



Evaluation of Myopics for Open Angle Glaucoma and Estimation of Risk

KEYWORDS

Myopia, open angle glaucoma, visual field, intraocular pressure

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ABSTRACT

Background: There is high prevalence of myopia in India and there is appreciable incidence of open angle glaucoma in myopes. The aim is to screen the myopes for open angle glaucoma and its correlation.

Methods: We studied 66 myopes (132 eyes) with more than 3 diopters refractive error with more than 15 years of age. Intraocular tension was measured with Goldmann Applanation tonometer. Thorough fundus examination was done after full dilatation of pupil. Field of vision was carried out with the help of Zeiss Humphrey Field Analyser 3. Angle of anterior chamber was examined with Goldman 3-mirror gonioscope. Diurnal variation and water drinking test were performed in glaucoma suspects.

Result: Only 15% myopes had IOP more than 20, rest 85% myopes had pressure less than 20 mmHg. Out of 66 myopes(132 eyes), 14 myopic eyes had open angle glaucoma, 2 eyes had absolute glaucoma and 8 eyes were glaucoma suspects.

Conclusion: About 18.1% myopes suffer from open angle glaucoma. It is therefore emphasized that myopes should be investigated for open angle glaucoma as many times they may remain symptomless.

Introduction: Glaucoma is a term describing a group of ocular disorders that result in optic nerve damage, often associated with increased intraocular pressure.¹

The term "Glaucoma" is said to refer to bluish green appearance of the pupil. In Hippocratic Aphorism the term glaucoma was used to describe blindness coming on in advancing years associated with glazed appearance of the pupil. Now it is emphasized that the classical feature of glaucoma are raised intraocular tension, optic disc changes, visual field changes.

Glaucoma has been called the "silent thief of sight"^[4] because the loss of vision often occurs gradually over a long period of time, and symptoms only occur when the disease is quite advanced. Once lost, vision cannot normally be recovered, so treatment is aimed at preventing further loss. Worldwide, glaucoma is the second-leading cause of blindness after cataracts.^{2,3}

In open angle glaucoma, there is no visible abnormality of the trabecular meshwork. It is believed that something is wrong with the ability of the cells in the trabecular meshwork to carry out their normal function, or there may be fewer cells present, as a natural result of getting older. Some believe it is due to a structural defect of the eye's drainage system. Others believe it is caused by an enzymatic problem. These theories, as well as others, are currently being studied and tested at numerous research centres across the country.

Myopic eyes may be more susceptible to glaucomatous changes at certain levels of IOP for the following reason. Myopic scleral canal is unusually large, abnormal shaped and tilted⁴, and myopic lamina cribrosa and peripapillary sclera are unusually thin^{5,6}. This may intensify the stress for given level of IOP⁶.

Myopia is a complex trait including both genetic and environmental factors as well as their interactions.^{7,8} High myopia is associated with increased risk of pathological ocular complications and may lead to blinding disorders such as premature cataracts, glaucoma, retinal detachment and macular degeneration⁹ making high myopia a major cause of legal blindness in many developed countries.¹⁰

The famous Blue Mountain Study emphasizes relation between POAG and myopia, with an odds ratio of 2.3 in eyes with low myopia, and 3.3 in moderate to high myopia¹¹. There are various studies depicting relation between myopia and glaucoma such as Barbados Eye study, Beaver Dam Eye Study, Singapore Malays Eye Study, Beijing Eye Study^{11,12,13}.

The association between myopia and POAG has been thought to be due to variety of mechanisms, including increased susceptibility of the optic nerve head to damage by raised IOP and the increased effect of shearing forces in optic nerve head damage. An important approach to detect early structural change in glaucoma is based on assessment of RNFL. Numerous studies have confirmed that RNFL measurement is sensitive for detecting glaucoma.

