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An Observational Study to Evaluate the Correlation of Essential Hypertension and Lipid Profile Parameters

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ABSTRACT

Objective & Aim: Frequency of coexístanse of elevated lipid profile and blood pressure are higher. Among modifiable cardiovascular risk factors elevated blood lipid profiles and basic hypertension appear to coexist and all amongst the major modifiable risk factors. The main aim of the study was to evaluate the correlation between basic essential hypertension and serum lipid profile.

Methods: For this observational study 110 adult hypertensive patients and same number of controls with normal blood pressure were selected. After taking patients consent demographic details like age, weight, height were documented in a predesigned pro forma. Serological test was sent for identify total cholesterol (TC), serum triglycerides (TG), Low Density Lipoprotein (LDL) and High Density Lipoprotein (HDL).

Results: It was observed that the mean age of study group and control group was 48.7±8.1 and 49.2±7.2 years respectively. It has also been observed that mean weight was slightly more as compare to control group. It was found that lipid profile like triglyceride; total cholesterol and LDL cholesterol were higher in hypertensive group as compared to that control group. Among the hypertensive subjects most frequently occurring abnormality was elevated TC followed by elevated LDL. With other lipid abnormalities, these abnormalities rather than in isolation, however often occurred together.

Conclusion: This observational study reveals that, among newly diagnosed hypertensives elevated lipid profile is coexistent. As both elevated blood pressure and serum lipid profile is considered as risk factors of severe coronary artery disease thus between BP and blood lipids biologic interrelations may impact the systems severely.

Keywords: essential hypertension, serum lipid profile, increased blood pressure

INTRODUCTION

In the developed countries a major health problem is essential hypertension and worldwide nearly one billion people are affected by this [1]. Essential hypertension contributes greatly to economic burden, mortality and morbidity. It is strongly associated with development of cardiovascular disease [2]. As estimated, in India there was approximately 24% of all deaths due to coronary heart disease and 57% of all deaths due to stroke [3]. In 2000 the estimated hypertensive individuals was 118 million which expected to raise upto 213 million by 2025 [4]. Apart from the dietary pattern the major risk factors for hypertension include dyslipidemia, obesity, alcohol consumption and smoking [5]. A close association between hypertension and dyslipidemia was observed in various studies [6,7]. Vascular endothelium is highly effected by additive adverse impact coexist risk factors like hypertension and dyslipidaemia and results in enhanced atherosclerosis, leading to CVD.

For patients with essential hypertension independent modifiable risk

factors were dyslipidemia which can be corrected by exercise, drugs and diet. The normotensives dyslipidemia are more prone for untreated hypertensives and lipid levels were in raise condition in untreated elevated blood pressure level [8].

Frequency of coexistance of elevated lipid profile and blood pressure appears to be higher. Among modifiable cardiovascular risk factors elevated lipid profile and hypertension are the important risk factors. The main aim of the study was to evaluate the correlation between basic essential hypertension and serum lipid profile.

METHODS

For this observational study 110 adult hypertensive patients and same number of controls without hypertension were selected from medicine and cardiology OPD. After taking patients consent demographic details like weight, height, age were documented in a predesigned pro forma and serological test were performed for total cholesterol (TC), serum triglycerides (TG), Low Density Lipoprotein (LDL) and High Density Lipoprotein (HDL).

After taking the informed consent and purpose of the study explain to all patients, study data was collected. Data was recorded in Microsoft's MS Excel sheet and SPSS software trial version 21 were used to carry out statistical analysis. Between the two means to find out the significance of difference unpaired T test was done. P value <0.05 was considered as statistical significance.

RESULTS

Demographic details of the patients are demonstrated in table 1. It was observed that the mean age of study group and control group was 48.7±8.1 and 49.2±7.2 years respectively. It was also been observed that mean weight was slightly more as compare to control group.

Table no 1: Demographic details

Variables	Study group (n=110)	Control group (n=110)	P Value
Age (years)	48.7 ± 8.1	49.2± 7.2	0.31
Gender			
Male	75	68	0.03
Female	35	42	0.02
Weight (kg)	70.8 ± 9.2	68.2 ± 7.4	0.001
Height (cm)	173.2 ± 8.2	178.6 ± 7.1	0.001
BMI (kg/m^2)	25.28 ± 4.1	22.47 ± 4.6	0.001
SBP (mmHg)	168.3 ± 13.6	120.1 ± 12.3	0.001
DBP (mmHg)	99.1 ± 10.2	73.6 ± 9.1	0.001

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

Table 2 demonstrated the mean level of serum lipoproteins among hypertensive and control group. It was found that lipid profile like triglyceride, total cholesterol and LDL cholesterol were higher in hypertensive group as compare to control group.

