EPIDEMIOLOGY OF COMMON OCULAR DISEASES IN DIABETES MELLITUS IN A TEACHING HOSPITAL

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ABSTRACT

BACKGROUND
Diabetes mellitus has exponentially increased from 108 million in 1980 to 422 million in year 2014 with the prevalence rate nearly doubling from 4.7% to 8.5%. Since it affects the economically productive age group; the impact of visual loss will not only be important for the person affected but also for the society at large. Diabetes currently affects around 69.2 million Indians (2015) and this is projected to go up to 109 million by year 2035. Hence the need of the hour is to recognize vision loss caused by diabetes and redirect our efforts to preserve vision.

MATERIALS AND METHODS
This study is part of a long term prospective study involving screening of diabetic patients for ocular diseases. As the first part of the series, data was collected from 455 diabetic patients who visited the ophthalmology department of Kanyakumari government medical college between March 2016 and August 2016 for defective vision. The patients were evaluated for visual acuity, slit lamp examination, intraocular pressure, gonioscopy, fields and fundus examination.

RESULTS
Data was analysed using SPSS. Among the common ocular manifestations, cataracts were more common in females and Diabetic Retinopathy was more common in males. The common ocular diseases were cataract 69% followed by Diabetic Retinopathy 23.7% and glaucoma 7.5%.

CONCLUSION
Patient awareness regarding cataract is good and is managed surgically. Diabetic Retinopathy has got specific screening protocols which if adhered to will help detect cases early. Glaucoma detection however suffers from lack of patient awareness, subjective performance of field tests and objective variations in disc evaluation. Glaucoma evaluation can be improved by combining it with Diabetic Retinopathy screening.

KEYWORDS
Diabetic Retinopathy, Optic Nerve Head, Fields, Fundus, Cataracts, Primary Open Angle Glaucoma.

BACKGROUND
Diabetes mellitus is a non-communicable disease which has shown a dramatic increase in the population the world over. The WHO estimates that approximately 9% of the world population is affected by diabetes. Screening both type 1& Type 2 DM patients are important. Though type 1 Diabetes mellitus patients are more prone for diabetic complications than type 2 DM, the latter are significant due to the sheer volume of type 2 DM patients (90%).[1]

Type 2 diabetes is strongly associated with obesity and is a major burden in developing countries undergoing rapid urbanization. Hypertension and smoking are other risk factors and together with diabetes form a formidable combination which spells doom for the person affected if not kept in check. WHO is now shifting it's focus from curable causes of blindness to preventable causes i.e. from cataracts to Diabetic retinopathy and Glaucoma. Both Diabetic retinopathy and glaucoma require early detection and regular follow up to keep the disease manifestations at bay.[2]

Aims and Objectives
To analyse the aetiology of visual loss in diabetic patients in our institution. To create awareness about avoidable blindness in diabetic patients. To educate and thereby motivate the patient for investigations, treatment and follow up.

MATERIALS AND METHODS
Study Design

This study is part of a long term prospective study involving screening of diabetic patients for ocular diseases. As the first part of the series, data was collected from 455 diabetic patients who visited the ophthalmology department of Kanyakumari Government Medical College between March 2016 and August 2016 for defective vision.

The patients were evaluated for Visual Acuity, Slit lamp examination, Intraocular pressure, Gonioscopy, Fields and Fundus examination. After obtaining informed consent the data was collected by means of a proforma.

Inclusion Criteria
455 Diabetic patients attending ophthalmology outpatient department between March 2016 and August 2016

Exclusion Criteria
Age less than 40 yrs. and more than 70 yrs. Defective vision due to injuries, recurrent surgeries

Examination of the Eye
Visual Acuity was recorded using Snellen's chart. Detailed examination of the eye was done using Torch and slit lamp. Intra ocular pressure was measured using applanation tonometer and fundus examination of dilated eye done using 90 D lens, indirect ophthalmoscope.

Definitions Used for the Study
Diabetic Retinopathy was classified as Mild, Moderate and Severe Non-Proliferative Diabetic Retinopathy (NPDR), Proliferative Diabetic Retinopathy (PDR) based on Early Treatment of Diabetic Retinopathy Study (ETDRS) criteria. Diabetic macular oedema was further divided into Diabetic macular oedema (DME) and clinically significant Macular oedema (CSME)

Glaucoma
A cup disc ratio >0.6, Optic nerve head evaluation by the ophthalmologist, Intra ocular pressure >21 mm of Hg, Field defects.

