

Study of Serum Lipid Profile Abnormality in Hypertensive Patients in a District Hospital

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Abstract

Background: Hypertension and dyslipidemia are major risk factors for cardiovascular disease, accounting for highest morbidity and mortality among the Bangladeshi people. Several well conducted epidemiological studies have demonstrated that serum lipid levels are significantly higher in hypertensive patients than in age, sex and body mass index matched normotensive patients.

Objectives: The aim of this study is to detect serum lipid profile abnormalities among hypertensive patients.

Methods: It has done in medicine department of 250 bedded district hospital, Kishoreganj from April to October 2018. Patient having hypertension admitted in different medicine wards were selected. The patients were selected randomly irrespective of age and sex. Serum lipid profile was done in all patients. Serum creatinine and random blood sugar were done to see whether patient is diabetic or having renal damage.

Results: Total 80 patients are enrolled in our study out of which 50 are male and 30 are female patients. Total cholesterol level has found increased in 55 (68.75%) patients. Triglyceride and LDL cholesterol have increased in 57 (71.25%) and 54 (67.5%) patients respectively. HDL cholesterol has found decreased in 58 (72.50%) patients.

Conclusion: Hypertensive patients in Bangladesh have a close association with dyslipidemia and need measurement of blood pressure and lipid profile at regular interval to prevent cardiovascular disease and stroke.

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Introduction

From an epidemiologic perspective there is no obvious level of blood pressure that defines Hypertension. In adults, there is a continuous incremental risk of cardiovascular disease, stroke and renal disease across level of both systolic and diastolic blood pressure. Cardiovascular disease risk doubles for every 20 mmHg increase in systolic and 10 mmHg increase in diastolic pressure. Among older individual, systolic blood pressure and pulse pressure are more predictors of cardiovascular disease than is diastolic blood pressure.

Clinically Hypertension may be defined as that level of blood pressure at which the institution of therapy reduces blood pressure related morbidity and mortality. Recent classification recommends blood pressure criteria for defining normal blood pressure, pre-hypertension, Hypertension (Stages I & II) and isolated systolic hypertension which is frequent among the elderly.¹

About 80-95% hypertensive patients are primary or essential hypertension. In the remaining 5-20% hypertensive patients are secondary hypertension. Primary hypertension tends to be familial and is likely to be the consequence of an interaction between environmental and genetic factors. There is well documented association between obesity (BMI >30 kg/m²) and hypertension. Centrally located body fat is more important determinant of blood pressure elevation than is peripheral body fat. Hypertension and dyslipidemia frequently occurs together. They are major risk factors for cardiovascular disease and account for more than 80% of deaths and disability in low and middle income countries.²

The incidence of atherosclerosis increase as blood pressure rises. Antihypertensive therapy reduces cardiovascular mortality, stroke and heart failure. The risk of atherosclerosis rises with serum cholesterol concentration and

lowering serum total and LDL cholesterol concentration reduces risk of cardiovascular events.³

Increased serum total cholesterol (TC), Triglyceride (TG), low density lipoprotein (LDL-c) and decreased high density lipoprotein (HDL-c) are associated major risk factors for cardiovascular disease.⁴ Nascent HDL particles are produced in both the liver and the intestine. HDL particle transport cholesterol away from periphery and may transfer it indirectly to the other particles such as VLDL.⁵

Chowdhury et al suggested that hypertensive patients need measurement of BP and lipid profile at regular intervals throughout their primary health care to prevent CVD and stroke.⁶ Overweight and obesity with increase in body mass index and waist circumference leads to adverse metabolic effects on blood pressure, cholesterol and triglyceride level. Obesity and overweight is associated with increased risk of various disorders including dyslipidemia.⁴

According to the guidelines of the American Heart Association the following values are prescribed for the above mentioned risk factors for cardiovascular disease. Blood pressure <130/85 mm of Hg; total cholesterol: <200 mg/dl; triglycerides: <200 mg/dl; HDL: >40 mg/dl; and LDL <130 mg/dl.⁶ In Bangladesh, consumption of saturated fat and red meat is a known risk factor for CVD, especially Hypertension.²

Objectives

This is an Observational study. The study was designed to identify serum lipid profile abnormalities in hypertensive patients.

