

Lipoprotein Status And The Influence Of Age On Lipoprotein Status Among The Essential Hypertensives And Normotensives.

Dr. Suhasini Sanda*, Dr. Rakesh Mamilla**

*Assistant Professor, Department of Physiology, Siddhartha Medical College, Vijayawada, Andhra Pradesh, India, **Department of Pulmonology, NRI Medical College, China Kakani, Guntur Dist. , Andhra Pradesh, India.

Abstracts: Background: Hypertension, hyperlipidaemias and ageing are considered major independent risk factors for cardiovascular morbidity and mortality. Although independent as risk factors, the three entities are closely related and often operate simultaneously to affect the cardiovascular system adversely, resulting eventually damage to various organs most notably heart, kidneys and brain. As the average blood pressure tends to rise progressively with increasing age, the prevalence of hypertension and atherosclerosis increases with ageing. Methodology: The present study comprised of 50 hypertensive and 50 normotensive subjects with Body Mass Index (BMI) less than 30. The controls selected were matched for age, sex, and dietary habits. The subjects with co-existing disorders of hypertension like diabetes, smokers, pregnancy and children are excluded. After overnight fasting of 12 to 14 hours, 5 ml of blood is collected from the subjects and selected biochemical parameters are measured and the data is statistically analysed. Results: The evaluation of lipid profile patterns in above subjects showed hypercholesterolaemia, hypertriglyceridaemia, increased LDL-C, total cholesterol / HDL-C ratio in hypertensives and decreased HDL-C levels in hypertensives when compared with normotensives. The Age influence on lipid profile patterns in above subjects showed significant increase in total cholesterol levels in normotensives with ageing than in hypertensives. There is significant increase in serum triacylglycerol levels in normotensives and hypertensives with ageing. There is also significant increase in total cholesterol / HDL-C ratio in normotensives with ageing than in hypertensives. Conclusion: This shows strong evidence for the increase in the risk for coronary artery disease with ageing in normotensives and once hypertension sets in there is no significant influence of age on associated dyslipidaemias. As age is a non-modifiable risk factor for coronary heart disease special care should be taken for the management of hypertension and abnormal lipid profiles in elderly subjects. The modifiable risk factors should be controlled by life style modification and pharmacological treatment of hypertension and dyslipidaemias. [Sanda S NJIRM 2015; 6(3):1-5]

Key Words: Hypertension, Hyperlipidaemias, Normotensives, Ageing.

Author for correspondence: Dr. Suhasini Sanda, Flat No: 202 Prakasa Residency, Opp: Anil Estates, Seetharampuram, Vijayawada - 520002, Andhra Pradesh, India. Email: sandasuhasini67@gmail.com.

Introduction: An elevated blood pressure is a very important public health problem with prevalence of 15% in different parts of world population. The blood pressure is the single most useful test for identifying individuals at a high risk of developing coronary heart disease. The prevalence of hypertension in India is 59.9 and 69.9 per 1000 in males and females respectively in urban population and 35.5 and 35.9 per 1000 in males and females respectively in the rural population.

Essential hypertension is usually asymptomatic, readily detectable, usually easily treatable and leading to lethal complications such as coronary artery disease, stroke, renal failure and congestive cardiac failure if untreated. Hyperlipidaemia and hypertension are major risk factors for coronary heart disease and Arteriosclerosis.⁵ More over when they occur together, the risk increases

significantly. Many studies found the prevalence of hypertension in hyperglyceridaemic and hypercholesteroleamic subjects.³ Essential hypertension is thought to be a heterogeneous group of disorders.¹

The age is a non-modifiable risk factor for coronary heart disease. The average blood pressure tends to rise progressively with increasing age in almost every population. As a consequence, the prevalence and incidence of hypertension also increases with age. In the Framingham heart study, the incidence of hypertension was measured over 30 years of follow-up in 5209 adults. With increased age in men, the incidence of hypertension increases from 3.3% at ages 30 to 39 to 6.2% at ages 70 to 79 and in women from 1.5% at ages 30 to 39 years to 8.6% at ages 70 to 79 years. The rise in blood pressure with age probably

represents an accumulation of environmental influences and the effects of genetically programmed senescence in the body systems. The endothelial dysfunction invariably develops in hypertension, in atherosclerotic disease and during the ageing process thus linking these three with common clinical manifestations. In this regard a comparative study is undertaken to assess the lipoprotein status among essential hypertensives.

