

Intraocular pressure (IOP) in Diabetes Mellitus (DM) patients – a startling association**Lalith Sundaram, Rahana Ashraf¹, TC Ranjakumar², Sruthi Swaminthan¹**

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ABSTRACT:

Purpose: This study was conducted to assess the relation between diabetes and intraocular pressure (IOP) changes in the patients with Type 2 Diabetes Mellitus at a tertiary care centre in Kerala

Methods: 100 eyes of 100 patients with Type 2 Diabetes Mellitus & 200 eyes of 200 normal individuals without diabetes, within a period of 2 years were included in the study. Also the Age, Fasting Blood Sugar (FBS), Post Prandial blood sugar (PPBS), Glycosylated hemoglobin (HbA1c) & Urine analysis were recorded.

Results: The data were collected and then analyzed by SPSS 17 statistical software. The mean IOP in Diabetics was found to be 14(+/- 2.26) and Non Diabetics was 12.29(+/-2.327), and this difference was found to be statistically significant ($p < 0.001$) using the Unpaired T Test.

Conclusion: Hence it is recommended that the intraocular pressure of diabetics be measured and recorded on a regular basis to prevent any glaucomatous progression.

Keywords: Glaucoma, Intraocular pressure, Retinopathy, Trabecular Meshwork, Type 2 diabetes mellitus.

INTRODUCTION

Intraocular pressure is found to be the most significant risk factor for the emergence of glaucoma and often associated with Systemic Arterial Hypertension and Diabetes Mellitus.¹⁻³ Diabetes mellitus is an important ocular risk factor with the co existence of retinopathy for certain types of cataract, intraocular pressure increase, rubeosis iridis and possibly open angle glaucoma via its course.^{4,5} Diabetes mellitus has emerged as a major cause of blindness and visual disability in developed countries as well as developing countries for many years. Many studies have suggested a significant rise in the relative risk of people with diabetes mellitus to present ocular hypertension favoring the emergence of open angle glaucoma.⁵ The purpose of this study is to observe the intraocular pressure behaviour in Diabetes Mellitus (DM).

MATERIAL AND METHODS

The study conducted was a Case Control Prospective study. All the diabetic patients coming to the Ophthalmology and the Medicine OPD in the period of study were included in the study. The total sample size was 300, 200 were Controls (Non Diabetics) and 100 were Diabetics (Type 2 Diabetes Mellitus). The sample size was calculated according to the sample size calculation formula for a Case Control Study.

Following approval of the Research & Ethics committee, the study was carried out in the Department of Ophthalmology, in collaboration with the Department of Medicine. Written informed consent was obtained from each patient after explaining about the study. Also biodata of the patients were recorded before examination which included their name, age, sex, occupation and address. Duration of Diabetes, mode of treatment for the same and also family history

of Diabetes was noted. Blood investigations like FBS, PPBS, HbA1c and routine Urine Analysis was also done and the results were recorded for both groups. All the patients underwent a basic Ophthalmological examination. The vision was noted with the help of a Snellen's chart.

A torchlight exam was done of all the patients who came to the OPD. Pupillary reactions were noted. This was followed by slit lamp examination. This included Applanation Tonometry also. The pupils were dilated with 1% tropicamide.

Later, Retinal examination was done with a Direct Ophthalmoscope followed by Indirect Ophthalmoscopy using +90D and +20D lenses respectively. Fundus screening was done in all patients to rule out other ocular pathologies.

Statistical analysis was done using SPSS-17, Mean values calculated & difference between them tested by Unpaired t-test. A *p* value of 0.05 was taken for statistical significance. A Chi Square Test was done for comparing the quality of the data. Pearson Correlation analyses were done to assess the relationship between the parameters showing the normal distribution.

Inclusion Criteria:

1. Patients giving informed consent
2. Type2 Diabetics visiting Medicine & Ophthalmology OPD; diagnosed based on WHO criteria

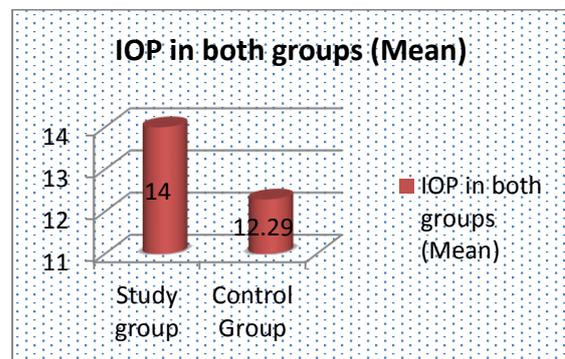
3. Duration of Type2 DM: 0 – 20years.