Type of the study:

This is a prospective clinical study

Inclusion criteria

1. Patients having myopia >3D
2. Age >15yrs

Exclusion criteria

1. Patients with systemic disease and local ocular disease assessed by history and clinical examination, which were known to cause open angle glaucoma
2. Patients having myopia <3D

Materials and Methods :

Study Procedure:

The study was carried out in following manner.

Patients' introduction was taken in the form of the name, age, sex, address, occupation, registration number.

The complains such as gradual diminution of vision or blurring of vision, delayed dark adaptation, ocular discomfort, contraction of visual fields, seeing of coloured halos, repeated change of glasses for near vision and localised loss of vision in visual field were asked for.

Certain special examinations and investigations were done.

- Retinoscopy was done after full dilatation of pupil by tropicamide 0.8% and phenylephrine 5%
- Intraocular tension- is recorded by Goldmann Applanation tonometer
- Gonioscopy was done with the help of Goldmann 3-mirror gonioscope to assess the condition of angle
- Fundus examination
- Field of vision by using Humphrey perimeter, 30-2 SITA standard program
- Diurnal variation and water drinking test in glaucoma suspects.

Statistical analysis was done of the values by using SPSS software.

Results:

The study was carried out in 66 myopes(132 eyes) with the refractive error of more than 3 diopters above the age of 15 years. 40% myopes had IOP more than 20, rest 60% myopes had pressure less than 20 mmHg.

We found 16 eyes had open angle glaucoma including 2 eyes had absolute glaucoma and 8 eyes were glaucoma suspects.

In case of water drinking test in glaucoma suspects, 4 eyes had rise of IOP was between 1-7mmHg and 4 eyes had rise of IOP more than 8 mmHg.

Distribution of study subjects is as follows

Total Males- 38(5 Glaucomatous)

Total females- 28(7 Glaucomatous)

It was observed that glaucoma was more common in age group of 46-60 years in myopes.

Range of refractive error in all study subjects is as follow

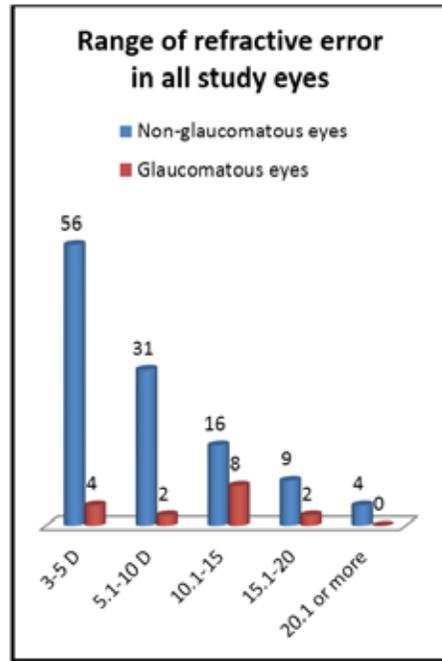


Fig:1

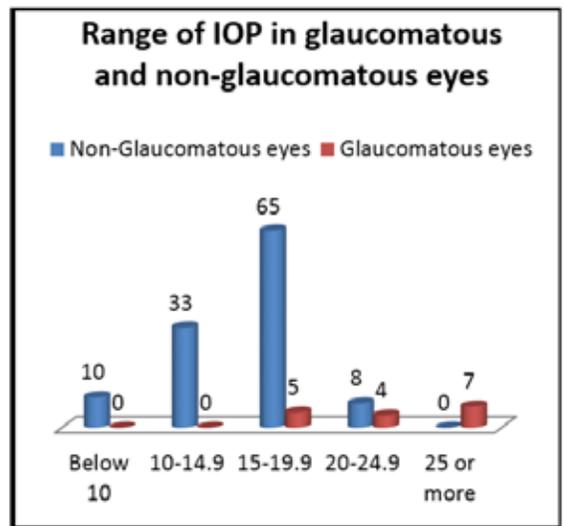


Fig:2

Fig:2

Among non-glaucomatous eyes, 8 eyes had IOP more than 20mmHg and remaining 108 eyes had IOP lower than 20mmHg. Among 132 eyes, 107 eyes had myopic crescent, 65 eyes had chorioretinal degenerative changes, 15 eyes had degenerative changes in vitreous, 1 eye had retinal detachment, 16 eyes had no changes.

