# POST MYDRIASIS RISE IN INTRAOCCULAR PRESSURE WITH TROPICAMIDE IN NORMAL INDIVIDUALS, GLAUCOMA CASES WITH AND WITHOUT RAPID PROGRESSION

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## ABSTRACT

**Background:** Rise in intraoccular pressure (IOP) may have significant effects on optic disc. **Objective:** To compare post-mydriasis rise in intraoccular pressure with tropicamide in normal individuals and glaucoma cases with or without rapid progression. **Subjects and Methods:** Study design: Quasi-experimental. Sampling Technique: Non-Randomized, consecutive sampling. This study was performed on 116 eyes of 116 patients reporting at Eye Department, Combined Military Hospital (CMH), Lahore from 1st August 2012 to 30th April 2013. They were assigned to three groups based on their glaucoma profile: Group A: Normal subjects without raised IOP or glaucomatous visual field loss. Group B: Diagnosed cases of glaucoma without significant visual field defect progression. Group C: Diagnosed cases of glaucoma with significant visual field defect progression over last two years. SPSS version 16 Software was used for statistical analysis to compare intra-ocular pressure changes post-mydriasis in the three groups. **Results:** IOP rise post-mydriasis was low (1.89 mmhg) in normal individuals whereas the spike was statistically significant in glaucoma patients (5.88 mmHg). Diagnosed cases of glaucoma with worst prognosis has a relatively higher IOP spike (10.6 mmhg) as compared to those with slower visual field defects (5.88 mmhg) progression.($p<0.05$). **Conclusion:** Our study showed a significant rise in IOP in glaucoma patients with and without rapid progression as compared to normal subjects. Post-mydriasis IOP spike is a reliable diagnostic and prognostic provocative test for glaucoma suspects and diagnosed cases. However, the negative effects of raised IOP on an already compromised optic nerve head must be kept in mind.

**Keywords:** Glaucoma, Glaucoma suspect, Intraocular pressure, Mydriasis.

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## INTRODUCTION

Glaucoma is defined as a neurodegenerative disorder causing progressive damage to optic nerve and retinal nerve fibre layer; most significant risk factor being an intraocular pressure above the cut-off point of 20mm of Hg. The risk factors for glaucoma are broadly divided into two groups, static and dynamic. Static include family history, gender, age, myopia, central corneal thickness and ethinicity, while dynamic have intraocular and blood pressure under its umbrella.[1] Intraocular pressure (IOP) is affected by multiple factors. Medications, posture, exercise, blinking, eye movements, and Valsalva manoeuvre can influence the measurements of IOP.[2] Among the topical medications, mydriatrics and miotics are employed in routine for clinical examination and treatment purposes. A post-mydriatic rise in IOP has long been recognized. It was long known that pupillary dilatation is a potent risk factor for triggering acute rise of IOP in patients with closed anterior chamber angles.[3] Later it was postulated that increased IOP post-mydriatic was a universal phenomenon, though quantitatively more significant in patients of Primry Open Angle Glaucoma (POAG).[4] Previous research has demonstrated that cycloplegics cause a rise in IOP in 2% of the normal population while in 23% of the patients with POAG.[5] This rise in IOP has been reported to be maximum at 45 min after the instillation of the mydriatic.[6]

In Pakistan, visual field analysis are not available everywhere. Furthermore the case of glaucoma suspects becomes even more controversial. Ocular hypertension treatment study (OHTS) inferred the cumulative risk of glaucoma suspects developing glaucoma without treatment was 9.5% over five years as compared to 4.4 % in those without treatment.[7] In such cases, a test is required that can help us in determining the need to start medication. Also, we commonly come across patients on anti-glaucoma medications that have no investigative proof of glaucoma progression and they are on medication on the basis of years old diagnosis. In all such cases, provocative test such as IOP rise associated with pupillary dilatation can be immensely helpful. We carried this study to assess the post-mydriatric rise with tropicamide in IOP in normal, glaucoma patients with and without rapid progression.

## SUBJECTS AND METHODS

This was a quasi-experimental study that was conducted in Combined Military Hospital, Lahore and included 116 patients, from 1st August 2012 to 30th April 2013.

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Inclusion criteria
- Patient with primary open angle glaucoma
- Either sex
- Age more than 30 years, before which glaucoma is juvenile open angle glaucoma

Exclusion criteria:
- Anterior chamber angle narrowing or closure
- Patients having congenital and acquired corneal anomalies e.g. microcornea, keratoconus, mooren ulcer, peripheral corneal degenerations.
- Patients having previous history of ocular surgery or trauma as the cornea are already distorted.
- Patients with secondary glaucomas
- Patients with any other anterior chamber pathology

Approval was taken from the ethical committee of the institution. Administrative permission was taken from concerned authorities. A detailed history and a thorough clinical examination was carried out on the patients presenting to CMH Lahore, including visual acuity, slit lamp examination, goldman's applanation tonometry and fundoscopy. Intra-occular pressure was taken in all patients, followed by instillation of 1% tropicamide eye drops and IOP re-checked after 60 minutes.