Material and Methods: The present study was carried out in the Department of Physiology, Siddhartha Medical College, Vijayawada. The study group comprised of 50 hypertensive subjects and control group comprised of 50 normotensive subjects who were selected in the Department of General Medicine, Government General Hospital, Vijayawada.

- (1) The study group comprised of non-obese and non-diabetic patients with essential hypertension and who were untreated and freshly diagnosed.
- (2) Patients suffering from secondary hypertension, myocardial infarction, hypothyroidism, renal hypertension, nephrotic syndrome, obesity, biliary obstruction, diabetes mellitus and on oral contraceptives were excluded from the study.
- (3) Subjects with Body Mass Index > 30 were excluded from the study.
Weight in kg / Height in m² = B.M.I.
(Christopher et al, 1991).
- (4) Smokers, children, pregnancy were excluded.
- (5) The controls selected were matched for age, sex, socio-economic status and dietary habits to remove the effect of possible confounding effect from these factors.
- (6) Blood pressure of newly diagnosed patients was taken at 3 or more occasions in a month's time before they were registered for evaluation. The patients with diastolic pressure more than 95 mm Hg and / or with systolic blood pressure 155mm Hg were included in study.

The biochemical parameters selected were measured and later analysed in both study and control groups. The data regarding the biochemical parameters were compared in both study and control groups and their difference between the

groups was tested using appropriate statistical techniques like 'Z' test and 't' test.

Collection of Blood Samples:

After an overnight fasting of 12 to 14 hours, about 5 ml of whole blood was collected via venipuncture with the help of disposable syringe in the morning. The estimation of lipid profiles was carried out in laboratory after getting fasting blood samples.

The following biochemical investigations were done.

- Total serum cholesterol.
- Serum triacylglycerol.
- Serum HDL-C.
- Serum LDL-C.
- Total serum cholesterol / HDL-C ratio.

TOTAL CHOLESTROL & HDL CHOLESTROL ESTIMATION:

Method: Enzymatic method (Kit method)
Monozyme liquichem cholesterol & HDL cholesterol
(CHOD / POD - PHOSPHOTUNGSTATE Method)

The desirable value for Total serum cholesterol: £ 200 mg / dL

The desirable value for HDL-C: 35 mg / dL

TOTAL TRIACYLGLYCEROL ESTIMATION:

Method: Enzymatic method (Kit method)
(GPO-POD Method with ESPAS)
(MONOZYME LIQUICHEM TRIGLYCERIDES)

The desirable value for serum Triacylglycerol: upto 150 mg/dL

LDL CHOLESTROL:

LDL-C select FS (Diasys):
Diagnostic reagent for quantitative invitro determination of low density lipoprotein cholesterol (LDL-C) in serum or plasma on photometric systems.

The desirable value for serum LDL-C: £ 130 mg / dL

TOTAL SERUM CHOLESTROL / SERUM HDL-C RATIO:

Total Serum Cholesterol / Serum HDL-C Ratio is calculated from the above values.

The desirable value: £ 3.5

Results: A total number of 100 subjects have been included in the present study. These subjects have been grouped into

- Normotensives (Control Group) - 50
- Hypertensives (Study Group) - 50

The following parameters are taken for the present study.

