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MACULAR OCULAR COHERENCE TOMOGRAPHY CHANGES IN PATHOLOGICAL MYOPIA.

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ABSTRACT

BACKGROUND: Myopia is one of the most common refractive error which affecting 27% of world population **OBJECTIVES:** To study the role of ocular coherence tomography (OCT) in detecting the macular changes in pathological myopia. **STUDY DESIGN:** Observational case study. **PLACE AND DURATION OF STUDY:** This study was carried out at the Department of Clinical Ophthalmology, Khyber Girl's Medical College, Hayatabad Medical Complex (HMC), Peshawar over a period of six months from 10th September 2021 to 10th March 2022. **PATIENTS AND METHODS:** This was an observational case study. There were 70 eyes of 35 patients and both male and female were included in the study. First the visual acuity, refraction and detail slit lamp examination of all the patients was carried out in the OPD. The axial length was measured with A-Scan. Then ocular coherence tomography (OCT) was done in all the patients and the findings were documented in given proforma. **RESULTS:** this study include 70 eyes of 35 patients. In whom 22 male and 13 female patients. The range of the age was 11 to 60 years. All the included patients have pathological myopia. Whose refractive error was more than -6.00 diopter and axial length was more than 26 mm. The macular changes seen in 60% of the cases. .In which the most common changes in high myopic patients was the combination of different macular pathologies. This was present in 22 eyes (31.1%). The other pathologies include ERM, retinoschisis, foveoschisis, PVD, Macular hole and CNV was also seen in our study. **CONCLUSIONS:** It was concluded that ocular coherence tomography play an important role in detecting the different macular changes in high pathological myopic patients. Which was some time not visible on ophthalmoscopic examination?

KEY WORDS: OCT, Myopia

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INTRODUCTION

Myopia is one of the most common refractive errors which affecting 27% of world population[1].pathological myopia is one of the type of myopia which is associated with more than -6 diopter or axial length is more than 26mm. it is one of the most common cause of low vision and blindness worldwide and affect 1-3% of the general population[2].

Pathological myopia is associated with an high risk of sight-threatening problems such as macular degeneration, choroidal neovascularization, retinoschisis, posterior staphyloma, glaucoma, retinal detachment, and cataract[1,3]. In pathological myopia various changes can also occur in the different retinal layers of the macula such as retinoschisis, cysts, macular hole, foveoschisis, posterior vitreous detachment (PVD), epiretinal membrane (ERM) and choroidal neovascularization (CNV). Sometime these changes are varying subtle and cannot diagnose by simple ophthalmoscopy. In such cases optical coherence tomography play an important role in the diagnosis and progression of these changes in the macula[4].

Ophthalmic surgeons employ optical coherence tomography (OCT), a non-intrusive method, to see sectional pictures of the retina & optic nerve as well as assess the macula & retinal nerve fibre layer (RNFL)5. It aids in determining the presence of the macular alterations that are among the numerous ocular abnormalities brought on by pathological myopia. That leads to myopic individuals' eyesight to decline and cannot be readily seen with ophthalmoscopy6. Over the last ten years, optical coherence tomography (OCT), which provides qualitative as well as quantitative assessments of the macula & retinal nerve fibre layer (RNFL), have been extensively employed to evaluate the retina & optic nerve. Prior to the development of OCT, only enucleated globes were capable of being used to study the structural changes that occurred in very myopic human eyes, and histomorphometric measurements were taken of the ocular tissues.

METHODS

This was an observational case study which was conducted on the outdoor patients in the department of ophthalmology, HMC Peshawar over a period of six month from 10th September 2021 to 10th March 2022. Data was collected with the help of proforma.

Inclusion criteria

Patients with refractive error of -6 diopter or more and axial length 26mm or more were included in the study.

Exclusion criteria

1. Age less than 10 years
2. Any Previous history of trauma
3. Opaque media such as corneal opacity or cataract
4. Previous history of ocular surgery or laser therapy.
5. Retinal vascular or other retinal pathologies.
6. Diabetic and hypertension

Data collection procedure

All the patients who attend the OPD during study period were screened for eligibility. After informed consent all participants underwent complete eye examination. The examination include both the corrected and

uncorrected visual acuity to find the refractive error, intraocular pressure measurements, slit Lamp bio microscopy and dilated fundus examination. While the axial length was measured by using A-Scan ultrasound biometry.