Cataract
Significant cataract assessed by the ophthalmologist causing a visual acuity less than 6/18.

Fasting blood sugar and post prandial blood sugar estimation was done for all participants at Biochemistry Department of Kanyakumari Medical College.

RESULTS

Age Group (years)	Male	Female	Total
41-50	53	42	95
51-60	86	84	170
61-70	112	78	190
Total	**251**	**204**	**455**

Table 1. Distribution of Subjects by Age and Sex

Among 455 diabetic patients examined, 251 are men and 204 are women.

Ocular Disease	Total no. of Patients	%
Glaucoma	34	7.5
Cataract	314	69
Refractive errors	67	14.7
Vitreous & Chorioretinal	138	30

Table 2. Association of Common Ocular Diseases in Diabetic Patients

Cataract ranks first followed by vitreoretinal, refractive errors and glaucoma

Diabetic Retinopathy	Total no. of Patients	Prevalence %
NPDR Mild	28	6.2
Moderate	44	9.7
Severe	15	3.3
PDR	21	4.6
Total	108	23.7
NPDR/ PDR with CSME	22	4.8

Table 3. Various Stages of Retinopathy in Diabetes Mellitus

The prevalence rate of diabetic retinopathy is 23.7%

Duration of Diabetes	NPDR				PDR			
	Mild	Moderate	Severe	Total	Vitreous Hge	RD	NVD/NVE	Total
0-5 years	11	4	1	16	-			
6-10 years	10	12	4	26	1	1	1	3
11-15 years	4	13	4	21	4	1	5	10
>15 years	3	15	6	24	2	3	3	8

Table 4. Distribution of NPDR/PDR in Relation to Duration of Diabetes

Type of Glaucoma	Total No. of Cases	Prevalence %
Primary open angle glaucoma (POAG)	29	6.4%
Primary angle closure glaucoma (PACG)	1	0.2
Neovascular glaucoma	1	0.2
Phacomorphic glaucoma	1	0.2
Phacolytic glaucoma	2	0.4
Total	**34**	**7.5**

Table 5. Distribution of Various types of Glaucoma in Diabetic Subjects

Glaucoma had a prevalence of 7.5%

Age	Glaucoma				Total
	Primary		Secondary		
	Male	Female	Male	Female	
41-50 years	2	1			3
51-60 years	12	8		1	21
61-70 years	5	2	1	2	10
Total	**19**	**11**	**1**	**3**	**34**

Table 6. Distribution of Glaucoma in Relation to the Age

Disease	Male	Female	Total
Diabetic Retinopathy	67	41	108
Cataract	163	151	314
Glaucoma (Primary)	19	11	30
Glaucoma (Secondary)	1	3	4

Table 7. Male and Female Distribution of Common Ocular Diseases in Diabetes
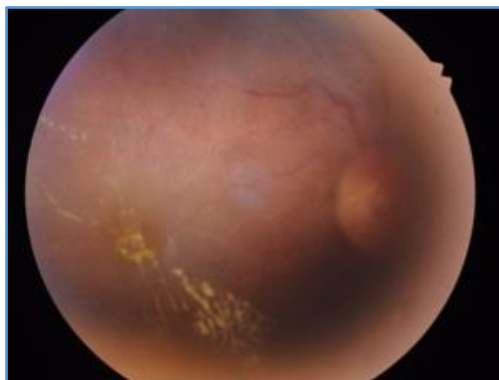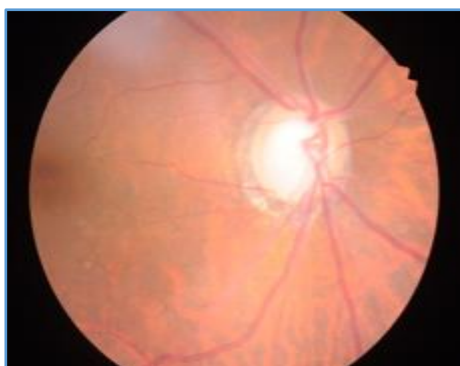