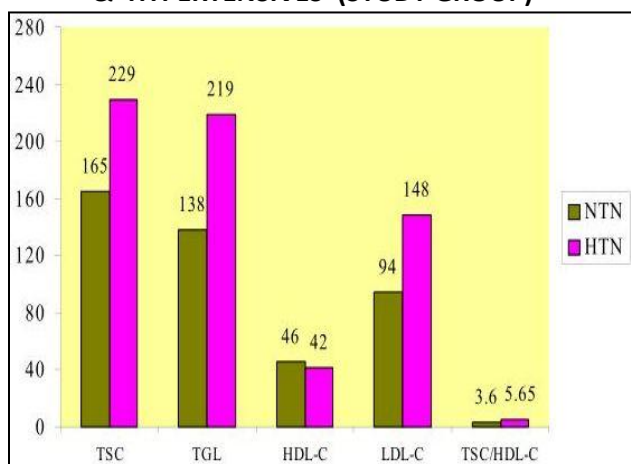
- (1) Total Serum Cholesterol
- (2) Serum Triacylglycerol
- (3) Serum HDL-C
- (4) Serum LDL-C
- (5) Total Serum Cholesterol / HDL-C ratio

Table 1: Comparative statistical analysis of lipid profiles in 'NOROTENSIVES' (Control Group-50) & 'HYPERTENSIVES' (Study Group-50)

	NTN M±SD	HTN M±SD	Z VALUE	P VALUE	S
TSC	165± 12.42	229± 6.5	32.32	<0.001	S
TGL	138± 21.86	219± 12.43	22.62	<0.001	S
HDL-C	46± 0.87	42± 0.87	23.12	<0.001	S
LDL-C	94± 7.9	148± 6.8	36.73	<0.001	S
TSC/HDL-C RATIO	3.6± 0.256	5.65± 0.285	19.90	<0.001	S

S –Significant

Graph 1: Comparative statistical analysis of Lipid Profiles in 'NORMOTENSTIVES (CONTROL GROUP) & 'HYPERTENSIVES' (STUDY GROUP)



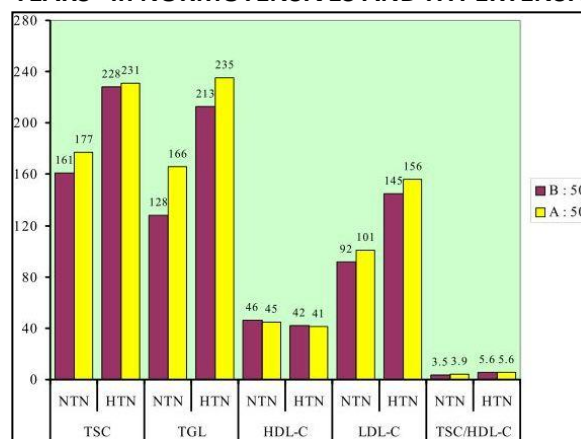
NTN – Normotensives (Control Group)
HTN – Hypertensives (Study Group)

Table 2: Comparative statistical analysis of TOTAL SERUM CHOLESTEROL, SERUM TRIACYLGLYCEROL, SERUM HDL-C, SERUM LDL-C AND TOTAL CHOLESTEROL/HDL-C RATIO in age groups "BELOW 50 YEARS " and "ABOVE 50 YEARS" in NORMOTENSIVES AND HYPERTENSIVES

		B-50	A-50	Z VALUE	P VALUE	SIG
TSC	NTN	161± 11.8	177± 22.4	2.446	<0.05	SIG
	HTN	228± 7.4	231± 20.48	0.517	>0.05	INS
TGL	NTN	128± 16.8	166± 24.4	5.20	<0.05	SIG
	HTN	213± 9.4	235± 30.14	2.58	<0.05	SIG
HDL-C	NTN	46± 0.82	45± 6.1	0.588	>0.05	INS
	HTN	42± 0.82	41± 2.84	1.252	>0.05	INS
LDL-C	NTN	92± 7.85	101± 19.8	1.595	>0.05	INS
	HTN	145± 5.66	156± 23.53	1.669	>0.05	INS
TSC/ HDL-C	NTN	3.5± 0.216	3.9± 0.45	3.076	<0.05	SIG
	HTN	5.6± 0.336	5.6± 0.405	0	0	INS

