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Evaluation of Lipid Profile Among Prehypertensive and Normotensive Patients: A Teaching Hospital based Study.

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ABSTRACT

Background: This study was designed to compare the lipid profile among prehypertensive and normotensive and its correlation between blood pressure and lipid profile in prehypertensive patients. **Methods:** This case-control study on forty prehypertensives and forty normotensive subjects. Blood pressures were recorded and serum lipid profiles were measured and compared using student t test. Correlation between blood pressure and serum lipid profile was done. **Results:** The mean SBPs of prehypertensives group and normotensives group were 132.43±6.25 mmHg versus 110.02±2.60 mmHg, respectively, and mean DBPs were 88.42±4.05 mmHg versus 74.21±3.72 mmHg, respectively. The mean SBP and DBP of prehypertensives group were higher than those of normotensives group. the serum lipid profile of recently, diagnosed prehypertensive patients was significantly altered as compared to normotensive subjects. **Conclusion:** The serum lipid profile of recently, diagnosed prehypertensive patients was significantly altered as compared to normotensive subjects.

Keywords: Lipid profile, Prehypertension and Normotensive.

INTRODUCTION

Hypertension and dyslipidemia seem to be the two major risk factors contributing to the increasing cardio-vascular disease worldwide including India. As its prevalence is increasing globally, this is of majore concern. The reasons seem to be very many and some associated with unhealthy diet and different life-style. Stress is also a major contributing factor to cardiovascular disease (CVD) but little is known about the mechanisms that underlie this connection.[1] It has recently been estimated that many people worldwide and 60 million in the United States suffer from hypertension.[2] Recent studies shows 1.59 million deaths have occurred in India due to cardiovascular diseases and this number is projected to increase in future.[3,4] Hypertension affects 26% of world adult population.[5] Hypertension itself is an independent risk factor for cardiovascular diseases and deaths.[6] Subjects with prehypertension have a greater risk of developing hypertension than that lower Blood pressure.[7] In addition prehypertension is a greater risk factor for cardiovascular diseases.[8] Various studies have shown that dyslipidemia occurs in patients suffering with hypertension as compared to normal subjects.[9-12] Therefore increased level of blood lipids signify the increased cardiovascular risk in subjects suffering from prehypertension. So early detection of this derangement and early intervention may arrest the progression of prehypertension to hypertension and prevent the complications of individuals suffering from hypertension. Our aim was to find the evaluation of lipid profile among prehypertensive and normotensive and its correlation between blood pressure and lipid profile in prehypertensive patients.

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MATERIALS AND METHODS

This present study was carried out in the department of Clinical Biochemistry, RKDF Medical College Hospital and Research Center, Bhopal in collaboration with the department of Medicine during the period from March 2017 to February 2018. Randomly, selected 80 patients which age in between 20-65 years and were categorized in two groups:

Group 1: 40 patients prehypertensive as cases.
Group 2: 40 subjects normotensive as controls.

Subjects with inclusion criteria as per 7th joint national committee on prevention, detection, evaluation and treatment of blood pressure defines prehypertension has –"Systolic blood pressure ranging between 120-139 mm of Hg and/or Diastolic blood pressure ranging between 80-89mm of Hg".[13]

All the subjects had BMI range between 18.5 KG/m2 and 30 kg/m2. Subjects with history of alcohol intake, diabetes mellitus or any other major illness and obese subjects were excluded from the study. Complete history was taken, general, systemic and clinical examination was done. BP was measured with sphygmomanometer from the right arm in sitting position after taking 10 minutes of rest. The appearance of first Korotkoff sound was taken as systolic blood pressure and disappearance of 4th Korotkoff sound is taken as diastolic blood pressure. 3 measurements were taken and the mean of best two were used for analysis.

Biochemical Analysis

An overnight fast 5 ml of venous blood samples was collected for following biochemical parameters to be studied.[14]

1. Total Cholesterol (TC) by enzymatic end point CHOD-POD methods.
2. Triglyceride (TG) by enzymatic glycerol phosphate oxidase/peroxidase methods.
3. HDL-Cholesterol by direct enzymatic end point method.
4. LDL-Cholesterol by Friedewald's formula. LDL-c = Tc-HDL-c(TG/5)

Statistical Analysis

All values were expressed as mean ± S.D. We used student t-test and pearson's correlation coefficient to find the statistical significance. A P-value < 0.05 was to be considered statistically significant.

RESULTS & DISCUSSION

We studied the evaluation of lipid profile among prehypertensive and normotensive and its correlation between blood pressure and lipid profile in prehypertensive patients. [Table 1] shows the maximum numbers of prehypertensive subjects were in the age group of 45-50 and minimum in 20-25. [Table 2] Shows the mean SBPs of prehypertensives group and normotensives group were 132.43±6.25 mmHg versus 110.02±2.60 mmHg, respectively, and mean DBPs were 88.42±4.05 mmHg versus 74.21±3.72 mmHg, respectively. The mean SBP and DBP of prehypertensives group were higher than those of normotensives group.

