

Assessment of Serum Lipid Profile among Hypertensive patients in Uttarakhand

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Abstract

Background: Hypertension and dyslipidemia are associated with oxidative stress and are major causes of cardiovascular disease amounting to 30% of global death rate. Lipoproteins are fundamental to the atherosclerotic process and greatly affect the impact of hypertension on development of target organ damage and therefore on cardiovascular morbidity and mortality.

Objective: To assess serum lipid profile of hypertensive patients in Uttarakhand.

Material and Methods: Hospital based cross sectional study was conducted from June 2016 to November 2016 in Government Medical College and Base Hospital, Srinagar, Uttarakhand. Total 150 known hypertensive patients were enrolled from the catchment area of the hospital. Data was collected by interview, clinical examination and investigation. Statistical analysis was carried out on Microsoft excel 2016.

Results: Among 150 hypertensive patients (106 males and 44 females), maximum hypertensives 79 (52.7%) were in the age group of 50 to 70 years and 132 (88.0%) of them were in the 2nd stage of Hypertension. Serum levels of total cholesterol, triglyceride, HDL-C and LDL-C in hypertensive subjects were 190.50±32.84, 225.94±86.72, 40.10±4.23 and 43.05±9.50 mg/dl respectively.

Conclusions: Dyslipidemia is associated with hypertension and hypertensive patients need measurement of blood pressure and lipid profile at regular intervals to prevent cardiovascular diseases.

Keywords: Lipid Profile, Hypertension, Cholesterol, HDL-C, Triglyceride.

Introduction

Globally, hypertension has become one of the major health problems and a most common risk factor for cardio-vascular disease (CVD).⁽¹⁾ 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.⁽²⁾ 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.⁽³⁾

Hypertension and dyslipidemia are associated with oxidative stress and are major causes of cardiovascular disease amounting to 30% of global death rate.⁽⁴⁾ It is widely accepted that cardiovascular disease is associated with hypertension and increased blood levels of low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides. In contrast, a low level of high density lipoprotein (HDL) is a risk factor for mortality from cardiovascular disease.⁽⁵⁾

The blood pressure however, is not the only determinant of cardiovascular damage and the propensity of hypertensive patients to develop target organ damage is markedly influenced by coexisting risk factors such as age, sex, smoking, obesity, diabetes, dyslipidemia and others. Among these factors lipoproteins are fundamental to the atherosclerotic process and greatly affect the impact of hypertension on

development of target organ damage and therefore on cardiovascular morbidity and mortality.⁽⁶⁾

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

Material and Methods

This study was a cross sectional study in which 150 Known hypertensive patients were enrolled. These patients were sought through health check-up including blood pressure assessment between June 2016 to November 2016 from Government Medical College and Base Hospital, Srinagar, Uttarakhand. All the subjects were residents of the catchment area of the Hospital. Patients with features of any cardiac or renal complication and major medical problem were excluded. After obtaining informed consent, data was collected by interview, clinical examination and investigation.

Blood pressure was measured after the subject had rested for at least 5 minutes from right arm placed at the heart level by a physician. Two measurements were taken by a mercury sphygmomanometer with at least 5 minutes between successive measurements. The mean of two measurements of Korotkoff phase I was recorded for systolic blood pressure (SBP). The mean of two values of korotkoff phase IV was recorded for diastolic pressure (DBP). Hypertension was classified according to JNC-8 Criteria.⁽⁷⁾

Hypertension	Systolic BP (mm of Hg)	Diastolic BP (mm of Hg)
Stage 1	140 -159	or 90 -99
Stage 2	≥160	or ≥100

Venous blood was collected in the morning after an overnight fast and serum was used for the biochemical tests. Lipid parameters (TC, TG, LDL-C and HDL-C) were estimated by enzymatic colorimetric test. Hypercholesterolemia was defined as fasting total serum cholesterol and triglyceride of greater than or equal to 200mg/dl and 150 respectively. Blood concentration of LDL-C (low-density lipoprotein cholesterol) equal or above 150mg/dl and blood concentration of HDL-C (high-density lipoprotein cholesterol) under 40mg/dl respectively, were considered to be undesirable.⁽⁸⁾

Statistical analysis was carried out on Microsoft excel 2016. Continuous parameters were expressed as mean ± SD.

Results

In the present study, out of 150 hypertensive patients, 106 were males and 44 females. Maximum Hypertensives 79 (52.7%) were in the age group of 50 to 70 years (Table 1).

