

ASSESSMENT OF SERUM LIPID PROFILE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND ITS ASSOCIATION WITH DIABETIC NEPHROPATHY

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ABSTRACT:

Background: Diabetes mellitus is a common cause of hyperlipidaemia, particularly in individuals with poor glycaemic control, which ultimately is an important risk factor for developing micro and macro vascular complications. Diabetic nephropathy is the main leading cause of end-stage renal disease. **Material & Methods:** In the present study a total 100 patients with type 2 diabetes mellitus randomly selected. General physical examination, detailed history and lab investigation for Fasting and post prandial blood sugar, fasting lipid profile, 24 hour urine protein, spot urine albumin levels, serum creatinine levels and spot urine albumin creatinine ratio were estimated. **Results:** The prevalence of dyslipidemia in our study was 70%. Most common pattern of serum lipid abnormality in our study was combined dyslipidemia. 34 out of 100 Diabetes patients had Diabetic Nephropathy. Out of 34 Diabetic Nephropathy patients 26 had micro albuminuria and 08 had macro albuminuria. Out of these 100 diabetic patients, 62 patients had GFR > 90 ml/min/1.73 m², 28 had GFR of 60-90 ml/min/1.73m² and 10 patients had GFR < 60 ml/min/1.73 m². We found highly significant association (p value < 0.001) of Diabetic Nephropathy with High LDL-C, High TG and High TC levels. There was no significant association of Diabetic Nephropathy with Low HDL-C levels (P > 0.05). **Conclusion:** Lipid profile should be done annually in all patients with diabetes and screening for Diabetic Nephropathy should include urinary ACR in a spot urine sample and estimation of GFR. Patients should be managed with life style modifications, adequate glycemic control with or without lipid lowering agents.

Key words: Diabetes mellitus, Diabetic nephropathy, Lipid profile.

INTRODUCTION

The worldwide prevalence of diabetes mellitus is rapidly growing and epidemic is occurring in all proportions. The worldwide prevalence of diabetes mellitus among adults is approximate around 6.4% and this is affecting 285 million people in 2010 and is expected to raise to 7.7% affecting 439 million people by the 2030 (1).

Abnormalities in serum lipids associated with diabetes mellitus are termed as dyslipidaemia rather than hyperlipidaemia because it was observed that there may be changes in both quality and quantity of the serum lipoproteins. Diabetes mellitus (DM) is a most common secondary cause of hyperlipidaemia, particularly in individuals with poor glycaemic control,

which ultimately is an important risk factor for developing atherosclerosis and coronary heart disease (2).

The global prevalence of diabetes is growing very fast almost unquestionably and it can be associated with an inexorable and parallel increase in the long-term complications that are associated with diabetes. Diabetes mellitus threatens to decrease life expectancy and increase the morbidity and mortality as a consequence of its complications which are further divided as macro vascular and micro vascular. The leading cause of end stage renal disease and diabetes related mortality and morbidity is diabetic nephropathy. It is also one of the most characteristic long-term complications in terms of mortality and morbidity for individual patients with diabetes mellitus. Diabetic nephropathy is the main leading cause of end-stage renal disease (ESRD) around the globe, and it is observed that approximate 20% of type 2 diabetic patients develop the ESRD during their lifetime (3).

The role of raised serum lipoproteins in macro vascular complications is well established. But their role in micro vascular complications mostly the diabetic nephropathy has not been studied extensively. Therefore, the present study was aimed to study serum lipid profile in patients with type 2 diabetes mellitus and association of dyslipidemia with diabetic nephropathy.

MATERIALS & METHODS

The present study was conducted in our tertiary care hospital, patients attending to the outpatient department or admitted in the Department of General Medicine, who were between 40-80 yrs. of age. This study was a cross sectional hospital

based study. 100 patients with type 2 diabetes mellitus randomly selected irrespective of duration of diabetes were included in the study after obtaining approval from the institutional ethics committee. Patients with Hypertension, patients on lipid lowering agents and patients on medications which alter lipid profile and patients with BMI > 30 kg/m² were excluded from the study. General physical examination and detailed history was taken. Fasting and post prandial blood sugar, fasting lipid profile was done. Low density lipoprotein cholesterol (LDL-C), Glycosylated hemoglobin (HbA1c) and TG, TC, HDL-C levels were estimated because of the targets recommended by American Diabetes Association (ADA) were considered to classify as dyslipidemia which includes TG ≥ 150 mg/dl, LDL ≥ 100mg/dl, HDL ≤ 40 mg/dl in males and ≤ 50 mg/dl in females and TC > 200 mg/dl (4). Along with above all 24 hour urine protein, spot urine albumin levels, serum creatinine levels and spot urine albumin creatinine ratio were estimated. GFR was calculated by using Crockroft-Gault equation. In present study, various descriptive and inferential statistics have been calculated. Chi-square test has been applied for the comparison in different groups. The p-value less than 0.05 was considered statistically significant. The data were analyzed using MS Excel 2010, Epi Info v7 and SPSS v22.

RESULTS

In present study we randomly selected one hundred Diabetes mellitus patients visiting outpatient department or admitted in the department of general medicine at our tertiary care hospital. Out of these 100 diabetic patients, 54 were Males and 46 were Females. The Mean age of patients in our study was 51.9 + 10.6

years. Mean duration of diabetes mellitus was 7.13 +3.5 years. Mean HbA1C was 8.03 +2.1. Mean FBS was 159.6 + 48.7 mg/dl and mean PPBS was 248.9 + 84.3 mg/dl. The prevalence of dyslipidemia in our study was 70%. 40 out of 54 Male patients had dyslipidemia, i.e. the prevalence of dyslipidemia in males was 74% whereas 30 out of 46 female patients had dyslipidemia i.e. the prevalence of dyslipidemia in female DM patients was 65.2%.

