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ORIGINAL ARTICLE

Screening of high myopia patients for association with primary open angle glaucoma.

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ABSTRACT… Objectives: To review the prevalence of primary open angle glaucoma in patients with high myopia. **Study Design:** Observational Study. **Setting:** Department of Ophthalmology, KDA Teaching Hospital Kohat. **Period:** January 2019 to December 2019. **Material & Methods:** During this period 93 high myopic patients were selected. Informed consents were taken from them after explaining the purpose, procedure and tests required for diagnosis. Out of 93 patients 74 were male and 19 were female. Age range of the patients was from 20 to 57 years with mean age 43 years. Proper proforma was designed for documentation of intraocular pressure, perimetry, fundoscopy (Cup-disc ratio) and Optical coherence topography. Refraction of all patients was done with auto-refractometer and then subjectively. All 93 patients were high myopic with refractive error of -6 diopter spherical and above. Intraocular pressure was checked with air puff tonometer. Anterior segment examination was checked with slit lamp. Gonioscopy was done in 9 patients whose angles were suspected to be narrow or open. Pupils were dilated with tropicamide eye drops. Fundosopy with direct and indirect slit lamp biomicrosopy was done for Cupped-Disc ratio. 2 patients who had high intraocular pressure with no glaucomatous cupping disc were advised Optical coherence topography. Perimetry to all patients was advised with automated visual field analyzer. **Results:** Out of 93 high myopic patients 13(13.97%) had glaucomatous features. Out of 13 patients intraocular pressure more than 21mmHg and glaucomatous field defects were present in 100% while glaucomatous cupping discs were present in 11(84.61%) patients. **Conclusion:** High myopia is high risk association with primary open angle glaucoma.

Key words: Cupped-Disc Ratio (CDR), Diopter Spherical (DS), Intra Ocular Pressure (IOP), Optical Coherence Topography (OCT), Primary Open Angle Glaucoma (POAG).

INTRODUCTION

High myopia is expected to be a major refractive error related cause of visual impairment affecting about 5 billion people and 10% of world population by year 2050.[1] High myopia has exponentially a very high risk for inducing ocular morbidities in the form of cataract, retinal detachment and open angle glaucoma[2] which is mainly due to increase in axial length.[3]

POAG is caused by many factors of which high IOP is the high risk modifying factor with particularly if family history is present.[4] POAG is more prevalent and in meta-analysis of older than 70 years of age have prevalence of 6%, 16% and 3% in white, black and Asian population respectively.[5] The open angle glaucoma by various studies have been commonly reported in high myopic patients particularly young one.[6,7] The mechanism of high myopia associated with POAG is not clearly documented. However it is strongly speculated that increase in axial length causes tilting of optic disc which induces injury to retinal nerve fiber layers particularly axons in lamina cribrosa.[8] High myopia has been identified by many research is a major risk factor for developing POAG.[9,10] Retrospective research conducted on high myopia have reported 28% association with POAG.[11] Population based meta-analysis study have reported more odds ratio of high myopia with glaucoma which are in consonance to meta-analysis on POAG and myopia.[12]

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Optic nerve damage due to glaucoma may be identified late in the pathological course of disease in high myopic patients because of IOP tending to be in normal range. High myopic patient's large opti disc size and have a clear well delineated rim.[13]

The pathogenesis of POAG is mainly mechanical ie high IOP compresses structures and optic nerve head, disturbing the axoplasmic blood flow and excavation of optic nerve head. The other vascular theory is thought to be due to insufficient blood supply either due to high IOP or other causes like high blood pressure and vasospasm. It has been thought that optic nerve head structurally in high myopic eyes is more susceptible to glaucomatous damage due to changes in the connective tissues structures and arrangement.[14] This can be related to reduce RNFL thickness in myopic eyes which may also predisposes for development of glaucoma.[15]

