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Comparative Study of postprandial lipid levels in patients with Type 2 Diabetics and Non-Diabetics

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ABSTRACT:

Objective: Dyslipidemia plays an important role in pathogenesis of atherosclerosis in diabetic patients. Serum triglyceride level gradually increases after a meal, reaches a peak at 3-4 hours after the meal and then slowly returns to initial level at 6-8 hours after the meal. Most of the time body will be exposed to non fasting level of lipids. i.e., postprandial state. Postprandial lipid level gives a better assessment of atherosclerotic risk than fasting state. The following study was carried out to find the characteristics of postprandial lipid levels in type 2 diabetes mellitus patients in comparison with non diabetics.

Methods: This was an observational study conducted in Department of medicine, N.S.C.B.M.C.H., Jabalpur (M.P.). Blood samples for postprandial lipid levels were taken 2 hours after a standard meal in 100 patients with type 2 diabetes mellitus and 100 patients without diabetes mellitus who fulfilled inclusion and exclusion criteria and were compared. In Type 2 diabetes patients, postprandial lipid levels were compared with Apolipoprotein B levels

Results: In our study, mean age of patients with diabetes mellitus and without diabetes mellitus were found to be 50.8±11.24 years and 49±11.75 years respectively. Though the majority of them were males, more proportion of dyslipidemia was found in female but it is not statistically significant.

Conclusion: It is concluded that postprandial lipid levels were more significantly elevated in Diabetics than in non diabetics. No statistically significant association observed, between postprandial hyperlipidemia with apolipoprotien B level in patients with type 2 diabetes mellitus. However, apolipoprotein B level was high in diabetics with postprandial dyslipidemia.

I. INTRODUCTION:

Diabetes mellitus (DM) is one of common metabolic disorders characterised by elevated levels of blood glucose resulting from defects in insulin secretion, insulin action, or both[1].

Dyslipidemia plays a crucial role in atherogenesis, in both prediabetics and diabetes, characterized by elevated triacylglycerol (TG), reduced high density lipoprotein (HDL-C), and predominant low density lipoprotein. Several lines of evidence have shown exaggerated postprandial lipid derangement, evoking functional abnormalities of the vascular endothelium and atherosclerosis in diabetes[3].

The postprandial lipid levels have a better role over fasting lipid profile (FLP) in cardiovascular risk prediction and diabetes evaluation.

According to the International Diabetes Federation (IDF), 8.8% of the adult population have diabetes, with men having slightly higher rates (9.6%) than women (9.0%).[2]

Current statistics globally shows that 463 million and 374 million individuals have diabetes and prediabetes (impaired glucose tolerance (IGT)).[3]

The estimates in 2019 showed that 77 million individuals suffered from diabetes in India, which is expected to increase to over 134 million by 2045. Approximately 57% individuals remain undiagnosed.[4]

The overall percentage of women suffering from diabetes in the M.P. state was 5.1% while in men it was 6.7%.

Serum TG level gradually increases after a meal, reaches a peak at 3–4 h after the meal, and then slowly returns to its initial level at 6–8 h after the meal. Hence, most of the day, it is non-fasting state (in other words a postprandial state) for people who eat at least three meals per day. The body is exposed to circulating lipids throughout most part of the day. A fasting state occurs for only a brief duration of the day. Thus, there is a strict need for the treatment of postprandial hyperlipidemia. [5]

This study was carried out to find the characteristics of postprandial lipid levels in type 2 diabetes mellitus patients in comparison with normal subjects and compare it with apolipoprotein B level

II. MATERIALS AND METHODS

The present study was carried out in Department of Medicine and diabetic OPD, Netaji Subhash Chandra Bose Medical College &

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Hospital, Jabalpur (M.P.) Each patient included in the study was methodically evaluated by obtaining a detailed history and performing complete examination at presentation. This was recorded on a predesigned and structured proforma along with the routine investigations done as per standard protocol

INCLUSION CRITERIA

Patients diagnosed with type 2 diabetes mellitus on the basis of revised
American Diabetic Association Criteria (Fasting plasma glucose ≥126 mg/dl and 2 hour postprandial plasma glucose ≥200 mg/dl),

EXCLUSION CRITERIA

Type 1 diabetes mellitus
Inherited disorders of lipid metabolism
Liver disease
Endocrine diseases affecting lipids (hypothyroidism, cushing's syndrome)
Renal disease
Smoking and alcoholism
Patients on medication affecting lipid metabolism.
This was an observational study, conducted after approval from institutional ethical committee and written informed consent taken from all the participants. Blood samples for postprandial lipid levels were taken 2 hours after a standard meal in 100 patients with type 2 diabetes mellitus and 100 patients without diabetes mellitus who fulfilled inclusion and exclusion criteria and were compared. In Type 2 diabetes patients, postprandial lipid levels were compared Apolipoprotein B levels

III. RESULTS:

Table-1: Age and Gender wise distribution of patients with dyslipidemia type 2 diabetes mellitus and without diabetes mellitus