Informed written consent was taken and procedure as well as the research details were communicated to the patients. Patients were divided into three groups.

**Group A:** Normal subjects without raised IOP or glaucomatous visual field loss. (39 subjects)

**Group B:** Diagnosed cases of glaucoma without significant visual field defect progression. (39 subjects)

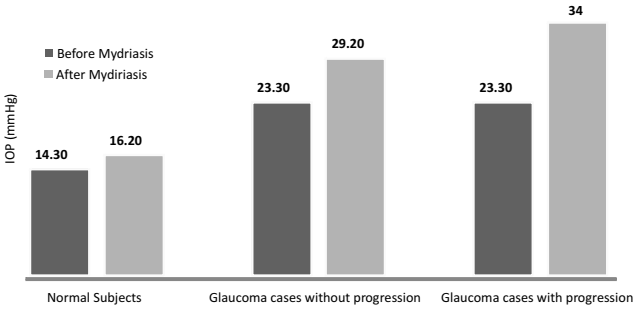
**Group C:** Diagnosed cases of glaucoma with significant visual field defect progression over last two years. (38 subjects)

Significant visual field defect patients were who fulfilled following criteria
- Cup to disc ratio of more than 0.6
- Presence of atleast one complete "siedel's scotoma" in one half of the visual field confirmed on three repeated visual fields. All the glaucoma patients having a glaucomatous damage lesser than above, were included in the category of cases without significant visual field defects progression. The data was entered and analyzed using SPSS version 16

# RESULTS

Out of 116 patients, 53 were males. The mean IOP in normal patients was 14.35 ± 2.32 mm of Hg which increased to 16.24 ± 2.57 mm of Hg after mydriasis with tropicamide; with difference of 1.89 mmHg (p=0.2). In glaucoma patients without progression pre-mydriasis mean IOP was 23.38 ± 4.09 which hiked to a mean of 29.26 ± 4.49 mm of Hg after mydriasis; an increase of 5.88 mm of Hg after mydriasis in glaucoma patients (p=0.05). Similarly, in glaucoma patients with rapidly advancing visual field loss in spite of continuous treatment, the mean IOP before mydriasis was 23.30 ± 2.17 and after mydriasis it was 34.00 ± 2.85mm of Hg; the difference was 10.69 mm of Hg (p=0.05). (Figure I)

**Figure I: Comparison of intraoccular pressure in three groups**




# DISCUSSION

In the united states, according to a research report, about 2250000 patients suffer from glaucoma. Prevalence data also showed that 84000 to 116000 Americans are bilaterally blinded by glaucoma. In white population, it is estimated that upto 27% for one eye and 9% for both eyes are blinded at about 20 years after diagnosis.[8] The management of glaucoma depends heavily on the prediction of future progression of the visual field defects and glaucomatous damage to the disc and retinal nerve fibre layer. Early Manifest Glaucoma trial revealed that the first baseline intraocular pressure measured at the first visit of the patient had a predictive value as to progression of disease process and visual field defects.[9] Lowering the IOP of the patient decreases the damage to the disc and slows down the progress of visual field defects.

Increase in IOP after pupillary dilatation has been accorded diagnostic as well as prognostic value. According to research articles, an elevation of 01 mm of Hg after pupillary dilatation is associated with an increase of 24% in the chances of glaucoma

progression.[10] A study had shown earlier that phenylephrine 10% led to 8 mm of Hg or more rise in IOP in 48% of the eyes.[11] Another study stated the IOP hike in primary open angle glaucoma eyes affects the patients.[12] The findings are comparable to our study.

IOP elevations have been documented by some researchers.[13] The IOP hike reaches a maximum in 45 to 60 minutes, and remains high for four to six hours.[14] This is also comparable to current study results. It has been postulated that IOP fluctuation in the course of day is a major risk factor for the progression of glaucomatous damage. Since post-mydriasis IOP hike is also a form of fluctuation, it is considered a risk factor for the progression of visual field defects.[15] It is a measure of the trabecular meshwork outflow. Its measurement can help us to determine the long term control of IOP.[15]

## CONCLUSION

Our study showed a significant rise in IOP with tropicamide in glaucoma patients with and without rapid progression. Post-mydriasis IOP spike is a reliable diagnostic and prognostic provocative test for glaucoma suspects and diagnosed cases. However, the negative effects of raised IOP on an already compromised optic nerve head must be kept in mind.

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