Then the pupillary dilatation was done in all the patient with tropicamid to performed ocular coherence tomography (OCT). Multiple macular OCT scan of (6 × 6 mm) area of the macular region centered on the fovea was examined for any pathology.

Statistical analysis

The findings were documented in the proforma and the data was analyzed using SPSS 23.0.

RESULTS

It was an observational case study which includes 70 eyes of 35 patients. 22 (62.9%) men & 13 (37.1%) women were of the patients. The ages ranged from 11 – 60, with a mean of 35.5 years. Table-1

High pathological myopia affects each and every patient involved. Whose axial length was greater than 26 mm and whose refractive errors were greater than -6.00 diopter? The macular changes in pathological myopia were given in table 1. In which the most common changes in high myopic patients was the combination of different macular pathologies. Which was present in 22 eyes (31.1%)? The other pathologies include ERM, retinoschisis, foveoschisis, PVD, Macular hole and CNV. Table-2

Table 1: Patients characteristics

Characteristics	Frequency	Percentage
Gender		
Male	22	62.9%
Female	13	37.1%
Age		
Age range	11-60 years	
Mean age	±35.5 years	

Table 2: Macular changes on OCT in pathological myopia

Macular changes	Frequency	Percentage
ERM	7	10%
Retinoschisis	6	8.6%
Foveoschisis	1	1.4%
PVD	4	5.7%
Macular hole	1	1.4%
CNV	1	1.4%
Combination	22	31.5%
Normal	28	40%
Total	70	100%

ERM- epi retinal membrane, PVD- posterior vitreous detachment, CNV- choroidal neovascularization

DISCUSSION

High pathological myopia associated with various ocular complication specially related to macula. Most of the time the macular changes are very subtle and not visible on ophthalmoscopic examination. In such cases optical coherence tomography (OCT) play an important role in deducting these macular changes. Optical coherence tomography (OCT) have an advantage over the other imaging system such as B-Scan in exploring the macular changes in pathological myopia when the globe is stretched due to increasing in the axial length[4,6].

The ocular alteration associated with pathological myopia specially macular changes was explain by Frisina R et al as a macular traction maculopathy (MTM) which include retinoschisis, cysts, macular hole, foveoschisis, posterior vitreous detachment (PVD), epiretinal membrane (ERM) and choroidal neovascularization (CNV)[7,8].

In our study the prevalence of myopia was more in males then females. This is because in our society, the female have less opportunity to reach to the ophthalmologist then males. the male predominance was also found in Gumbe B et al study in which it was 53%[9].

In our study, macular ocular coherence tomography (oct) was normal in 40% of the

cases while in 60% of the cases different macular changes was detected in pathological myopia. Among them 31.1% have a combination of more than one macular change? These results were close to the result of Elgouhary SM et al and Miyake et al study[10,11]. In which macular OCT was normal in 43% and 48% of cases respectively.

The other most common maculer pathology in high myopic patient in our study was epi retinal membrane which was 10% which was identified as a hyperreflective band located over the ILM. While in Atta Allah HR at al[12] study shows epi retinal membrane in 15% of cases which was higher than our study. Similarly in Gomaa AR et al[13] study epi retinal membrane was detected in 65 eyes on ocular coherence tomography.

Much other pathology such as CNV, macular hole, PVD, and foveoscysis also identified in our study however the percentage of these pathologies was low in our study as compared to the Attaallah et al study[12].this because the population sample in our study is small. Similar macular changes were also seen in high myopic eyes in Choi KJ et al[6] study.

In summary, the oct is an an important noninvasive tool, which help the ophthalmologists in the diagnosis, progression and treatment of the various subtel sight threating macular pathologies in high myopic patients. It is not only helpful in detecting macular change but can also detect many other myopic changes which is associated with the optic disc and choroid.

Limitation: This study had some limitations. First, it was an observational case study, thus selection bias may have been present. Furthermore, there were not very numerous individuals that participated in the research. Thirdly, because the research was carried out at only one facility, it may not have been entirely typical of the community as a whole. To overcome with better results further randomized control trials with large cohort in multiple teaching hospitals are advised.

Conclusion; ocular coherence tomography play an important role in detecting macular changes in pathological myopia which may be miss on ophthalmoscopic examination.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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CONFLICT OF INTEREST: No competing interest declared.

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