Fundus examination of 16 glaucomatous eyes (including 2 eyes of absolute glaucoma) is as follows:

Intra-papillary fundus findings:

NRR 1-4:- 9 eyes,

NRR 5-7:-10 eyes,

NRR 8-10:- 5 eyes,

Nasal shifting of blood vessels:- 16 eyes,

Baring of circumlinear vessel:- 11 eyes

Note: NRR scoring is done according to Disc Damage Likelihood Scale¹⁵. Each eye may have 2 or more findings.

Extra-papillary fundus findings:

Optic disc haemorrhage:-6 eyes

Localised wedge defects:-7 eyes

Diffuse neuronal loss:-3 eyes

Peripapillary chorioidal atrophy:-10 eyes

Note: Each eye may have 2 or more findings.

Visual field changes

Generalised depression- 18

Nasal step or depression- 8

Temporal step or depression- 6

Enlargement of blind spot- 17

Paracentral scotoma- 10

Arcuate defects - 8

Note: Each eye may had 2 or more findings. Visual fields cannot be examined in 2 eyes because of absolute glaucoma.

Therefore, incidence of open angle glaucoma in myopes comes out to be 18%

We found 16 myopic eyes having open angle glaucoma (including 2 myopic eyes had absolute glaucoma) and 8 myopic eyes were found to be suspected glaucomatous.

Open angle glaucoma is usually said to be common in late adult age group and is a disease of advancing age. In present study 67% glaucoma cases were found in 46 to 60 years. Also, in the present study, 58% cases were male glaucomatous.

Our study is comparable with famous Blue Mountains Eye Study¹⁶, the Singapore Malay Eye Study¹⁷, the Los Angeles Latino Eye Study¹⁸.

Among 132 eyes, 81% eyes had myopic crescent, 49% eyes had chorioretinal degenerative changes, 11% eyes had degenerative changes in vitreous, 0.8% eyes had retinal detachment, 12% eyes had no changes.

In Glaucomatous eyes, 37% were normal on fundus examination, 42% had DDLS stage 5-7 (Glaucoma Damage) whereas 21% had DDLS stage 8 or more (i.e.Glaucoma disability).

Conclusions:

In the present study, 132 eyes were examined. Out of them 12% were found to be glaucomatous and 6% were found to be glaucoma suspects. The open angle glaucoma in myopes is common above the age of 45-60 years and common in males.

Overall conclusion is myopes should be investigated for open angle glaucoma.

Limitations:

There may be limitations in our study such as, we have not calculated the odds ratio in our study like other famous studies had done.

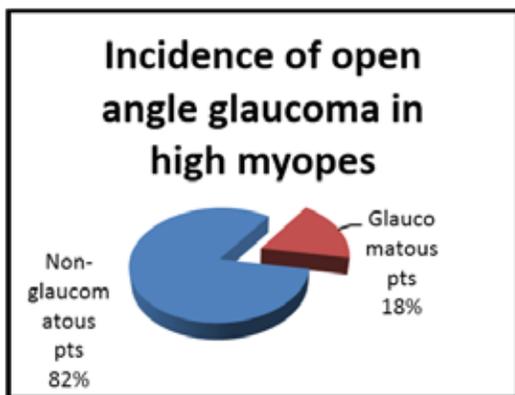


Fig:3

Discussion:

In our study, intraocular pressure in 108 eyes (other than glaucomatous eyes) was 18.4 ± 1.5 mmHg. The range was from 8mmHg to 22mmHg. IOP in 24 glaucomatous eyes (including 2 absolute glaucomatous eyes, 8 eyes of glaucoma suspects) was 23.4 ± 0.8 mmHg. The range was from 20 mmHg to 28mmHg.

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