

A study of ocular manifestations of Diabetes mellitus and ocular complications relating to the duration of diabetes, at a tertiary care hospital, in South India.

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Abstract:

Context: The gravest ocular manifestation, diabetic retinopathy is the most frequent and the earliest demonstrable evidence of complication of diabetes.

Aims: The present study is to determine the relation of duration of diabetes and the ocular complication.

Settings and Design: The study is done at a tertiary care hospital, South India.

Methods and Material: A total number of 100 patients were studied.

Results: The M:F ratio of 1:1, major age group between 50-59 years and majority of patients were NIDDM type and the maximum duration of diabetes was 6-10yrs.

Conclusions: In this study the most notable complication seen with increasing duration of diabetes was NPDR. Other complications like corneal ulcer, extraocular muscle palsy, neovascular glaucoma, Xanthelesma, blepharitis and anterior ischemic neuropathy were recorded.

Key-words: diabetes, ocular, complications, duration, retinopathy

I. Introduction

Diabetes mellitus may be defined as primary disorder of carbohydrate metabolism, secondarily involving the protein and fat metabolism characterized by hyperglycemia and glycosuria (1). It is a predictable but not a preventable disease. The increased longevity of diabetic patient as a result of modern treatment has made it as a major cause of serious eye diseases(2,3). Its gravest ocular manifestation, diabetic retinopathy is the most frequent and may be the earliest demonstrable evidence of complication of diabetes.

Usually, a diabetic patient seeks the advice of ophthalmologist only when the ocular condition is in the advance stage and heavy burden is thrown on ophthalmologist. It is therefore, essential to examine the fundus and anterior segment of eye of every diabetic patient periodically at regular intervals to detect early cases by way of diabetic clinics. This study is done to analyse the relation of duration of diabetes, diabetic retinopathy, anterior segment complications, age incidence and sex incidence.

Aims And Objectives:

- To study the ocular manifestations of diabetes mellitus.
- To determine ocular complications relating to duration of diabetes.

II. Subjects and Methods

Study population :

All Diabetic patients attending a tertiary care hospital, in Krishna District, Andhrapradesh , India in the months of October 2011- December 2012.

Methods of recording:

Patient details like demographic details, Diabetic disease details and clinical findings were recorded as per the proforma shown later. The clinical examination was conducted after recording the demographic details.

Methods of clinical examination:

1. The visual acuity was recorded using Snellen's visual acuity chart for each eye separately with the corrective glasses available with the patient.
2. The anterior segment of the eye was examined using a slit lamp.
3. After dilating the pupil with phenylephrine 10% and Tropicamide 1% eye drops posterior segment examination done with direct ophthalmoscopy.
4. Clinical findings were recorded on the proforma sheet.

Definitions:

1. Primary education means up to 5 th class in the school, secondary education means

up to matriculation/intermediate.

2. The type of Diabetes was determined by the history of the patient.

Inclusion criteria:

-all patients with type 1 and type 2 diabetes mellitus

Exclusion criteria:

-Gestational diabetes mellitus.

Results: Total number of patients studied: 100

In the present study, the male to female ratio was 1:1

TABLE -1: Sex ratio

Sex	Number	Percentage
Male	50%	50%
Female	50%	50%

TABLE -2: Age incidence

Age	percentage
11-19	0%
20-29	1%
30-39	5%
40-49	29%
50-59	32%
60-69	25%
70-80	8%
TOTAL	100%

In our study, 50-59 years formed the major age group.

TABLE -3: Incidence of the type of diabetes

Type	Number	Percentage
NIDDM	96	96%
IDDM	4	4%

Table 4: showing the DURATION OF DIABETES

Years	Number	Percentage
1-5	24	24%
6-10	35	35%
11-15	26	26%
16-20	08	08%
>20	07	07%

In our study the maximum duration of Diabetics are between 6-10 years.

TABLE – 5: Range of VISUAL ACUITY

Visual Acuity	Right eye	Percentage	Left eye	Percentage
6/6	10	10%	9	9%
6/9	12	12%	14	14%
6/12	18	18%	13	13%
6/18	15	15%	13	13%
6/24	12	12%	7	7%
6/36	6	6%	13	13%
6/60	10	10%	12	12%
3/60	11	11%	15	15%
HM	4	4%	3	3%
PL	1	1%	0	0%
No PL	0	0%	0	0%
Not tested	1	1%	1	1%

Among the visual impairment 18% of the patients had 6/12 in right eye and 15% had 3/60 in left eye.1% of the patients had PL in right eye and 3% had hand moments in left eye.

