

A Study of Lipid Profile Abnormalities among Patients with Essential Hypertension Attending Tertiary Care Centre

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ABSTRACT

Introduction: Hypertension is an important public health problem both in developed and developing countries. Hypertension is known to be associated with alterations in lipid metabolism which gives rise to abnormalities in serum lipid and lipoprotein levels but the cause and effect relationship is not known. The study was initiated with objective to assess the lipid profile abnormalities among primary hypertensive patients attending tertiary care center.

Material and Methods: A case control study was done in outpatient department (OPD) of General medicine, GITAM Institute of Medical Sciences & Research, Visakhapatnam during May to October 2019. A total of 200 study participants were included based on inclusion & exclusion criteria, 100 were primary hypertensive cases and 100 were age and gender matched controls. After obtaining approval from Institutional Ethics Committee and informed consent taken from all study participants data was collected. Data entered in MS excel sheet and analyzed by using SPSS software.

Results: Out of 200 study participants 88(44%) were female and 112(56%) were male. Majority of the study participants were in the age group 50 to 70 years. The mean values of the total cholesterol, low density lipoprotein (LDL) cholesterol, and triglycerides were significantly higher in hypertensive patients compared to control group. The mean high density lipoprotein (HDL) cholesterol was lower among cases than controls. These differences were found to be statistically significant.

Conclusion: Dyslipidemia and hypertension in combination increases the risk of cardiovascular diseases, stroke etc. Hence early detection of dyslipidemia in hypertensive patients and aggressive treatment of both the conditions should be carried out to prevent complications.

Keywords: Lipid Profile Abnormalities, Hypertension, Cardiovascular Diseases.

INTRODUCTION

Abnormalities in serum lipid and lipoprotein levels (dyslipidemia) are recognized as major modifiable cardiovascular disease (CVD) risk factors¹ and have been identified as independent risk factors for essential hypertension giving rise to the term dyslipidemic hypertension.^{2,3} Hypertension and dyslipidemia are estimated to contribute to 7.1 and 4.4 million deaths per year, respectively.⁴ The co-existence of these two risk factors have more than an additive adverse impact on the vascular endothelium which results in enhanced atherosclerosis, leading to CVD. They constitute the important components of the metabolic syndrome (MS), as defined by the National

Cholesterol Education Program (NCEP) Guidelines (Adult Treatment Panel III).⁵ The Framingham Heart Study data on the hypertensive population reported that more than 80% had at least one additional cardiovascular disease risk factor and predominantly these risk factors were atherogenic in nature.⁶ Some of the studies found that the treatment of dyslipidemia has favorable effects on both coronary and cerebrovascular events^{7,8}, same holds good for treatment of hypertension. The present study was commenced with an objective to assess the lipid profile abnormalities among primary hypertensive patients attending tertiary care hospital.

MATERIAL AND METHODS

Present case control study was conducted for 6 months (May to October 2019) in Outpatient Department (OPD) of General medicine, GITAM Institute of Medical Sciences & Research, Visakhapatnam on cases who were primary hypertensive patients of age group between 30-70 years and control group were non-hypertensive patients of same age group and gender who attended medical OPD for other illnesses.

After obtaining permission from the Institutional Ethics Committee, GITAM Institute of Medical Sciences & Research, Visakhapatnam, study was commenced. Informed written consents in the local language were taken from all the study participants who were included in the study.

Inclusion criteria

- Cases: All male and female primary hypertensive patients and controls: all male and female non-hypertensive patients of same age group.
- Age group 30 to 70 years.
- Those who were willing to participate in the study

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How to cite this article: Anil Kumar Mahapatro, Surada Chandrika, Rajyalakshmi Chepuru. A study of lipid profile abnormalities among patients with essential hypertension attending tertiary care centre. International Journal of Contemporary Medical Research 2020;7(1):A1-A4.

DOI: <http://dx.doi.org/10.21276/ijcmr.2020.7.1.1>



Exclusion criteria

- Age below 30 years and above 70 years
- Patients with secondary hypertension
- Those who were not willing to participate in the study.

Sample size: Total 200. Cases were 100 consecutive patients with primary hypertension and controls were 100 consecutive patients without hypertension were considered during this study period.

