

Comparative study of Serum lipid profile between prehypertensive and normotensive subjects

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Abstract

Objective: The main objective of this study was to assess the lipid profile in prehypertensives and compare it with that of normal subjects and to study the co relation of blood pressure with lipid profile.

Methods: We conducted a cross sectional study on 50 prehypertensives and 50 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 study results showed significant increase in total cholesterol, LDL, VLDL, Triglycerides in prehypertensives compared to normotensives. While decrease in HDL value was seen in prehypertensives compared to normotensives. And there was a significant correlation between blood pressure and lipid profile.

Conclusion: Lipid profile is altered in prehypertensives compared to normal. So analysis of lipid profile in pre hypertensive individuals will serve as a useful tool for monitoring adverse cardiovascular outcomes.

Key words: Lipid profile, Hypertension, Prehypertension

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Introduction

The occurrence of hypertension and cardiovascular diseases is rapidly increasing in developing countries like India. This is mainly because of change in life style. According to recent studies about 1.59 million deaths have occurred in India due to cardiovascular diseases and this number is projected to increase in future.^[1,2] Hypertension affects 26% of world adult population.^[3] Hypertension itself is an independent risk factor for cardiovascular diseases and deaths.^[4]

The 7th joint national committee on prevention, detection, evaluation and treatment of blood pressure defines prehypertension as –“Systolic blood pressure(SBP) ranging between 120-139 mmHg and/or diastolic blood pressure(DBP) ranging between 80-89mm of hg.^[5] Previously this range was considered as high normal blood pressure.

Persons with prehypertension have a greater risk of developing hypertension than that lower Blood pressure.^[6] In addition prehypertension is a greater risk factor for cardiovascular diseases (CVD).^[7] Various studies have shown that dyslipidemia^[8] occurs in patients suffering with hypertension as compared to normal subjects.^[9,10,11] 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.

Studies have shown that lipid profile is altered in hypertensive patients as compared to normotensives but not much is documented about prehypertensives. So the present study is done to compare serum lipid profile among prehypertensive and normotensive and to correlate the blood pressure and lipid profile in prehypertensive subjects.

Aims and Objectives

The objective of the study was to assess the lipid profile in prehypertensive and compare it with that of normal subjects and to study the co-relation of blood pressure with lipid profile.

Material and Methods

The study was carried out by department of pathology Adichunchanagiri Institute of Medical Sciences, B G Nagara. Sample size was 100 which were divided into following groups. Cases - group 1 (50) consisted of prehypertensive subjects. Controls - group - 2 (50) consisted of normotensive subjects. Criteria for subject selection were 100 subjects of age between 18-60 years randomly selected from general population. Written consent of all the subjects was taken. Institutional ethical committee approval was obtained.

Inclusion criteria: Subjects with inclusion criteria as per JNC -7 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”. [5] 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. 5 ml of venous blood was collected after overnight fasting for 12 hours in all the subjects for estimation of serum total cholesterol, Triglycerides, LDL, VLDL and HDL by automated biochemistry analyzer (Merilyzer auto quant 400). Correlation between blood pressure and lipid profile was made. Statistical data was expressed as mean +/- standard deviation and comparison of variable between the 2 groups was done by student *t* test and P value of less than 0.05 was considered as statistically significant

Results

Comparative cross sectional study with 50 cases with prehypertension and 50 cases of normal blood pressure, was undertaken to measure and compare the lipid profile among prehypertensives and normal subjects and to find the co-relation of lipid profile among prehypertensive and normal subjects. Maximum

numbers of prehypertensive subjects were in the age group of 40-50 and minimum in 18-30.

Table 1: Shows age distribution among prehypertension and normal subjects

Age group (Years)	Prehypertensive	Normal
18-30	6	12
30-40	8	24
40-50	23	10
50-60	13	4

Table 2: Shows sex distribution among prehypertensive and normal subjects

Sex	Prehypertensive	Normal
Male	39	42
Female	11	8

Ratio of males: females subjects in normal was 4.3:1. Ratio of male: female prehypertensive subjects was 3.5:1.

Table 3: Shows comparison of blood pressure between prehypertensive and normal subjects

Blood pressure (mm/Hg)	Prehypertensive (Mean±SD)	Normal (Mean±SD)	P value
SBP	130.60±4.26	114.60±4.60	<0.001
DBP	84.64±2.80	72.60±2.10	<0.001

Results are represented in mean±SD. p value is significant at <0.05.