Table -6: Lenticular Changes

Lens	Right eye	Percentage	Left eye	Percentage
Clear	50	50%	49	49%
PSCC	26	26%	21	21%
Diffuse cataract	11	11%	15	15%
Aphakia	01	1%	01	01%
Pseudophakia.	14	14%	12	12%

Among the lenticular change the posterior sub capsular cataract change had a maximum prevalence of 26% in right eye and 21% in left eye.

Table -7: Showing number of patients with cataract according to age group and type of cataract

Age group	Posterior subcapsular cataract	Diffuse cataract	Total
20-29	0	0	0
30-39	0	2	2
40-49	6	2	8
50-59	10	6	16
60-69	7	3	10
70-79	2	2	4
Total	25	15	40

Total no. of patients with cataracts: 40 Total no. of male patients: 18 Total no. of female patients: 22 The highest incidence of cataract was found in 50-59 years age group. Cataract was more common in female patients.

Table – 8: Vitreous Complications

Vitreous	Right eye	Percentage	Left eye	Percentage
Clear	86	86%	86	86%
Vitreous Hemorrhage- fundus visible	05	05%	06	06%
Vitreous Hemorrhage- fundus not visible	01	01%	02	02%
Sub hyaloid Hemorrhage	07	07%	01	01%
Asteroid hyalosis	01	01%	05	05%
Fundus Not visible	0	0%	0	0%

Among the vitreous complications 6% of patients had vitreous hemorrhage, 7% had subhyaloid hemorrhage in right eye and 8% of patients had vitreous hemorrhage, 1% had subhyaloid hemorrhage in left eye.

Table -9: Retinopathy Changes

Retinal finding	Right eye	Percentage	Left eye	Percentage
No Retinopathy	17	17%	18	18%
Mild NPDR	26	26%	24	24%
Moderate NPDR	17	17%	18	18%
Severe NPDR	11	11%	17	17%
Early PDR	09	09%	05	05%
High risk PDR	13	13%	13	13%
CSME	10	10%	13	13%

The prevalence of mild NPDR constituted the major group among fundus of 26% in right eye and 24% in left eye.

Table- 10: Duration of diabetes and associated retinopathy

Duration of DM	No retinopathy	Mild NPDR	Moderate NPDR	Severe NPDR	Early PDR	High risk PDR	Fundus not seen	Total
1-5	16	15	12	20	3	0	48	
6-10	7	23	14	14	0	11	1	70
11-15	8	10	10	7	13	4	0	52
16-20	2	2	5	1	2	4	0	16
>20	2	2	0	6	0	4	0	14
Total	35	52	41	30	15	26	1	200

Among 200 eyes studied, incidence of mild NPDR is more in patients with duration of diabetes 6-10 years and severity of retinopathy is increasing with duration of diabetes.

Table -11: Optic Disc Changes

Optic disc	Right eye	Percentage	Left eye	Percentage
Normal	99	99%	0	0%
Papillopathy	0	0%	0	0%
AION	01	01%	0	0%
Not visible	0	0%	0	0%

In optic disc changes, AION was present in 1% of the patients.

Table -12: Showing Correlation Between Duration Of Diabetes And Associated Ocular Complication

Diagnosis	Duration of diabetes (years)	1-5	6-10	11-15	16-20	>20
NPDR	Frequency	1	5	26	15	5 4
	%	50%	50%	34%	29.4%	26.6%
PDR	Frequency	2	6	11	4	2
	%	6.6%	11.5%	25%	23.5%	13.3%
CSME	Frequency	2	2	7	4	4
	%	6.6%	3.8%	15.9%	23.5%	26.6%
Cataract	Frequency	8	14	11	4	5
	%	26.6%	26.9%	25%	23.5%	33.3 %
Others	Frequency	3	4	1	0	0

The most notable complications seen with increased duration of diabetes was NPDR (seen in 50% subjects with diabetes for 1-10 years duration). Increased incidence of CSME was noted as the duration of diabetes increased (3.8% of subjects with diabetes in the duration range of 6-10yrs had CSME while 26.6% of subjects with diabetes in the duration range of >20 years had CSME

Table-13: Ocular Complications And Their Frequency Of Occurrence

Ocular complication	Number of patients	Percentage
Recurrent styes	01	1
Xanthelasma	04	4
Blepharitis	02	2
Corneal ulcer	04	4
Cataract	40	40
Retinopathy	83	83
Neovascular glaucoma	02	2
AION	01	1
Extra ocular muscle palsy	04	4

