Assessment of lipid profile among hypertensive patients attending to a rural teaching hospital, Sangareddy

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Abstract

Background: Hypertension has become one of the major health problems and a most common risk factor for cardiovascular disease.

Objectives: The present study was aimed to assess the lipid profile in hypertensive patients and find out its relation between lipid profile and hypertension.

Materials and Methods: The present study was carried out at MNR Medical College & Hospital situated in Sangareddy, part of Medak District, Telangana state. A total of 160 study subjects were selected from the medicine ward of MNR hospital during the period from January 2015 to December 2015.

Results: A significantly higher levels of total cholesterol, triglycerides, low-density lipoprotein, and very low-density lipoprotein were estimated in hypertensive subjects when compared with normotensive (< 0.001). The mean HDL of cases was significantly lower than that of controls ($p < 0.001$).

Conclusion: The present study concludes that dyslipidemia is associated with hypertension. Because of increased blood pressure can create disturbances in lipoprotein metabolism. This can be preventing by taking healthy diet, proper medical treatment and life style change. Finally regular assessment of lipid profile among hypertensive patients can prevent cardio vascular diseases.

KEY WORDS: Atherosclerosis, cardiovascular disease, dyslipidemia, diastolic blood pressure, systolic blood pressure

Introduction

Globally, hypertension has become one of the major health problems and a most common risk factor for cardio-vascular disease (CVD). This increases the risk of stroke, myocardial infarction, loss of vision, heart failure, and renal failure.[1,2] The prevalence of hypertension is increasing day by day worldwide, especially in the developing countries, due to rapid urbanization, unhealthy diet, and lifestyle changes have lead to an increased rate of CVD in Southeast Asia, including India.[3–5] According to World Health Organization (WHO) report, India by 2020 CVDs will be the largest cause of disability and death. Around 2.6 million people in India are predicted to die due to coronary heart diseases by 2020.[6–8]

The worldwide majority of CVDs are associated with hypertension and dyslipidemia. This increases the risk of Atherosclerosis. Globally there is a wide variation in serum lipid profile among different populations. Increased serum levels of triglycerides (TG), low-density lipoproteins (LDL), total cholesterol (TC), and decreased high-density lipoproteins (HDL) are known to be associated with major risk factors for CVDs.[9] Hypertension with dyslipidemia is having altered ratio

of high total cholesterol and triglycerides or low-density lipo-proteins. So there was a relation between the concentration of LDL and CVDs.

The present study was aimed to assess the lipid profile in hypertensive patients and find out its relation between lipid profile and hypertension.

Material and Methods

The present study was carried out at MNR Medical College & Hospital situated in Sangareddy, part of Medak District, Telangana state (600 beds teaching hospital catering to rural population). A total of 160 study subjects of both sex groups were selected from the medicine ward of MNR hospital during the period from January 2015 to December 2015. This study was approved by institutional ethical committee and investigations were carried out in the biochemistry laboratory, MNR Medical College & Hospital, Sangareddy.

Collection of Blood Sample

Venous blood samples were collected, after 12 h fast from the above study subjects. Briefly, 5 ml of blood from the cubital vein was collected in a plain bottle after explaining the procedure to the study subjects. Serum was separated from the blood samples by a centrifuged machine at 3000 rpm for 10 min in the Biochemistry Department. Estimations were carried out on the serum samples by standard kit methods and analyses were performed on ERBA Chem-5 semi-autoanalyzer.

Parameters measured:

In the present study the following parameters were measured:

1. Total cholesterol.
2. Triglycerides.
3. HDL-cholesterol.

Serum total cholesterol was measured by the CHOD-PAP method,[10] triglycerides were measured by the GPO-Trinder method,[11] HDL-cholesterol measured by the Phosphotungstic acid method,[12] and the values of LDL and very-low-density lipoprotein cholesterol (VLDL) can be calculated using Friedewald's equation[13] as follows:

- LDL-Cholesterol = total cholesterol-(HDL-cholesterol+tri-glycerides/5)
- VLDL-C = Triglycerides/5.

Statistical Analysis

The collected data were analyzed by SPSS software version 16.0. All results were presented as mean ± standard deviation (SD). A *p*-value of less than 0.001 was considered significant.

