Original Article

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Study of Lipid Profile in Newly Detected Adult Hypertensive Patients

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Abstract

Background: Hypertension is a leading cause of mortality and morbidity worldwide which doubles the risk of cardiovascular diseases. Hypertension and dyslipidemia are major modifiable risk factors associated with an increasing risk of cardiovascular disease. **Aims & Objective:** To study the different components of lipid profile in newly detected adult hypertensive patients and to compare the lipid profile changes among newly detected adult hypertensive patients with normotensive patients in a tertiary care hospital .**Subjects and Methods:** The study was done in the department of General medicine in Hassan institute of medical sciences, Hassan, Karnataka a tertiary care hospital. Patients were selected randomly from outpatient and in patients departments after taking consent and fulfilling the inclusion and exclusion criteria. Two hundred and fifteen age and sex matched patients were enrolled for the study and they were divided into two groups based on blood pressure. Group A - study group (109) newly detected hypertension patients and Group B –control group (106) comprising normotensive patients. Both the groups fasting lipid profile was studied and compared. **Results:** Total 215 patients were included in the study, of which 109 patients were in group A (study group) comprising newly detected hypertension patients and 106 patients were in group B(control) comprising of normotensive patients. The mean SBP (systolic blood pressure) was 159.4 mm of Hg in Group A whereas it was 113.2 in Group B, the mean DBP (diastolic blood pressure) was 99.4mm of Hg in Hypertensive patients (Group A), and it was 73.1 in normotensive patients (Group B). Serum levels of cholesterol, triglyceride and LDL were 194.2, 152.2 and 122.2 mg/dl respectively in hypertensive patients, whereas in normotensive patients they were 146.4, 110.2 and 102.6 mg/dl respectively which were higher in hypertensive patients. Whereas serum HDL was almost the same in both the groups. **Conclusion:** Newly detected adult hypertensive patients are dyslipidemic as compared to normotensive patients, so proper blood pressure control and monitoring of lipid profile at regular intervals helps in preventing major complications such as cardiovascular diseases and cerebrovascular accidents.

Keywords: Hypertension, Lipid profile, dyslipidemia.

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Introduction

Hypertension is known to be associated with alteration in lipid metabolism which causes abnormalities in serum lipids and lipoproteins. It has been documented that presence of dyslipidemia worsens the prognosis of hypertensive patients [(1)]. Dyslipidemia is more common in untreated hypertensive patients than normotensive patients and lipid levels increases as BP increases[(2,3)].Though no specific pattern of dyslipidemia has been consistently reported among hypertensive patients, many studies have shown that total cholesterol, triglycerides and virtually all fractions of lipoproteins tend to be more frequently abnormal among hypertensive patients than in normotensive people. The prevalence of hypertension is projected to increase globally, especially in the developing countries.[(4)] In recent years, rapid urbanization, increased life expectancy, unhealthy diet and lifestyle changes have led to an increased rate of cardiovascular disease in southeast Asia.[(5)] Epidemiological studies have established a strong association between hypertension and coronary artery disease.[(6)]

Hypertension , the leading cause of mortality in world, is also a simply treatable risk factor of stroke, myocardial infarction, cardiac failure, peripheral vascular disease, aortic dissection, atrial fibrillation, and end stage renal disease.[(7)] An excessive daily intake of saturated fats, cholesterol, and other sources of calories and subsequent disturbance of lipid profile leading to hypertriglyceridemia and hypercholesterolemia are associated with obesity and consequently hypertension.[(8, 9)] Impaired insulin function,[(10)] increased peripheral resistance, and cardiac output, sympathetic tone is some of the responsible mechanisms which lead to hypertension. In a study in 2000, Brown confirmed the association between Basal Metabolic Index (BMI), serum cholesterol, HDL, and hypertension.[(11)]

Subjects and Methods

This study was done in the Department of General Medicine, Hassan Institute of Medical Science, Hassan, Karnataka, from January 2019 to November 2019. Patients visiting General Medicine Outpatient and patients admitted as In Patient were included in the study after fulfilling inclusion

and exclusion criteria. Written consent for willingness to participate in the study was obtained. Ethical clearance was taken for the study by the institutional ethical committee. A predetermined preformed was used to record the details of history, physical examination and investigations. Blood pressure was measured by using sphygmomanometer with standard protocol after the patient had rested for 10 minute.

Two groups were made one study group (Group A) (109) who were newly detected hypertensive (JNC 8 Guidelines) and control group who were normotensives (Group B) (106). Venous blood 5ml was collected in the morning after an overnight fasting and sent for lipid profile analysis. Results entered in excel sheet and compared using statistical analysis by SPSS (statistical package for social sciences software) version10.

Inclusion Criteria

Patients meeting criteria of Hypertension JNC 8(systolic Bp>140mm of Hg and diastolic Bp of>90mm of Hg), age > 18 years.

Exclusion criteria

Patients with known Diabetes Mellitus, secondary hypertension and major medical illness such as CKD, Cardiac illness. Patients who were already on treatment for lipid lowering drugs and antihypertensive drugs.

