Original Research Article

The study of correlation between dyslipidemia and hypertension and its complications in 30-70 years age group

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Abstract

Background: Dyslipidemia and hypertension were the two widely recognized independent key risk factors for development of coronary vascular disorders (CVD). Therefore, Dyslipidemia and hypertension can serve as an easy clinical approach to know persons at greater risk for the and timely interference directed to decrease CVD events. To this purpose, we studied the correlation between dyslipidemia and hypertension and its complications among 30-70 years age group in a tertiary care hospital in Andhra Pradesh.

Materials and methods: The present work was a hospital based, analytical cross sectional study conducted in the department of General Medicine in a tertiary care hospital at Andhra Pradesh over the period of two years from October 2012 to September 2014. A total of 100 HTN patients and 50 non hypertensive controls were recruited for the study. The patients were in the range of 30-70 years age group. Both known hypertensive patients who were on treatment for a varying period of time and newly diagnosed hypertensive patients were included in the study. The hypertensive and healthy controls were selected in to the study by systematic random sampling. A structured and validated designed case report form (CRF) was used for data collection. The tool was validated by including the inputs from five experts in the subject area. The blood samples were drawn from all the patients after 10 to 12 hours of fasting. FBS, PPBS and Lipid profile values were obtained as per the prescribed

standards. Descriptive analysis of demographic and relevant clinical parameters was done. Various serum lipid levels were considered as primary outcome variables. Categorical variables were presented as frequencies and percentages.

Results: There were 100 hypertension patients and 50 controls were included in the final analysis. Among the hypertension patients 86% of them were males and 14% were females. The HDL value was lower in hypertensive patients, compared to control group (39.78±6.37 Vs 54.5±4.2). Statistically significant difference was observed in total cholesterol, LDL cholesterol, TC/HDL ratio and LDL/HDL ratio between obese and non obese as well as in CVA, IHD among hypertensive patients relatively with healthy volunteers.

Conclusion: Biochemically there was significant difference was observed in total cholesterol, LDL cholesterol, TC/HDL ratio and LDL/HDL ratio between obese and non obese hypertensive patients. The similar discrepancy was noticed in CVA, IHD patient population. The HDL value was low down in all hypertensive patients compared to control group.

Key words

Dyslipidemia, Hypertension, Obesity, Coronary Vascular Disorders.

Introduction

South Asian general populations wrap an elevated incidence of cardiovascular risk factors and earlier onset of cardiovascular disease (CVD) in spite of a normal body mass index as per international values [1, 2]. Dyslipidemia and hypertension were the two widely recognized independent key risk factors for development of CVD [3-5] and these may constitute Metabolic syndrome (MetS) [6, 7]. MetS is a group of clinical and biochemical abnormalities that confer a greater risk factor for type-2 DM and CVD [8]. The risk is associated with concomitant hypertension and dyslipidemia, is an additional sum of the individual risk factors [9, 10]. Some of the studies found that the treatment of dyslipidemia has favorable effects on both coronary and cerebrovascular events, than to independent decrease the blood pressure benefit [11, 12]. Therefore, Dyslipidemia and hypertension can serve as an easy clinical approach to know persons at greater risk for the and timely interference directed to decrease CVD events [13]. To this purpose, we evaluated the correlation between dyslipidemia and hypertension and its complications among 30-70 years age group in a tertiary care hospital in Andhra Pradesh.

Material and methods

Study site: The present work was a hospital based, analytical cross sectional study conducted in the department of General Medicine, NRI Medical College& General Hospital, Chinakakani, Guntur, Andhra Pradesh.

Study population: The patients were in the range of 30-70 years age group. Both known hypertensive patients who were on treatment for a varying period of time and newly diagnosed hypertensive patients were included in the study.

Study duration: The data collection for the study was from October 2012 to September 2014 i.e. for a period of 2 years

Sample size and sampling method: A total of 100 patients who fulfilled the inclusion criteria were included in the study. A total of 50 non hypertensive controls were included in the study. The hypertensive and healthy controls were selected in to the study by systematic random sampling.

Inclusion criteria

- Patients with essential hypertension with or without complication of hypertension and on medication were included for study.
- Systolic blood pressure > 140 mmHg and diastolic >90 mmHg based on

average of two readings or one in case of known hypertensive and on anti hypertensive medication, recorded by standard mercury sphygmomanometer, with appropriate cuff size and patient in supine position after 5 minutes of relaxation.