Results

In the present study, a total of 160 subjects were divided into two groups, 60 controls (normotensive) and 100 cases (hypertensive) with the age range of 35–75 years. Out of 60 normotensive controls, 36 were males and 24 females and in 100 hypertensive cases, 70 were males and 30 females as shown in Table 1. The systolic and diastolic blood pressure was calculated separately. The mean ± SD of systolic blood pressure of normotensive subjects was 118.7 ± 3.47 and that of hypertensive subjects was 166.9 ± 8.27. The mean systolic blood pressure was found to be higher in hypertensive subjects than controls ($p < 0.001$). The mean ± SD of diastolic blood pressure of normotensive subjects was 77.8 ± 3.44 and that of hypertensive subjects was 95.06 ± 4.87. The mean diastolic blood pressure of hypertensive cases was found to be higher than controls ($p < 0.001$). The results are shown in Table 2. The mean ± SD of total cholesterol among hypertensive cases was 253.71 ± 21.6 mg/dl, whereas that of control was 163.7 ± 9.1 mg/dl. The mean ± SD of hypertensive cases was significantly higher than controls ($p < 0.001$). The mean ± SD of Triglycerides among hypertensive cases were 178.87 ± 22.9 mg/dl and that of control was 129.9 ± 8.3 mg/dl. The mean ± SD of Triglycerides in hypertensive cases were significantly higher than controls ($p < 0.001$). The mean ± SD of HDL among hypertensive cases was 39.96 ± 2.97 mg/dl and that of control were 45.06 ± 4.54 mg/dl). The mean HDL of cases was significantly lower than that of controls ($p < 0.001$) and is statistically significant. The mean ± SD of LDL among hypertensive cases was 177.6 ± 21.08 mg/dl and that of controls was 92.76 ± 11.06 mg/dl. The mean ± SD of LDL of hypertensive cases was significantly higher than that of controls ($p < 0.001$).

Table 1: Age- and gender-wise distribution of controls and cases

Age	Controls (*n* = 60)		Cases (*n* = 100)	
	Males (%) (*n* = 36) (60%)	Females (%) (*n* = 24) (40%)	Males (%) (*n* = 70) (70%)	Females (%) (*n* = 30) (30%)
35–39	5 (13.8%)	2 (8.4%)	6 (8.6%)	4 (13.4%)
40–49	7 (19.4%)	4 (16.6%)	12 (17.1%)	6 (20%)
50–59	8 (22.2%)	4 (16.6%)	20 (28.5%)	9 (30%)
60–69	7 (19.4%)	6 (25%)	17 (24.3%)	6 (20%)
70–75	9 (25%)	8 (33.3%)	15 (21.4%)	5 (16.6%)
Total	36 (100%)	24 (100%)	70 (100%)	30 (100%)

Table 2: Comparison of systolic and diastolic blood pressure between normotensive and hypertensive cases

Parameters	Controls (*n* = 60)	Cases (*n* = 100)	*t*-Value	*p*-Value
	Mean ± SD	Mean ± SD		
SBP	118.7 ± 3.47	166.9 ± 8.27	50.625	*p* < 0.001 S*
DBP	77.8 ± 3.44	95.06 ± 4.87	31.025	*p* < 0.001 S*

S* = Significant.

Table 3: Comparative study of lipid profile between controls and cases

Lipid profile	Controls (*n* = 60)	Cases (*n* = 100)	*t*-Value	*p*-Value
	Mean ± SD	Mean ± SD		
Total cholesterol	163.7 ± 9.1	253.71 ± 21.6	29.35	*p* < 0.001 S*
Triglycerides	129.9 ± 8.3	178.87 ± 22.9	14.99	*p* < 0.001 S*
HDL	45.06 ± 4.54	39.96 ± 2.97	8.59	*p* < 0.001 S*
LDL	92.76 ± 11.06	177.6 ± 21.08	28.85	*p* < 0.001 S*
VLDL	25.98 ± 1.67	36.54 ± 6.60	12.142	*p* < 0.001 S*

S* = Significant.

The mean ± SD of VLDL among hypertensive subjects was 36.54 ± 6.60 mg/dl and mean ± SD of VLDL of controls was 25.98 ± 1.67 mg/dl. The mean ± SD of VLDL of hypertensive cases was significantly higher than controls (*p* < 0.001) as shown in Table 3.

Discussion

In the present study, the relationship between hypertension and serum lipid profile among the rural population of Sangareddy was evaluated. The present study reveals that the mean ± SD of the total cholesterol, LDL, and triglycerides were significantly higher in hypertensive patients compared to normotensives.

Similar findings were observed by Shahadat et al.,[14] Adedeji et al.,[15] Saha et al.[16]. The present study reveals a strong relation relationship between dyslipidemia and hypertension. It may lead to the development of coronary heart diseases. Our study is supported by some other studies done in Nigeria and India, where total cholesterol, LDL, and triglycerides higher levels in hypertensive patients compared to normotensives.[17,18] In our study, mean ± SD of HDL levels was significantly higher in normotensives compared to hypertensive subjects. Similar findings were observed by Osagie et al.,[17] in Nigeria and by Bhavani et al,[18] Lakhshmankumar et al.,[19] in India.

In the present study, lipid profile among hypertensive patients was evaluated. To some extent, correlation between hypertension and the altered lipid profile was successfully evaluated. However, the present study involved small sample size due to limited period and therefore the results inferred may not be considered as the reflection of larger population. Regular evaluation of lipid profile is must in all hypertensive cases to stop further aggravation and risk of CVDs.

Conclusion

The present study concludes that dyslipidemia is associated with hypertension. Because of increased blood pressure can create disturbances in lipoprotein metabolism. This can be preventing by taking healthy diet, proper medication, and lifestyle change. Finally, regular assessment of lipid profile among hypertensive patients can prevent cardiovascular diseases.

Acknowledgments

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