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Original article

A Study On Clinically Significant Macular Oedema In Diabetic Patients In Tertiary Care Centre, Kurnool

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ABSTRACT

Aim: To study the association of CSME in diabetic patients with respect to Age, Sex, Urban and Rural population, NDPR and PDR. **Material & Methods**: A Study population of 500 diabetic patients attending the outpatient department of Ophthalmology at Regional Eye Hospital, Kurnool, Andhra Pradesh was taken. The present study was conducted from july 2014 to june 2016. Both type 1 and type 2 diabetic patients were taken into account. A complete ophthalmological examination was done and the patients were clinically graded according to ETDRS classification. **Results :** Out of 500 patients 29 patients had CSME which constitutes 5.8%. Of these 29 patients ,9 patients belong to the age group 61-80 years(1.8%) , 15(51.72%) patients were female. 18 (68.8%) out of 29 patients had PDR and 15(51.72%) patients came from rural area. **Conclusion :** Present study shows that CSME is more common in the age group of 61-80 years. Female patients are more prone to CSME than male patients. More progressive the diabetic retinopathy higher will be the incidence. Patients coming from rural areas showed higher prevalence than urban population.

Introduction

Diabetes Mellitus and the eye diseases associated with it comprise a set of complex disorders with multifactorial etiology, where genetic and environmental factors play an important role. It is a major cause of avoidable blindness in both developed and developing countries. Newly diagnosed diabetic cases are increasing at an alarming rate in the developing countries like India due to better life style and the demographic right shift of the population, urbanization and disparities in the access to the health care system.

WHO estimates that 19% of world's diabetic population lives in India and 80 million people in India will have diabetes by the year 2030. Diabetic retinopathy is the most common complication of diabetes mellitus. Patients having diabetic retinopathy are 25 times more at risk of developing blindness than non- diabetic individuals. Timely diagnosis with the help of better screening and referral facilities, strict control of systemic parameters and timely intervention can delay the sight threatening complications of diabetic retinopathy.

Diabetic retinopathy (DR) is a chronic progressive, potentially sight-threatening disease of the

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retinal vasculature associated with prolonged hyperglycemia and other conditions linked to diabetes mellitus (DM) such as hypertension[11]. It eventually afflicts virtually all patients with diabetes. It is estimated that diabetes affects 4% of the world's population, almost half of whom have some degree of DR at a given time[12,13] .DR occurs in all Type 1 and 75% of Type 2 DM after 15 years of duration of diabetes[12,14,15] . Visual disability from DM is a significant public health problem. However, this morbidity is largely preventable and treatable [2]. Diabetic macular edema (DME) is the most frequent cause of severe vision impairment in diabetic patients [16] .Diabetic maculopathy can occur at any level of retinopathy and alter the structure of macula, significantly affecting its function. Although treatment of established retinopathy can reduce the risk of visual loss by 60%, DR remains to be the leading cause of blindness among working-aged adults in the world. The identification of risk factors is important for the evolution of better management strategies for DR. The possible risk factors for retinopathy which were shown in previous studies included diabetic duration, glycemic control, age of onset of diabetic treatment, systemic hypertension, renal function/nephropathy, body mass, sex, human leukocyte antigen status, cigarette smoking, and elevated blood lipids [14,15,17-17]. Despite the recognized importance of maculopathy as a cause of visual morbidity in diabetes, risk factors for maculopathy have received considerably less attention in the literature. Diabetic duration, age, sex, age of diagnosis, insulin use, higher glycosylated hemoglobin (HbA1C), diuretic use, systemic hypertension, and proteinurea have been associated with diabetic macular oedema(DME).Once diabetic maculopathy occurs, there is no satisfactory treatment and the prognosis of

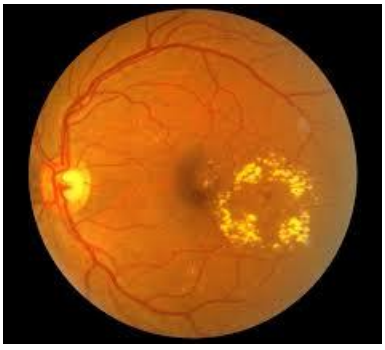

Image 1 : Fundus picture of clinically significant macular oedema

Age groups (years)	CSME Present	CSME Absent	Total	Percentage
0-20	2	128	130	0.4%
21-40	5	153	158	1%
41-60	8	89	97	1.6%
61-80	9	45	54	1.8%
>80	5	56	61	1%
Total	29	471	500	

