STUDY OF ASSOCIATION OF DIABETIC MACULOPATHY WITH HYPERTENSION

Sivaramareddy Kolli[1], Anandareddy Endreddy[2], Viswas Reddy[3]

[1]Associate Professor, Department of Ophthalmology, Katuri Medical College & Hospital, Guntur, Andhra Pradesh.
[2]Assistant Professor, Department of Psychiatry, Katuri Medical College & Hospital, Guntur, Andhra Pradesh.
[3]Resident, Department of Ophthalmology, Katuri Medical College & Hospital, Guntur, Andhra Pradesh

ABSTRACT

BACKGROUND

Diabetic retinopathy is a leading cause of blindness in adults and is unique in displaying a uniform epidemiology profile worldwide. Diabetic maculopathy is the most common microvascular complication in diabetes which can produce severe visual loss. Apart from diabetes, a number of systemic factor like hypertension, has an important role in occurrence and progression of DME. Thus control of these factors along with control of blood sugars can prevent or reverse the maculopathy and there by restore the vision of diabetic patients.

OBJECTIVE

To study the association of diabetic maculopathy with hypertension and to highlight the effect of this factor on onset and/or progression of diabetic maculopathy.

METHODS

A cross sectional two group comparative study was carried out in 100 diabetic patients with retinopathy more than 18 years attending the department of ophthalmology (Katuri medical college) in the period of September 2012 to April 2014.
For all patients, visual acuity with Snellen's chart, slit lamp examination, intraocular pressure by applanation tonometry, fundus examination with direct, indirect ophthalmoscopy and 90D lens was conducted. Patients were divided into 2 groups (group1-Retinopathy with maculopathy and group 2- retinopathy without maculopathy).
A detailed history of duration of diabetes, type of treatment, hypertension, taken from the patient. The significance of the hypertension was compared in both the groups involved in the study.

RESULTS

In the present study of 100 patients diagnosed with diabetic retinopathy, majority were males (54% in study group and 58% in control group) by age 51-60 years. There was no significant difference in the age and gender distribution among two groups. Majority of the patients in the both groups were on treatment with anti-hypertensives (64% in the study group and 74% in control group). In this study, the mean value of SBP and DBP were significantly higher in study group compared to control group.

CONCLUSION

Diabetic maculopathy was significantly associated with systemic risk factors like high blood pressure, thus early detection of this risk factor and its control prevent the development and progression of maculopathy and there by prevent the significant visual loss in diabetic patient.

KEYWORD

Diabetic Maculopathy, Glycosylated Haemoglobin, Hypertension, Lipid Profile.

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INTRODUCTION: It is estimated that diabetes mellitus affects 4 percent of the world's population, almost half of whom have some degree of diabetic retinopathy at any given time.[1,2] According to WHO, diabetic retinopathy is responsible for 3-7% of the total blindness in Asia.[3] In India the prevalence of diabetic retinopathy in general population is 3.5% and the prevalence of diabetic retinopathy in the population with diabetes mellitus is 18.0%. In a population-based study in South India, diabetic retinopathy was detected in 1.78% of the diabetic patients screened.[4,5] According to the World Diabetes Atlas, India is projected to have around 51 million people with diabetes. There is a growing concern for Asia being the region for diabetic epidemic.[6,7]

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Corresponding Author:
Dr. Sivaramareddy Kolli, Department of Ophthalmology,
Katuri Medical College & Hospital,
Guntur-522019, Andhra Pradesh.
E-mail: dr.sivaram_kolli@yahoo.com,
anandendreddy@gmail.com
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Diabetic retinopathy is a chronic progressive, potentially sight threatening disease of the retinal vasculature associated with the prolonged hyperglycaemia and other conditions linked to diabetes mellitus such as hypertension.[8] Diabetic maculopathy is the most common micro vascular complication in diabetes which can produce severe visual loss.[9]

Diabetic maculopathy is a form of diabetic retinopathy in which visual loss occurs due to macular oedema, it predominantly occurs in non-insulin dependent diabetics. Diabetic maculopathy can occur at any level of retinopathy and alter the structure of macula, significantly affecting its function. Patients with hypertension are more likely to develop severe level of DR and have more rapid progression of DR when compare with diabetic patient without hypertension. In addition diabetic patient with hypertension have been reported to be up to 3times more likely to develop Diffuse Macular Oedema (DME).[10]

The identification of risk factors is important for the evolution of better management strategies for DR. From previous studies possible risk factors for retinopathy in general have included diabetic duration, glycaemic control, age at onset, diabetic treatment, systemic hypertension, renal function/nephropathy, body mass, and elevated blood lipids.