Compared to normotensive, prehypertensives had a 12-20 mm/hg of increase in SBP and 10-15mm/hg of DBP.

Table 4: Showing comparison of lipid profile parameter between prehypertensives and normal subjects

Lipid parameters	Prehypertensives (Mean±SD)	Normal (Mean±SD)	P value
Total cholesterol (mg/dl)	204.1±10.40	140±22.20	<0.01
LDL (mg/dl)	118.88±12.74	92.80±4.97	<0.01
VLDL (mg/dl)	42.85±3.80	29.26±2.48	<0.01
HDL (mg/dl)	39.71±6.76	52.40±3.80	<0.01
Try glycosides (mg/dl)	179.76±12.40	136.64±6.2	<0.01

Results are presented in mean±SD .p. value is significant <0.05.

From the above findings we can say that compare to normotensive subjects there was a significant increase of total cholesterol, LDL, VLDL and TG while there was decrease in HDL value among prehypertensive.

Table 5: Showing co-relation of BP with lipid parameters

Pair	Prehypertensive		Normal	
	r-value	P value	r value	p value
SBP (mmhg)vs total cholesterol (mg/dl)	0.593	0.001	0.215	0.133
SBP (mmhg)vs LDL (mg/dl)	0.348	0.013	0.245	0.086
SBP (mmhg)vs VLDL (mg/dl)	0.675	0.001	0.076	0.599
SBP(mmhg)vs Triglyceride (mg/dl)	0.386	0.005	0.082	0.57
SBP(mmhg)vsHDL (mg/dl)	-0.284	0.045	-0.046	0.075
DBP (mmhg)vs total cholesterol (mg/dl)	0.428	0.007	0.028	0.84
DBP (mmhg)vs LDL (mg/dl)	0.395	0.004	0.254	0.07
DBP (mmhg)vs VLDL (mg/dl)	0.625	0.0001	0.012	0.93

DBP(mmHg)vs Triglyceride (mg/dl)	0.364	0.009	0.245	0.086
DBP(mmHg)vsHDL (mg/dl)	-0.480	0.0004	-0.241	0.09

Results are represented in mean +/- SD. P value is significant at <0.05.

The above table showed blood pressure with lipid parameters. There was statistically significant co relation between SBP and lipid parameters in prehypertensives except in HDL there was significant negative association between SBP and HDL in prehypertensives.

While there were no significant correlation between SBP and lipid parameters in normal subjects.

There were statistically significant correlations between DBP and lipid parameters in prehypertensives. While there were no significant correlation between DBP and lipid parameters in normal subjects.

Discussion

Pre hypertension is defined as- "SBP ranging between 120-139mmHg and DBP ranging between 80-89mm Hg".^[5]

An attempt was made in the present study to assess the lipid profile in prehypertensive and compare it with that of normal subjects and to study the correlation of blood pressure with lipid profile.

Choi K M et al did a study which aimed to determine the prevalence of prehypertension and hypertension and their association with risk factors.^[12] 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 been diagnosed.

In our present study the maximum number of hypertensives were found in 4th to 5th 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.^[13]

The mean SBP & DBP in hypertensive in present study was 130.60±2.6 & 84.64±2.80 respectively which is much similar to that reported by Hitesh A Jani et al who observed that SBP & DBP in hypertensives were 132.80±4.56 & 86.76±3.40 respectively.^[13]

Table 6: Comparison of lipid profile parameters of present study with various studies

Lipid parameters	Ravi Venkatachalam et al. ^[14]	Hitesh A. Jani et al. ^[13]	Present
Total Cholesterol(mg/dl)	162.23±25.33	200±14.44	204.11±10.40
LDL(mg/dl)	9.30±19.47	141.3±14.3	118.88±12.74
VLDL(mg/dl)	22.69± 5.3	27.56±1.48	42.85±3.80
HDL(mg/dl)	45.23±11.34	53.93±4.24	39.71±6.76
Triglycerides(mg/dl)	83.42±31.18	137.78±7.4	179.76±12.40

In the present study Total cholesterol, LDL, VLDL, Triglyceride in pre hypertensive were significantly increased as compared to normotensives. Similar findings were demonstrated by Hitesh. A. Jani et al. and Ravi venkatachalam et al.^[13,14]

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.^[14] The study conducted by Ravi Venkatachalam et al. Hitesh A Jani too reported similar relation to lipid profile.^[13,14]

Conclusion

In the present study lipid profile in pre hypertensive subjects 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.

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