Original Article

Frequency of Dyslipidemia in Type 2 Diabetic Patients with Hypertension

Muhammad Nadeem Sohail[1], Muddasar Ahmed[1], Mehwish Saeed[1], Mahboob Qadir[1] and Muhammad Ibrahim[2]

ABSTRACT

Objective: To determine the frequency of dyslipidemia in type 2 diabetic patients with hypertension.
Study Design: Cross-sectional study
Place and Duration of Study: This study was conducted at the diabetes outpatient department of Nishtar Hospital Multan in 6 months duration from January 2021 to June 2021.
Materials and Methods: A total of 145 patents with diagnosed type 2 diabetes and hypertension were enrolled in study. Detailed history and physical examination was done on all patients, fasting blood sample of all patients was drawn under aseptic measures and sent to laboratory for lipid profile to determine the status of dyslipidemia. SPSS version 24 was used for data analysis and after test of significance p values ≤ 0.05 was considered as significant.
Results: Presence and absence of dyslipidemia was shown as 80.7% and 19.3% respectively. Increased value of cholesterol (above 180) was observed in 57.2% patients and increased triglycerides (above 150) were observed in 70.3% patients. Low high density lipids were observed in 80% patients.
Conclusion: Type 2 diabetic patients with associated hypertension are at greater risk of dyslipidemia and most common identified abnormality of lipid profile is low level of high density lipids (HDL).
Key Words: Type 2 diabetes, Dyslipidemia, Hypertension, HDL, LDL

INTRODUCTION

Chronic metabolic disorder type 2 diabetes results from insufficiency of insulin production or action[1]. Prevalence of diabetes is increasing day by day worldwide, according International Diabetes Federation survey in 2006 about 246 million people are diabetic and this rate is will cross the figure of 380 million in next 20 years[2]. Patients of type 2 diabetes have 4 times greater risk of cardiovascular diseases which is major cause of mortality in diabetic people[3].

Some major risk factors to cardiovascular mortality include diabetic dyslipidemia, hyperglycemia, smoking, hypertension and increased BMI or obesity[4]. Numerous studies were conducted in the past and describe association between hypertension and

1. Department of Endocrinology Unit, Nishtar Medical University & Hospital, Multan.
2. Department of Biochemistry, Bahauddin Zakariya University, Multan.

Correspondence: Dr. Muhammad Nadeem Sohail, Fellow Endocrinology Unit of Medicine, Nishtar Medical University & Hospital, Multan.
Contact No: 0333 6143972
Email: dr_nadeem_sohail@hotmail.com

abnormal lipid levels[5]. Prolong dyslipidemia causes damage to endothelial cells which results in loss of vasomotor action. This pathophysiologic process lead to atherosclerosis and that later developed hypertension[6].

Some prospective studies reported strong association between hypertension and increased level of plasma lipids[7]. This whole pathophysiological phenomenon named as syndrome X that involves increased concentrations of insulin, glucose and triglycerides and decreased in concentrations of high density lipids. Syndrome X with hypertension is a strong risk factor of coronary artery diseases (CAD)[8]. Both qualitative and quantitative changes can occur in lipoprotein as result of diabetic dyslipidemia. Identification and timely institution of a proper management is of utmost importance in hypertensive diabetic patients with dyslipidemia because of an established high risk of coronary heart disease and stroke in these patients.[9,10]

However, this aspect is frequently overlooked in our local setup and puts patients at higher risk of morbidity and mortality. This study will enable us to find out the burden of dyslipidemia in our local population of type 2 diabetic patients with hypertension which if found to be high will enable us emphasize a routine screening for dyslipidemia in this patient population and to start treatment at an earlier stage. This, in turn, will result in a decreased morbidity and mortality associated with micro and macrovascular complications in our patients.

MATERIALS AND METHODS

Study was conducted at the diabetes outpatients department of Nishtar hospital Multan in 6 months duration from January 2021 to June 2021. Study was started after ethical approval from hospital ethical board. Non probability consecutive sampling technique was used. Written consent was taken from patients after detailed description of study. Sample size was calculated by using WHO sample size calculator with following statistics, 95% confidence interval, and power of study 80% and prevalence of dyslipidemia 75.8%[11].

Patients diagnosed with type 2 diabetes mellitus (on history, physical examination, and laboratory evidence of hyperglycemia) and having hypertension whether previously diagnosed or newly identified with a blood pressure above 130/80 mmHg, attending the diabetes outpatient department were included. Patients with insulin dependent diabetes mellitus (type 1 diabetes), ischemic heart disease, macrovascular complications, history of stroke, decompensated heart failure, family history of dyslipidemia, chronic liver disease, cerebrovascular accident, pregnant women and who not willing to give consent were excluded from study. Physical examination and detailed medical and surgical history was taken from patients. After aseptic measures fasting blood sample was taken by researcher himself to investigate the dyslipidemia.

Collected data was entered in SPSS version 24 for analysis. Mean and standard deviation was calculated for numerical variables like age, duration of disease and frequency (percentages) were calculated for categorical variables like gender. Student t-test and chi square test were applied to see association among qualitative and quantitative outcome variables respectively. P value $\leq$ 0.05 was taken as significant.