Methods

The study was conducted at 250 bedded district hospital Kishoreganj, Bangladesh. It was an observational study. It was conducted for seven months from April to October 2018. Sample

size was 80 patients, to find out serum lipid abnormalities in hypertensive patients.

Inclusion criteria

1. Age- 30 years and above
2. Hypertension
3. Obesity
4. Fasting lipid profile
5. Smoking

Exclusion criteria

1. Diabetes Mellitus
2. Thyroid disorders
3. Renal Disease
4. Drugs (Beta-blockers, Thiazide diuretics & Steroids)

Informed written consent has taken before including the patient in the study. Consent has

taken from the patient and their relatives. Demographic profiles including age, gender, obesity, blood pressure and family history of hypertension are recorded for each patient and fasting lipid profile, random blood glucose and serum creatinine are measured.

Results

Lipid profile is estimated from fasting samples collected from 80 hypertensive patients. Out of which 50 (62.50%) patients are male and 30 (37.50%) patients are female. Age group of hypertensive patients included in this study are 30 years and above. Among them age group 51-60 years belongs 25 (31.25%) patients which is the largest group followed by age group of 41-50 years belonging 18 (22.50%) patients.

Table I: Age and Gender distribution

Age (years)	Male	Female (30)	Total
31-40	06 (7.50%)	03 (3.75%)	09 (11.25%)
41-50	13 (16.25%)	05 (6.25%)	18 (22.50%)
51-60	15 (18.75%)	10 (12.50%)	25 (31.25%)
61-70	09 (11.25%)	06 (7.50%)	15 (18.75%)
>70	07 (8.75%)	06 (7.50%)	13 (16.25%)
Total	50	30	80

Table II: Comparison of BMI among hypertensive patients

BMI (kg/m ²)	Male	Female	Total
18.5-24.9	14 (17.50%)	08 (10.00%)	22 (27.50%)
25-29.9	27 (33.75%)	18 (22.50%)	45 (56.25%)
>30	09 (11.25%)	04 (5.00%)	13 (16.25%)
Total	50	30	80

The data shows that hypertensive patients had significantly higher BMI whereas 45 (56.25%) patients have BMI in between 25-29.9.

Table III: Comparison of SBP among hypertensive patients

SBP (mmHg)	Male	Female	Total
140-149	12 (15.00%)	07 (8.75%)	19 (23.75%)
150-159	14 (17.50%)	09 (11.25%)	23 (28.75%)
160-169	10(12.50%)	06 (7.50%)	16 (20.00%)
170-179	08 (10.00%)	05 (6.25%)	13 (16.25%)
>180	06 (7.50%)	03 (3.25%)	09 (11.25%)
Total	50	30	80

Table IV: Comparison of DBP among hypertensive patients

DBP (mmHg)	Male	Female	Total
90-94	12 (15.00%)	08 (10.00%)	20 (25.00%)
95-99	18(22.50%)	12 (15.00%)	30 (37.50%)
100-104	10(12.50%)	05 (6.25%)	15 (18.75%)
105-109	06 (7.50%)	03 (3.25%)	09 (10.75%)
>110	04 (5.00%)	02 (2.50%)	06 (7.50%)
Total	50	30	80

Measuring Blood pressure of all these hypertensive patients in this study systolic and diastolic blood pressure varies in different ranges, Maximum 23(28.75%) patients belongs to 150-159 mmHg systolic blood pressure and 30 (37.50%) patients are in 95-99 mmHg diastolic blood pressure.

Study of fasting Lipid profile of 80 hypertensive patients reveals lipid abnormalities including 55 (68.75%) patients has increased serum total cholesterol level, 57 (71.25%) has increased serum triglyceride level. Besides 54 (67.50%) patients has increased serum LDL level and 58 (72.50%) has decreased Serum HDL level.

