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Research Article

Comparative study of serum lipid profile between prehypertensive and normotensive

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ABSTRACT

Background: Prehypertensive subjects have greater risk of developing hypertension than the normotensive subjects. Studies have shown that lipid profile is altered in hypertensive patients as compare to normotensive subjects. But not much is documented about lipid profile in prehypertensives. So the present study is done to compare the serum lipid profile among prehypertensive and normotensives and to correlate the blood pressure and lipid profile in prehypertensives.
Methods: 50 prehypertensive and 50 normotensive subjects were recruited from the general population. Blood pressures were recorded and serum lipid profiles were measured and compare using student t test. Correlation of serum lipid profile and blood pressure was done using person correlation.
Results: The study results showed significant increased in total cholesterol, LDL, VLDL and serum triglyceride level in prehypertensives compare to normotensives. While there is no significant change in HDL level in prehypertensive compare to normotensive. And there is also a significant correlation between blood pressure and lipid profile in prehypertensive subjects.
Conclusion: Lipid profile is altered in prehypertensives compare to normotensives. That's why timely diagnoses and life style modification is required in prehypertensives.

Keywords: Blood pressure, Lipid profile, Prehypertension

INTRODUCTION

The prevalence of hypertension and cardiovascular disease is rapidly increasing in developing countries.[1] This is likely related to changing lifestyle and increase longevity. The estimate shows that cardiovascular diseases have led to 1.59 million deaths in India in 2000 and this number is projected to increase in future.[1,2] Hypertension affects nearly 26 percent of the adult population worldwide.[3] Hypertension is an independent predictor for cardiovascular diseases, cerebrovascular diseases and death.[4]

The seventh report of joint national committee on prevention, detection, evaluation, and treatment of blood pressure (JNC 7) defines hypertension as blood pressure >140/90 mmhg.[5] Person with blood pressure above optimal levels, but not clinical hypertension, are defined as having "prehypertension". Prehypertension is defined by JNC 7 report as systolic blood pressure (SBP) ranging between 120 to 139 mmHg and/or diastolic blood pressure (DBP) ranging between 80-89 mmhg.[5] This range was earlier classified as high normal blood pressure. Classifying this range as prehypertension has placed many people who were earlier considered normal under this high risk category. Person with prehypertension have a greater risk of developing hypertension than do those with lower blood pressure levels.[6] In addition, prehypertension itself is a risk factor for major cardiovascular events, independent of the other cardiovascular risk factors.[7]

Dyslipidemia also increases the rate of macrovascular complications (atherosclerosis).[8] Studies have shown increased level of dyslipidemia in patients suffering with hypertension as compare to normal subjects.[9,10,11] Therefore increase level of blood lipids signify the increased cardiovascular risk in patients suffering from prehypertension. Studies also suggest that prehypertensives are more likely to progress to hypertension as compared to subjects with normal BP. Therefore early detection of this derangement and early interventions may arrest the progression of prehyertension to hypertension and prevent complications in individuals suffering from prehypertension. So the present study is undertaken 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.

METHODS

The study was carried out by department of physiology. 100 subjects of age between 18 to 40 years were randomly selected from general population. The subjects were divided into two groups. Group 1consists of prehypertensive subjects and group 2 consists of normotensive subjects. Informed written consent of all the subjects participating in this study was taken. And institutional ethical committee approval was also taken. Subjects with the inclusion criteria such as prehypertensive as per JNC 7 criteria, non-smokers, and BMI in the range 18.5 kg/m^2 and less than 30 kg/m^2 were taken into the study group. While subjects with the history of smoking, alcohol intake, diabetes mellitus, or any other major illness and obese subjects were excluded from the study. Complete history taking and general and systemic clinical examination was done to rule out any clinical disorder likely to interfere with the study findings. Anthropometric parameters such as height, weight, waist circumference were measured and BMI was calculated.