Chi square = 19.7054 p value = 0.0004

TABLE:1 Association of age group with prevalence of CSME

	CSME Present	CSME Absent	Total	Percentage
Male	14	127	141	48.27%
Female	15	344	359	51.72%
Total	29	471	500	

Chi square = 6.1280 ,p value = 0.0132

TABLE:2 Association of gender with CSME

visual outcome is poor, so it is always better to prevent its development. Hence, there is a need for a study to find out the risk factors associated with the development of clinically significant macular edema (CSME) in diabetic patients, to control the same and subsequently reduce the incidence of diabetic maculopathy in future.

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and

	CSME Present	CSME Absent	Total	Percentage
Mild NPDR	1	211	212	4%
Moderate-Severe NPDR	10	126	136	37.3%
PDR	18	134	152	68.8%
Total	29	47	500	

Chi square = 21.7730, p value = 0.0000

TABLE:3 Association of type of DR with CSME

	CSME Present	CSME Absent	Total	Percentage
Urban	14	329	343	48.27%
Rural	15	142	157	51.72%
Total	29	471	500	

Chi square = 5.9036 p value = 0.0150

TABLE :4 Association of residence with CSME

blood vessels.

The vast majority of cases of diabetes fall into two broad etiopathogenetic categories. In one category, type 1 diabetes, the cause is an absolute deficiency of insulin secretion. Individuals at increased risk of developing this type of diabetes can often be identified by serological evidence of an autoimmune pathologic process occurring in the pancreatic islets and by genetic markers. In the other, much more prevalent category, type 2 diabetes, the cause is a combination of resistance to insulin action and an inadequate compensatory insulin secretory response. In the latter category, a degree of hyperglycemia sufficient to cause pathological and functional changes in various target tissues, but without clinical symptoms, may be present for a long period of time before diabetes is detected. During this asymptomatic

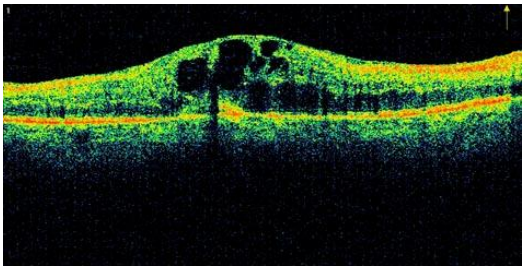

Image 2 : OCT picture of clinically significant macular oedema

period, it is possible to demonstrate an abnormality in carbohydrate metabolism by measurement of plasma glucose in the fasting state or after a challenge with an oral glucose load.

Material and methods :

A study was conducted among 500 diabetic patients attending the outpatient department of Ophthalmology at Regional Eye Hospital (REH), Kurnool, Andhra Pradesh between July 2014 to June 2016. Both type 1 and type2 diabetic patients were taken into study. Informed consent was taken from all diabetic patients. A detailed documentation of parameters like Age, Sex, Occupation, Address, most importantly the duration of diabetes, family history of diabetes and glycemic status using HBA1C test was done. A detailed history of the duration of diabetes, type of treatment, smoking/tobacco use, hyperlipidemia and hypertension were taken from the above selected patients. A complete Ophthalmologic examination including 1) Visual acuity (V/A) testing using the Snellens chart or Illiterate E-chart, 2) Detailed anterior & posterior segment evaluation using Slit lamp biomicroscopy, Direct & Indirect Ophthalmoscopy, 3) Fundus examination using Fundus photography were done. Patients with macular pathology were subjected to ocular coherence tomography (OCT) examination. The patients were clinically graded according to ETDRS classification.