Exclusion Criteria:

1. Patients with pre existing ocular pathologies like Glaucoma, Uveitis, Hypertension, Ocular trauma, intraocular surgery, Intravitreal injections high refractive errors, use of drugs for retinal problems or previous ocular surgery in both groups
2. Treated Diabetic Retinopathy, Refractive errors > ± 3D, and treated or untreated Glaucoma.

RESULTS

All patients in study fulfilled the inclusion criteria. The study group (Diabetics) had 100 participants (n=100) and the control group (Non Diabetics) had 200 (n=200). The mean IOP in Diabetics was found to be 14 (+/- 2.26) and Non Diabetics was 12.29 (+/-2.327), and this difference was found to be statistically significant (*p*<0.001) using the Unpaired T Test.



Relationship between CMT, HbA1c & FBS in both patients

Parameters	Study group r	Study group p	Control Group R	Control Group P
CMT-HbA1c	-.088	.382	.235	.100
CMT-FBS	.116	.422	.043	.673
CMT- DM duration	-.208	.147	-	-

DISCUSSION

Although diabetes is associated with higher IOP values in most population studies, the underlying mechanisms are still not very clear. Many of the recent research studies have said that changes in corneal biomechanics (i.e.;

increased corneal hysteresis) in diabetic eyes can cause overestimated IOP measurements.⁶ The increased IOP among women with elevated glycosylated haemoglobin is related to accumulation of fibronectin in trabecular meshwork.⁷ The new vessels in iris that is formed as a result of chronic high blood sugar

in diabetics may be the main reason for glaucoma and ocular hypertension in these group of patients. The aqueous outflow facility in normal persons was reported to be 0.28 ± 0.05 microlitre/min/mm Hg. Whereas, in glaucoma it has been reported to be 0.16 ± 0.01 microlitre/min/mm Hg. The difference in aqueous outflow facility of Diabetics with retinopathy versus Diabetics without retinopathy was not statistically significant. However when compared, non proliferative with proliferative retinopathy there was a marked difference.

For the early diagnosis of this disorder, ophthalmoscopy to observe the optic nerve cupping, and tonometry for measuring the IOP should be included as a part of the routine ophthalmological examination in all patients of over 35 years of age. This becomes especially important in patients with family history of glaucoma. Also, high-risk persons should be screened once in every two years from the age of 30, and yearly from the 50 years of age.

REFERENCES

1. Leske CM, Connel AMS, Wu SY, Hyman LG, Schachat AP. Risk factors for open-angle glaucoma. *Arch Ophthalmol* 1995;113:918-24.
2. Nicolela MT. Fluxosanguíneo ocular em glaucoma: métodos de avaliação e importância. *Arq Bras Oftalmol* 1997;60:639-49.
3. Dielemans I, Vingerling JR, Algra D, Hofman A, Grobbee DE, Jong PTVM. Primary open-angle glaucoma, intraocular pressure, and systemic blood pressure in the general elderly population. *Ophthalmology* 1995;102:54-60.
4. Quigley HA, Enger C, Katz J, Sommer A, Scott R, Gilbert D. Risk factors for the development of glaucomatous visual field loss in ocular hypertension. *Arch Ophthalmol* 1994;112:644-9.
5. Klein BEK, Klein R, Moss SE. Incidence of self reported glaucoma in people with diabetes mellitus. *Br J Ophthalmol* 1997;81:743-7.
6. Castro DPE, Prata TS, Lima VC, Biteli LG, de Moraes CGV, Paranhos A. Corneal viscoelasticity differences between diabetic and non-diabetic glaucomatous patients. *Journal of Glaucoma* 2010;19(5):341-3.
7. Oshitari T, Fujimoto N, Hanawa K, Adachi-Usami E, Roy S. Effect of chronic hyperglycemia on intraocular pressure in patients with diabetes. *Am J Ophthalmol* 2007; 143(2):363-5.

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