Original Research Paper

Volume - 11 | Issue - 01 | January - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Ophthalmology

RETINAL CHANGES IN MYOPIC PATIENTS AT A TERTIARY CARE CENTRE IN EASTERN INDIA

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ABSTRACT

Background: Myopia is a major cause of visual impairment in both the developed and the developing world. Its prevalence ranges between 83% to 97% and the prevalence of high myopia ranges between 7% and 22%. Individuals with high myopia have increased risk of retinal complications which can be potentially sight threatening.

Aims And Objectives: To determine the prevalence and types of retinal changes in patients with myopia and the relationship of the retinal changes with the severity of myopia.

Materials And Methods: Patients attending the outpatient department having myopia and age more than 8 years were selected for the study. They underwent dilated fundoscopy (direct and indirect ophthalmoscopy) to record the various retinal changes.

Results: Tessellated fundus (58.5%) and peripapillary atrophy (40.5%) were the most common findings. Temporal crescent (21.5%), lattice degeneration (16.5%), white with or without pressure (11%), retinal tears (4%) and retinal detachment (2%) were also seen. No changes were observed in 22% of the eyes.

Conclusion: Myopic individuals should be educated on the symptoms of various complications and seek care immediately if symptoms arise.

KEYWORDS : myopia, retinal changes, fundus examination, eye screening.

INTRODUCTION

The Greek word myopia means to close or contract the eye (myopia, from myein "to shut" and ops "eye"). The term myopia was introduced from the habit which short sighted people frequently have of half closing the eyelids when looking at distant objects. Myopia is that dioptric condition of the eye in which, with the accommodation at rest, incident parallel rays of light come to a focus anterior to the light sensitive layer of the retina.[1]

In simple myopia, there are no degenerative changes in the fundus although peripheral retinal degenerations often become evident later in life, and they do not progress after adolescence when a degree of 5 or 6D may be attained.[1]

Pathological myopia is an eccentric group wherein the myopia is degenerative and progressive, likely due to a disease rather than a biologic variation. There is high axial myopia with characteristic pathological changes at the posterior pole.[2] The refractive change appears in childhood, usually between 5 to 10 years of age, and increases steadily up to 25 years or beyond, finally amounting to -15 or -25D or more. The myopic eyes show excessive axial length with increased scleral expansion, dehiscence and posterior staphyloma formation. The global expansion of the eye is a slow process that occurs during a person's life resulting in blinding complications.[1]

Although isolated high myopia in children less than 10 years of age is rare[3], it is the most common factor associated with non-traumatic paediatric rhegmatogenous retinal detachment and is a significant cause of visual disability.[4] Compared to adults, children with retinal detachments are less likely to report symptoms and they present late with more chronic detachments, have worse surgical and visual outcomes, and are more difficult to examine.[5]

Myopia is an increasing public health concern, with prevalence estimates as high as 80% in selected regions of East Asia among younger persons.[6] Among young adults aged 18-24 years in East Asian countries, the prevalence of myopia ranges between 83 and 97% and the prevalence of high myopia ranges between 7 and 22%.[7] Although the prevalence of myopia varies by the country, age and ethnic group, it is a major cause of visual impairment in both the developed and developing world. Given the alarming rates of myopia in Asia, there will be an enormous adult population at high risk of developing pathological myopia.

The most common pathologies in myopics include optic nerve crescent, white without pressure, lattice degeneration and pigmentary degeneration. High myopia is also suggested to be associated with bilateral rhegmatogenous retinal detachment, a condition with very severe visual morbidity. Risk factors for the development of rhegmatogenous retinal detachment are peripheral retinal abnormalities such as lattice degeneration, retinal holes and tears.

Individuals with myopia have increased risk of retinal complications such as lattice degeneration, retinal detachment, subretinal neovascular membrane leading to submacular haemorrhage and subsequent scarring. Myopia related complications like posterior staphyloma and chorioretinal atrophy increase proportionally with increase in axial length of the eye. Thinned out chorioretinal tissue is associated with poor blood circulation and may lead to choroidal neovascularization by inducing vascular endothelial growth factor expression.