III. Discussion

Ocular complications and their frequency of occurrence

In the present study we found retinopathy to be the most common ocular complication occurring in diabetes subjects (83%). The prevalence of cataract was 40% followed by corneal ulcer(4%) and extra ocular muscle palsy (4%). The prevalence of diabetic retinopathy varied from 28.8% in persons who had diabetes for less than five years to 77.8% in persons who had diabetes for 15 or more years in a study conducted by Klein et al (6). Diabetes is the underlying cause in 25–30% of patients aged 45 years and older who develop acute extra ocular muscle palsy (Rush JA) (24). In a study by Watanabe K, 1% of patients with diabetes were found to have cranial nerve palsies, compared with only 0.13% of control subjects .(25) .

Age

In this study most of the patients were found to be in the age group of 50-59 years (32%). The average age of the patients studied was 54.26 years. Comparable age distribution was found in a study by Raheja.(26) .

Sex

In the present study 50 patients were male while 50 patients were female. We found association between sex and ocular complication of diabetes mellitus wherein cataract was more common in female diabetes patients (44%) as compared to male patients (36%). Similar increased prevalence of cataract was reported in female diabetes patients in a study by Raman (27) . In our study the prevalence of NPDR was higher in female diabetes patients (70%) than in male diabetes patients (60%). This is similar to Wisconsin Epidemiological study of Diabetic Retinopathy found higher prevalence of Diabetic Retinopathy in females (5,6) .

Cataract

In the present study incidence of cataract was found to be 40%. The highest incidence of cataract was found in the 50-59 years age group. Cataract was more common in female patients (44%). Increased incidence of cataract in female diabetic patients was also noted similarly in a study by Harding JJ et al (28) and Raman (27).

Type of diabetes and associated ocular complication

In our study 75% of patients with type 1 diabetes mellitus had NPDR while 64.6% of patients with type 2 diabetes mellitus had NPDR. The prevalence of NPDR was higher in type 1 diabetes subjects, while the prevalence of PDR was equal in both the types of diabetes (25%). This result is in contrast to the results

obtained by Muawyah (29) which might be due to less number of patients with type 1 diabetes mellitus in the present study. We found 17.7% of type 2 diabetes subjects having CSME while 50% with type 1 diabetes had CSME. The prevalence of maculopathy was remarkably high (42% in type 1 and 53% in type 2 diabetic patients) in a study conducted by Zander et al (30).

Duration of diabetes and associated ocular complication

In this study we found a significant correlation between duration of diabetes and associated ocular complication. The most notable complications seen with increased duration of diabetes was NPDR (seen in 61.5% subjects with diabetes for 6-10 year duration). Increased incidence of retinopathy with increase in duration of diabetes (type 1 and type 2) was noted in studies conducted by Klein *et al*(2) and Yanko *et al*(31).

IV. Conclusion

- Diabetic retinopathy was the commonest ocular complication of diabetes, followed by cataract and corneal ulcer.
- Extra ocular muscle palsy is also a relatively common ocular complication of diabetes.
- Non proliferative diabetic retinopathy was more common in type 1 diabetes subjects as compared to type 2 diabetes subjects
- Proliferative diabetic retinopathy was equal in both type 1 and type 2 diabetes mellitus
- Prevalence of diabetic retinopathy was higher in patients with longer duration of diabetes.
- Prevalence of CSME increased with increased duration of diabetes.

Summary

Present study included hundred patients with diabetes attending a tertiary care hospital OPD with ocular complications of diabetes in one or both eyes. Eighty three cases had diabetic retinopathy while forty cases had cataract. Corneal ulcer and extraocular muscle palsy was noted in four cases each. Neovascular glaucoma was present in two cases. Xanthelasmae are present in four cases and blepharitis in two cases. Anterior ischaemic optic neuropathy was noted in one case.

In the present study 50(50%) patients were male while 50(50%) patients were female. Cataract was more common in female diabetes patients (44%) as compared to male patients (36%). The prevalence of NPDR was higher in male diabetes patients (70%) than in female diabetes patients (60%). In this study most of the patients were found to be in the age group of 50-59 years (32%). The average age of the patients studied was 52.46yrs. The highest incidence of cataract was found in the 50-59 yrs age group. The most notable complications seen with increased duration of diabetes was NPDR (seen in 61.5% subjects with diabetes for 6-10 year duration). Awareness should be improved among diabetics regarding need for good diabetes control and regular eye check-up to reduce the risk of severe visual loss from diabetic retinopathy.

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