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ORIGINAL ARTICLE

Evaluation of the serum lipid profile in type 2 diabetic patients: An observational study

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ABSTRACT:

Background: The present study was conducted for evaluating the serum lipid profile in type 2 diabetic patients: An observational study**. Materials & methods:** A total of 100 type 2 diabetic patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and complete medical history of all the patients was recorded. Blood samples were obtained from all the patients and were sent to laboratory where serum lipid parameters such as serum total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and serum triglycerides (TGs) were estimated using auto-analyser. Low-density lipoprotein cholesterol (LDL-C) was calculated after taking into consideration its limitation, LDL-C = TC – (HDL-C + [TG/5]). Very low-density lipoprotein (VLDL) was calculated by TG/5. **Results:** Mean serum TG levels, Totals cholesterol levels, HDL levels, LDL levels and VLDL levels were found to be 162.5 mg/dL, 220.3 mg/dL, 48.3 mg/dL, 139.5 mg/dL and 32.5 mg/dL respectively. Significant correlation was seen while correlating lipid dysfunction with HbA1c levels. **Conclusion:** Diabetic patients should be frequently screened for assessment of alteration in lipid profile.

Key words: Lipid, Diabetes

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INTRODUCTION

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 blood vessels.[1, 2]

The aetiology of diabetes in India is multifactorial and includes genetic factors coupled with environmental influences such as obesity associated with rising living standards, steady urban migration, and lifestyle changes. Yet despite the incidence of diabetes within India, there are no nationwide and few multi-centric studies conducted on the prevalence of diabetes and its complications. The studies that have been undertaken are also prone to potential error as the heterogeneity of the Indian population with respect to culture, ethnicity, socio- economic conditions, mean that the extrapolation of regional results may give inaccurate estimates for the whole country.[3, 4]

Several pathogenic processes are involved in the development of diabetes. These range from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. In addition, rising childhood obesity rates and the increasing diagnosis of type 2 (formerly “adult-onset” diabetes) among children and young adults have become an increasingly serious health crisis, which will result in more people having and managing diabetes for most of their lives. Diabetes is associated with several inter-related metabolic abnormalities.[5, 6]Hence; the present study was conducted for evaluating the serum lipid profile in type 2 diabetic patients: An observational study

MATERIALS & METHODS

A total of 100 type 2 diabetic patients were enrolled. Complete demographic and clinical details of all the patients was obtained. A Performa was made and complete medical history of all the patients was recorded. Blood samples were obtained from all the patients and were sent to laboratory where serum lipid parameters such as serum total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and serum triglycerides (TGs) were estimated using auto-analyser. Low-density lipoprotein cholesterol (LDL-C) was calculated after taking into consideration its limitation, LDL-C = TC – (HDL-C + [TG/5]). Very low-density lipoprotein (VLDL) was calculated by TG/5. All the results were recorded and analysed using SPSS software.

RESULTS

Mean age of patients was 53.5 years. Majority of the patients belonged to the age group of more than 40 years. 56 percent of the patients were of males. 61 percent of the patients were of rural residence. Mean serum TG levels, Totals cholesterol levels, HDL levels, LDL levels and VLDL levels were found to be

162.5 mg/dL, 220.3 mg/dL, 48.3 mg/dL, 139.5 mg/dL and 32.5 mg/dL respectively. Significant correlation was seen while correlating lipid dysfunction with HbA1c levels.

Table 1: Demographic details

Variable		Number	Percentage
Age group (years)	Less than 40	29	29
	More than 40	71	71
	Mean (years)	53.5 years	
Gender	Males	56	56
	Females	44	44
Residence	Rural	61	61
	Urban	39	39

Table 2: Lipid profile

Lipid profile	Mean	SD
TG (mg/dL)	162.5	65.20
Total cholesterol (mg/dL)	220.3	81.5
HDL (mg/dL)	48.3	10.1
LDL (mg/dL)	139.5	25.1
VLDL (mg/dL)	32.5	13.04

Table 3: Correlation of lipid dysfunction with HbA1c

Lipid profile	OR	p- value
TG (mg/dL)	29.2% to 33.5%	0.002*
Total cholesterol (mg/dL)	35.4% to 39.1%	0.001*
HDL (mg/dL)	31.3% to 33.4%	0.012*
LDL (mg/dL)	36.5% to 39.1%	0.024*
VLDL (mg/dL)	26.1% to 31.4%	0.004*

