

Prevalence of diabetes mellitus in common ophthalmic disorders

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Abstract

Aim: To study the prevalence of diabetes mellitus in common ophthalmic diseases such as glaucoma, cataract and retinopathy.

Materials and Methods: This cross sectional, observational study. The study was conducted in a tertiary eye care hospital. Patients with diseases of glaucoma, cataract and retinopathy in this study. Thorough eye examination was carried out in outward patient department at Tertiary eye care hospital. Examination was carried out in ophthalmology department with slit lamp examination, distant direct ophthalmoscopy, fundus examination with the help of direct ophthalmoscope, indirect ophthalmoscope and slit lamp with 90D tonometry with help of applanation tonometer. First anterior segment examination was done with the help of slit lamp, and applanation tonometer after thorough examination of anterior segment, posterior segment was thoroughly examined. Pupils of patients were dilated with the help of Tropicamide 0.5% with Phenylephrine. After full dilatation of pupil fundus examination was done after 30 mins. The patients were evaluated for diabetic retinopathy and findings such as microaneurysm, dot and blot hemorrhages, venous dilatation, intraretinal microvascular aneurysm, neovascularisation at the disk, neovascularisation elsewhere, hard exudates, macular edema were noted.

Results: Are during this study a total of 856 patients were included in the study. There were 42% male patients and 54% female patients. Out of 856 patients 75% were affected with cataract, 70% with retinopathy, and 58% with glaucoma. Prevalence of diabetes mellitus in glaucoma is 18.50%. Ocular disorders without diabetes mellitus in patients with cataract is 54.6, in retinopathy is 3.05% and in glaucoma is 11.56%.

Conclusion: we then came to the conclusion that one of the most potential risk factor for eye diseases is diabetes mellitus. There were most strong association of diabetes mellitus in cataract and glaucoma.

Keywords: Diabetes mellitus, Diabetic retinopathy, Diabetic cataract, Glaucoma.

Introduction

Cataract is the degeneration and opacification of lens fibres already formed, the formation of aberrant lens fibres or deposition. Loss of transparency occurs because of abnormality in lens proteins and disorganization of lens fibres. Cataract is the most common cause of visual impairment in India. Also in most of the rural areas in the developing countries, Age related cataract is rare in less than 50yrs of age until it is associated with some other metabolic diseases like diabetes. Senile cataract in diabetic person develops at an earlier age and more rapidly than normal senile cataract. Diabetes mellitus remains one of the leading factor affecting the visual capabilities of a population as a whole. In diabetes snowstorm or snowflake cataract develop that is subcapsular opacities in anterior and posterior cortex. Or sometimes fine, needle shaped polychromatic cortical opacities may also form. High level of glucose that is hyperglycemia is reflected in aqueous humour, which then diffuses into lens. And then glucose metabolises into sorbitol and sorbitol then accumulate in lens which lead to secondary osmotic over hydration and leading to formation of cataract.

The prevalence of diabetic retinopathy varies between studies which is reported even in population of same country. But most probably it is reported that around 40% diabetic prevalence. In that also in type 1 diabetic mellitus diabetic retinopathy is more common than that of type 2 diabetic retinopathy. Only 5 to 10 percent population suffer from proliferative diabetic retinopathy in type 1 diabetic retinopathy incidence is upto 90% after the period of 30

years. Risk factors are - 1. Duration of disease, 2. Poor glycemic control of diabetes, 3. Pregnancy, 4. Hypertension, 5. Nephropathy, 6. hyperlipidemia, 7. Smoking, 8. Cataract surgery, 9. Obesity, 10. Anemia, etc. Diabetic retinopathy is a microvascular complication due to microangiopathy having directly linked to glycemic control and affects the kidneys, eyes and peripheral nerves. Diabetics have a 20-205 times greater risk of blindness. Histology shows loss of intramural pericytes, thickening of basement membrane and the closure of retinal capillaries. The above sequence of events leads to dilatation of vessels seen as micro aneurysms. Extensive closure of capillaries finally lead to ischemia of retina.

