

An Observational Study to Evaluate the Correlation of Serum Lipid Profile and Hypertension in Poorly Controlled Type 2 Diabetes Mellitus Patients

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ABSTRACT

Aim: The aim of this retrospective observational study was to evaluate the correlation of serum lipid profile and hypertension in poorly controlled type 2 diabetes mellitus patients.

Methods: This was a retrospective analysis done among the patients who has visited tertiary hospital medicine outpatient department. Patients' records were used to extract data after getting consent from the individual patient. Details and purpose of the study was thoroughly explained to all individuals before enrolment.

Result: It was observed that diabetic patients were having more systolic and diastolic pressure as compare to non-diabetic subjects. Intergroup differences between diabetic and non-diabetic group in systolic blood pressure is statistically significant ($p < 0.001$). It has been observed that total cholesterol (212.3 ± 42.1 vs 185.5 ± 40.4 , $p = 0.042$), triglycerides (162.4 ± 53.8 vs 111.2 ± 44.7 , $p = 0.001$), HDL (42.6 ± 4.7 vs 46.8 ± 5.9 , $p = 0.251$), LDL (141.2 ± 28.5 vs 117.4 ± 22.8 , $p = 0.231$) and VLDL (1.625 vs 22.3 ± 8.5 , $p = 0.003$). 37% patients were having triglyceride more than 150 mg/dl where as 62% patients were having cholesterol more than 200 mg/dl among population who were diabetic.

Conclusion: Type 2 diabetes patients were having elevated blood pressure and serum lipid levels as compare to non-diabetic patients which warned the importance of meticulous management of these two conditions to decrease risk for cardiovascular diseases in patients with diabetes.

Keywords: Hypertension, Lipid profile, Glycemic control, Diabetes

INTRODUCTION

Type 2 diabetes is associated with dysfunction and failure of various organs, especially the heart and peripheral blood vessels. The molecular basis for type 2 diabetes is poorly understood but insulin resistance and β -cell dysfunction are well documented^[1,2]. Environmental influences and genetic factors^[3,4], and in particular, the increasing prevalence of obesity^[5] and sedentary lifestyle^[6] are likely contributors to the increasing prevalence of type 2 diabetes.

Although type 2 diabetes increases the risk of microvascular complications, such as retinopathy and nephropathy^[7,8], most diabetic patients die of macrovascular complications, including coronary artery disease and stroke. Type 2 diabetes increases the risk of cardiovascular disease by 200% to 400%^[9]. The burden of cardiovascular disease is pronounced, especially in women who have diabetes^[10]. The risk of macrovascular disease is increased before glucose levels reach the diagnostic threshold for diabetes, 25% of newly diagnosed patients already have overt cardiovascular disease^[11].

Hypertension is associated with diabetes, largely independent of age and obesity^[12], although abdominal visceral obesity is can especially strong risk factor for the development of both conditions^[13]. Hypertension is part of the metabolic syndrome^[14], with a prevalence as high as 60% in patients who have type 2 diabetes^[14]. According to The Seventh Report Of The Joint National Committee On

Prevention, Detection, Evaluation and Treatment Of High Blood Pressure [15], diabetes is a compelling indication for treating hypertension aggressively in affected patients.

Patients who have type 2 diabetes have a dyslipidemia that is characterised by increases in atherogenic small, dense, low density lipoprotein (LDL) subfractions and serum triglycerides and decreases in high density lipoproteins (HDL)-2 cholesterol [16].

The objective of this retrospective observational study was to evaluate the correlation of serum lipid profile and hypertension in poorly controlled type 2 diabetes mellitus patients.

METHODS

This was a retrospective analysis done among the patients who has visited tertiary hospital medicine outpatient department. Patients' records were used to extract data after getting consent from the individual patient. Details and purpose of the study was thoroughly explained to all individuals before enrolment.

50 diabetic and 50 nondiabetic individuals were included in this retrospective analysis after satisfying the inclusion and exclusion criteria. Diabetic patients with glycated Haemoglobin (HbA1c) level > 7% of both sexes were included in this trial. Patients who denied to give written inform consent and presented with any micro or macrovascular complication were excluded from this study.