NTN – Normotensives HTN – Hypertensives
B – 50 - Below 50 years A – 50 – Above 50 years
SIG – Significant INS - Insignificant

Graph- 2: Comparative statistical analysis of TOTAL SERUM CHOLESTEROL, SERUM TRIACYLGLYCEROL, SERUM HDL-C, SERUM LDL-C AND TOTAL CHOLESTEROL/HDL-C RATIO in age groups "BELOW 50 YEARS " and "ABOVE 50 YEARS" in NORMOTENSIVES AND HYPERTENSIVES



Discussion: The present study comprised of a random sample of population which has been selected on strict criteria based on including non-obese, non-diabetic, essential hypertensive and normotensive subjects. The patients are without complications in the range of 35 to 50 years and 51 to 65 years of both sexes.

- The results from the present study suggest a strong clustering of risk factors for coronary artery disease in hypertensive subjects.
- The differences of mean values of total serum cholesterol, serum triacylglycerol, serum HDL-C, serum LDL-C and total cholesterol / HDL-C ratio in normotensives and hypertensives are assessed statistically and proved significant.
- Thus the hypertensives have significantly higher total serum cholesterol, serum triacylglycerol, serum LDL-C levels and total cholesterol / HDL-C ratio and lower HDL-C levels than normotensives.
- 80% of hypertensive subjects showed increased levels of total serum cholesterol, serum triglycerides, serum LDL-C, total cholesterol / HDL-C ratio and lowered HDL-C levels than normotensives in the present study. Similar results have been observed in other studies.
- The findings in my study suggesting an association between hypertension and a syndrome of mixed lipid abnormalities. Similar results have been observed in other studies. ¹¹
- In the present study the changes in lipids in hypertensives give a strong evidence for the presence of some common mechanism of hypertension and lipid abnormalities.
- The normotensive subjects have low levels of total serum cholesterol than hypertensive subjects of all age groups.
- Total cholesterol levels are significantly higher among respondents who are of 'above 50 years' age group than 'below 50 years' age group in normotensives.

- Age has significant influence on total cholesterol levels in normotensives.
- Age has no significant effect on total cholesterol levels in hypertensives.
- Age has no significant effect on serum LDL-C and HDL-C levels in both normotensives and hypertensives. Similar results have been observed in other studies. ¹³
- Age has got significant influence on serum triacylglycerol levels in normotensives and hypertensives.
- Age has got significant influence on total cholesterol / HDL-C ratio in normotensives.
- Age has got no significant influence on total cholesterol / HDL-C ratio in hypertensives.
- The influence of age on lipid profiles in normotensives and hypertensives in the present study give evidence for the presence of common clinical manifestations of hypertension, hyperlipidaemias and ageing.

Conclusion: The present studies show strong evidence for the increase in the risk for coronary artery disease with ageing in normotensives and once hypertension sets in there is no significant influence of age on associated dyslipidaemias. Hence we conclude that the estimation of these lipid profile patterns in hypertensive subjects shows the abnormal lipid profiles in them. Thus helping to achieve the goal of proper management of hypertension in order to reduce the morbidity and mortality due to premature cardiovascular disease. As age is a non-modifiable risk factor for coronary heart disease special care should be taken for the management of hypertension and abnormal lipid profiles in elderly subjects. The modifiable risk factors should be controlled by life style modification and pharmacological treatment of hypertension and dyslipidaemias.

This study also helps in the treatment of hypertension as many commonly used antihypertensive drugs cause many metabolic changes like dyslipidaemias. So the results of this

study may influence the attitude of physicians as well as the society towards the control of hypertension and the associated hypercholesterolaemias.

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