Research Article

A study of assessment of dyslipidemia in hypertensive patients

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Abstract

Introduction: The metabolic syndrome is a constellation of interrelate risk factors of metabolic origin—metabolic risk factors that appear to directly promote the development of atherosclerotic cardiovascular disease. The most widely recognized of the metabolic risk factors are atherogenic dyslipidemia, elevated blood pressure, and elevated plasma glucose. **Aims and objectives:** To assess the Dyslipidemia in hypertensive patients as per ATP-3 guidelines. **Material and Method:** In the present study two groups were formed (hypertensive and control group). Lipid profile of all the selected patients was done and compared. **Results:** 48% and 32% of hypertensive patients were having borderline high to high cholesterol level. 40% hypertensive subjects were having elevated serum triglyceride levels. 54% of patients belonging to control group had optimal LDL Cholesterol level.44% hypertensive were having VLDL >30. In control group only 6% were having VLDL >30. 92% hypertensive had levels more than 40 whereas in control group 38% had levels more than 40. **Conclusion:** thus we conclude that there is significant association of Hypertension and Dyslipidemia.

Keywords: dyslipidemia, hypertensive.

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INTRODUCTION

The metabolic syndrome[1,2] is a constellation of interrelate risk factors of metabolic origin—metabolic risk factors that appear to directly promote the development of atherosclerotic cardiovascular disease (ASCVD). Patients with the metabolic syndrome also are at increased risk for developing type 2 diabetes mellitus also. Another set of conditions, the underlying risk factors, give rise to the metabolic risk factors. The most widely recognized of the metabolic risk factors are atherogenic dyslipidemia, elevated blood pressure, and elevated plasma glucose. Individuals with these characteristics commonly manifest a prothrombotic state and a proinflammatory state as well. Atherogenic dyslipidemia consists of an aggregation of lipoprotein abnormalities including elevated serum triglyceride and apolipoprotein B (apo B), increased small LDL particles, and a reduced level of HDL cholesterol[3,4,5,6] (HDL-C). Atherosclerotic cardiovascular disease (CVD)[7,8,9] is the leading cause of death in the western society and, increasingly, in developing countries. Although several environmental and genetic risk factors for atherosclerosis have been identified over the last decades The introduction of the concept of "global risk" in adults includes hypertension, Smoking, diabetes and obesity. There are also other factors involved, but non- controllable. Those are age, sex, race and heredity. Major epidemiological studies in adults have established a strong positive association between total and low-density lipoprotein (LDL) cholesterol levels and the incidence of CAD morbidity and mortality. Among adults dying of CAD, more than one third have a total cholesterol level >240 mg/dL, a level at which the rate of CAD is twice that when total cholesterol is <200 mg/dL. Low levels of high-density lipoprotein (HDL) cholesterol also are associated with an increased risk of CVD in adults. Studies in adults over time periods as short as 3 to 7 years have shown that lowering elevated

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LDL cholesterol levels, lowers the risk of coronary heart disease[10]. The Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III, or ATP III) presents the National Cholesterol Education Program's (NCEP's) updated recommendations for cholesterol testing and management. It is similar to Adult Treatment Panel II (ATP II)1,2 in general outline and fundamental approach to therapy ATP III represents an update of recommendations for clinical management of high blood cholesterol and related abnormalities. It is constructed on the foundation of previous reports, ATP I and ATP II. Thus the present study was undertaken to assess the dyslipidemia in hypertensive patients attending tertiary care hospital.

AIMS AND OBJECTIVES

To assess the Dyslipidemia in hypertensive patients as per ATP-3 guidelines.

MATERIAL AND METHODS

The present study was conducted at Tertiary care teaching medical College and Hospital for the duration of 2 years. Randomly assigned O.P.D. and I.P.D patients suffering from hypertension were selected for the study and were compared to control group (i.e. not suffering from hypertension). Thus two groups were formed.

Group A: Consist of Control group. Patients whose history, examination and blood investigations were negative for Hypertension (50 subjects).

Group B: Consist of patients diagnosed Hypertension New or Old (25 subjects).

Following criteria was used to select hypertensive patients.