RESULTS

A total of 145 patient's data was analyzed, among them 78/145 (53.8%) were male and 67/145 (46.2%) were female. Mean age, body mass index, duration of diabetes, duration of hypertension and smoking (pack year) were 54.27 $\pm$ 7.91 years, 28.63 $\pm$ 3.93 kg/m², 9.43 $\pm$ 4.09 years, 8.19 + 2.39 years and 7.87 $\pm$ 6.62 (pack year) respectively. Similarly total cholesterol, triglycerides, and high density lipids were 202.03 $\pm$ 39.24, 188.85 $\pm$ 48.98 and 38.82 $\pm$ 8.32 respectively (Table-1). In graph-1 presence and absence of dyslipidemia was shown as 117 (80.7%) and 28(19.3%) respectively. Increased value of cholesterol (above 180) was observed in 57.2% patients and increased triglycerides (above 150) were observed in 70.3% patients. Low high density lipids were observed in 80% patients (Table-2).

Table No.1: Demographics and lipid profile (n=145)

Characteristics	Study values mean ± SD or frequency (%)
Gender	
Male	78 (53.8)
Female	67 (46.2)
Age	54.2±7.9
Body Mass Index (kg/m²)	28.6±3.9
Duration of diabetes mellitus (years)	9.4±4.0
Duration of hypertension (years)	8.1±2.3
Smoking (pack years)	7.8±6.6
Cholesterol (mg/dl)	202±39.2
Triglycerides (mg/dl)	188.8±48.9
High density lipoprotein (mg/dl)	38.8±8.3
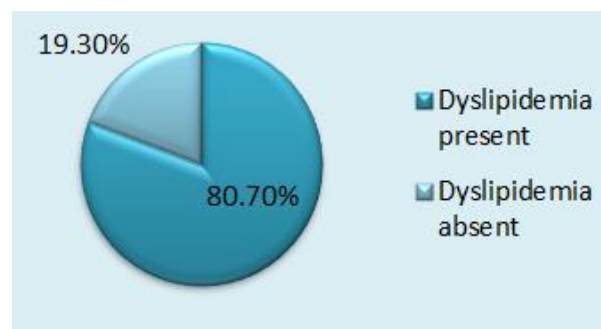
FigureNo.1: Frequency of dyslipidemia in patient population

Table No.2: Effect of duration of hypertension on the frequency of dyslipidemia

Characteristics		Duration < 8 years N = 62	Duration ≥ 8 years N = 83	P-value
Dyslipidemia	Yes	51	66	0.679
	No	11	17	
Hypercholesterolemia	Yes	41	42	0.062
	No	21	41	
Hypertriglyceridemia	Yes	45	57	0.610
	No	17	26	
Low HDL	Yes	50	66	0.867
	No	12	17	

DISCUSSION

In our study mean duration of hypertension was 8.19 + 2.39 years and dyslipidemia was observed in 80.7% of population. In 2004 Ilanne-Parikka et al[12] conducted a study on this topic and observed 75% of patients with type 2 diabetes having dyslipidemia and hypertension. Targeted therapy of metabolic syndrome and preventive measures are necessary. Another study was conducted by Yadav et al[13] and reported proportion of dyslipidemia in 64.1% of population and hypertension was found in 49% type 2 diabetic patients.

In a study conducted by Shrewastwa et al[14] on Nepali population 108 diabetic patients with associated

hypertension were evaluated for their fasting lipids and dyslipidemia was recorded in 90.7% of patients. It was concluded that there was no significant association between dyslipidemia and duration of diabetes mellitus. In another Pakistani study Ahmad et al[15] observed hypertriglyceridemia in 78% type 2 diabetic patients and LDL-cholesterol border line values in 92 patients.

In our study 53.8% male patients and 46.2% were female patients and mean age of patients was 54.27 $\pm$ 7.91 years. Kengne et al[16] conducted a study and reported equal ration of male and female gender and mean age of patients was 55.8 $\pm$ 10.5 years. Metabolic syndrome was observed in 71.7% of patients and mostly in female patients. Another similar study was conducted by Marjani et al[17] in 2011 and reported that males are more prone to hypertensive and its associated problems as compare to females. Metabolic syndrome was observed in 76.7% of patients using IDF criteria.

In 2012 Janghorbani et al[18] also completed a similar study and reported that among type diabetic patients hypertension and dyslipidemia are common in females. Dyslipidemia was observed in 62% patients and hypertension in 77% of patients. Another study was conducted on Nigerian population by Osuji et al[19] and reported dyslipidemia in 55.5% of diabetic type and hypertensive patients. Both these studies are in accordance with our findings.

Sufficient clinical evidence are available on this hypothesis that presence of contributing factors type 2 diabetes, hypertension along with dyslipidemia are atherogenic, early control and treatment of these abnormalities can reduce the risk of CAD progression[20]. Gilani et al[21] conducted a study on 150 diabetic patients and observed significant proportion with hypertension and dyslipidemia.

CONCLUSION

Type 2 diabetic patients with associated hypertension are at greater risk of dyslipidemia and most common identified abnormality of lipid profile is low level of high density lipids (HDL).

Limitations: Main limitations of our study were cross sectional experimental design and small study duration which may not express the association of hypertension and dyslipidemia.

Author's Contribution:

Concept & Design of Study:	Muhammad Nadeem Sohail
Drafting:	Muddasar Ahmed, Mehwish Saeed
Data Analysis:	Mahboob Qadir, Muhammad Ibrahim
Revisiting Critically:	Muhammad Nadeem Sohail, Muddasar Ahmed
Final Approval of version:	Muhammad Nadeem Sohail

Conflict of Interest: The study has no conflict of interest to declare by any author.

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