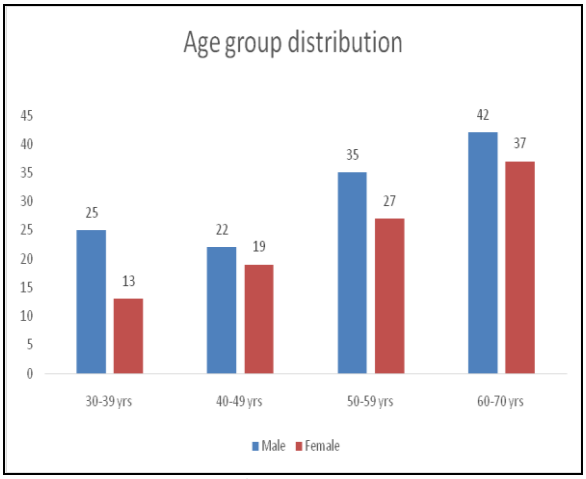

Figure 1: Distribution of study participants based on age group

Table 2: Mean level of serum lipoproteins

Parameters	Study group (n=110)	Control group (n=110)	P Value
Total Cholesterol (mg/dl)	216.3 ± 18.2	161.7 ± 19.42	0.002
Triglyceride (mg/dl)	181.74 ± 24.5	131.71 ± 21.37	0.005
HDL- Cholesterol (mg/dl)	44.26 ± 3.98	49.2 ± 3.17	0.001
LDL- Cholesterol (mg/dl)	152.74 ± 25.8	106.53 ± 17.3	0.001

Among the hypertensive subjects most frequently occurring abnormality was elevated TC (90, 82%) followed by elevated LDL (55, 50%).

Table 3: Prevalence of serum lipid abnormality

Lipid abnormality	Study group (n=110)	Control group (n=110)
Elevated TC (> 200 mg/dL)	90 (82%)	9 (8%)
Elevated LDL (>130 mg/dL)	75 (68%)	16 (14.5%)
Elevated TG (> 150 mg/dL)	23 (21%)	3 (3%)
Low HDL-C (< 40 mg/dl)	55 (50%)	31 (28%)

Table 4: Correlation of serum lipid profile with systolic and diastolic blood pressure

Parameters	Systolic Blood Pressure		Diastolic blood pressure	
	r	p	r	p
Total Cholesterol(mg/dl)	0.681*	<0.001	0.693*	<0.001
TG(mg/dl)	0.656*	<0.001	0.572*	<0.001
HDL(mg/dl)	0.382*	<0.001	0.431*	<0.001
LDL(mg/dl)	0.534*	<0.001	0.582*	<0.001

Table 4 demonstrate with systolic, diastolic blood pressure significant positive association of different fractions lipid profile.

DISCUSSION

The current study demonstrates the association of hypertension with conventional lipid parameters. Than the controls in stage 1 and stage II hypertensive patients mean Diastolic Blood Pressure (DBP) and Systolic Blood Pressure (SBP) were significantly higher. Risk of cardiovascular events has a consistente and continuous relationship with blood pressure, the chance of cardiovascular disease was higher with the elevated blood pressure levels [9]. Several epidemiological studies have demonstrated as compared to the younger age group the association of other cardiovascular diseases and arterial stiffness in hypertensive patients in aged, with increasing age both parameters are increasing [10,11]. For cardiovascular disease as partially overlapping risk factors dyslipidemia and hypertension are well established [12-15].

Several genetical factors and some of the environmental factors like Vitamin D deficiency, depression, psychological stress, salt intake, obesity and lack of exercise play a role for influencing blood pressure [16]. Present study demonstrate that lipid profile like triglyceride, total cholesterol and LDL cholesterol were higher in hypertensive group as compare to control group. A compare to controls in hypertensive group the mean HDL was lower. Similar findings were observed in several previous trials also [17-19]. It was also observed in present study that among the hypertensive subjects most frequently occurring abnormality was elevated TC (90, 82%) followed by elevated LDL (55, 50%). With other lipid abnormalities, these abnormalities rather than in isolation, however often occurred together.

Framingham Heart Study already demonstrated that at least one additional cardiovascular disease risk factor were presented in hypertensive patients predominantly these risk factors were atherogenic in nature [20]. I was already been proven that favourable effects on both cerebrovascular and coronary events were seen after treatment of dyslipidaemia [21,16].