[Table 3] shows the mean value of total cholesterol in study group-1 and control group-2 was 206.32+12.54 mg/dL and 142.2+20.04 mg/dL, respectively. The difference was statistically significant (p<0.001). The mean value of triglycerides in study group-1 and control group-2 was 181.47+10.24 mg/dL and 138.4+3.21 mg/dL, respectively. The difference was statistically significant (p<0.001). The mean value of HDL cholesterol in study group-1 and control group-2 was 41.64+6.04 mg/dL and 54.42+6.7 mg/dL, respectively. The difference was statistically non-significant (p< 0.001). The mean value of LDL cholesterol in study group-1 and control group-2 was 120.28+9.04 mg/dL and 94.5+5.7 mg/dL, respectively. The difference was statistically non-significant (p< 0.001). The mean value of VLDL cholesterol in study group-1 and control group-2 was 44.52+8.05 mg/dL and 31.6+4.08 mg/dL, respectively. The difference was statistically significant (p< 0.001).

Table 1: Shows age distribution among prehypertension and normal subjects:

Age in Years	Group-1	Group-2
20-25	1	2
25-30	2	16
30-35	4	12
35-40	2	0
40-45	12	7
45-50	14	3
50-55	5	0
55-60	0	0
60-65	0	0

Table 2: Shows comparison of blood pressure between prehypertensive and normal subjects.

Variables	Group-1 (Mean±SD)	Group-2 (Mean±SD)
SBP (mm/Hg)	132.43±6.25	110.02±2.60
DBP (mm/Hg)	88.42±4.05	74.21±3.72

*Statistically significant(p<0.05)

Table 3: Showing comparison of lipid profile parameter between prehypertensives and normal subjects:

Parameters	Group-1 (Mean±SD)	Group-2 (Mean±SD)	p-value
TC (mg/dl)	206.32+12.54	142.2+20.04	<0.001
TG (mg/dl)	181.47+10.24	138.4+3.21	<0.001
LDL-c (mg/dl)	120.28+9.04	94.5+5.7	<0.001
HDL-c (mg/dl)	41.64+6.04	54.42+6.7	<0.001
VLDL-c (mg/dl)	44.52+8.05	31.6+4.08	<0.001

[*Statistically significant(p<0.05); Note:TC(Total Cholesterol), TG(Triglyceride), LDL-c (low density lipoprotein cholesterol), HDL-c(high density lipoprotein cholesterol),VLDL-c(very low density lipoprotein cholesterol)]

Table 4: Showing co-relation of Blood Pressure with lipid parameters

Parameters	Correlation Between SBP and Lipid profiles		Correlation Between DBP and Lipid profiles	
	r-value	p-value	r-value	p-value
TC (mg/dl)	0.593	0.014	0.428	0.016
TG (mg/dl)	0.386	0.04	0.364	0.03
LDL-c (mg/dl)	0.348	0.018	0.395	0.012
HDL-c (mg/dl)	-0.284	0.34	-0.480	0.36
VLDL-c (mg/dl)	0.675	0.002	0.625	0.001

[Table 4] shows the strong and statistically significant positive correlation in between Systolic Blood Pressure and Total Cholesterol in prehypertensives (p<0.014). Statistically significant positive correlation between Systolic Blood Pressure and Triglycerides in prehypertensives (p<0.04).

LDL-c & VLDL-c also showed a statistically significant positive correlation with Systolic Blood Pressure ($p<0.018$ & $p<0.002$). But HDL-c in prehypertensives group showed a statistically not significant negative correlation with Systolic Blood Pressure ($p<0.34$). Similarly, statistically significant correlations between DBP and lipid parameters in prehypertensives except HDL-c.

Hypertension is recognized globally as a major risk factor for CVD, stroke, diabetes, and renal diseases.[15] About 80% of hypertensive persons have comorbidities such as obesity, glucose intolerance, abnormalities in lipid metabolism, among others. In the present study Total cholesterol, Triglyceride, LDL-c, VLDL-c in prehypertensive were significantly increased as compared to normotensives. Similar findings were demonstrated by Hitesh. A. Jani et al. and Ravi venkatachalam et al.[16,17] From the present study we have found an association of dyslipidemia with prehypertension. A population study in china in 1154 subjects found that total cholesterol, LDL, VLDL, Triglyceride were significantly increased & HDL were significantly decreased in prehypertensives.[17] The study conducted by Ravi Venkatachalam et al. Hitesh A Jani too reported similar relation to lipid profile.[16,17] Choi K M et al did a study which aimed to determine the prevalence of prehypertension and hypertension and their association with risk factors.[18] They conducted their survey in 2001 over a population of 6074 in Korea they concluded that hypertension and prehypertension were common in Korea and about one-half of the hypertensive's have not be diagnosed. In our present study the maximum number of hypertensives was found in 3th to 4th decade. While the maximum number of pre-hypertensive in a study conducted by Hitesh A. Jani et al was found to be 2nd to 3rd decade.[16] This present study shows the mean SBP and DBP of prehypertensives group were higher than those of normotensives group, which is much similar to that reported by Hitesh A Jani et al who observed that SBP & DBP in hypertensives.[16]

CONCLUSION

These findings suggest, that the serum lipid profile of recently, diagnosed prehypertensive patients was significantly altered as compared to normotensive subjects. So analysis of lipid profile in pre hypertensive individuals will serve as a useful tool for monitoring adverse cardiovascular outcomes. The higher level of serum TC, TG and LDL-cholesterol in the study population may be due to genetic factors and increased consumption of dietary animal fat, lack of physical exercise, metabolic disorders like diabetes mellitus and hypothyroidism, severe stress, increased age, sex as well as alcohol and tobacco consumption may also be the contributory factors for this phenomenon.

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