Method of data collection: Study participants were explained about the purpose of the study and after taking the informed consent, data was collected. Socio demographic information of the study subjects like name, age, gender, address, socio economic status, occupation etc. were taken. History about associated risk factors like diabetes mellitus, smoking, alcohol, heart diseases, stroke etc., were taken and history regarding causes of secondary hypertension like chronic renal failure, renal artery stenosis, hyperaldosteronism, pheochromocytoma, thyroid disease, cushing syndrome, coarctation of the aorta, takayasu disease etc were ruled out. General Physical Examination and anthropometric measurements like height and weight were measured, blood pressure, heart rate were recorded. Investigations like Total cholesterol (TC), High density lipoprotein cholesterol (HDL)

levels, Low density lipoprotein cholesterol (LDL) levels and triglycerides (TG) were estimated. Those who had TC \geq 200 mg/dl or TG \geq 150 mg/dl or LDL \geq 130 mg/dl or HDL $<$ 40 mg/dl for men and $<$ 50 mg/dl for women were considered as dyslipidemic.⁵ Hypertension is defined as Systolic blood pressure (SBP) \geq 140mmHg and or Diastolic blood pressure (DBP) \geq 90mmHg.

Study tools: Sphygmomanometer, stethoscope, Non-stretchable measuring tape, Calibrated standard adult weighing scale, etc.

STATISTICAL ANALYSIS

Data was entered in MS excel sheet and analyzed by using SPSS software trial version 21. Qualitative data was represented as proportions/percentages and quantitative data was represented as Means & standard deviations. Unpaired T test was used to find out the significance of difference between the two means. The significance of difference in the percentage of dyslipidemia among each group was analyzed using chi-square test. P value $<$ 0.05 was considered as statistically significant.

RESULTS

A total of 200 study participants were studied. 100 study subjects were cases and 100 study subjects were controls.

Out of 200 study participants 88(44%) were female and 112(56%) were male. Among cases and controls 44 were female and 56 were male (table-1).

In the present study majority of the study participants were in the age group 60 to 70 years (male-40, female -35) followed by 50 to 59 years (male-30, female-25) (fig-1).

From the above table, the mean systolic pressure among cases (156.70 \pm 8.12) was higher than controls (114.87 \pm 5.21). The difference between them was found to be statistically significant. The mean diastolic pressure was higher in cases

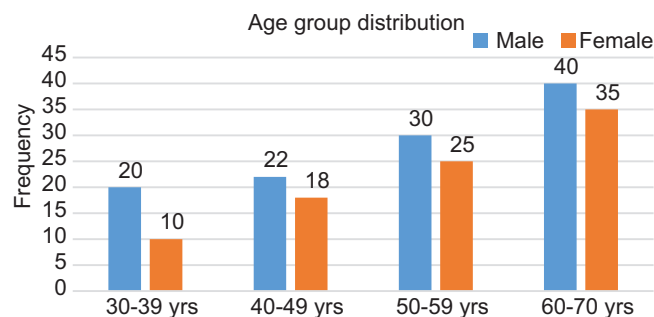
Gender	Cases	Controls	Total	P value
Female	44 (44%)	44 (44%)	88 (44%)	1.00
Male	56 (56%)	56 (56%)	112 (56%)	
Total	100 (100%)	100 (100%)	200(100%)	

Table-1: Gender distribution between cases and controls

Parameter	Cases Mean \pm SD	Controls Mean \pm SD	P value
SBP	156.70 \pm 8.12	114.87 \pm 5.21	0.001
DBP	92.72 \pm 5.42	74.67 \pm 6.62	0.001

Table-2: Comparison of mean SBP, DBP between cases & controls

Parameter	Cases Mean \pm SD	Controls Mean \pm SD	P value
Total Cholesterol	202.46 \pm 40.12	186.41 \pm 32.12	0.002
Triglycerides	161.51 \pm 40.61	142.31 \pm 36.12	0.005
HDL	42.86 \pm 5.23	49.16 \pm 3.84	0.001
LDL	124.18 \pm 36.85	114.12 \pm 31.48	0.03

Table-3: Comparison of mean lipid values between cases and controls**Figure-1:** Distribution of study participants based on age group