MATERIAL & METHODS

This observational study was conducted on outdoor high myopic patients in Eye unit KDA Teaching Hospital Kohat from January 2019 to December 2019. During this period 93 high myopic patients were selected. Informed consents were taken from them after explaining the purpose, procedure and tests required for diagnosis. Out of 93 patients 74(79.56%) were male and 19(20.43%) were female (Table-I). Age range of the patients was from 20 to 57 years with mean age 43 years (Table-II). Proper proforma was designed for documentation of IOP, perimetry, fundoscopy (Cup-disc ratio) and Optical coherence topography. Refraction of all patients was done with auto-refractometer and then subjectively. All 93 patients were high myopic with refractive error of -6 diopter spherical and above (Table-III). Intraocular pressure was checked with air puff tonometer. Anterior segment examination was done with slit lamp. Gonioscopy was done in 9 patients whose angles were suspected to be narrow or opened. Pupils were dilated with tropicamide eye drops. Fundosopy with direct and indirect slit lamp biomicrosopy was done for Cupped-Disc ratio. 2 patients who had high intraocular pressure and no glaucomatous cupping disc were advised OCT. Preimetry was advised to all patients with automated visual field analyser.

RESULTS

Out of 93 high myopic patients 13 (13.97%) had glaucomatous features (Table-IV). Out of 13 glaucomatous patients high intraocular pressure more than 21 mmHg and glaucomatous field defects was observed in 13 (100%) and glaucomatous cupped-disc was present in 11(84.61%) patients (Table-V).

Gender	Number of Patients (%)
Male	74 (79.56)
Female	19 (20.43)

Table-I. Gender distribution. Total patient 130.

Age Group in Years	Number of Patients (%)
20-30	15 (16.12)
31-40	20 (21.50)
41-509	53 (56.98)
Above 50	5 (5.37)

Table-II. Age group. Number of patients 93.

Refractive error in Diopter Sphericals	Number of Patients (%)
6-10	64 (68.81)
11-15	19 (20.43)
16-20	10 (10.75)

Table-III. Myopic refractive error. Number of patients 93.

Profile	Number of Patients (%)
Non-Glaucomatous	80 (86.02)
Glaucomatous	13 (13.97)

Table-IV. Profile of patients. Number of patients 93.

Parameter	Number of Patients	Percentage
High IOP	13	100
Glaucomatous field defects	13	100
Glaucomatous CDR	11	84.61

Table-V. Glaucomatous parameters. Number of patients 13.

DISCUSSION

In ophthalmology comorbidities are more commonly detected while dealing with a particular disorder. Therefore it is mandatory to look for

other disorders too.

POAG is more prevalent in high myopic patients. Our study has shown a prevalence of 13.97% of POAG in high myopic patients. High myopia is being a complex trait associated with increased risk of pathological ocular complications such is cataract, glaucoma, age related macular degeneration and retinal detachment.[16] Our results regarding high myopia being a major risk factor associated with POAG is supported my national and international studies. Khalid A, Saleem AA, Ganj D study on high myopia a risk factor for POAG has revealed that 16.5% patient's high myopic patients had concurrent POAG being a statistically significant feagure.[17] Population based studies have reported that the risk of glaucoma increases with increasing degree of myopia. Singapore Malaya eye study have reported that high myopic patients have three time high risk of POAG as compared to emmetropic people.[18] The Sweden early manifest glaucoma trial have reported that prevalence of newly detected glaucoma increased with increasing myopia across all age groups.[19]

Jarus JB, Mantas P, have reported that for a given IOP in eyes with POAG optic nerve damage appears to be more pronounced in high myopic eyes with larger disk than in non-myopic eyes.[20] This suggest high susceptibility optic nerve damage in high myopic patients.

Mastropasqus L, Lobefelo L et al conducted studies on high myopia associated with POAG and established that 6-29% patients POAG have concurrent high myopia.[21] Sheng Ju Chen, Peng Lu, et al have concluded in their study that in addition to other factors high myopic refractive error has a close association with POAG.[22] Mary Oiu, Sophia Y, had conducted a study and reported that odds of visual field highly increased in high myopic patients as compared to emmetropic patients.[23] A series of risk factors diseases with POAG has been identified in systematic literature review. High myopia has been found to be a high risk factor associated with POAG as well as vasospasm, retinal vascular diseases, hypotension and hypertension.[24]

CONCLUSION

The observed data being supported by other research data and meta-analysis profoundly give strong association between high myopia and POAG. Myopic patients may have other devastating ocular co-morbidity in the form of POAG. Therefore it is of immense importance all myopic patients should be screened for POAG at frequent intervals. This will give timely addressing treatment to the concurrent co-morbidities.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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