Most common pattern of serum lipid abnormality in our study was combined dyslipidemia. That was of raised TG and low HDL-C levels were the most common pattern in both males and females. Second most common pattern was the isolated dyslipidemia in which Low HDL-C levels in both males and females observed. Out of the total 100 diabetic patients, twelve had well controlled diabetes mellitus (HbA1C < 7) and 88% patients had poorly controlled diabetes mellitus (HbA1C >7). There was a significant association between prevalence of dyslipidemia and glycemic control (p value < 0.05). Dyslipidemia was more common in patients with uncontrolled diabetic status. In present study 34 out of 100 Diabetes patients had Diabetic Nephropathy. Out of 34 Diabetic Nephropathy patients 26 had micro albuminuria and 08 had macro albuminuria. Out of these 100 diabetic patients, 62 patients had GFR > 90 ml/min/1.73 m², 28 had GFR of 60-90 ml/min/1.73m² and 10 patients had GFR < 60 ml/min/1.73 m².

We found highly significant association (p value < 0.001) of Diabetic Nephropathy with High LDL-C, High TG and High TC levels. There was no significant association of Diabetic Nephropathy with Low HDL-C levels (P > 0.05).

Table No.-1: Mean values of lipid parameters in our study.

Lipid parameter	Mean +SD
Total cholesterol	177.2 + 45.4
HDL-C	35.4 +12.6
LDL-C	109.8+31
Triglycerides	188.7 +93.5

Table No.-2: Association of dyslipidaemia with HBA1C.

	Well controlled diabetes (Hba1c < 7)	Poorly controlled diabetes (Hba1c > 7)	P value
Dyslipidaemia	5 (41.6 %)	85 (96.6%)	< 0.001
Normal lipid profile	7 (58.3%)	3 (3.4%)	< 0.001

DISCUSSION

The prevalence of dyslipidemia in Diabetes Mellitus patients in present study was 70%. This finding was nearly similar to studies done by Mitthal A, et al.(5) Hetal Pandya, et al.(6) Which showed prevalence of 61% and 72%, respectively. In contrast to that Daniel Nii Aryee Tagoe, et al (7) which showed prevalence of 93% of cases had dyslipidemia in compared to controls (23%). There was no statistically

significant difference among males and females in the prevalence of dyslipidemia. Most common pattern of dyslipidemia was combined dyslipidemia with low HDL-C + high triglycerides (TG) in both males and females in present study. Similar results observed in a study done by Kolhar U et al and found that combined dyslipidemia affecting 26% females and 29% male patients (8). In contrast to that a study done by Jayarama N, et al. found that most common pattern of dyslipidemia in both males (44.2%) and females (42.97%) was combined dyslipidemia (9). Second most common pattern of dyslipidemia in present study was isolated Low HDL-C levels affecting 20 % female patients and 22 % of male patients. In context with this a study done by Jayarama N, et al. found that second most common pattern of dyslipidemia was isolated low HDL levels affecting 17.09% males and 12.85% females. These results were in comparison and nearly similar to present study (9). In present study poorly, controlled diabetes mellitus patients (HbA1C > 7) had 96.6% prevalence of dyslipidemia as compared to 41.6 % prevalence of dyslipidemia in well controlled diabetes mellitus patients (HbA1C <7). Similar results were also obtained in studies done by Ram Vinod Mahato et al (10) and Prashant Tayde et al (11). In present study 34 out of 100 Diabetes patients had Diabetic Nephropathy. Out of 34 Diabetic Nephropathy patients 26 had micro albuminuria and 08 had macro albuminuria. Similar results were obtained in a study done by Kanakamani J et al in north india and found that the prevalence of microalbuminuria was 24.7%, and that of macroproteinuria was 6.2% (12).

Out of 66 patients with normal AER, 18.5% patients had GFR < 90 ml/min/1.73m² whereas rest of the patients had GFR > 90ml/min/1.73 m². Which was nearly similar to study done by Macisaac RJ and Jerums G has shown that 20 % patients with type 2 diabetes mellitus have GFR <60ml/min/1.73m² while rest were normo albuminuric (13). A decline in GFR is usually accompanied by increase albuminuria but some diabetic patients follow a non-albuminuric pathway to renal impairment. Hence both albuminuria and GFR should be assessed as markers of diabetic CKD progression.

We found highly significant association (p value < 0.001) of Diabetic Nephropathy with High LDL-C, High TG and High TC levels. There was no significant association of Diabetic Nephropathy with Low HDL-C levels (P > 0.05). Similar result observed in a study done by Toth PP et al found that increase in HDL-C was associated with decrease in any MVC risk (P<.0001) and for LDL-C, TG, and non-HDL-C increase resulted in increases of MVC risk (14).

CONCLUSION

The present study highlights the burden of dyslipidemia in type 2 diabetes mellitus patients and that there was a significant association of Diabetic Nephropathy with lipid parameters. Hence lipid profile should be done annually in all patients with diabetes. Albuminuria and GFR have complementary roles in staging and stratifying the risk of progressive diabetic kidney disease. Hence screening for Diabetic Nephropathy should include measurements of urinary ACR in a spot urine sample and measurement of serum creatinine and estimation of GFR. Since Diabetic Nephropathy is

associated with High TC, TG and LDL-C, patients should be managed with life style modifications with or without lipid lowering agents to achieve target lipid values along with adequate glycemic control to prevent or delay the appearance and progression of Diabetic Nephropathy.

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