Blood pressure was measured with the sphygmomanometer from the right arm of seated participant after five minutes rest and was recorded using 1^{st} and 5^{th} korotkoff sounds. The appearance of 1^{st} korotkoff sound was taken as systolic blood pressure (SBP) and 5^{th} korotkoff sound was taken as diastolic blood pressure (DBP). Three blood pressure measurements were taken and the mean of the last two measurements were used for analysis.

5 ml of venous blood was collected after overnight fasting of 12 hrs in all the subjects for estimation of serum total cholesterol, HDL cholesterol, LDL cholesterol, VLDL cholesterol, and serum triglyceride by standard enzymatic method.

Statistical analysis was done by using software SPSS version 20. All the parameters are measured in MEAN ± SD. Independent student t test has been used to find significance of study parameters between two groups. And pearson correlation has been used to find significance correlation between blood pressure and lipid profiles.

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 correlation of blood pressure with lipid profile among prehypertensives and normal subjects.

Comparison of basic characteristics like age, height, weight and BMI between two groups did not show significant different between the two group ($p>0.05$). The two groups were similar in terms of basic characteristics. (Table 1).

Table 1: Comparison of baseline variable between prehypertensives and normal.

Baseline variables	Prehypertensives	Normal	P value
Age in years	25.17 ± 5.4	26.78 ± 5.37	0.224
Height in Cm	170.23 ± 6.8	170.45 ± 7.6	0.135
Weight in Kg	65.78 ± 9.8	66.98 ± 10.34	0.670
BMI (Kg/m^2)	21.45 ± 2.34	21.76 ± 2.45	0.645

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

Comparison of blood pressure values between two groups showed significant difference. ($p<0.001$) (Table 2).

Table 2: Comparison of blood pressure value between prehypertensives and normal.

Blood pressure	Prehypertensives	Normal	P value
SBP	132.80 ± 4.56	116.20 ± 5.38	<0.001
DBP	86.76 ± 3.40	72.90 ± 5.23	<0.001

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

Comparison of lipid parameters between two groups is shown in Table 3. TC, LDL C, VLDL C and triglycerides values were significantly increased in prehypertensives as compare to normotensive subjects. While there was no significant difference in the value of HDL between two study groups.

Table 4 shows correlation of blood pressure with lipid parameters. There were statistically significant correlation between SBP and lipid parameters in prehypertensives except 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.

Table 3: Comparison of lipid parameters between prehypertensives and normal subjects.

Lipid parameters	Prehypertensives	Normal	P value
Total cholesterol (mg/dl)	200 ± 14.44	140 ± 22.60	0.01
LDL (mg/dl)	141.3 ± 14.3	94.83 ± 7.97	0.001
VLDL (mg/dl)	36.34 ± 2.75	27.56 ± 1.48	0.04
HDL (mg/dl)	55.30 ± 3.34	53.93 ± 4.24	0.668
Triglycerides (mg/dl)	181.72 ± 13.77	137.78 ± 7.4	0.01

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

Table 4: Correlation of blood pressure with lipid parameters.

Pair	Prehypertensives		Normal	
	r value	P value	r value	P value
SBP(mmhg) vs total cholesterol (mg/dl)	0.492	0.001	0.258	0.124
SBP(mmhg) vs LDL (mg/dl)	0.365	0.016	0.253	0.154
SBP(mmhg) vs VLDL (mg/dl)	0.564	0.003	0.066	0.366
SBP(mmhg) vs HDL (mg/dl)	-0.377	0.01	-0.043	0.790
SBP(mmhg) vs Triglycerides (mg/dl)	0.398	0.03	0.077	0.645
DBP(mmhg) vs total cholesterol (mg/dl)	0.395	0.03	0.018	0.923
DBP(mmhg) vs LDL (mg/dl)	0.348	0.02	0.283	0.07
DBP(mmhg) vs VLDL (mg/dl)	0.540	0.004	0.018	0.901
DBP(mmhg) vs HDL (mg/dl)	-0.429	0.006	-0.211	0.078
DBP(mmhg) vs Triglycerides (mg/dl)	0.385	0.04	0.235	0.145

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

DISCUSSION

The aim of the present study was to compare the lipid profile among prehypertensives and normal subjects and to correlate lipid profile with blood pressure. Prehypertension was associated with significantly higher total cholesterol, LDL C, VLDL C and triglyceride levels as compare to normal. HDL cholesterol value is significantly lower in prehypertensives than normal. This clearly shows that prehypertensives are at increased risk of cardiovascular events as compare to normal subjects.

