

A Study of Lipid Profile with Reference to Cardiovascular and Cerebrovascular Events among Hypertension Patients at a Tertiary Care Centre, Tamil Nadu, India

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ABSTRACT

This study, conducted in the locality of Kanchipuram over a period of 1 1/2 years, was meant to analyze the Serum lipid profiles of Hypertensive Patients with respect to various clinical profiles and its incidence. As to gain a better understanding of the relation between blood pressure and blood lipids which may provide insight into the mechanisms where by hypertension is associated with increased risk of Coronary Artery Disease and Cerebrovascular disease. The serum lipid profiles (TC, TGL, HDL, VLDL, LDL, TC/ HDL, LDL/ HDL ratios) of 100 hypertensive patients was studied and compared with CVA group with Non-CVA group and IHD group with Non - IHD group. Study group consisted of patients with hypertension as identified by history, clinical examination, and other relevant examinations. TC and LDL were raised in CVA group, which was statistically very significant. TC/ HDL and LDL/HDL were also raised in CVA group as compared to non-CVA group, which was statistically very significant. TC and LDL is raised in IHD group with Hypertension, which was statistically very significant. There was significant alteration of lipid profile in hypertensive patients among who have developed CVA and IHD and those who have not yet.

Key words : Hypertension; TC; LDL; HDL; VLDL; TGL; Cerebrovascular accident; Ischemic heart disease.

INTRODUCTION

Cholesterol was incriminated as an etiological factor for atherosclerosis in the beginning of this century. Various studies around the world have well established that LDL and VLDL are atherogenic and HDL is a protective factor against Coronary Artery Disease and Hypertension. Serum lipid and lipoprotein concentration are commonly used to identify individuals who may have significant atherosclerotic disease.

There has been dramatic rise in the prevalence of coronary artery disease in the recent past and it is projected to rise substantially in future. Several well-conducted epidemiological studies have demonstrated that cholesterol levels are significantly higher in hypertensive patients. Biological inter relationship between hypertension and hypercholesterolemia may influence the mechanism whereby blood pressure is associated with coronary heart disease and CVA. The two risk factors

appear to have synergistic relationship. So early detection of risk factors before the catastrophic and life-threatening effect of severe atherosclerosis is a major problem for the general public as well as for the practicing physician.

The aim of the study was to evaluate the of lipid profile (TC, TG, HDL-c, LDL-c, VLDL-c, TC/HDL-c, LDL-c/HDL-c) in hypertensive patients and correlate the lipid levels with various clinical parameters of hypertensive patients such as

1. Comparison of lipid levels in cerebrovascular accident and non-cerebrovascular accident hypertensive patients.
2. Comparison of lipid levels in ischemic heart disease and non-ischemic heart disease in hypertensive patients.
3. To know the incidence and types of hyperlipidemia in hypertensive subjects.

MATERIALS AND METHODS

A total of 100 patients admitted with hypertension studied. The patients in the range of 40-80 years. Both known hypertensive patients on treatment and newly diagnosed hypertensive patients were included in the study. Secondary hypertensive subjects and those with diabetes mellitus, hypothyroidism and receiving lipid-altering drugs were excluded

from the study. Patients with acute illness like high grade fever and first two weeks following surgery were excluded from the study. Purpose of elimination was to obtain a pure picture of relationship between hypertension and lipids. A detailed history and Careful physical examination with basic necessary Laboratory investigations including Serum lipid profile with prior 12 hours fasting sample was analyzed for the various lipid fractions and studied accordingly.

OBSERVATIONS

Table-1 shows the mean values of lipid fractions of CVA with hypertension and non-CVA with hypertension. It can be seen that TC is raised in CVA group, which is statistically highly significant. LDL is raised in CVA group, which is statistically very significant. TC/ HDL and LDL/ HDL are raised in CVA group compared to non-CVA group, which is statistically very significant. TGL, HDL and VLDL are not statistically significant.

Table-2 shows the mean values of lipid fractions IHD patients and non-IHD patients. It can be seen that TC is raised in IHD group, which is statistically significant. LDL is raised in IHD group, which is statistically very significant. TGL, HD, VLDL, TC / HDL and LDL / HDL are not statistically significant.