Moderate NPDR
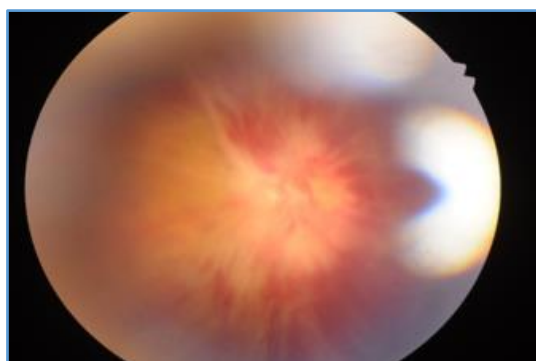
CRVO

Anti-Glaucoma Valve in Position Postoperative Filtering Bleb

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DISCUSSION

In this study 251 males and 204 females who presented with complaints of defective vision were subjected to a thorough evaluation to find out the causes for defective vision. Of these 314(69%) had cataract making it the commonest cause for visual loss in diabetic patients 151 females (74%) had cataract compared to 163 males (64%)[3]. This is comparable with the SN DREAMS study where the reported prevalence of cataract in diabetic patients was 65%.[4] In a Russian study it has been reported that nearly 20% of the patients undergoing cataract surgery are diabetics. [1,5] While snow flake cataract is typically associated with IDDM, Diabetes accelerates the onset and progression of senile cataract.[6] Though cataract extraction may worsen the diabetic Retinopathy, a clear media is a precise requirement for treatment and follow up of diabetic retinopathy and glaucoma,

The prevalence of diabetic retinopathy in India is around 12% - 22.4%. In Chennai Urban Rural Epidemiology Study(CURES) the prevalence was 17.6%[2] and in the Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study (SN –DREAMS) the prevalence rate was 18%. However, in our study a prevalence rate of 23.7% patients (108) had Diabetic Retinopathy. The higher prevalence could be due to the fact these patients reported to the department due to defective vision which compares with a study in Africa on self-reported Diabetics where the prevalence was 26.2%. In south east Asia the Diabetic Retinopathy ranged from 12.2-44.3% in known diabetes.[7]

The changes found in Non-Proliferative Diabetic Retinopathy were Micro aneurysms, superficial and deep haemorrhages, cotton wool spots and hard exudates, venous beading and intra retinal microvascular abnormalities (IRMA). In Proliferative Diabetic Retinopathy the findings were Neovascularisation Disc, Neovascularisation elsewhere, Vitreous Haemorrhage and tractional Retinal Detachment. The prevalence of Diabetic retinopathy was greater in males 67 males (26.7%) compared to 41 females (20.1%) which is comparable to similar studies like the Andhra Pradesh Eye Disease Study, United Kingdom Prospective Diabetes Study (UKPDS),[8] SN-DREAMS, CURES studies. However, the reason for the higher incidence in males is yet to be determined.

Primary open angle glaucoma is the commonest form of glaucoma in diabetes mellitus.[9,10] The other types of glaucoma encountered in the study being neovascular glaucoma, Primary angle closure Glaucoma, Lens induced Glaucoma. The prevalence of glaucoma in diabetics ranges from 4.96% to 14.6%.[11] In a study by Sheetal Dharmadhikari et al the prevalence of glaucoma was 15.6%.[12] In this study a total of 34 patients (7.5%) were affected. Unlike Diabetic Retinopathy, glaucoma suffers from inter observer variation in assessment of optic nerve head analysis, subjective performance of fields and diurnal and central corneal thickness affecting intraocular pressure. Females were found to be more affected by secondary glaucoma compared to males probably because access to

health care is limited and health is not on the list of their priorities.

There was one neovascular glaucoma in this study corresponding to a prevalence of 0.2%. He underwent a glaucoma drainage device procedure for Intra ocular pressure control. Though the prevalence of rubeosis iridis is more in diabetes only about a third progress to neovascular glaucoma.[13]

CONCLUSION

This study has been undertaken to document the aetiology and assess the various factors contributing to defective vision in patients with diabetes mellitus. The awareness about glaucoma is the lowest. Cataracts were responsible for significant visual loss followed by diabetic retinopathy and glaucoma. The incidence of diabetic retinopathy was more in males compared to females. Unlike cataracts where surgery before the onset of complications is likely to restore good vision, both glaucoma and diabetic retinopathy need early detection and intervention in the form of intra ocular pressure control and better metabolic control to prevent visual loss. The detection of glaucoma can be enhanced if it is combined with diabetic retinopathy screening.

This study has helped heighten the awareness of the prevalence of disorders causing vision loss not only among treating ophthalmologists, physicians but also among patients.

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