



PREVALENCE OF DYSLIPIDEMIA AND MICROVASCULAR COMPLICATIONS IN INDIVIDUALS WITH NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS

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ABSTRACT **Background:** Diabetic dyslipidemia and microvascular complications lead to morbidity and mortality in diabetic patients.
Objectives: To assess the prevalence of dyslipidemia and microvascular complications in newly diagnosed type 2 diabetes mellitus.
Method: cross sectional study carried out in a teaching hospital in north east India. A total of 100 newly diagnosed diabetics were included in this study. Clinical and laboratory investigations were performed as per requirement and analysed using SPSS software.
Result: Microvascular complications were found in 39% of the patients ; neuropathy being the most common followed by nephropathy and retinopathy. Nephropathy and retinopathy were significantly associated ($p < 0.05$). Dyslipidemia was found in 30% patients with hypertriglyceridemia with low HDL being most common. Dyslipidemia was significantly associated with nephropathy and retinopathy ($p < 0.05$).
Conclusion: Diabetes has taken an epidemic proportion in our country hence early diagnosis followed by strict hyperglycaemic control is needed to prevent and delay the microvascular complications.

KEYWORDS : dyslipidemia, microvascular complications, newly diagnosed, type 2 diabetes mellitus

INTRODUCTION

DIABETES MELLITUS refers to a group of common metabolic disorders that share the phenotype of hyperglycemia¹. Diabetes is one of the commonest chronic non communicable disease affecting the society at large, both in developing and developed countries.

India comes in the top three countries with high diabetic population in the world, second only after China, earning the dubious distinction of being termed the “Diabetes Capital of the World”.

Type 2 diabetes mellitus (T2DM) is accompanied by a high prevalence of associated disorders like the various components of the metabolic syndrome, microvascular complications like retinopathy, nephropathy, neuropathy and macrovascular complications like coronary artery disease, peripheral vascular disease and cerebrovascular disease, resulting in significantly high morbidity and mortality². Due to its asymptomatic course, T2DM evades diagnosis for many years. Long standing diabetes mellitus is associated with an increased prevalence of microvascular and macrovascular complications. The first indication of the presence of T2DM may actually be detected at the time of diagnosis of a diabetic complication. T2DM is associated with the development of premature arteriosclerosis and a higher cardiovascular morbidity and mortality³. Diabetic dyslipidemia is believed to play an important role in the pathogenesis of accelerated atherosclerosis in this condition⁴. Thus this study was undertaken to see the prevalence and pattern of dyslipidemia and microvascular complications in individuals with newly diagnosed T2DM.

METHOD

This study was a cross sectional study carried out in a teaching hospital over a period of six months. After approval from institutional ethics committee, consenting patients who satisfied inclusion criteria (newly diagnosed T2DM of less than 3 months duration) were enrolled. Type 1 diabetes mellitus, patients with previous history of any vascular disease, end stage renal disease, pre existing neurological disease including stroke or history of nephrotoxic, neurotoxic or oculotoxic drugs use were excluded. A detailed clinical examination was performed, ophthalmoscopic examination, both direct and indirect were done. Detailed neurological examination including test to rule

out autonomic neuropathy like history of change in bowel or bladder habits, examination of skin to note change in colour, temperature, sweating, changes in heart rate and blood pressure with respiration or to carotid massage, valsalva test, deep breath test were conducted. After a eight hour fasting, venous blood samples were collected for measuring fasting blood glucose, HbA1C, serum cholesterol level, High Density Lipoprotein Cholesterol(HDL), triglyceride(TG), serum urea and creatinine. Post prandial plasma glucose as well as urinary albumin creatinine ratio(ACR) were measured. The data analysis was performed using SPSS software version 17.0 (IBM corporation, Chicago, USA).

RESULTS

There were 100 patients in the study, majority were men, with most being in the age group of 46-55 (n=51). Microvascular complications were found in 39 patients(39%). The most common complication was neuropathy (24%) followed by nephropathy(19%) and retinopathy(7%). Retinopathy and nephropathy were found in 6 patients(6%) while all three were found in 2 patients(2%). The age group of 56-65 years had the most number of complications. Interestingly the age group of 46- 55 years had the least number of nephropathy and retinopathy. Both neuropathy and retinopathy were more common in males than in females. Dyslipidemia was found in 36 patients(36%) of whom 22 were men and 14 were women. Similar to other complications it was most commonly seen in the age group of 56-65 years. Both hypertriglyceridemia with low HDL-C and isolated hypertriglyceridemia was present in 12 patients(33.33%), hypertriglyceridemia with low HDL-C and low LDL -C was present in 5 patients(13.88%) while 7 (19.44%) had other mixed pattern of dyslipidemia. 13 of (36.11%) dyslipidemic patients had nephropathy. Fisher's Exact Test shows the two-sided P value to be less than 0.05. Thus dyslipidemia and nephropathy were significantly associated.

