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BLOOD LIPIDS PROFILE IN NON - OBESE PATIENTS WITH UNTREATED HYPERTENSION AND RECENTLY IDENTIFIED DIABETES MELLITUS

[1]Dr Ahmad Zeeshan, [2]Dr Yasir Yaqoob, [3]Dr Muhammad Owais Fazal

[1,2,3]Assistant Professor Medicine, Punjab Medical College and Allied Hospital, Faisalabad.

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Abstract:

Aim: *The study aims to determine the results of blood cholesterol and triglycerides estimation in non-obese patients with recently identified diabetes mellitus and untreated hypertension have been reported and compared with non-obese normal controls.*

Place and Duration: *In the Medicine Unit II of Allied Hospital, Faisalabad for one year duration from April 2018 to April 2019.*

Methods: *Serum cholesterol and triglycerides were measured in 3 groups of non-obese people. The groups included 40 patients diagnosed with new diabetes, 40 patients with norm glycemic hypertension and 40 normal control groups. The mean values of serum cholesterol and triglycerides in patients with diabetes and hypertension were significantly higher than in the control group. With the exception of the weak correlation between the mass index and triglycerides in hypertension, lipid values were not associated with the mass index in patient groups.*

Results: *Type IV hyper lipoproteinemia (hypertriglyceridemia) was the most common lipid abnormality in approximately one third of patients and 20% of the control. An abnormality of Ha and II b lipoproteins was observed in a small percentage among patient groups, but not observed in the control.*

Keywords: *Triglycerides, hypertension, serum cholesterol.*

Corresponding author:

Dr Ahmad Zeeshan,

Assistant Professor Medicine, Punjab Medical College and Allied Hospital, Faisalabad.

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INTRODUCTION:

Chronic diseases such as diabetes and hypertension are important causes of morbidity and mortality. There is also a clinical impression that diabetes and hypertension are more often associated than noted earlier accidentally [1-2]. These two conditions, along with high blood lipids, are important risk factors for developing atherosclerosis and can act synergistically to increase risk [3]. The spectrum of complications of chronic diseases in underdeveloped countries is starting to pay attention [4]. The lipid profile in diabetes, and especially hypertension, has not been studied in detail in patients in Pakistan. Although the same change is expected in blood lipids in uncontrolled diabetes, the relationship between hypertension and hyperlipidemia has not been clearly defined [5-6]. In this study, estimated blood cholesterol and triglyceride results in non-obese patients with recently identified diabetes and untreated hypertension were compared with normal non-obese controls [7-8].

MATERIAL AND METHODS:

This Prospective study was held in the Medicine Unit II of Allied Hospital, Faisalabad for one year duration from April 2018 to April 2019. Serum cholesterol and triglycerides were measured in 3 groups of non-obese people. The groups included 40 patients diagnosed with new diabetes, 40 patients with norm-glycemic hypertension and 40 normal control groups. The controls were grouped from patients who came to the hospital because of minor ailments.

All patients and controls had a complete history and physical examination, and women were asked questions about oral contraceptives and those have possible secondary cause of hyperlipidemia, namely those with hypothyroidism, biliary cirrhosis and nephrosis are excluded. The laboratory investigations included glucose tolerance test, hemoglobin, and urinalysis and blood urea were done. After fasting overnight, blood samples were taken to predict lipids. Serum cholesterol was calculated using Abell methods (Abell et al., 1952) and using the Zilversmet and Van Handel method, the triglyceride levels were calculated. The mass index was calculated from the height (inches) / 3 mass (pounds). A mass index value of less than 12 indicates obesity.

Hyperlipidemia was diagnosed when serum cholesterol was greater than 280 mg and triglycerides over 200mg%. Temporary categorization of hyper lipoproteinemia was performed using the Fredrickson et al. Classification.
Type Iia: hypercholesterolemia only.
Type Iib: proportional increase in serum triglyceride and cholesterol levels.
Type IV: only hypertriglyceridemia.

RESULTS:

Table I shows the patients distribution with diabetes, hypertension and normal control by age and sex.

Table I: Age and Sex Distribution in Hypertension, Diabetes and Controls

Age (yrs)	Hypertension n=40		Diabetes n=40		Controls n=40	
	M	F	M	F	M	F
20-30	5	1	0	3	1	4
31-40	3	9	5	6	7	10
41-50	5	10	7	7	5	3
51-60	1	4	1	5	4	1
Above 60	0	2	5	1	2	3
Total	14	26	18	22	19	21
Mean Age (Yrs) + S.D.	42.12 ± 11.71		45.44 ± 12.11		42.40 ± 10.06	

There were 40 patients in each group and their gender distribution was as follows:
Hypertension group: 14 men and 26 women
Female's Diabetic group: 18 men and 22.
Females Control group: 19 men and 21 women.
The vast majority of patients in each group were between 31 and 60 years old. In 3 groups (year + - SS):
Hypertension group 42.12 + 11.71
Diabetic group 45.44 + 12.11
Controls 42.40 + 10.06
Table II shows the average values of the mass index, serum cholesterol and triglycerides in patients with control group, untreated hypertension and newly diagnosed diabetes. As expected, the mass index was over 12 in cases and controls, which did not mean three groups.