- At least 1 prescription for an antihypertensive medication plus an outpatient diagnosis of hypertension; or
- At least 2 outpatient diagnoses of hypertension; or
- At least 1 prescription for an antihypertensive medication plus 1 According to criterion of seventh report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)

All the subjects were selected between Age Group of 20 - 70years. Informed consent was taken from all the participants. Details of all the subjects were noted on a prestructured proforma. Details about name, age, sex, finding of general and systemic examination were noted. Lipid profile was done in all the subjects (i.e. group A and B). Lipid profile was estimated using CHOP–PAP Method for Serum Cholesterol and GPO – PAP Method for Serum Triglycerides. HDL cholesterol was estimated by using corning express plus auto analyzer. LDL cholesterol levels can be measured in either serum or plasma but usually are determined indirectly by using the Friedewald formula.

Friedewald Formula

LDL cholesterol = total cholesterol - (HDL cholesterol - [Triglycerides/5]).The findings of lipid profile in hypertensive and control group were noted and were compared as per the **ATP-3 guidelines.** The obtained results were compared by using chi-square test.

RESULTS

Table 1: Sexwise distribution of study subjects

Sex	CONTROL	HTN	Significance
M	39 (78%)	15 (60%)	X^2=2.62, df=1, p>0.05 (Not significant)
F	11 (22%)	10 (40%)	
Total	**50 (100%)**	**25 (100%)**	

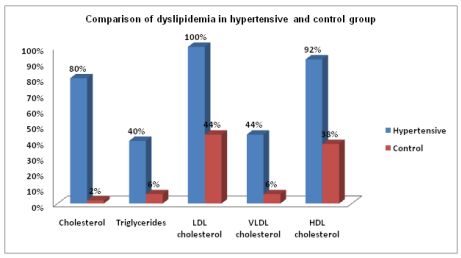
It was observed that in control group 78% were male and 22% were female. Whereas in hypertensive group 60% were male and 40% were female. The difference in these groups was not statistically significant. Thus the two groups are comparable.

Table 2: Distribution of subjects according to lipid profile

Parameter	Levels		Hypertensive		Control		Significance
			No.	%	No.	%	
Cholesterol	<200	Normal	5	20	49	98	X^2=50.58, df=2, p<0.000*
	200 – 239	borderline high	12	48	00	0	
	≥ 240	High	8	32	01	2	
Sr. Triglycerides	< 150	Normal	15	60	47	94	X^2=14.01, df=2, p<0.009*
	150 – 199	Borderline	8	32	3	6	
	200 -499	High	2	8	0	0	
	> 500	Very high	0	0	0	0	
LDL cholesterol	<100	Optimal	0	0	27	54	X^2=42.77, df=4, p<0.000*
	100-129	above optimal	6	24	20	40	
	130-159	Borderline high	12	48	2	4	
	160-189	High	2	8	0	0	
	≥190	Very High	5	20	1	2	

VLDL cholesterol	≤ 30	Normal	14	56	47	94	X^2=15.85, df=1, p<0.000*
	>30	High	11	44	3	6	
HDL cholesterol	<40	Normal	2	8	31	62	X^2=19.72, df=1, p<0.000*
	40-60 and above	High	23	92	19	38	
BMI	< 18.5 kg/mts²	Underweight	10	40	31	62	X^2=3.64, df=2, p> 0.05
	18.5-24.9	Normal	13	52	15	30	
	25 - 29.9	Overweight	2	8	4	8	
	30-34.9	Obese	0	0	0	0	

* Statistically Significant



It was observed that majority of the subjects (98%) in control group were having normal serum cholesterol. 48% and 32% of hypertensive patients were having borderline high to high cholesterol level. the difference cholesterol level in hypertensive and control group were statistically significant. When serum triglyceride levels were compared it was observed that 94% subjects in control group were having normal triglyceride levels. Whereas 40% hypertensive subjects were having elevated serum triglyceride levels and the difference was statistically significant. In this study 54% of patients belonging to control group had optimal LDL Cholesterol level. While 40% had near optimal to above optimal LDL Cholesterol levels. 48% patients belong to hypertensive group had borderline high LDL Cholesterol level and 8% had high LDL Cholesterol level whereas 20% hypertensive patient very high LDL Cholesterol levels and the difference observed was statistically significant. In the present study it was observed that high levels of VLDL cholesterol were commonly found in hypertensive. 44% hypertensive were having VLDL >30. In control group only 6% were having VLDL >30. While measuring HDL cholesterol it was observed that 92% hypertensive had levels more than 40 whereas in control group 38% had levels more than 40. The difference HDL cholesterol level in hypertensive and control group was statistically significant. It was observed that 62% of control group were underweight. 52% patients belonging to hypertensive group had normal BMI. Only 8% of patient belonging to hypertensive and control group were overweight. P-value for B.M.I was found to be statistically insignificant in hypertensive patient.