Results :

Out of 500 diabetic patients, total of 29 patients had CSME. The prevalence of CSME is highest among the age group of 41-80 years contributing to 3.4% of total number of cases. It is more commonly seen in female patients with prevalence of 51.72%. Prevalence of CSME is directly proportional to the severity of diabetic retinopathy. Patients with PDR are more prone to develop CSME with prevalence of 68.8%. Patients coming from rural areas showed higher prevalence (17.77%) than those from urban areas

Discussion :

Diabetes Mellitus is a metabolic disorder of multiple etiologies characterized by hyperglycemia with disturbances of carbohydrate, protein and fat metabolism resulting from defects in insulin secretion, action or both[1] . Epidemiological data suggests that the diabetic retionopathy (DR) is the leading cause of new cases of blindness between the age group of 20-74 years [2]. Visual impairment associated with Diabetes mellitus known as Diabetic Eye Disease may result from macular ischemia, Diabetic Macular Edema (DME), Vitreous haemorrhage or Tractional retinal detachment. Of the conditions mentioned above, DME is the most common cause of visual impairment. Data from Wisconsin epidemiological study of DR suggests that the 14 years incidence of DME is 26% [3] .DR is the commonest cause of blindness in the age group of 45-65 years in the developed countries. Further the consequence of diabetic maculopathy is more frequent and is the cause of Visual loss in over 75% of adults with DM [4] . DR is a vascular disorder affecting the microvasculature of retina. Capillary damage is apparent in the earliest stage of DR by the loss of pericytes i.e., the mural cell and capillary basement membrane thickening[5]. With increased duration and severity of hyperglycemia, there occurs eventual capillary closure and microaneurysm formation. Majority of diabetics have no symptoms until late stages by when it may be too late for effective treatment. It is one of the major causes of morbidity in patients suffering from DM of longer duration[6] .

WHO estimates that the global prevalence of DM will increase from 2.8 to 4.4 % from the year 2000 to 2030. India is known as " Diabetic capital of the world" with a diabetic population of 40.9 millions projected to raise to 79.4 millions by 2030. This is fast becoming an important cause for visual disability in India [7] . The associated risk factors being Hypertension (HTN), Glycated Hb, SBP,PP, lipoprotein level and BMI. The significant life threatening risk factors are chronic kidney disease, cardiovascular disease & hyperlipidemia. An international clinical severity scale was developed for DR & DME. This is based on Early Treatment Diabetic Retinopathy Study (ETDRS) which is graded into mild, moderate, severe, very severe, Progressive Diabetic Retinopathy (PDR), Advanced Diabetic Retinopathy (ADR)[8,9] .

The definition of Clinically Significant Macular Edema (CSME) is the most significant outcome of the ETDRS in that it established a method for clarity & diagnosing DME and determining when treatment is required. In order to diagnose CSME one of the following characteristics must be present on clinical examination:

1. Any retinal thickening with in 500 microns of the centre of macula.
2. Hard exudates with in 500 microns of the centre of macula with adjacent retinal thickening .
3. Retinal thickening of at least 1 DD in size, any part of which is within 1 DD of the centre of the macula.

In table 1, the study population is divided into 5 age groups like 0 -20 ,21-40 ,41-60 ,61-80, >80 years. In 0-20 years group, 2 persons(0.4%) had CSME, in 21-40 years group, 5 persons(1%) had CSME, in 41-60 years group, 8 persons(1.6%) had CSME, in 61-80 years group, 9 persons(1.8%) had CSME, in >80 years group, 5 persons(1%) had CSME. People aged 61-80 years showed highest prevalence of 1.8%. In table 2, patients with CSME are divided based on sex. Out of 29 patients of CSME, 14 were male who constitute 48.27% and 15 were female who constitute 51.72%.This shows that CSME is more common in female patients(51.72%) than male patients (48.27%). In table 3, patients were categorised into mild NPDR, moderate to severe NPDR and PDR. Patients with PDR showed higher prevalence which is 68.8%.Table 4 shows the division of CSME patients into urban and rural population. Patients coming from rural areas showed higher prevalence of 17.77% than urban population(15.5%).

Conclusion :

This study shows that the prevalence of CSME is more in the age group of 41-80 years. With respect to sex it is more commonly seen in female than in male. Patients with proliferative diabetic retinopathy are more prone to CSME than non-proliferative diabetic retinopathy. People coming from rural areas are having high risk of developing CSME.

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