MATERIALS AND METHODS: A cross-sectional study was carried out in 100 diabetic patient with retinopathy attending department of ophthalmology in the period of September 2012 to April 2014 to assess the association between hypertension and diabetic maculopathy.

Method of Collection of Data:

Study Area: Hospital Based (Katuri Medical College Hospital and Research Centre)

Design of Study: cross-sectional, comparative study.

Sampling Technique: 100 patients of Diabetic retinopathy were included for this study by simple random sampling method. All subjects underwent detailed ocular examination, fundoscopy and other required investigations to assess the association between diabetic maculopathy with, hypertension, nephropathy & hyperlipidaemia.

Sample Size: A total of 100 Type 2 diabetic patients, which included 50 patients having both retinopathy & maculopathy (Study Group); 50 patients having retinopathy without maculopathy (Control Group)

Inclusion Criteria:

A. Diabetic Retinopathy with or without maculopathy patients of both sexes.
B. Diabetic retinopathy patient aged more than 18 years.
C. Diabetic patients having other systemic illness like hypertension.

Exclusion Criteria:

A. Patient who have had an episode thyroid or chronic inflammatory syndrome, alcoholism or malnutrition.
B. patient on diuretics, B-Blocker, hypolipidemic agents or any other drug or hormone know to influence lipid or lipid protein metabolism, were not include
C. Non-diabetic cases of maculopathy (E.g. toxic maculopathy, retinal vein occlusion, infective cause, retinal dystrophy, ARMD, trauma).
D. Patients undergone any intra ocular surgery, intra ocular laser treatment or intraocular injections in the past 3 months.

Data Analysis: Data collected will be entered on excel spread sheet after coding and further processed using SPSS Version 17.0 (Statistical package for social sciences). The data analysis was done by computing proportions, mean of standard deviation. Appropriate test of significance was used based on type of data. A P value <0.05 was considered significant.

Procedure: An informed written consent was obtained in every case. A detailed ocular history and medical history was taken. A detailed general physical examination was performed. Blood pressure was recorded in all the cases a total of three readings were taken. All recordings were taken with patient in sitting position. The patients were given a rest of 15 minutes before each blood pressure recording. The average of three recordings was taken as the final value.

An elaborate biomicroscopic examination of the anterior segment was performed. Visual acuity was recorded for both distance and near and BCVA was recorded. IOP was recorded using applanation tonometer. Pupils were dilated with topical medication of 1% tropicamide and 5%phenylephrine drops, the latter being omitted in hypertensives. Detailed fundoscopy was done by direct ophthalmoscopy, indirect ophthalmoscopy and slit lamp biomicroscope using 90D AND 70D Volk lenses.

After fundus examination, only patients having retinopathy in at least one eye were selected for further study, & subsequently divided in to 2 groups (study group-Retinopathy with maculopathy & control group-Retinopathy without maculopathy). Informed consent was taken from the concerned patients. Fundus picture of the patients were taken with fundus camera. The Diabetic retinopathy was graded according to ETDRS classification. A detailed history of duration and type of treatment of diabetes, history of duration and treatment of hypertension was taken from the above selected patients. The mean value of the three consecutive Blood pressure readings was assessed. Following blood investigation (FBS, PPBS, Glycosylated Hb, Serum lipid profile, Urine albumin, RFT) of the concerned patients were done. HbA1c determination is based on the turbidimetric inhibition immunoassay. FFA was done in all patients to decide on the treatment plan.

The significance of the risk factor (Hypertension) was compared in both the groups involved in the study.

RESULTS: A comparative two group cross sectional clinical study with 50 patients in each group was undertaken, to

analyse the influence of systemic risk factors on the development of diabetic maculopathy in type II diabetic patient. The data was analysed using various statistical test like descriptive and inferential statistics, Mean±SD (Min–Max), student t test (two tailed independent) and chi-square or Fischer Extract Test.

Age in years	Study Group (50PATIENTS)		Control Group (50PATIENTS)	
	NO	%	NO	%
31-40	4	8	6	12
41-50	8	16	12	24
51-60	20	40	21	42
61-70	12	24	7	14
71-80	6	12	4	8
TOTAL	**50**	**100**	**50**	**100**

Table 1: Age Distribution of Patients Studied

Samples were age matched with P=0.573.

Table 1 shows the age distribution of patients in this study. Majority of patients included in this study were in the age group 51-60 years (40%). The mean age of the patients in the study group (with CSME) was 57.02±9.75 and in control group mean age was 56.42±9.25. There was no significant difference in age distribution among the two groups (P=0.573).