DISCUSSION

The present study was conducted with the objective to assess dyslipidemia in hypertensive patients. The study was conducted at Tertiary care teaching Hospital and two groups were formed (hypertensive and control group). It was observed that age-wise prevalence of hypertensive was more common in age group of 51-60 years (36%) whereas it was rare in younger population (5% in 20-30years). NHANES III Data (1988-1994) U.S. Adult Population, found similar results. It was found that 98% belonging to control group had Normal Serum Cholesterol levels. Borderline high to high Serum Cholesterol was found in Hypertensive patients. 48% and 32% of hypertensive patients were belonging to borderline high to high cholesterol level and the difference was astatically significant. SB Hulley, JM Walsh and TB Newman *et al*[11] reported had Similar results I their study. Since serum cholesterol has been linked to atherogenesis, many researchers have speculated that treatment to reduce cholesterol levels may slow the progression or induce the regression of coronary atherosclerotic lesions and hypertension. Hypercholesterolemia and Hypertension are important risk factors for the development of micro- and macrovascular complications in people with diabetes. Borderline and high Serum Triglycerides levels were common in Hypertensive patients. 60% had normal Serum Triglycerides levels and 32% had borderline and 8% had very high Serum Triglycerides levels. Whereas 94% patients were belonging to control group had normal Serum Triglycerides level. The observed difference in hypertensive and control group was statistically significant. Cecil M. Burchfiel, Ami Laws; Richard Benfante; Robert J. Goldberg, *et al*[8] Presented in part at the 66th Scientific Sessions of the American Heart Association that risk of Hypertension and atherosclerotic disease appears elevated in subjects with high Triglyceride and Cholesterol levels independent of other cardiovascular risk factors. It was observed that the level of LDL cholesterol level was consistently elevated in hypertensive patients. Thus high level of LDL cholesterol correlates well with risk of cardiovascular disorders. Robert Boizel, Pierre Yves Benhamou, Bernard Lardy, François Laporte, Therese Foulon, *et al*[12] found out that the high LDL cholesterol and triglycerides increases the risk of Hypertension even when the HDL cholesterol level was normal. 94% of control group had normal

VLDL cholesterol levels whereas 44% hypertensive had VLDL cholesterol level above 30 thus substantiating the role of VLDL in Hypertensive patients. While measuring serum HDL it was observed that 62% of patients belonging to control population had a HDL cholesterol levels less than 40. Majority of (92%) hypertensive had HDL cholesterol level between above40. Thus it was observed that even HDL levels were high Hypertensive patients. **WP Castelli, JT Doyle, T Gordon, CG Hames, MC Hjortland, SB Hulley, A Kagan and WJ Zukel** *et al*[13] concluded that total cholesterol and triglycerides were directly related to CHD prevalence. But surprisingly, these findings were less uniformly present in the various study groups than the inverse HDL cholesterol-CHD association. It was seen that HDL cholesterol levels appeared to increase with age in men but not in women. Even other studies have reported the same. Ettinger WH, Wahl PW, Kuller LH, Bush TL, Trucy RP, Manolio TA, Borhami NO, Wong ND, O'Leary DH[14] found that HDL cholesterol levels appeared to increase with age in men but not in women. It was observed that 62% of control group were underweight. 52% patients belonging to hypertensive group had normal BMI. Only 8% of patients belonging to hypertensive and control group were overweight. Thus BMI was higher in hypertensive patients. **Attila Brehm, Georg Pfeiler, Giovanni Pacini, Heinrich Vierhapper and Michael Roden *et al*[15] from** Medical University of Vienna, Austria studied the correlation between BMI and lipid profile of patients. They found similar results to our study that fasting serum TG concentrations were 40% higher in individuals with higher BMI. Even these individuals were prone to have risk of diabetes and hypertension.

CONCLUSION

Thus we conclude that there is significant association of Hypertension and Dyslipidemia.

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