As some of the retinal complications are potentially sight threatening, understanding the risk factors for the development of these complications in high myopia will be beneficial to identify these high-risk subjects.

Delayed diagnosis or neglect may be detrimental to the visual prognosis of myopic individuals who are developing retinal changes. As some of the retinal changes may predispose to visual impairment, highly myopic individuals should be educated on the symptoms of various eye conditions and seek care immediately if symptoms arise.

AIMS AND OBJECTIVES:

1. To determine the prevalence and types of retinal changes in patients with myopia.
2. To determine the relationship of the retinal changes with the severity of myopia.

METHODS:

Patients having myopia aged above 8 years presenting in the outpatient ophthalmology department were included in the study. A total of 100 patients were included. Informed consent was taken from all the patients. Ethical clearance was obtained from the institute Ethics committee. This is a cross sectional descriptive study performed over a period of 1 year (May,2019- May,2020).

Inclusion Criteria:

Patient having myopia attending the Ophthalmology OPD.

Exclusion Criteria:

1. Age below 8 years.

2. Patient having cataract which precludes view of retina.
3. Patient having any other systemic disease like diabetes, hypertension etc. with posterior fundus lesions.
4. Noncooperative patients.

Procedure:
The need and the nature of the examination was explained to the patient. The patient's visual acuity at presentation and the best corrected visual acuity were recorded. A detailed history was taken, the age of onset of the ocular symptoms, intake of any medications, family history of refractive errors and other ocular diseases was asked.

The eyes were dilated using eye drop Tropicacyl Plus (Sunways India PVT. LTD, Tropicamide 0.8%+ Phenylephrine Hydrochloride 5%). Direct ophthalmoscopy to note gross changes in the disc and macula, Slit lamp biomicroscopy using 90 D lens to visualize the fundus, Indirect ophthalmoscopy with scleral indentation were done to visualize the retina, especially anterior to the equator. Goldman 3 mirror lens was used to confirm the findings at the retinal periphery seen with indirect ophthalmoscopy, in case of diagnostic confusion.

RESULTS AND ANALYSIS:
A total of 100 patients (200 eyes) were examined and the data was collected and analyzed.

Table 1: Age Incidence

Age group	number of patients	Percentage
8 to 20	34	34%
21 to 30	36	36%
31 to 40	16	16%
41 to 50	6	6%
>50	8	8%
Total	100	100%

Table 1 shows that the distribution of myopia was highest in the age group 21-30 years (36 patients, 36%), followed by 8-20 years (34 patients, 34%).

Table 2: Sex Incidence

Sex	Number of patients	Percentage
Male	42	42%
Female	58	58%
Total	100	100%

Table 2 shows the distribution of myopia to be more in females (58 patients, 58%) than in males (42 patients, 42%).

Table 3: Occupation

Occupation	number of patients	Percentage
Student	56	56%
Engineer	12	12%
Teacher	8	8%
Housewife	6	6%
Clerk	4	6%
Labourer	8	6%
Others	6	6%
Total	100	100%

Table 3 shows that most of the patients were students (56 patients, 56%). 8% patients had a family history of high myopia.

Table 4: Refractive Status

Refractive Status	Number Of Eyes	Percentage
-2 to <-4	37	18.50%
-4 to <-6	96	48.00%
-6 to <-8	38	19.00%
-8 to <-10	15	7.50%
>=-10	14	7%
Total	200	100.00%

Table 4 shows the distribution of patients according to the refractive error. 96 eyes (48%) had a refractive error between -4 to <-6D followed by 38 eyes (19%) between -6 to <8D and 37 eyes (18.5%) had a refractive error between -2 to <-4D.