Gender	Study Group			
	NO	%	NO	%
Male	27	54	29	58
Female	23	46	21	42
Total	**50**	**100**	**50**	**100**

Table 2: Gender Distribution of Patients Studied

Samples were sex matched with P=0.266

Table 2 shows the sex distribution of the patients in this study. In the study group, out of 50 patients,27(54%) were males and 23(46%) were females. In the control group 29 (58%) were males and 21(42%) were females. There was no significant difference in the gender distribution among the two groups (P=0.266).

Duration OF DM	Study Group		Control Group	
	No	%	No	%
5-10 yrs	12	24	35	70
11-15yrs	19	38	10	20
16-20 yrs	14	28	3	6
>20 yrs	5	10	2	4

Table 3: Distribution of patient as per duration of DM

Duration of Diabetics was significantly more in study group with P=0.002**

Table 3 shows the distribution of patients in this study according to the duration of DM. In study group 24% had duration 5-10 years, 38% in between 11-15 years, 28% in between 16-20 years and 10%>20 years. In control group, majority of patients had duration 5-10 years (70%), 20% in between 11-15 years, 6% in between 16-20 years and 4% >20 years. This shows that the duration of diabetes was more in study group compare to control group (P=0.002) and statistically significant.

Hypertension	Study Group		Control Group	
	No	%	No	%
No	12	24	24	48
Yes	38	76	26	52
Total	50	100	50	100

Table 4: Comparison of Blood pressure in two groups studied

Table 4 shows the distribution of patients according to the presence of hypertension. In the study group out of 50 patients, 38(76%) were hypertensive whereas in control group 26 patients (52%) were hypertensive with P<0.001. Distribution of hypertension was significantly higher in study group compare to control group.

Blood Pressure	Study Group	Control Group	P Value
SBP (mm Hg)	141±12.73	132±13	<0.001
DBP (mm Hg)	92.52±7.13	87.76±6.39	<0.001

Table 5: Comparison of Blood pressures (mean SBP & DBP) in two groups Studied

The mean SBP 141±12.73 in study group, whereas in control group was 132±13 with P<0.001. The mean DBP in study group was 92.52±7.13 in study group, whereas in control group was 87.76±6.39 with P<0.001. Both mean SBP and mean DBP were significantly high in study group.

Type of Maculopathy	No of Patient	%
Focal macular edema	11	22
Diffuse macular edema	9	18
Ischemic macular edema	8	16
Mixed macular edema	22	44
Total	50	100

Table 6: Distribution of Maculopathy among Study Group

In our study,16% of patient having ischemic macular oedema, 18% having diffuse macular oedema, 22% having focal macular oedema, 44% having mixed macular oedema. So in study group maximum patient is having mixed macular oedema.

DISCUSSION: Diabetic maculopathy is the most common micro vascular complication in diabetes which can produce severe visual loss. [9] Prevalence of blindness due to diabetes is around 3-7% in southeast Asia according to October 2005 study. [11] Diabetic maculopathy, resulting from diabetic retinopathy (DR), is defined as the presence of retinal thickening within one disc diameter or two of the macula.

In our study, patients who were selected with diabetes were having the disease for duration of 5-35 years and it was observed that 38(76%) patients in the study group and 15(30%) patients in the control group were of more than 10 years duration. And in the control group 35(70%) were found to be of 5-10 years duration compare to 12(24%) in study group. This shows that the duration of DM is significantly associated with maculopathy changes (P=0.002).

In comparison with other previous studies which demonstrated the duration of DM as one of the risk factors for diffuse macular oedema. [12,13] The importance of diabetes duration was also demonstrated by WESDR data which showed an increase in the prevalence of diabetic maculopathy of 28% in patients whose age at the time of diagnosis was 30 years or older & whose diabetes duration was 20 years longer. Ong Ming Jew, Mohammadrezah Peyman[14] also concluded in their study that the duration of diabetes among CSME group was significantly higher than the non CSME group.[15]

In this study it was found that 38(76%) patients in the study group and 26(52%) patients in the control group were hypertensive, and the mean value of SBP and DBP was more in the study group (SBP 141±12.73 and DBP 92.52±7.13) than the control group (SBP 132±13 and DBP 87.76±6.39) and statistically significant p<0.001. Our study was comparable with the following studies. Jacqueline M et al have concluded that the risk of developing diffuse macular oedema was 3.2 times greater in patients with high BP.[16] UKPDS study has shown that there was 47% decrease in deterioration of visual acuity by 3 lines using ETDRS chart by tight BP control in type 2 DM patients.

CONCLUSION: The increasing number of individuals with diabetes in India suggests that DR & diabetic maculopathy will continue to be the major contributors to vision loss and associated functional impairment for years to come.

This study concludes DR was more common in the age group of 51-60 years.

Prolonged duration of diabetes (>10yrs) was significantly associated diabetic maculopathy.

Diabetic maculopathy is more common in the patients having uncontrolled systemic hypertension.

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