6 patients(31.57%) with nephropathy patients had coexisting retinopathy. Fisher's Exact Test shows the two-sided P value to be less than 0.05. Thus retinopathy was significantly associated with nephropathy

DISCUSSION

In our study the mean age at diagnosis was found to be 53.7 years. This

corroborates with the work done by RAMA *et al*⁵ which shows that in developing countries, the majority of diabetes patients are in the age range of 45-64 years whereas in the developed countries are aged >65 years.

39% of the newly diagnosed type 2 diabetics were having at least one diabetic complication, this agrees well with the finding of UKPDS⁶ study in which up to 50 % of newly detected T2DM were having diabetic complications at the time of diagnosis. Of these 20 (33.3%) were men and 19 (47.5%) were women, so women had higher preponderance of complication than men.

The complication rate was highest in 56 -65 age group, with 23 patients out of 35 in this population group (65.71%) presenting with complication at the time of diagnosis. The association was statistically significant (p value < 0.05). Studies have shown that microvascular complications increase with advancing age¹³⁸.

Diabetic retinopathy was seen in 7% patients, similar to other studies done in India.⁹ Neuropathy was seen in 24 % patients which is quite similar to study done by Ramachandran et al and Agrawal et al where it was reported to be 27.5 %¹⁰ and 26.8 %¹¹ respectively. The prevalence of neuropathy in our study was less than some other studies¹² which is explained by the fact that they used electrophysiological studies for the diagnosis of neuropathy. Nephropathy was seen in 19% newly diagnosed diabetics which was similar to a study¹² from Jhansi where the prevalence was 17.34%. WHO multicentric study¹³ of vascular disease in diabetes reported a wide variation in prevalence of nephropathy. Thus it can be concluded that prevalence of nephropathy varies considerably between different geographic regions. Multiple factors may be responsible for this like genetic predisposition, smoking pattern, coexisting hypertension or other socioeconomic and cultural/ environmental factors.

6 patients (31.57%) with nephropathy had retinopathy. The association was statistically significant (P value < 0.05). This finding is similar to many other studies¹⁵⁻¹⁶ which reported similar strong correlation between these two.

Dyslipidemia was found in 36% of the patients, similar to that seen in other studies¹⁷. The classical diabetic dyslipidemia that is increased TG with reduced HDL was present in 12 patients (33.33%). Similarly isolated increased TG was also seen in 12 patients (33.33%), 5 patients (13.88%) had increased TG and LDL with decreased HDL. 7 (19.44%) had other mixed pattern of dyslipidemia. Among the dyslipidemics, 16 patients (44.44%) were having diabetic complication at the time of diagnosis. Of the dyslipidemic patients 13 (38.88%) were having nephropathy. The association was statistically significant (P value < 0.05).

Positive correlation was found with LDL-C, TG, and total cholesterol, whereas negative correlation was found between ACR and HDL-C. The finding agrees with the various studies which have shown that microalbuminuria is associated with lipid profile abnormalities¹⁸. Today, it is recognized that the presence of microalbuminuria, in addition to being a marker of incipient renal disease in diabetic patients, seems to be also a marker of large vessel disease, and is associated with an increased cardiovascular disease mortality, especially coronary heart disease¹⁹.

CONCLUSION

On the basis of our study we conclude that Diabetic complications are fairly common in newly diagnosed type 2 DM patients, most common being neuropathy. There was a significant association between retinopathy and nephropathy. Dyslipidemia was present in 36 % of newly diagnosed type 2 diabetics, and the most common pattern of dyslipidemia was increased TG with reduced HDL -C. Dyslipidemia was found to be significantly associated with nephropathy.

In summary, prevalence of complications is quite high even at the time of diagnosis of Type 2 diabetes. Hence screening tests for complications are strongly recommended at the time of diagnosis not only for early detection, but also to prevent the progression into end stage disease.

Endeavour should be made to control hyperglycemia and hypertension tightly by appropriate therapeutic measures so that the occurrence and worsening of complications could be mitigated.

There is an urgent need for concerted efforts by Government and Non-governmental sectors to implement national programmes aimed at prevention, management and surveillance of the disease.

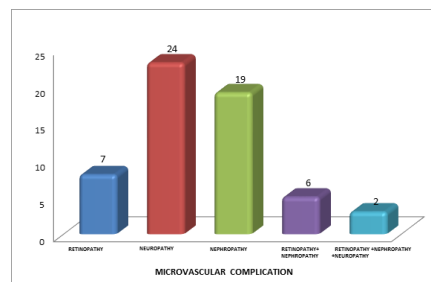


FIGURE 1

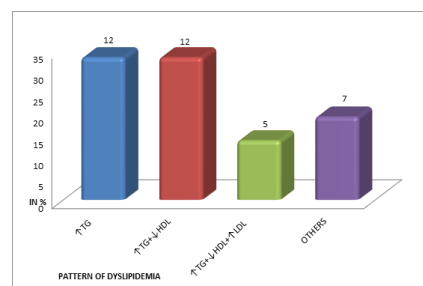


FIGURE 2

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