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A STUDY ON CORRELATION BETWEEN INTRAOCULAR PRESSURE AND MYOPIA

Ophthalmology

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ABSTRACT

Myopia, or near-sightedness, is the refractive error in which the rays of incident light from infinity are focused in front of the retina, in an unaccommodated state.

We found that, there is a significant correlation between myopia and intraocular pressure as increase in the IOP was onbhigher side in high and moderate myopics in comparison to emmetropic and low myopic indicating higher degrees of myopia as an important risk factor for ocular hypertension.

KEYWORDS

Iop, Myopia, Glaucoma , Refractive Error

INTRODUCTION-

Myopia, or near-sightedness, is the refractive error in which the rays of incident light from infinity are focused in front of the retina, in an unaccommodated state.[1] High grade myopia can increase the risk for glaucoma, retinal detachment, and chorioretinal degeneration.[2] There is higher prevalence of glaucoma among myopic eyes than in any other refractive errors or emmetropic eyes.[3]The relative risk of open angle glaucoma is found to increase incrementally as refractive status shifts from hypermetropia to myopia, becoming three times greater for myopic of - 5D or more as compared with hypermetropics. Glaucoma in myopic subjects is said to be pressure mediated.[4,5]

MATERIAL AND METHOD –

An observational study is carried out in the patients coming to the out patient department of ophthalmology in SKN medical college over a period of 6 months. The study included 100 eyes of 50 patients aged between 11-52 year of both genders.After obtaining informed consent from all patients,a complete ocular examination including slit lamp examination, dilated fundus examination, retinoscopy and refraction was carried out. Visual acuity for distant vision was measured by Snellen's chart.Goldmann applanation tonometer was used for measuring the intraocular pressure by the same investigator in all cases. Exclusion criteria were a history of corneal infection or abnormalities. Patients with family history of Glaucoma, history of trauma or surgery in the eye, patients on any topical medications and myopic macular degeneration were also excluded from the study.The Inclusion criteria were Spherical myopia of -0.5D and above, Cylinders of 1D or less.

100 eyes of 50 patients were divided into four groups.
Group-A included Emmetropic patients with refraction ranging from +0.50
to-0.50 DS.
Group-B included low myopia ranging from -0.75 DS to - 3.00 DS.
Group-C included moderate myopia from -3.00 DS to - 6.00 DS.
Group-D included high myopia >-6.00 DS.

DATA ANALYSIS-

All results are expressed as mean ± SD and one way ANOVA test was used (Analysis of variance) for multiple group comparison.The level of statistical significance was set to $P<0.05$.

Results-

The study population included 50 myopic patients (100eyes). The age range of the patients was 10–52 years, mean age being 28.4 years. The study included 18 females and 32 males.(Table 1).The four diagnostic groups did not show any significant difference in gender distribution. The included eyes showed refractive error ranging from +0.50 DS to -10.00 DS.

Table 1: Sex wise distribution and their percentage

Number		Percentage
Male	32	64
Female	18	36
Total	50	100

Table 2: Distribution of refractive error among the different study groups

Study group	Distribution	Percentage%
Group A	**46**	**46**
Group B	**38**	**38**
Group C	**11**	**11**
Group D	**5**	**5**

Group A Emmetropia included 46 eyes, Group B low myopia included 38 eyes, Group C moderate myopia included 11 eyes and Group D high myopia included 5 eyes (Table 2).

Table 3: Mean intraocular pressure among the four groups.

	The mean Intraocular pressure recorded	
group A	11.78mm Hg	(SD:2.06),
Group B	12.60mm Hg	(SD:2.36),
Group C	15.98 mm Hg	(SD:2.76)
Group D	18.24mm Hg	(SD:0.83)

The intraocular pressure of emmetropes (Group A) and low myopia (Group B) did not show statistically significant difference in Intraocular pressure but the IOP in moderate (Group C) and high myopia(Group D) was found to be higher side.The results was statistically significant with a 'P 'value < 0.05.

DISCUSSION

The results in this study, found a positive correlation between intraocular pressure and increasing degree of myopia. Several previous reports showed same findings.[6,7] Many studies have reported that the myopic patients especially in the high myopic group showed higher Intraocular pressure than controls.[6,8-10]. The intraocular pressure was significantly higher not only in the high myopic group but also in the moderately myopic groups compared to emmetropia and low myopic groups in this study.

However no correlation was noted between intraocular pressure and refraction in some studies.[11] Different methods and samples may be the reason for the inconsistent result with different studies. There is an increased prevalence of glaucoma among myopic eyes compared with non-myopic eyes.[6,7] However it is not very clear why myopia causes an increased Intraocular pressure. There are several hypotheses. One hypothesis is that the increased intraocular pressure is related to an increased stress of the global wall and decreased ocular rigidity in the myopic eyes.[12]

According to Schmid JL et al In myopic eyes the inner radius of the globe is longer and the global wall is thinner compared to non-myopic eyes.[12]

Study group	Frequency	Mean IOP	SD
A	46	11.78	2.06
B	38	12.60	2.36
C	11	15.98	2.76
D	5	18.24	.83

Myopia has been identified as a risk factor for open angle glaucoma.

Increased chance of open angle glaucoma in myopia may be due to streatching and tractional vectors not evenly distributed across the myopic disc, or due to the reduced RNFL (Retinal Nerve Fiber Layer) thickness in myopia.

Nesterov A et al postulated that, in myopic eyes the ciliary body is in relatively posterior position in relation to canal of Schlemn so that it has less mechanical advantage in widening the spaces in the trabecular meshwork during accommodation.[13]

The parameters like axial length, corneal curvature and central corneal thickness were not measured in this study.Therefore the role of these factors in the refraction related mechanical changes of the cornea were not known.

These factors may influence the correlation between myopia, IOP and biomechanical properties of cornea.[14,15]

The other limitation is that the investigative groups are not age or gender matched which may influence the results. However, no significant differences were found between the females and males in each group. No significant correlation was found in the measured parameters with age. A large sample size with age and gender match and measurement of corneal biomechanical parameters need to be considered in the study design in the future.

CONCLUSION

In the present study we conclude that, there is a significant correlation between myopia and intraocular pressure as increase in the IOP was on higher side in high and moderate myopics in comparison to emmetropic and low myopic indicating higher degrees of myopia as an important risk factor for ocular hypertension.

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