The studies done in America also showed the association of prehypertension with risk factors such as hypercholesterolemia, diabetes mellitus, and obesity.[6] studies done in Korean population showed that prehypertensives are more likely to have metabolic syndrome as compare to normals.[12] The result of present study also support the point that increased serum lipid parameters except HDL is seen in prehypertensives. This clustering of cardiovascular risk factors among prehypertensives suggests that person found to have prehypertension should be screened for other cardiovascular risk factors.

Before JNC 7 was published, these persons were considered to have normal blood pressure and were not recognised as potential candidates for cardiovascular intervention or risk reduction. But now we know, that the person with prehypertension are at increased risk of cardiovascular events. Prehypertensives are also at increased risk of progression to hypertension. The evidence that prehypertensives are at risk of cardiovascular events is now quite strong and some studies have begun to evaluate the role of pharmacological intervention.[13]

CONCLUSION

Lipid profile is altered in prehypertensives compare to normotensives. That's why timely diagnoses and life style modification is required in prehypertensives.

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REFERENCES

1. The world health report 1999: the double burden emerging epidemics and persistent problems. Geneva, WHO;1999. Available from: http://www.who.org/, access on august 2013.

2. Gaffar A, Reddy KS, Singhi M. Burden of noncommunicable diseases in south asia. BJM 2004;328:807-10.
3. Kearney PM, Whelton M, Reynold K, Muntner P, Whelton PK, He J. global burden of hypertension: analysis of world wide data, Lancet 2005;365:217-23.
4. World hypertension league year book 2000-2001: fighting hypertension into next millennium. Toledo, OH: world hypertension league;2001. p.3-6.
5. Miller ER 3rd, Jehn ML. New high blood pressure guidelines create new at risk classification: change in blood pressure classification JNC 7. Cardiovascular. 2004;19(6):367-71.
6. Greenlund KJ, Croft JB, Mernsah GA. Prevalence of heart disease and stroke risk factors in person with prehypertension in united states, 1999-2000. Arch Intern Med 2004;164:2113-8.
7. Lizka HA, Mainous AG 3rd, King DE, Everett CJ, Egan BM prehypertension and cardiovascular morbidity. Ann Fam Med 2005;3:294-9.
8. Lili J. Diabetic dyslipidemia. Medicine update. 2000; 10:547.
9. Giles TD. Assessment of global risk : a foundation for new, better definition of hypertension. J clin hypertens (Greenwich). 2006;8(8):5-14.
10. Sathiyapriya V, Selvaraj N, Nandeesh H, Bobby Z, Aparna A, Pavtharn P. Association between protein bound sialic acid and high sensitivity C-reative protein in prehypertension: a possible indication of underlying cardiovascular risk. Clin Exp hypertens. 2008;30(5):367-74.
11. Nan EH, Kim HC. Comparison of cardiovascular risk factors between normotension and prehypertension. Korean J Lab Med. 2007; 27(5): 377-81.
12. Choi KM, Park HS, Han JH, Lee JS, Lee J, Ryu OH, Lee KW, Cho KH, Yoo D, Baisk SH, Choi DS, Kim SM: Prevalence of prehypertension and hypertension in a Korean population; Korean national health and nutrition survey 2001. J hypertens 2006,24:1515-1521.
13. Julius S, Nesbitt SD, Egan BM, Weber MA, Michenson EL, Kaciroti N, Black HR, Grimm RH Jr, Messerli FH, Oparil S, Schork MA: feasibility of treating prehypertension with an angiotensin receptor blocker. N engl J Med 2006,354:1685-97.

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