	Diabetes mellitus n=100
male	52
female	48
31-40years	19
41-60 years	62
>60 years	19

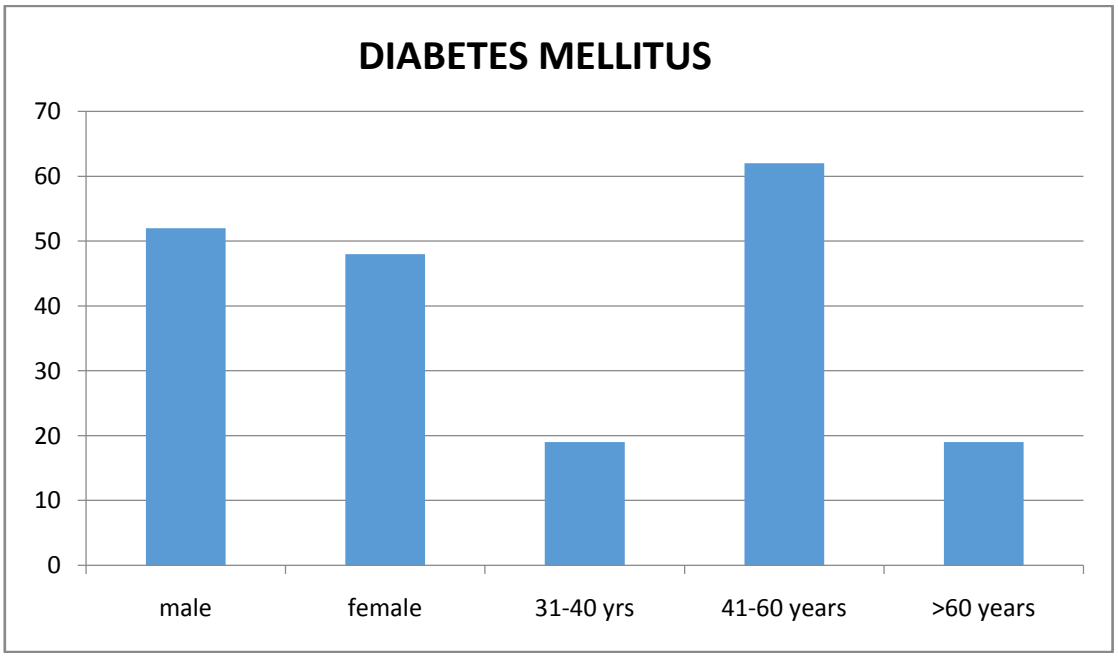

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Table – 2: Occurance of dyslipidemia in patients with diabetes and non diabetics

Lipid parameter	Diabetes mellitus (n=100)		Without Diabetes mellitus (n=100)		p-value
	No. of patients	%	No. of patients	%	
High PP-TC	30	30%	8	8%	**<0.001**
Low PP-HDL	8	8%	20	20%	**0.002**
High PP-LDL	18	18%	5	5%	**0.007**
High PP-VLDL	53	53%	29	29%	**0.001**
High PP-TG	53	53%	22	22%	**<0.001**
High TC/HDL	27	27%	14	14%	**0.04**

Table 2 shows significant postprandial dyslipidemia with p-value less than 0.05 in diabetics as compared to non diabetics

Table-3: Apolipoprotien B levels in Type 2 Diabetes Mellitus

	Type 2 diabetes		
APOLIPOPROTIEN B	</=1.33	61	61.0%
	>1.33	39	39.0%

Table 3 shows the occurance of high apolipoprotien B in type 2 diabetics.

Table -4: Comparison of apolipoprotein b levels with postprandial hyperlipidemia in patients with type 2 diabetes mellitus

Lipid parameter	APOLIPOPROTIEN B				p-value
	<1.33 (n=61)		>1.33 (n=39)		
	No. of patients	%	No. of patients	%	
High PP-TC	17	27.9%	13	33.3%	0.33
PP-HDL	6	9.8%	2	5.1%	0.55
High PP-LDL	11	18.0%	7	17.9%	1
High PP-VLDL	31	50.8%	22	56.4%	0.65
High PP-TG	31	50.8%	22	56.4%	0.86
High TC/HDL	15	24.6%	12	30.8%	0.5

Table 4 shows there was high proportion of postprandial hyperlipidemia in patients with high apolipoprotein B levels but there was no statistically significant association observed between them with p-value >0.05

Table-1 stated that among 100 patients with Type 2 Diabetes Mellitus, 52 were Males and 48 were Females. Age wise distribution showed maximum were between 41-60 years age group with mean age of 50.8 for diabetes mellitus

Table-2 stated that among 100 patients with type 2 diabetes mellitus and 100 patients without diabetes mellitus, High postprandial VLDL levels, , High postprandial triglyceride level, are seen in 53% and 53% in patients with type 2 diabetes mellitus and 29% and 22% in patients without diabetes mellitus which is statistically significant with a p-value 0.001 and <0.001 respectively.