Table1: Comparison of lipid levels between CVA and non-CVA patients with hypertension (Mean ± S.D)

Subjects	No. of cases	TC	TGL	HDL	LDL	VLDL	TC/HDL	LDL/HDL
CVA	15	227.0±25.7	181.0 ±71.9	38.8 ±5.13	152.0 ±28.8	36.2 ±14.1	5.91 ±0.95	3.93 ±0.89
Non-CVA	85	188.0 ±38.9	161.0 ±58.9	40.0 ±6.61	115.0 ±40.7	32.1 ±11.8	4.80 ±1.30	2.96 ±1.26
Significance		p<0.001	NS	NS	p<0.01	NS	p<0.01	p<0.01
p<0.05—significant					p<0.001—highly significant			
p<0.01—very significant					NS— not significant			

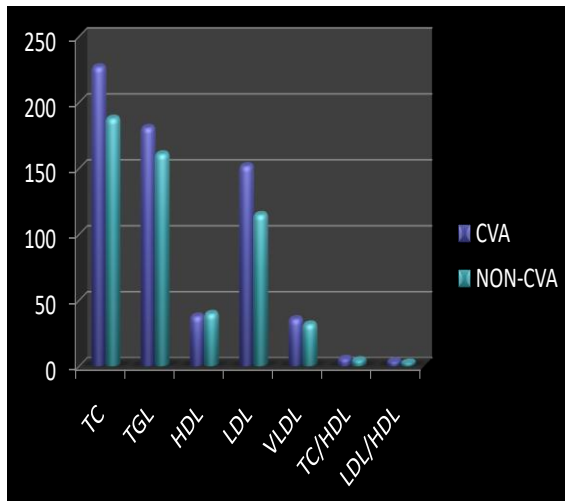
Table 2: Comparison of lipid levels between IHD and non-IHD patients with hypertension(Mean ± S.D)

Subjects	No. of cases	TC	TGL	HDL	LDL	VLDL	TC/HDL	LDL/HDL
IHD	29	209 ±36	161 ±50.2	40.8 ±6.3	146 ±65.5	32.1 ±10.0	5.22 ±1.17	3.32 ±1.30
Non-IHD	71	188 ±39.7	165 ±65.3	39.4 ±6.45	115 ±39.6	33.0 ±13.1	4.86 ±1.36	3.01 ±1.23
Significance		p<0.05	NS	NS	p<0.01	NS	NS	NS
p<0.05—significant					p<0.001—highly significant			
p<0.01—very significant					NS—not significant			

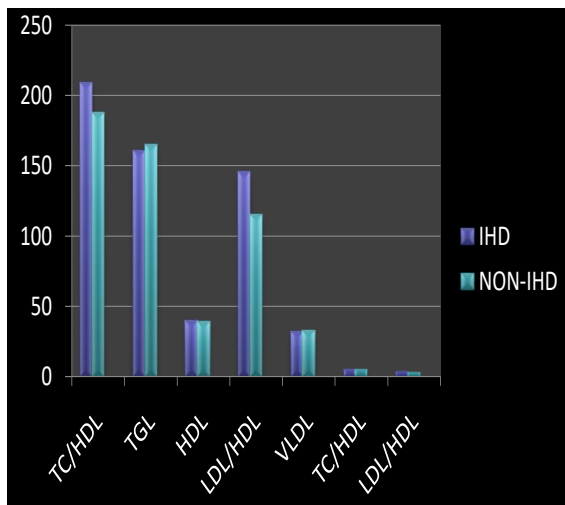
Table 3: Incidence of hyperlipidemia

	Male	Female	Total
No. of patients studied	86	14	100
No. of patients with hyperlipidemia	61	12	73
Percentage (%)	70.93	85.71	73

Hyperlipidemia is found in 73 patients. The incidence of hyperlipidemia in males were 70.93 % and in females 85.71%.



Graph 1: Comparison of lipid levels between CVA & Non-CVA patients with hypertension



Graph-2: Comparison of lipid levels between IHD and Non-IHD patients with Hypertension

Table 4: Types of hyperlipidemia encountered in the study

Types of hyperlipidemia	Male	Female	Total	%
Type I	8	4	12	16.43
Type IIa	25	0	25	34.24
Type IIb	18	2	20	27.39
Type III	0	0	0	0
Type IV	10	6	16	21.91
Type V	0	0	0	0

The types of hyperlipidemia encountered in the present study are shown in table 11. 73 patients had hyperlipidemia among which 61 were males and 12

females. 16.43 % belong to Type I, 34.24 % belong to Type IIa, 27.39 % belong to Type IIb and 21.91 % belong to Type IV hyperlipidemia.

DISCUSSION

Hypertension and hyperlipidemia are recognized as major risk factors in development of CAD and IHD as evidenced by a number of epidemiologic studies through out the world. In the present study a total of 100 patients of Essential Hypertension as defined according to JNC VII. Blood samples were drawn for lipid profile analysis, from all the patients. Lipid profile values were analyzed with various clinical parameters as discussed below.

Serum lipids and hypertension in Cerebrovascular Accident

In the presents study it can be seen that TC was raised in CVA group, which is statistically highly significant. LDL was raised in CVA group, which is statistically very significant. TC/ HDL and LDL/ HDL were raised in CVA group compared to non-CVA group, which is statistically very significant. TGL, HDL and VLDL are not statistically significant.