Results

Total 215 patients were included in the study, of which 109 patients were in group A (study group) comprising newly detected hypertension patients and 106 patients were in group B(control) comprising of normotensive patients.

Serum levels of cholesterol, triglyceride and LDL were 194.2, 152.2 and 122.2 mg/dl respectively in hypertensive patients, whereas in normotensive patients they were 146.4, 110.2 and 102.6 mg/dl respectively. There is a statistical significance observed between serum cholesterol, triglycerides and VLDL of hypertensive and normotensive (Table.1) patients (P<0.0001) whereas serum HDL was almost the same in both the groups in contrast where HDL levels will be low in hypertensive individuals. In our study we also found significant association between the two groups in TC/HDL analysis (P<0.001).

Average age of patients in group A was 48 as compared to 41 in group B. Males dominated the study in both the groups as compared to females.

Table 1: Lipid profile recording in Group A and Group B

Parameters Lipid profile	Group A Hypertensive patients (109)		Group B Normotensive patients (106)		P Value
	Average in mg/dl	SD	Average in mg/dl	SD	
TotalCholestrol(TC)	194.2	43.81	146.4	39.86	<0.001
Triglyceride	152.2	79.41	110.2	37.02	0.0101
HDL	44.1	12.80	44.3	7.90	0.878
LDL	122.2	39.15	102.6	26.98	0.1695
VLDL	26.2	16.08	20.6	6.99	<0.001
TC/HDL	4.431	2.17	3.361	0.987	0.0010
LDL/HDL	2.791	1.794	2.347	0.80	0.063

Table 2: Age and Sex recording in Group A and Group B

Parameter		Group A Hypertensive patients (109)		Group B Normotensive patients (106)	
		Average	SD	Average	SD
Age		48.34	4.21	40.92	3.81
Sex	Male	74		59	
	Female	35		47	

Table 3: Blood Pressure recording in Group A and Group B

Parameter	Group A (Hypertensive patients)		Group B (Normotensive patients)	
	Average	SD	Average	SD
BP(mm Hg) Systolic Blood Pressure	159.4	(18.4)	113.2	(10.11)
DBP(mmHg) Diastolic Blood Pressure	99.4	(11.3)	73.1	(9.4)

Discussion

Hypertension is recognised globally as a major risk factor for cardiovascular disease, stroke, diabetes and renal disease [12]. In our study we studied the relationship of serum lipid profile in a newly detected adult hypertensive patients which showed that mean levels of total cholesterol, triglycerides and VLDL were significantly higher(P<0.01) compared to normotensive patients(Table.1). The study also showed serum total cholesterol was significantly higher in hypertensive patients than in normotensive patients, this is consistent with earlier observations done in other parts of the world.[13, 14, and 15]

Hypertension and dyslipidemia are two of the main risk factors for vascular diseases and are often associated. The coexistence of the two risk factors has more than an additive adverse impact on the vascular endothelium, which results in enhanced atherosclerosis leading to cardiovascular disease. In this study there was no statistically significant difference in serum LDL and HDL Cholesterol level between hypertensive and normotensive individuals in contrast to various studies showing low HDL is a significant risk for hypertension.

The mean SBP(systolic blood pressure) was 159.4 mm of Hg in hypertensive patients whereas it was 113.2 in normotensive patients, the mean DBP(diastolic blood pressure) was 99.4mm of Hg in Hypertensive patients ,it was 73.1 in normotensive patients respectively, which was statistically significant (p value <0.001). Elevated SBP causes higher risk of coronary heart disease mortality than elevated DBP or combined systolic/diastolic hypertension.[16, 17]

The coexistence of hypertension and dyslipidemia has multidimensional clinical implications, first cardiovascular risk is enhanced for this reason both conditions should be treated aggressively.[18] This association has been linked to central obesity and insulin resistance that play main roles in pathogenesis of both hypertension and dyslipidemia.

The exact mechanism by which a low HDL increases Cardiovascular disease risk has however not been fully elucidated, though experimental studies suggest a direct role

for HDL in promoting cholesterol efflux from foam cells in the atherosclerotic plaque depots in blood vessels to the liver for excretion. It also exhibits potent anti- inflammatory and antioxidant effects that inhibit the atherogenic process.[19, 20] But in our study HDL level was more in both the groups probably because of younger age group in our study.

Despite the relatively low incidence and burden of coronary heart disease risk factors, high risk groups such as hypertensive's may need to be more fully evaluated for lipid abnormalities and treatment started early for those found with lipid abnormalities.

Limitation of the study

It is a hospital based study it did not exactly represent the population at large as the risk of those who did not come to hospital may differ from those who did.

Conclusion

Newly detected adult hypertensive patients are dyslipidemic as compared to normotensive patients, so proper blood pressure control and monitoring of lipid profile at regular intervals helps in preventing major complications such as cerebrovascular accidents and cardiovascular diseases.

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