*: Significant

DISCUSSION

Diabetes mellitus is a serious metabolic disease, affecting people of all geographic, ethnic or racial origin and its prevalence is increasing globally1. Burden from this costly disease is high on the low and middle income countries (LMIC) where the impacts of modernization and urbanization have caused marked adverse changes in lifestyle parameters. In 2013, of the estimated 382 million people with diabetes globally, more than 80 per cent lived in LMIC. It was estimated that India had 65.1 million adults with diabetes in 2013, and had the 2nd position among the top 10 countries with the largest number of diabetes. This number is predicted to increase to 109 million by 2035 unless steps are taken to prevent new cases of diabetes. Primary prevention of diabetes is feasible and strategies such as lifestyle modification are shown to be effective in populations of varied ethnicity However, for implementation of the strategies at the population level, national programmes which are culturally and socially acceptable and practical have to be formulated which are currently lacking in most of the developed and developing countries. Early diagnosis and institution of appropriate therapeutic measures yield the desired glycaemic outcomes and prevent the vascular complications.[8-10]Hence; the present study was conducted for evaluating the serum lipid profile in type 2 diabetic patients: An observational study

Mean age of patients was 53.5 years. Majority of the patients belonged to the age group of more than 40 years. 56 percent of the patients were of males. 61 percent of the patients were of rural residence. Mean serum TG levels, Totals cholesterol levels, HDL levels, LDL levels and VLDL levels were found to be 162.5 mg/dL, 220.3 mg/dL, 48.3 mg/dL, 139.5 mg/dL and 32.5 mg/dL respectively. K C Mathura et al evaluated lipid profile in diabetic patients. Lipid profiles of 30 patients with type 2 diabetes were taken and a detailed clinical workup done, including estimation of the body mass index (BMI). The study revealed that dyslipidemia is very common in type 2 diabetics and the most common abnormality seen was increased serum triglyceride levels (73.3%). The next common abnormality was decreased serum high-density lipoprotein cholesterol (HDL-C) levels and increased serum low-density lipoprotein cholesterol (LDL-C) levels, both seen in 66.7% patients respectively. A high total serum cholesterol levels was seen in 46.7% patients. Forty percent of the patients examined were on the overweight side, 16.7% being overtly obese. Thus their study, despite having small number of patients, clearly shows the association between type 2 diabetes and hyperlipidemia, which may influence the mechanism by which type 2 diabetes is associated with increased CAD risk.[11]

In the present study, significant correlation was seen while correlating lipid dysfunction with HbA1c levels.

Aclan Ozder et al, in a previous study researched association between serum lipid profile and blood glucose, hypothesizing that early detection and treatment of lipid abnormalities can minimize the risk for atherogenic cardiovascular disorder and cerebrovascular accident in patients with type 2 diabetes mellitus. Fasting blood glucose (FBG), total cholesterol (TC), high density lipoprotein (HDL), low density lipoprotein (LDL), triglyceride (TG) and glycated haemoglobin (HbA1c) levels were evaluated. A hepatic ultrasound was performed for every diabetic to evaluate hepatosteatosis. Results of serum lipid profile showed that the mean values for TC, TG, HDL and LDL in female patients were 227.6 ± 57.7 mg/dl, 221.6 ± 101.1 mg/dl, 31.5 ± 6.7 mg/dl and 136.5 ± 43.7 mg/dl, respectively. The mean values for TC, TG, HDL and LDL in male patients were 219.1 ± 34.7 mg/dl, 250.0 ± 100.7 mg/dl, 30.2 ± 7.4 mg/dl and 125.7 ± 21.4 mg/dl, respectively. Significantly higher mean serum levels of TC, TG and LDL and significantly lower mean serum levels of HDL were noted in patients with diabetes ($p<0.001$). FBG showed significant positive correlation with TC ($p<0.05$) and TG ($p<0.05$). Significant correlations were observed between serum levels of TC, TG, LDL and hepatosteatosis and HbA1c ($p<0.05$).[12]

CONCLUSION

Diabetic patients should be frequently screened for assessment of alteration in lipid profile.

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