such as Hongkong,¹ Taiwan,² Singapore³ and Japan.⁴

The macula is located roughly in the centre of the retina, temporal to the optic nerve. It is a small and highly sensitive part of the retina responsible for detailed central vision. The fovea is the very centre of the macula. It is about 5.5 mm in diameter and is the area providing the clearest, most distinct vision. It has been shown in histopathological studies that there is increasing scleral and retinal thinning with myopia.^{5,6} With the availability of modern imaging technologies, in vivo measurements of retinal thickness have been made possible, and the relationship between myopia and retinal thickness has been examined.^{7,8,9,10,11}

OCT may also have a role in the clinical assessment of glaucoma, as recent studies have shown macular and peripapillary thinning in glaucomatous eyes.^{12,13,14} In this study, we examined the relationship between Macular thickness and myopia with the OCT to see whether it would support the histologic and clinical observations.

MATERIAL AND METHODS: A total of 250 healthy myopic eyes were studied in the study. All the patients having myopia ranging from -0.50 D to -23 D visiting in outpatient department ASG eye hospital, jodhpur, Rajasthan. Following individuals were excluded who were previously operated for retinal detachment, person having myopia with retinopathy like diabetic, hypertensive, persons with Optic disc atrophy, Optic disc pallor, Aphakic eye, Cataract and Glaucoma. Each subject underwent a

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comprehensive ophthalmic evaluation and dilated fundus examination. Refractions were recorded with an automatic refractometer.

Subjects were divided into two diagnostic groups, according to refractive error; Group A low myopia (spherical equivalent between -0.50 D to -6.00 D) and Group B high myopia (Spherical equivalent > -6.00 D). Optical coherence tomography (OCT) is an optical signal acquisition and processing method that captures micrometre-resolution, three-dimensional images from within optical scattering media (e.g., biological tissue). In our study Fourier domain (Optovue, RTVue, version 6.3.2.73) type of Optical Coherence Tomography machine was used to calculate Macular thickness.

Statistical analyses were performed with commercially available software (SPSS ver. 16.0; SPSS Inc, Chicago, IL). Linear regression method was used to determine the correlation between Macular thickness and spherical equivalent, and expressed as the Pearson coefficient of correlation.

RESULTS: A total of 250 cases have been studied. Out of which 164 are that of Low myopia (Group A) and 86 are that of High myopic (Group B).

Macular Thickness of Fovea is more in group A in comparison to group B. In Superior Outer, Temporal Outer, Nasal Outer, Superior Inner, Temporal Inner, Inferior Inner and Nasal Inner quadrants macular thickness is more in group A in comparison to group B. Only in Inferior Outer quadrant macular thickness is lower in group A then group B.

Parameters	Group A -0.50 D to < - 6 D		Group B > - 6 D	
	Mean	SD	Mean	SD
Foveal	245.06	23.75	244.77	27.64
Sup. outer	284.40	50.95	271.91	33.32
Temporal outer	272.37	19.43	260.93	26.75
Inf. outer	266.20	23.27	268.56	43.61
Nasal outer	295.85	29.37	291.06	27.94
Sup. Inner	307.97	19.27	300.78	29.32
Temporal inner	297.12	19.63	291.76	28.22
Inf. Inner	312.54	43.35	298.08	24.44
Nasal inner	312.42	23.95	306.52	31.27

Table 1: Showing Macular thickness in different quadrant by Optical coherence tomography (OCT) in different groups

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Parameters	Correlation between Myopia scores with			
	r-value	t-value	p-value	Sign.
Foveal	0.0391	0.6157	0.5386	NS
Sup. outer	0.2083	3.3540	0.0009	S
Temporal outer	0.3118	5.1678	0.0000	S
Inf. outer	0.1554	2.4777	0.0139	S
Nasal outer	0.2167	3.4951	0.0006	S
Sup. Inner	0.2711	4.4347	0.0000	S
Temporal inner	0.1621	2.5876	0.0102	S
Inf. Inner	0.2271	3.6718	0.0003	S
Nasal inner	0.2157	3.4781	0.0006	S

Table 2: Correlation between Myopia scores with different parameters by Karl Pearson's correlation coefficient method

DISCUSSION: In present study macular thickness at fovea and inner and outer macular quadrants are less in high myopic group than in the low myopic group.

In present study macular thickness of fovea is not significantly related with myopia and macular thickness of inner and outer macular quadrants are significantly related with myopia.

Macular thickness of fovea is less in Group B (high myopic group) then Group A (low myopic group).

Lam¹⁵ investigated the relationship between myopia and macular thickness using Stratus OCT and found that no significant difference existed in the inner ring macular thickness among the groups (high myopia, low to moderate myopia and nonmyopic eyes). In contrast, P-C Wu¹⁶ reported that the mean retinal thickness measured by third-generation OCT in the inner and outer macular area of the high myopia group was significantly less than that in the non-myopia group. In the present study, we applied Fourier domain OCT to measure the retinal thickness of the macular area in myopia patients.

The results indicated that with the increase of myopia, the retina becomes thinner in high myopia patients except Inferior outer quadrant.

Like present study, Mrugacz M (2004)¹⁷ also found thinner fovea with increasing myopia.

In contrast to our study, Dennis Shun Chiu Lam et al (2007)¹⁸ P-C Wu (2007)¹⁶ Song AP et al (2014)¹⁹ found that foveal thickness is more in myopic patients.

Mrugacz M (2004),¹⁷ P-C Wu et al(2007)¹⁶ Song AP et al (2014)¹⁹ Lin Liu, Jun Zou et al (2014)²⁰ found that macular thickness in outer and inner rings decreases with increasing myopic refraction which is in agreement with our study.

Two Asian adult OCT studies in Japan and Singapore (Wakitani Y, Sasoh M 2003,²¹ Lim MC, 2005,)²² found that the macular retinal thickness did not vary with refraction, these results are contrast to our study results.

The findings of the present study provide information to clinicians regarding the pattern of regional variations in macular thickness in patients affected by myopia.

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