Table II: Mean Values (± S.D.) Ponderal Index, Cholestrol and Triglycerides in Control, Patients with Hypertension and Diagnosed Diabetes.

Investigations	Controls n=40	Hypertension n=40	Diabetes n=40
Ponderal Index	12.52 ± 0.59	12.24 ± 0.61	12.31 ± 0.54
Cholesterol	188.90 ± 31.75	215.90 ± 48.39	222.90 ± 51.95
Triglycerides	148.90 ± 56.34	211.90 ± 109.10	200.90 ± 110.79

*N.S = Not Significant

The mean blood cholesterol values in the control group were 216% in the hypertensive group and 189% compared to 223% in the diabetic group. The average cholesterol values in patients with diabetes and hypertension were significantly higher than in the control group.

The mean triglyceride values in the control group were 215% in the hypertensive group and 150% compared with 203% in the diabetic group. These values in the patient groups were again significantly higher than in the control group.

Table III shows the correlation between mass index and lipid values in patients with hypertension and diabetes. There was no correlation between the mass index and cholesterol in the hypertensive group (r = + 0.1030), but only a very weak correlation between the mass index and triglyceride values (r = - 0.2384): 010> P> 0.05).

In the diabetic group, the correlation coefficients of the mass index with cholesterol (r = -0.2009) and triglycerides (r = -0.2299) were not statistically significant. Type IV abnormalities were observed in 33% of the hypertensive group, 30% in the diabetic group and 20% in the control group.

Table III: Results of Correlation Between Ponderal Index and Lipid Values in Patient Groups

Relationship in Variables	Hypertension Group Correlation Co-efficient	Diabetes Group Correlation Co-efficient
Ponderal Index with Cholesterol	r = + 0.1030 N.S.	r = - 0.2009 N.S.
Ponderal Index with triglyceride	r = - 0.2384	r = - 0.2299 N.S

N.S. = Not Significant

Table IV: Distribution of lipid abnormalities in patient and control groups (%).

Table IV: Shows the distribution of various types of hyperlipoproteinaemias in the three groups

Types of Lipid abnormalities	Hypertension n=40	Diabetes n=40	Controls n=40
Type IV	13 (33%)	12 (30)%	8 (20%)
Type II b	2 (5%)	5 (13%)	
Type II a	1 (3%)	2 (5%)	

Type II b was observed in the hypertensive group in 5%, in diabetic patients in 13% and none of the controls.
Type II a was observed in 3% of patients with hypertension and in 5% of patients with diabetes.

DISCUSSION:

A higher incidence of atherosclerosis has been observed in diabetes. Some epidemiological studies have shown that hypertriglyceridemia and glucose intolerance are common in atherosclerosis (Ostrander et al[9]. 2015). Diabetes is also often associated with several endogenous hypertriglyceridemia. The mechanism responsible for high triglyceride levels in diabetes has been the subject of important research. While lipolysis still provides fatty acid substrates, very low density lipoprotein (VLDL) has been observed in uncontrolled diabetes due to lipoprotein

lipase deficiency (Bagdade et al [10]. 2013). Excessive production increase due to hyper-insulinemia has been observed in cases of diabetes mellitus with mild onset (Bierman and Porte, Reaven et al [11]. 2013). This study is limited to non-obese people because obesity and presumably drugs can change lipid levels [12]. High triglyceride values in untreated diabetes are probably the result of altered metabolism and are not associated with mass index.

Cholesterol metabolism has been studied relatively less in diabetes. Careful metabolic studies in Pakistan suffering from diabetes have shown excessive cholesterol and triglyceride production (khattak and Mansoor, 2010) [13]. Although obesity is known to increase cholesterol production (Miettinen), weight remained constant in the study mentioned above. Cholesterol in the current series of diabetic patients was high despite the absence of obesity. Cholesterol levels showed little correlation with mass indicators.

The relationship between hypertension and high serum lipids is less understood [14]. A clear relationship between hypertension and hyperlipidemia may result from more frequent measurement of lipids in hypertension or the tendency of hypertension to become more obese (Chiang et al [15] 2016). The role of antihypertensive drugs in increasing serum lipid levels has also been reported (Ames and Hill, Chohan et al). In this study, hypertension, obesity, diabetes and previously treated patients were excluded from the study design. Both serum cholesterol and triglycerides were higher than controls and the values were not related to mass index. Recent Western studies show that serum triglyceride values increase in hypertensive patients and there is evidence that this relationship is largely independent of obesity (Thomas et al., 2005).

The study was conducted on selected case material observed in hospital practice. However, there is significant evidence of lipid changes in both non-obese diabetics and the hypertensive group. These observations highlight the need for more complete criteria, which may include lipid monitoring to control diabetes. The effects of increasing lipid levels in hypertensive patients are obvious. The mechanism of this relationship is not understood, but if other studies confirm this, it will be a solid condition for routine lipid prediction in cases of hypertension.

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