Blood pressure was measured with standard protocol and all biochemical tests were done by the unanimous pathology clinic to received authentic data. Data were analysed by using statistical package for social sciences (SPSS) version 17.

RESULT

Table 1 demonstrated the mean systolic and diastolic blood pressure in uncontrolled diabetes and non-diabetic groups. It was observed that diabetic patients were having more systolic and diastolic pressure as compare to non-diabetic subjects. Intergroup differences between diabetic and non-diabetic group in systolic blood pressure is statistically significant ($p < 0.001$).

Table1: Mean systolic and diastolic blood pressure in uncontrolled diabetics and non-diabetic group

Variables	Category	N	Mean \pm SD	t	P Value
Systolic BP	Diabetic	50	139.5 \pm 14.6	3.851	<0.001
	Non diabetic	50	126.7 \pm 8.9		
Diastolic BP	Diabetic	50	86.5 \pm 5.8	3.106	0.004
	Non diabetic	50	81.3 \pm 4.7		

Figure 1 demonstrated the detailed of percentage of elevated and normal both

systolic and diastolic blood pressure among diabetic and non-diabetic patients.

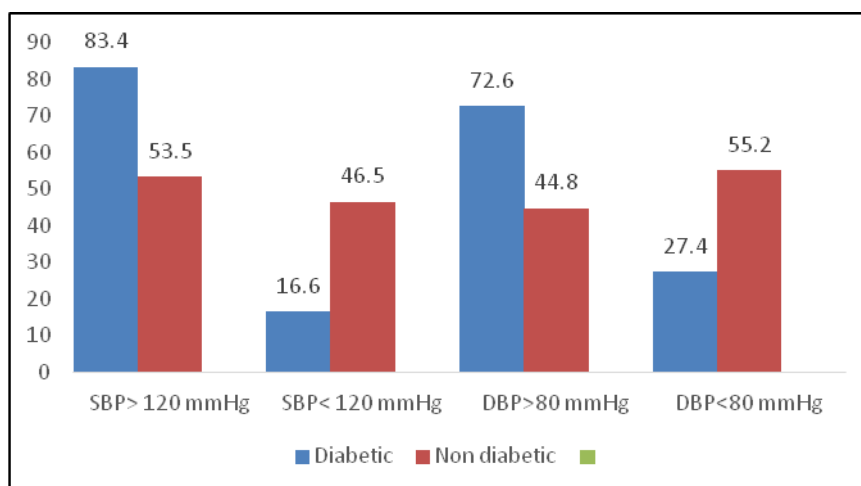


Figure 1: Comparison of diabetic status with systolic and diastolic BP

Table 2 demonstrated mean lipid profile among the two study groups. It has been observed that total cholesterol (212.3±42.1 vs 185.5±40.4, p=0.042), triglycerides (162.4±53.8 vs 111.2±44.7, p=

0.001), HDL (42.6±4.7 vs 46.8±5.9, p=0.251), LDL (141.2±28.5 vs 117.4±22.8, p=0.231) and VLDL (31.4±10.5 vs 22.3±8.5, p=0.003)

Table 2: Mean lipid profile in uncontrolled diabetic and non-diabetic subjects

Variables	Category	N	Mean ± SD	t	P Value
Total Cholesterol	Diabetic	50	212.3±42.1	3.124	0.042
	Non diabetic	50	185.5±40.4		
Triglycerides	Diabetic	50	162.4±53.8	2.989	0.001
	Non diabetic	50	111.2±44.7		
HDL	Diabetic	50	42.6±4.7	1.437	0.251
	Non diabetic	50	46.8±5.9		
LDL	Diabetic	50	141.2±28.5	1.625	0.231
	Non diabetic	50	117.4±22.8		
VLDL	Diabetic	50	31.4±10.5	3.429	0.003
	Non diabetic	50	22.3±8.5		

Figure 2 demonstrated the detailed of percentage of elevated and normal lipid profiles among diabetic and non-diabetic patients. 37% patients were having

triglyceride more than 150 mg/dl where as 62% patients were having cholesterol more than 200 mg/dl among population who were diabetic.