Table 5: Retinal Changes

Retinal changes	Number Of Eyes	Percentage
Tessellated fundus	117	58.5%
Peripapillary atrophy	81	40.5%
Disc tilt	63	31.5%
Temporal crescent	43	21.5%
Paving stone degeneration	20	10%
Lattice degeneration	33	16.5%
White without pressure	22	11%
White with pressure	16	8%
Retinal hole	26	13%
Retinal tear	8	4%
Retinal detachment	4	2%
Posterior staphyloma	8	4%
SRNVM	5	2.5%
Chorioretinal atrophy	4	2%
Normal fundus	44	22%

Table 5 shows the prevalence of various types of retinal changes in the study group. Tessellated fundus (58.5%) and peripapillary atrophy (40.5%) were the most common findings. Tilted disc (31.5%), temporal crescent (21.5%), lattice degeneration (16.5%), white without pressure (11%), white with pressure (8%), retinal hole (13%), paving stone degeneration (10%), retinal tear (4%), retinal detachment (2%) were also seen. Posterior staphyloma (4%), chorioretinal atrophy (2%), sub retinal neovascular membrane (2.5%) were the other findings. No retinal changes were seen in 22% eyes.

The risk of peripapillary atrophy, tilted disc and posterior staphyloma (p values <0.001 for all) was seen to increase with increase in the refractive error.

DISCUSSION:
Prevalence and types of retinal changes in 200 eyes of 100 patients with myopia were studied over a period of 1 year. On analysis of the data collected, the following findings were noted. Tessellated fundus (117 eyes,58.5%) and peripapillary atrophy (81 eyes, 40.5%) were the most common findings. These were followed by tilted disc (63 eyes, 31.5%), temporal crescent (43 eyes, 21.5%), lattice degeneration (33 eyes, 16.5%), retinal hole (26 eyes, 13%), white without pressure (22 eyes, 11%) and white with pressure (16 eyes, 8%). Paving stone degeneration (20 eyes, 10%), retinal tear (8 eyes, 4%) and retinal detachment (4 eyes, 2%) were also seen. Posterior staphyloma (8 eyes, 4%), chorioretinal atrophy (4 eyes, 2%) and subretinal neovascular membrane (5 eyes, 2.5%) were seen in few eyes showing that these were rare complications. No retinal changes were seen in 22% eyes.

In the cross-sectional study of 200 Iraqi patients with myopia at Baghdad in 2010, 61% patients showed posterior vitreous detachment, 27% had paving stone degeneration, 10% had lattice, 3% had white without pressure and only 10% had normal fundus.[8] These findings are very similar to our results.

Our study showed a high prevalence of tessellated fundus (58.5%), peripapillary atrophy (40.5%), tilted disc (31.5%) and temporal crescent (21.5%). In Singapore adult myopic eye study, tessellated fundus was seen in 90%, peripapillary atrophy in 81.2%, tilted disc in 57.4% and staphyloma in 23%.[9] The very high prevalence of tessellation and peripapillary atrophy could be attributed to the different age group and higher refractive error considered in their study.

In the study conducted on highly myopic eyes of young Asian adolescents, most common optic disc findings were peripapillary atrophy (97.3%) and tilted disc (27.5%).[10] Thus, we can say that the prevalence of various myopic changes in our study is similar to the other Asian studies.

In Singapore adult myopic eye study, the prevalence of peripapillary atrophy (p value =0.05), tessellated fundus (p value <0.001) and posterior staphyloma (p value <0.001) increased with increasing refractive error.[9] In our study, the risk of peripapillary atrophy, tilted disc and posterior staphyloma (p values <0.001 for all) was seen to increase with increasing refractive error. So, the results are corroborating with each other.

Studies have shown that myopia is an increasing public health concern, with prevalence estimates as high as 80% in selected regions of East Asia among younger persons.[7] In our study too we saw that a large number of patients were young and the distribution of myopia was highest in the age group 21-30 years (36 patients, 36%), followed by 8-

20 years (34 patients, 34%).

Thus, we can say that the findings of our study are similar to the findings of various other studies conducted on myopic patients in other countries of the world.

CONCLUSION:

Increasing refractive error causes a significant increase in the risk of developing retinal changes such as Tessellated fundus and peripapillary atrophy. Retinal hole, white with and without pressure, lattice degeneration, paving stone degeneration, retinal detachment, retinal tear, posterior staphyloma, chorioretinal atrophy and subretinal neovascular membrane were also seen. A large number of the subjects in our study were students. There is an enormous young adult population having myopia who are at risk of developing retinal changes resulting in significant visual loss. Regular screening of myopic eyes should be done to detect retinal changes and such individuals should be educated on the symptoms of various complications and seek care immediately if symptoms arise.

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