CONCLUSION

This observational study reveals that, among newly diagnosed hypertensives lipid variations are highly prevalent. As both elevated blood pressure and serum lipid profile is considered as risk factors of severe coronary heart disease thus between BP and blood lipids biologic interrelations may impact the systems severely.

REFERENCES

1. Kotchen TA. Hypertensive Vascular Disease. Harrison's Principles of Internal Medicine. (18th Edition) Part 10(Section 5):2042–2052. Chapter 247.
2. Buttar HS, Li T, Nivedita R. Prevention of cardiovascular diseases: Role of exercise, dietary interventions, obesity and smoking cessation.ExpClinCardiol.2005;10(4):229–49.
3. Gupta R, Gupta N. Hypertension epidemiology in the 21st century. India J Preventive Cardiology. 2013;2(4):1–6.
4. Reddy KS, Shah B, Varghese C, Ramadoss A. Responding to the threat of chronic diseases in India. Lancet.2005;366:1744–49.
5. Bhavani BA, Padma T, Sastry BK, Krishna Reddy N. Plasma Lipoprotein (a) levels in patients with untreated essential hypertension. Indian J Hum Genet. 2003; 9(2): 65–68.
6. Selby JV, Newman B, Quiroga J, Christian JC, Austin MA, Fabsitz RR. Concordance for dyslipidemic hypertension in male twins. JAMA. 1991;265:2079–84.
7. Borghi C. Interactions between hypercholesterolemia and hypertension; implications for therapy. Current Opinion in Nephrology and Hypertension. 2002; 11(5):489-96.
8. Neaton JD, Wentworth D. Serum cholesterol, blood pressure, cigarette smoking, and death from coronary heart disease: overall finding and differences by age for 316 099 white men. Archives of Internal Medicine. 1992;152(1):56–64.
9. Stanley S, Franklin, Nathan D, Wong Hypertension and cardiovascular disease: contributions of the framingham heart study. Global Heart. 2013;8(1):49–57.
10. AlGhatrif M, Strait JB, Morrell CH, Canepa M, Wright J, Elango P, et al. Longitudinal trajectories of arterial stiffness and the role of blood pressure: The baltimore longitudinal study of aging. Hypertension. 2013;62:934–41.
11. Ferreira I, van de Laar RJ, Prins MH, Twisk JW, Stehouwer CD. Carotid stiffness in young adults: a life-course analysis of its early determinants: the Amsterdam Growth and Health Longitudinal Study. Hypertension. 2012;59:54–61.
12. Carmena R, Duriez P, Fruchart J-C. Atherogenic lipoprotein perticles in atherosclerosis.Circulation.2004;109:III-27.
13. Gotto AM Jr. Evolving concepts of dyslipidemia, atherosclerosis, and cardiovascular disease. J Am Coll Cardial. 2005;46:1219–24.
14. O'Connell BJ, Genest JR. High-density lipoproteins and endothelial function. Circulation. 2001;104:2420–27.
15. Albuche J, Ferrieres J, Ruidavets JB, Guiraud-Chaumeil B, Perret BP, Chollet F. Serum lipids in young patients with ischaemic stroke: a case-control study. Journal of Neurology Neurosurgery and Psychiatry. 2000;69(1):29–33.
16. Cardillo C, Kilcoyne CM, Cannon RO, Panza JA. Increased activity of endogenous endothelin in patients with hypercholesterolemia. J Am Coll Cardiol., 2000;36: 1483-8.
17. Pyadala N, Bobbiti RR, Borugadda R, Bitinti S, Maity SN, Mallepaddi PC, Polavarapu R. Assessment of lipid profile among hypertensive patients attending to a rural teaching hospital, Sangareddy. Int J Med Sci Public Health. 2017;6:71-74
18. 12. T.V Murali Krishna, Vijaya Kumar Vasa, V A Deepika Ponnuru. The study of correlation between dyslipidemia and hypertension and its complications in 30-70 years age group. IAIM, 2016;3: 84-90.
19. Kavindra Borgaonkar, Ranjit Patil, Pradeep Ben. Lipid profile in hypertension: A meta analysis using western countries data. MedPulse – International Medical Journal 2016;3: 967-973.
20. Dalal JJ, Padmanabhan TN, Jain P, Patil S, Vasnawala H, Gulati A. LIPITENSION: Interplay between dyslipidemia and hypertension. Indian J Endocrinol Metab. 2012; 16:240–245.
21. Nickenig G, Baumer AT, Temur Y, Kebben D, Jockenhovel F, Bohm M. Statin-sensitive dysregulated AT1 receptor function and density in hypercholesterolemic men. Circulation, 1999; 100: 2131-4.

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