Clinical Study Of Fundal Changes In Myopia

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Abstract: Background: Aim: Study fundal changes in different age groups & degrees of myopia. Measure ocular parameters (Corneal Curvature, Axial Length, Intraocular Pressure, Central Corneal Thickness) associated with myopia.Material And Methods: Study included 150 patients out of which 50 were low, 50 medium and 50 high myopia. Examination included best corrected visual acuity, slit lamp examination, keratometry, axial length, central corneal thickness and intraocular pressure, ultrasound B scan, dilated fundus with indirect ophthalmoscope. Result: All fundus findings had correlation with high myopia except choroidal neovascularization which did not differ with degree. All degree showed highest percentage of Keratometry K1 between 42 to 43.99 D and K2 between 44 to 45.99 D with lowest percentage K1 between 46 to 48 D and K2 between 48 to 50 D. Axial length increased with severity. Highest percentage of central corneal thickness in all degree was between 500 to 549 microns.100% of high myopic had tessalation, it did not differ with age. Temporal crescent was common in higher age group. Peripheral retinal degeneration was common between 20 to 29 years. Posterior staphyloma was associated between 30 to 39 years. Retinal detachment did not vary with age. Conclusion: Visual impairment due to myopia may be prevented by early detection of cause by appropriate investigations and treatment. [Shah S A Natl J Integr Res Med, 2021; 12(5):11-13]

Key Words: Fundal Changes, Indirect Ophthalmoscopy, Myopia

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Introduction: The word Myopia is a Greek word, which means "to shut" or "to close the eye"[1]. Myopia is a type of refractive error in which parallel rays of light coming from infinity are focussed in front of the retina when accommodation is at rest. Also known as "near or short sightedness". Based on degree, myopia can be classified into a)Low myopia < -3.00 D, b)Medium myopia -3.00 D to -6.00 D, c)High myopia > -6.00 D. Various degenerative changes are seen in myopic fundus which are associated with degree of myopia and age.

Peripheral degenerations are common in retina. This study is to correlate fundal changes with age of patient & degree of myopia. Visual impairment due to myopia may be prevented by early detection of common cause by appropriate investigations and treatment. Example is Peripheral retinal degenerations & laser.

Material & Methods: This is Observational, Cross sectional Study on Myopic Patients attending Ophthalmology Out Patient Department in Tertiary Care Hospital willing to give written informed consent after approval from Institutional Review Board from November 2018 to August 2020.150 patients out of which were 50 low,50 medium and 50 high myopic. Total 300 eyes were examined. Patient willing to give written informed consent, patients between 10 to 50 years of age group, all degree of myopia, any Visual acuity were included in study.

Patients not willing to give written informed consent, patients below 10 years and above 50 years of age group, other ocular disease affecting vision except those related to age changes, aphakic and pseudophakic, systemic disease affecting vision, undergone ocular surgery or sustained trauma were excluded from study.

These patients underwent Best Corrected Visual Acuity measurement by Snellen's chart for distant vision, Jaeger's chart for near vision and Cycloplegic Retinoscopy, Anterior segment examination by Slit Lamp, Corneal Curvature by Manual Bausch and Lomb Keratometer.

Intraocular Pressure by Goldmann Applanation Tonometer, Central Corneal Thickness by Optical Coherence Tomography(Topcon),Axial length by Ultrasound A Scan using Immersion method, Dilated fundus examination by Heine Indirect

Ophthalmoscope using 20 D lens and Ultrasound B scan. Retinoscopy and Dilated fundus examination done using cyclopentolate eye drops 0.5% instilled every 10 minutes for three times.

Results: Results are as under.