High postprandial cholesterol level , High postprandial LDL and low Postprandial HDL were seen in 30%, 18%,53%, , 8% of patients with type 2 diabetes mellitus and 8%, 5%, 22%, and 20% of patients without diabetes mellitus respectively and there was a statistically significant difference observed between them with a p-value of <0.001, 0.007, 0<.001 and 0.002 respectively .

Table 3 stated that 61% of diabetics show high apolipoprotien B levels.

Table-4 stated that Among 100 patients with type 2 diabetes mellitus, on comparing the postprandial hyperlipidemia with apolipoprotein B levels, there was high proportion of postprandial hyperlipidemia in patients with high apolipoprotein B levels but there was no statistically significant association observed between them with p-value >0.05.

IV. DISCUSSION

The present study was conducted with aim to study the postprandial lipid profile in patients of Type 2 Diabetes Mellitus as compared to those without diabetes mellitus.

In our study, on comparing postprandial lipid parameters in patients with type 2 diabetes mellitus and without diabetes mellitus, there is significant difference observed between the two groups in all lipid parameters with p-value <0.05. this is similar to the study done by **S. Lim, Y.J. Kim, A.R. Khang et al**[6], where significant difference observed between groups with Normal glucose, prediabetes and type 2 diabetes mellitus in lipid parameters TC, HDL, LDL, and TG. Study done by **Sourabh Sultania et al**[7], also showed similar results where significant difference observed between two groups with lipid parameters except for TC and LDL. Our study is not matching with the study done by **Chakraborty et al**[2], where there is no significant difference between control and diabetic group except for TG. In the study done by **Gupta et al**[8], there is statistically significant difference observed with HDl, VLDL and TG but no significant association observed with TC and LDL.

In our study, comparing the apolipoprotein B levels and postprandial hyperlipidemia, there was high proportion of VLDL and TG than the other parameters. And the association found to be statistically not significant(p-value <0.05). It is not consistent with the study done by **Dorobantu M et al**[9], where they observed statistically significant association between high apolipoprotein B and hyperlipidemia(p-value>0.0001).

Limitation of study

This study is an observational study and sample size is relatively small

Secondly we did not do followup to correlate with the effect of hyperlipidemia and high apolipoprotein B in diabetes

V. CONCLUSION

- The mean age of type 2 diabetic patients was found to be 50.8years and patients without diabetes mellitus was 49 years.
- Males were more in preponderance than females but postprandial hyperlipidemia was more in proportion in females than males.
- On comparing the postprandial hyperlipidemia in type 2 diabetes mellitus and in patients without diabetes mellitus, there is statistically significant difference observed betweeen the two groups in all lipid parameters.
- No statistically significant association observed, between postprandial hyperlipidemia with apolipoprotien B level in patients with type 2 diabetes mellitus

REFERENCES:

[1]. American Diabetes Association, Diagnosis and classification of Diabetes Mellitus, Diabetes Care, 2011 Jan; 34(Suppl 1):S62-69.

[2]. Chakraborty, et al.: Fasting and postprandial lipid parameters, Journal of Family Medicine and Primary Care, 2020; 9(1):288-292

[3]. Ranjit Unnikrishnan et al, diabetes mellitus and its complications in India, Nat Rev Endocrinol, 2016 Jun; 12(6) : 357-70

[4]. Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. Indian J Ophthalmol 2021;69:2932-8

[5]. Kumar s. et al, Relation Between HbA1c and Lipid profile among Prediabetics, Diabetics and Non-diabetics: A Hspital-Based Cross-Sectional Analysis, Cureus 14(12): e32909.

[6]. Soo Lim, Yoon Ji Kim, Ah Reum Khang, Robert H. Eckel, Postprandial dyslipidemia after a standardized high-fat meal in BMI-matched healthy individuals, and in subjects with prediabetes or type 2 diabetes, Clinical Nutrition, 2021;40(11):5538-5546.

[7]. Saurabh Sultania, Dhanakar Thakur, Malini Kulshreshtha. Study of lipid profile in type 2 diabetes mellitus patients and its correlation with HbA1c. International Journal of Contemporary Medical Research 2017;4(2):437-439

[8]. Gupta P et al, to study fasting and postprandial lipid profile in type 2 diabetes mellitus in comparison to non diabetics, Asian Journal of Medical Sciences;2023:14(4)

[9]. Dorobanțu M, Halațiu VB, Gheorghe-Fronea O, Bala CG, Moldovan H, Irinel-Parepa R, Rodean IP, Benedek I, Benedek T. The Association between Apolipoprotein B, Cardiovascular Risk Factors and Subclinical Atherosclerosis-Findings from the SEPHAR National Registry on Hypertension in Romania. Int J Mol Sci. 2023 Feb 1;24(3):2813. doi: 10.3390/ijms24032813.