Glaucoma is a chronic progressive optic neuropathy leading to damage of optic nerve and loss of visual function. Glaucoma may be congenital or acquired. Glaucoma may be open angled or closed angle glaucoma based upon the flow of aqueous humour and anterior chamber configuration distinction also made between primary glaucoma and secondary glaucoma in which cause may be other any ocular condition or non ocular contribution which elevates intra ocular tension or pressure. Diabetes also impairs the regulation of posterior ciliary circulation which may exacerbate glaucomatous optic neuropathy over the age of 40 glaucoma affects 2 to 3% of population in that half of population that is 50% remains undiagnosed primary angle closer glaucoma is more common than primary open angle glaucoma. It seems reasonable to consider a longer duration of diabetes mellitus and prolonged damage of optic nerve and retina would be associated with higher risk of

glaucoma. Diabetes is also often associated with heart risk factors affecting the vascular perfusion of optic nerve head.

In this study an attempt was made to evaluate the prevalence of diabetes mellitus in ophthalmic diseases such as glaucoma, cataract and retinopathy.

Materials and Methods

It was a 1 year prospective study from 1st September 2017 to 31st August 2018. The study was conducted in Shri. Vasantrao Naik govt. medical college and hospital, Yavatmal. All the patients with complaints of cataract, glaucoma and retinopathy were included in the study. Those patients other than these disorders were excluded from the study. A total of 856 patients were enrolled in the study. All the patients with complaints of cataract, retinopathy and glaucoma were included in the study. There were 359 male patients and 496 female patients. The total study period was one year. The patients presenting to tertiary eye care centre out patient department or ward or department were included in this study. The study was approved by institutional ethical committee.

Inclusion Criteria:

1. Patient coming to tertiary eye care hospital
2. Patient diagnosed with cataract, glaucoma, retinopathy by ophthalmologist
3. Patient irrespective of the status of the treatment for Diabetes
4. Patients who gave informed consent.

Exclusion Criteria:

1. Patient who are terminally ill, comatose and unable to examine.
2. Patients who refused to give informed consent.

Results

Total of 856 patients were included in the study. All the patients with complaints of glaucoma, cataract and retinopathy. With clinical diagnosis were included in the study. There were 359 male patients and 496 female patients. Most of the patients were between the age group of 60-70 years followed by 50-60 years. Out of 856, exclusively cataract patients were 599. Retinopathy patients were 171 and glaucoma were 85. Prevalence of diabetes mellitus in cataract is 12%. Prevalence of diabetes mellitus in retinopathy is 47%. Prevalence of diabetes mellitus in glaucoma is 16%.

Table 1: Distribution of cataract among the patients

Types	Number of Patients (856)	Percentage of Patients
Cataract	599	70
Non-cataract	257	30

Diabetes was associated with 70% of examined cataract cases.

Table 2: Prevalence of diabetes mellitus in cataract patients

	Percentage of Patients
Cataract with diabetes mellitus	12%
Cataract without diabetes mellitus	88%

Prevalence of diabetes in cataract patients was 12%

Table 3: Prevalence of diabetes mellitus in retinopathy patients

Types	Number of Patients (171)	Percentage of Patients
Retinopathy with diabetes mellitus	80	47%
Retinopathy without diabetes mellitus	91	53%

Prevalence of retinopathy with diabetes mellitus was 47%.

Discussion

There were 360 male patients (42%) and female patients (58%). clearly it indicates that sex predilection was not significant in this study. This study on sex predilection was also consistent with the study conducted by Shashi et al.

Prevalence of cataract was found to be more profound among patients, which clearly shows cataract being the most common cause of vision impairment. results of our study on prevalence of cataract was consistent with the study of prevalence and determinants of diabetic retinopathy and cataracts in west African type 2 diabetes conducted by Rotimi et al. Prevalence of diabetes mellitus in cataract is 12%. This study was also consistent with study of influence of modifiable risk factors and senile diabetes conducted by Shakti et al. This result shows us that there is no strong influence of diabetes mellitus in cataract.