Table 1: Distribution Of Patients Based On Age

Age Group (Years)	%
10-19	32.0
20-29	41.3
30-39	12.7
40-50	14.0

Table 2: Distribution Based On Sex

Sex	%
Female	50.7
Male	49.3

Table 3: Association Between Fundal Changes And Degree Of Myopia

Fundal Changes	Low Myopia (%)	Medium Myopia (%)	High Myopia (%)
Temporal Crescent	0	0	56
Tessalation	44	60	100
Peripheral Retinal Degeneration	0	6	14
Retinal Detachment	0	0	4
Posterior Staphyloma	0	0	4
Choroidal Neovascularisation	0	0	1

Table 4: Association Between Keratometry K1 (Vertical Axis) And Degree Of Myopia

Keratometry (K1) Value	Low Myopia (D)	Medium Myopia (D)	High Myopia (D)
Highest % Between	42-43.99	42-43.99	42-43.99
Lowest % Between	46-48	46-48	46-48

Table 5: Association Between Keratometry K2 (Horizontal Axis) And Degree Of Myopia

Keratometry (K2) Value	Low Myopia (D)	Medium Myopia (D)	High Myopia (D)
Highest % Between	44-45.99	42-43.99	44-45.99
Lowest % Between	48-50	46-47.99	48-50

Table 6: Association Between Axial Length And Degree Of Myopia

Axial Length	Low Myopia (Mm)	Medium Myopia(Mm)	High Myopia (Mm)
Highest % Between	24-25.99	24-25.99	24-25.99
Lowest % Between	28-30	28-30	20-21.99

Table 7: Association Between Central Corneal Thickness And Degree Of Myopia

Central Corneal Thickness	Low Myopia (Microns)	Medium Myopia (Microns)	High Myopia (Microns)
Highest % Between	500-549	500-549	500-549
Lowest % Between	>600	400-449	400-449

Table 8: Association Between Fundal Changes And Age Groups

Fundal Changes	10-19 years	20-29 years	30-39 years	40-50 years
Temporal Crescent	4	14	13	15
Tessalation	47	67	32	42
Peripheral Retinal Degeneration	0	13	7	0
Retinal Detachment	0	2	2	0
Posterior Staphyloma	0	0	2	0
Choroidal Neovascularisation	0	0	1	0

Discussion: Maximum patients were in the age group 20-29 years followed by 10-19 years followed by 40-50 years followed by 30-39 years. There were more females than males in the study. Our results showed significant association of all fundus findings with high myopia than with low and medium myopia except choroidal neo vascularization which did not differ significantly with degree of myopia.

All degree of myopia showed highest percentage of Keratometry value K1 between 42 to 43.99 D and K2 between 44 to 45.99 D with lowest percentage of K1 between 46 to 47.99 D and K2 between 48 to 50 D indicating flatter than normal cornea to compensate axial elongation in myopic patients[2].Axial length increased with severity of myopia with value >28mm in 15% high myopic

patients and none with low or medium myopia patients. Highest percentage of central corneal thickness value in all degree of myopia was between 500 to 549 microns followed by 450 to 499 microns. Decrease in CCT underestimates IOP and is contraindication for laser surgeries in these patients. 100% of high myopic patients had tessalation, it did not differ with age. Temporal crescent was common in higher age group.

Peripheral retinal degeneration was common between 20 to 29 years of age. Posterior staphyloma was significantly associated with patients between 30 to 39 years. Retinal detachment did not vary with age. Information derived through limited number of 150 patients cannot be extrapolated to generalization considering large subset of myopic population.

Conclusion: Visual Impairment due to myopia may be prevented by early detection of common cause by appropriate investigations and treatment. Early diagnosis of peripheral retinal degenerations with indirect ophthalmoscopy and prophylactic laser treatment can prevent retinal detachment. Early diagnosis of CNV and its prompt treatment with laser photocoagulation and anti VEGF factors may prevent vision loss.

Ocular parameters are altered in pathological myopia. Axial length is increased and their increase is proportional to refractive error. Central corneal thickness is decreased which underestimates intraocular pressure thus easily missing coexisting glaucoma.

Therefore it should be mandatory that fundus of all myopic patients must be examined as routine with good mydriasis.

Effective reduction of visual impairment is available with optical correction by spectacles, contact lens and refractive surgery. Periodical monitoring is essential.

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