This study is compared with the study done by Rajwade.N A., et al (1996), the levels of total cholesterol, LDL-C lipoprotein and triglyceride, the strokes patients were observed to have higher levels but not significantly than those of matched normal subjects. [1]

Serum lipids and Hypertension in Ischemic Heart Disease

In the present study, it can be seen that TC is raised in IHD group, which is statistically significant. LDL is raised in IHD group, which is statistically very significant. TGL, HD, VLDL, TC/HDL and LDL/HDL are not statically significant.

Rost P.H., Devis B.R., et al (1996) in the systolic hypertension in the elderly program (SHEP) supported the concept that plasma cholesterol, LDL-C and ratios of TC/HDL-C & LDL-C/HDL-C were significantly higher in CAD men and women. [2]

Manninen V, et al (1992) in the Helsinki heart study and Misra K.P. et al (1980) found that LDL-C/HDL-C ratio, had more prognostic value than LDL-C and HDL-C alone and hypertriglyceridemia was a strong indicator of short term CAD risk especially when LDL-C/HDL-C ratio was also high. [3]

Incidence and Type of Hyperlipidemia

In the present study 73 patients had hyperlipidemia among which 61 were males and 12 females. 16.43 % belong to Type I, 34.24 % belong to Type IIa, 27.39 % belong to Type IIb and 21.91 % belong to Type IV hyperlipidemia.

Hakim A.S Mamatha S.A., Mehta et al (1997) found that in hypertensive subjects dyslipidemia was present in 40 % of patients. Male to female ratio was 3:2. In their study most prevalent abnormal lipid pattern was hypercholesterolemia

encountered in 55% of patients and isolated high triglyceride with normal cholesterol was 13%. [4]

Assmann G. and Schulte H, (1988) in PROCAM study found that most prevalence of lipid abnormality was TC 200-250 mg/dl and TC<200 mg/dl encountered 37.4 % for man and 41.3 % for women. TC 251-300 mg/dl and TG<200 mg was 24.8 % for men and 28.7% for women. TC 200- 300 mg/dl and TG 200-500 mg/dl was 20.4% for men and 62% for women. [5]

In the present study 73 patients had hyperlipidemia among which 61 males and 12 females. Male to female ratio was 5:1. 16.43 % belong to Type I, 34.24 % belong to Type IIa, 27.39 % belong to Type IIb and 21.91 % belong to Type IV hyperlipidemia. The study was compared with the study done by Vasantha V.C et al (1978) in which type-II was dominant over type-IV. [6]

Classification and properties of plasma lipoproteins [7]

Lipoprotein Class	Major lipids	Apoprotein	Density (g/ml)	Diameter (A)	Electrophoretic Mobility
Chylomicrons	Dietary triglycerides, Cholesterol ester	Ai, AII, A IV, B48, C1,C2, C3E	<0.95	800-5000	Origin
Chylomicron Remnants	Dietary Cholesterol ester	B48, E	<1.006	>300	Origin
VLDL	Endogenous triglyceride	B100, C1, C2, C3E	<10006	300-800	Prebeta
IDL	Cholesterol ester, Triglyceride	B100, E	1006-1019	250-350	Broad beta
LDL	Cholesterol ester	B100	1019-1063	180-280	Beta
HDL2	Cholesterol ester	A1, A2, C1,C2, C3, E	1063-1125	90-120	Alpha
HDL3	Cholesterol ester	A1, A2, C1,C2, C3, E	1125-1210	50-90	Alpha

Patterns of lipoproteins in plasma (Lipoprotein Types)

Lipoprotein Pattern	Major elevations in plasma	
	Lipoprotein	Lipid
Type I	Chylomicrons	TGL
Type II a	LDL	Cholesterol
Type II b	LDL and VLDL	Cholesterol and TGL TGL / chol. <5:1
Type III	Chylomicron remnants and IDL	TGL and cholesterol TGL / chol. >5:1
Type IV	VLDL	TGL
Type V	VLDL and chylomicron	TGL and cholesterol TGL / chol. > 5:1

The various combinations of elevated lipoproteins have been divided into six lipoprotein types or patterns by Freidrickson.

CONCLUSION

There is significant alteration of lipid profile in hypertensive patients when

compared among those with and without severe atherosclerosis in the form of Cerebrovascular disease and Cardiovascular diseases. Total cholesterol, LDL cholesterol, triglycerides, VLDL, TC/HDL and LDL/HDL ratios were significantly elevated in patients with hypertension. HDL is significantly reduced in hypertensive

subjects. Among patients with CVA with hypertension and non-CVA with hypertension it can be seen that TC, LDL, TC/ HDL and LDL/ HDL ratios were raised in CVA group. Between IHD and non-IHD patients it can be seen that TC and LDL were raised in IHD group. Thus indicating the necessity for intensive treatment of Hypertensive patients with hyperlipidemia focusing on primary prevention in persons with multiple risk factors and thus preventing life endangering events of severe atherosclerosis.

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