The mean systolic blood pressure (SBP) of hypertensive males and females were 165.81 ± 9.51 vs 166.73 ± 7.80 mm of Hg and mean diastolic blood pressure (DBP) was 100.00 ± 4.90 vs 99.00 ± 5.02 mm of Hg. (Table 2)

Among Hypertensives, 132 (88.0%) of them were in the 2nd stage of Hypertension as shown in Table 3.

Serum levels of total cholesterol, triglyceride, HDL-C and LDL-C in hypertensive male subject were 190.10 ± 31.78, 231.92 ± 91.37, 39.75 ± 4.18 and 43.94

± 9.60 mg/dl respectively while in female hypertensives the results were 191.45 ± 35.64, 211.55 ± 73.31, 40.95 ± 4.25 and 40.91 ± 9.07 mg/dl respectively. (Table 4)

Stage 1 hypertensive subjects had serum levels of total cholesterol, triglyceride, HDL-C and LDL-C to be 177.28 ± 27.51, 230.50 ± 62.75, 39.33 ± 5.09 and 41.89 ± 6.98 mg/dl respectively while in stage 2 hypertensives the values were 192.30 ± 33.19, 225.32 ± 89.66, 40.21 ± 4.11 and 43.21 ± 9.80 mg/dl respectively (Table 5).

Table 1: Age group wise distribution of hypertensive patients

Age Group (in Years)	Male (%)	Female (%)	Total (%)
30 – 50	49 (46.2)	08 (18.2)	57 (38.0)
50 – 70	47 (44.3)	32 (72.7)	79 (52.7)
≥ 70	10 (9.5)	04 (9.1)	14 (9.3)
Total	106 (70.7)	44 (29.3)	150 (100.0)

Table 2: Blood Pressure Distribution of Hypertensive Patients

Category	Male (n = 106)		Female (n = 44)	
	Mean (mm Hg)	SD (mm Hg)	Mean (mm Hg)	SD (mm Hg)
Systolic BP	165.81	9.51	166.73	7.80
Diastolic BP	100.00	4.90	99.00	5.02

Table 3: Distribution of Patients according to Hypertension Stages

Hypertension	Male (%)	Female (%)	Total (%)
Stage 1	12 (11.3)	06 (13.6)	18 (12.0)
Stage 2	94 (88.7)	38 (86.4)	132 (88.0)
Total	106 (70.7)	44 (29.3)	150 (100.0)

Table 4: Lipid Profile of Hypertensive Patients according to Sex

Lipid Profile	Male (n = 106)		Female (n = 44)		Total (n = 150)	
	Mean (mg/dl)	SD (mg/dl)	Mean (mg/dl)	SD (mg/dl)	Mean (mg/dl)	SD (mg/dl)
TC	190.10	31.78	191.45	35.64	190.5	32.84
TG	231.92	91.37	211.55	73.31	225.94	86.72
HDL-C	39.75	4.18	40.95	4.25	40.10	4.23
LDL-C	43.94	9.60	40.91	9.07	43.05	9.50

Table 5: Lipid Profile of Patients according to Hypertension Stages

Lipid Profile	Hypertension			
	Stage 1 (n = 18)		Stage 2 (n = 132)	
	Mean (mg/dl)	SD (mg/dl)	Mean (mg/dl)	SD (mg/dl)
TC	177.28	27.51	192.30	33.19
TG	230.50	62.75	225.32	89.66
HDL-C	39.33	5.09	40.21	4.11
LDL-C	41.89	6.98	43.21	9.80

Discussion

In the present study, serum lipid profile of hypertensives among the population from catchment area of Government Medical College and Hospital, Srinagar, Uttarakhand was evaluated. The Mean SBP as well as mean DBP was considerably high among hypertensives in this study which were similar to findings of study by Kanwar et al⁽⁹⁾ in Hadoti region and Pyadala et al⁽¹⁰⁾ in Sangareddy region of India.

In this study, the mean \pm SD of the total cholesterol and triglycerides were considerably higher in hypertensive patients which was also observed by Shahadat et al,⁽¹¹⁾ Adedeji et al,⁽¹²⁾ and Shah et al⁽¹³⁾ in their respective studies.

The mean \pm SD of HDL-C levels were considerably lower in hypertensives of this study which was also documented similarly by Idemudia et al⁽¹⁴⁾ in Nigeria and Lakhshman Kumar et al⁽¹⁵⁾ in India.

To some extent, correlation between hypertension and the altered lipid profile was successfully evaluated in this study. 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.

Conclusions and Recommendations

The present study concludes 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 the both. This study suggests that hypertensive patients need measurement of blood pressure and lipid profile at regular intervals can prevent cardiovascular diseases.

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