Lipid parameter	Sub category	Cases	Controls	Total	P value
Total cholesterol	Dyslipidemia	49 (57.6%)	36 (42.4%)	85 (100%)	0.05
	Normal	51 (44.3%)	64 (55.7%)	115 (100%)	
TGL	Dyslipidemia	52 (61.9%)	32 (38.1%)	84 (100%)	0.04
	Normal	48 (41.4%)	68 (58.6%)	116 (100%)	
HDL	Dyslipidemia	15 (60%)	10 (40%)	25 (100%)	0.02
	Normal	85 (48.6%)	90 (51.4%)	175 (100%)	
LDL	Dyslipidemia	42 (59.2%)	29 (40.8%)	71 (100%)	0.05
	Normal	58 (45%)	71 (55%)	129 (100%)	

Table-4: Comparison of dyslipidemia between cases and controls

(92.72±5.42) than controls (74.67±6.62) and this difference between them was found to be statistically significant (table-2).

From the above table, the mean total cholesterol was more among hypertensive patients (202.46±40.12) than controls (186.41±32.12). The mean triglycerides was higher among hypertensive patients (161.51±40.61) than controls (186.41±32.12). The mean HDL was low among cases (42.86±5.23) than controls (49.16±3.84). The mean LDL was higher among cases (124.18±36.85) than controls (114.12±31.48). The difference between them was found to be statistically significant (table-3).

Raised levels of total cholesterol, triglycerides, LDL were higher among hypertensive patients than controls and this difference was found to be statistically significant (table-4).

DISCUSSION

The present study mainly assessed the dyslipidemia among primary hypertensive patients. In this study more than half of the study participants were male (56%). Similar findings were observed in a study by Jugal Kishore et al.,⁹ who stated that majority were male in both hypertensive group and in control group. Hypertension increases as age increases. Vasan et al. in their study conducted among 1298 subjects found significant association of hypertension with age.¹⁰ In the present study majority of the study participants were in the age group 50 to 70. Similar findings were observed in a study by Pyadala N et al¹¹ and T.V. Murali Krishna et al.¹² These findings were inconsistent with study done by J Idemudia et al.,¹³ found that majority (63%) of the study participants were in the age group 30-39 years. The mean systolic pressure among cases (156.70±8.12) was higher than controls (114.87±5.21). The mean diastolic pressure was higher in cases (92.72±5.42) than controls (74.67±6.62). Similar findings were observed by Pyadala N et al¹¹ and Charles U. Osuji et al.¹⁴ Elevated levels of total cholesterol, triglycerides, LDL were higher among hypertensive patients than controls and this difference was found to be statistically significant. Similar findings were seen in a study by Charles U. Osuji et al.¹⁴

The present study found that the mean ± SD of the total cholesterol, LDL, and triglycerides were significantly higher in hypertensive patients compared to control group. The mean HDL was lower among cases than controls. Similar findings were observed in following studies, Pyadala N et al¹¹, T.V. Murali Krishna et al¹² Kavindra Borgaonkar et al.¹⁵ The coexistence of hypertension and dyslipidemia has multidimensional clinical implications. CVD risk is synergistically enhanced and for this reason, both conditions should be treated aggressively.

Limitations

- a It was a hospital based study.
- b Small sample size.
- c Treatment related issues are not discussed e.g. some antihypertensive drugs are known to cause dyslipidemia.
- d Patients with diabetes mellitus, smoking, hypothyroidism, alcoholism and other confounding

factors were not excluded in both cases and controls.

CONCLUSION

In this study there was statistically significant difference found in mean values of total cholesterol, LDL cholesterol, Triglycerides and HDL cholesterol between hypertensive patients and normotensives. This study concludes that dyslipidemia is associated with 57-62% of the hypertensive people. Though the cause and effect relationship is not known, increased blood pressure may create disturbances in lipid metabolism, early preventive strategies like life style changes (e.g. healthy diet, regular exercise, maintaining ideal body weight, absolute avoidance of smoking, alcohol), proper medications, (keeping in mind antihypertensive drugs are known to cause dyslipidemia) are very essential. Regular assessment of lipid profile and early intervention in terms of statin therapy among hypertensive patients along with antihypertensive treatment can prevent cardiovascular diseases, stroke and other comorbidities.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 05-12-2019; **Accepted:** 02-01-2020; **Published:** 09-01-2020