Prevalence of diabetes mellitus in retinopathy is 47%. This result supports the evidence of failure of management of eye complication in diabetes mellitus. This report has a positive association with the study of diabetic eye disease and its management among adult aged 40 years with self reported diabetes with in Fiji conducted by Brain et Al.

Prevalence of diabetes mellitus in glaucoma is 18%. The data suggest that, although diabetes and metabolic abnormalities may be slightly associated with the glaucoma, they are not significant factors for glaucoma. This study also supported the result of study diabetic metabolic abnormalities and glaucoma conducted by Tan et al.

No significant difference was found between the prevalence of male and female in the study. Since male and females were almost similar to predisposition of ocular disorders. There is no significant relationship between cataract and diabetes mellitus or any other above studied ocular disorders.

Conclusion

The results showed that diabetes mellitus is one of the potential risk factor for ocular disorder like retinopathy. In this study we came to know that cataract were the most important cause of vision impairment there were no strong influence of diabetes mellitus in cataract and glaucoma. However since we considered only a few people in our study, more research is needed to determine the relevance of this result to the larger general population.

Conflict of Interest: None.

References

1. Nakamura M, Kanamori A, Negi A. Diabetes as a risk factor for glaucomatous optic neuropathy. *Ophthalmologica* 2005;219;1-10.
2. Grunwald JE, Riva CE, Stone RA, Keates EU, Petring BL. Retinal autoregulation in open angle glaucoma. *Ophthalmol* 1984;12:1690-1694.
3. Frier B M, Fischer M. Davidson's principle and practice of medicine 20th edition. Davidson's;2006.
4. Tan GS, Wong TY, Fong CW, Aung T: Singapore Malay study diabetic metabolic abnormalities and glaucoma. *Arch Ophthalmol* 2009;10:1354-1361.
5. Shashi A, Rishendra Singh Sisodiya, Seemarani Sharma, M.K. Rathore, P.C. Dwivedi, Pankaj Choudhary et al. Glaucoma and Diabetes – A case control case study. AIOC 2009 Proceedings 337-338.
6. Lisa Brown, Eric B Rimm, Johanna M Seddon, Edward L Giovannucci, Lisa Chasan –Taber, Donna Spiegelman. A

- prospective study of carotenoid intake and risk of cataract extraction in US men. *Am J Clin Nutr* 1999;70:517-524.
7. Brain G, Fischer – Harder K, Sikivou B, Qoqonkana MQ, Szetu J, Ramke J. Diabetic eye disease among adults in Fiji self-reported diabetes. *Clin Exp Ophthalmol* 2010;10:907-1442.
 8. Jacobson DR, Murphy RP, Rosenthal AR. The treatment of angle neovascularisation with panretinal photocoagulation. *Ophthalmol* 1979;1270-1277.
 9. Rotimi C, Daniel H, Zhou J, Obisesan A, Chen G, Chen Y et al. Prevalence and determinants of diabetic retinopathy and cataracts in west African type 2 diabetes patients. *Ethnic Dis* 2003;13:110-116.
 10. Plitz Seymour JR, Grunwald JE, Hariprasad SM, Dupont J. Optic nerve blood flow is diminished in eyes of primary open glaucoma suspects. *Am J Ophthalmol* 2001;63-69.
 11. Nakamura M, Kanamori A, Negi A. Diabetes Mellitus as a risk factor glaucomatous optic neuropathy. *Ophthalmologica* 2005;219;1-10.

How to cite this article: Pendke SS, Padgilwar AR, Deshmukh SG. Prevalence of diabetes mellitus in common ophthalmic disorders. *Indian J Clin Exp Ophthalmol* 2019;5(1):20-22.