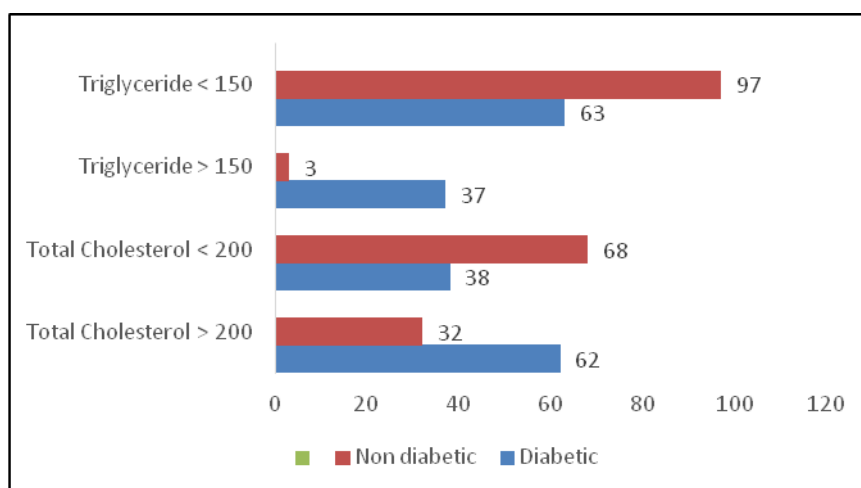


Figure 2: Comparison of percentage of lipid profile in diabetic and non-diabetic subjects

DISCUSSION

High blood pressure and diabetes are interlinked disease. These two diseases are considered as comorbidities as they occurred so frequently together. Blood pressure is raised because of the total amount of fluid in the body during diabetes. Volume expansion, salt retention and hypertension are results because of Renin Angiotensin Aldosterone system (RAAS) activation. By decreasing parasympathetic activity, enhancing sympathetic activity and reducing baroreceptor sensitivity, aldosterone also contributes to hypertension [17].

Despite its high prevalence, associated morbidity and increased mortality, hypertension still remains inadequately treated in the majority of patients. This is largely because of certain inherent problems associated with the management of hypertension. The problems include on one hand, the lack of necessary concern, application and at times knowledge, on the part of the physicians in question. On the other hand, the problem may be related to the lack of patient compliance. The pervasive lack of insight in such a killer disease is indeed quite

staggering. Occasionally of course, the hypertension is truly resistant.

Association between lipid levels and glycemic control has been established by several studies [18-20]. In the current study it had observed that diabetic patients were having more elevated lipid profile as compared to non-diabetic patients. It has been observed that total cholesterol (212.3 ± 42.1 vs 185.5 ± 40.4 , $p=0.042$), triglycerides (162.4 ± 53.8 vs 111.2 ± 44.7 , $p=0.001$), HDL (42.6 ± 4.7 vs 46.8 ± 5.9 , $p=0.251$), LDL (141.2 ± 28.5 vs 117.4 ± 22.8 , $p=0.231$) and VLDL (1.625 vs 22.3 ± 8.5 , $p=0.003$).

This study has established the strong association between uncontrolled diabetes with elevated blood pressure and lipid profile. Patients who were diagnosed with type 2 diabetes are strongly recommended for hypertension and lipid profile screening. Aggressive medical strategy should be taken to control blood pressure and lipid profile towards better outcome in blood glucose profile.

CONCLUSION

Type 2 diabetes patients were having elevated blood pressure and serum lipid levels as compared to non-diabetic patients which warned the importance of meticulous management of these two conditions to decrease risk for cardiovascular diseases in patients with diabetes.

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- How to cite this article: Azad BP. An observational study to evaluate the correlation of serum lipid profile and hypertension in poorly controlled type 2 diabetes mellitus patients. International Journal of Research and Review. 2020; 7(12): 274-278.