Table V: Comparison of Serum Total cholesterol level among hypertensive patients

Total Cholesterol (mg/dl)	Male	Female	Total
<200	18 (22.50%)	07 (8.75%)	25 (31.25%)
≥200	32 (40.00%)	23 (28.75%)	55 (68.75%)
Total	50	30	80

Table VI: Comparison of Serum Triglyceride level among hypertensive patients

TG (mg/dl)	Male	Female	Total
<150	16 (20.00%)	07 (8.75%)	23 (28.75%)
≥150	34 (42.50%)	23 (28.75%)	57 (71.25%)
Total	50	30	80

Table VII: Comparison of Serum LDL level among hypertensive patients

LDL(mg/dl)	Male	Female	Total
<150	17 (21.25%)	09 (11.25%)	26 (32.50%)
≥150	33 (41.25%)	21 (26.25%)	54 (67.50%)
Total	50	30	80

Table VIII: Comparison of Serum HDL level among hypertensive patients

HDL (mg/dl)	Male	Female	Total
≥40	08 (10.00%)	14 (17.50%)	22 (27.50%)
<40	42 (52.50%)	16 (20.00%)	58 (72.50%)
Total	50	30	80

Discussion

Abnormalities in serum lipid and lipoprotein levels (dyslipidemia) are recognized as major modifiable cardiovascular disease risk factor. Dyslipidemia is more common in untreated hypertensives and normotensives and lipid level increase as blood pressure increases. Hypertension is a powerful risk factor of cardiovascular disease and it remains one of the biggest health and economic issues facing the world.⁷ About 80% of hypertensive persons have comorbidities such as obesity, glucose intolerance and abnormalities in lipid metabolism. A prospective study in Bangladesh comparing lipid profile status in hypertensive patient as compare to healthy normotensive control found high serum TC, TG and LDL similar to our study. However few studies measured the strong association of hypertension and dyslipidemia among the Bangladeshi population.² In this study it is found that majority of the hypertensive patient in the age group of 51-60 years which is similar to other studies.^{4,8}

BMI has strong association with hypertension and dyslipidemia. Our study shows that hypertensive patients mostly belongs to BMI 25-29.9 kg/m² which is similar to other studies^{2,4,6,7,9,10} but varies with few studies.^{8,11}

In present study systolic blood pressure is 150-159 mmHg in majority patients which is similar with some other studies.^{2,8,9,11,12} We have found diastolic blood pressure 95-99 in majority patients which is similar to some studies^{2,9,12} and differs from some other studies.^{8,11} Present study is focused on to study the serum lipid profile pattern of hypertensive patients. In present study results revealed that the value of

serum total cholesterol, triglycerides and serum LDL cholesterol is significantly higher and statistically significant. HDL cholesterol is significantly lower in hypertensive patients. This abnormality of lipid profile is similar to almost all other studies.^{2,7,13,14,15,16,17}

Isolated low HDL cholesterol may be a relatively common baseline lipid abnormality among hypertensive patients. HDL cholesterol can result in endothelial damage and trigger an increase in blood pressure. HDL cholesterol also exhibit potent anti inflammatory and anti oxidant effect that inhibit the atherogenic process. It has additionally been shown that low HDL cholesterol level correlate with the presence other atherogenic risk factor. According Pavithran et al. alteration in lipid metabolism including a decrease in HDL cholesterol can result endothelial damage and trigger an increase in blood pressure which partially account for its strong predictive power for coronary heart disease. Multiple risk factors intervention trial showed that each decrease in HDL cholesterol of 1 mg/dl was associated with an increase in the risk of coronary heart disease of 2% in men and 3% in women.⁷

Conclusion

This study reveals that dyslipidemia is associated with hypertension. Hypertension and dyslipidemia can be modified either by proper life style changes or medical management or by the combination of both. Finally, it is recommended that regular assessment of serum lipid profile among hypertensive patient can prevent cardiovascular diseases and stroke.

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