Exclusion criteria

- Secondary hypertensive subjects 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 serum lipids.
- Patients with diabetes mellitus, hypothyroidism and those receiving lipid-altering drugs were excluded.

Study tools: A structured and validated designed case report form (CRF) was used for data collection. The tool was validated by including the inputs from five experts in the subject area.

Study procedure

After selection of cases, Clinical data was gathered as per Case Report Form (CRF) which included socio demographic history and details of detailed present, past, family clinical history and drug history. General physical examination including Height, Weight, BMI, Waist Hip ratio was measured. Systemic examination of Cardiovascular, Respiratory, Central Nervous and Gastro intestinal systems was done. The blood samples were drawn from all the patients after 10 to 12 hours of fasting. The patients were asked to have a light fat free diet on the day prior to the sampling. The venepuncture was done in the cubital fossa and about 10 ml of blood was drawn using perfectly dry and sterile syringe and blood was transferred to vaccutainer and within 2 hours of collection, serum was separated by centrifugation at 5000 RPM for 10minutes.The serum samples were analyzed on the same day; Care was taken to avoid hemolysis. The following investigations were performed in all the cases.

- Complete blood count
- Complete urine examination
- 12 lead ECG
- Fasting lipid profile-Total cholesterol, HDL, LDL, VLDL, Triglycerides.
- Fasting plasma glucose, 2 hour PPBS
- 2D ECHO, cardiac isoenzymes, chest x ray were done in relevant cases.
- CT / MRI Brain in relevant cases.

Laboratory procedure

Fasting serum samples were collected for estimation of total cholesterol by Cholesterol oxidase method with a reference range of 150-200 mg/dl, triglycerides by Lipase/GOL dehydrogenase method with a reference range of 120-150 mg/dl and HDL cholesterol by Direct Non immunological absolute HDL method using DADE DIMENSIONS – SEIMENS with a reference range of 30-80 mg/dl. LDL cholesterol was calculated using Friedwald formula.

Ethical considerations

Informed written consent was obtained from all the women, after explaining the risks and benefits involved in the study and voluntary nature of their participation. Confidentiality of the study participants was maintained throughout the study. The neonates were evaluated for the complications, as per the routine hospital management protocol; hence no additional test was done for the purpose of the study.

Statistical methods

Descriptive analysis of demographic and relevant clinical parameters was done. Various serum lipid levels were considered as primary outcome variables. Categorical variables were presented as frequencies and percentages. Quantitative variables were presented as mean and standard deviation. The lipid levels were compared between the hypertensive patients and the controls by unpaired t-test. The lipid levels were also compared among hypertensive patients, with or without IHD and CVA. The association between the categorical explanatory and outcome

variables was done by cross tabulation and calculating the corresponding odds ratio and 95% CI. Chi square test was used to assess the statistical significance of the association. P value < 0.05 was considered as statistically significant. IBM SPSS version 21 was used for statistical analysis.

Results

A total of 100 hypertension patients and 50 controls were included in the final analysis. Among the hypertension patients 86% of them were males and 14% were females. In both males and females, highest numbers of subjects were in the age group of 60 to 70 years (**Table - 1**).

Table - 1: Age and gender distribution of study population (N=100).

Age group (Years)	Male	Female	Total
30-39	5	0	5
40-49	20	3	23
50-59	25	5	30
60-70	36	6	42
Total	86	14	100

The entire range of lipid profile parameters excluding HDL cholesterol was higher in hypertensive subjects, compared to control group. The HDL value was lower in hypertensive patients, compared to control group (39.78±6.37 Vs 54.5±4.2). All these differences in mean values of lipid profile parameters were statistically significant with a p vale < 0.05 (**Table - 2**).

Statistically significant difference was observed in total cholesterol, LDL cholesterol, TC/HDL ratio and LDL/HDL ratio between clinically obese and non obese subjects among hypertensive patients. There was no statistically significant difference between the two groups in other parameters, including Triglycerides, HDL and VLDL cholesterol levels (**Table - 3**).

Statistically significant difference was observed in total cholesterol, LDL cholesterol, TC/HDL ratio and LDL/HDL ratio between Subjects with and without CVA among hypertensive patients. All these parameters were higher in patients affected by CVA. There was no statistically significant difference between the two groups in other parameters, including Triglycerides, HDL and VLDL cholesterol levels (**Table - 4**).

Statistically significant difference was observed in total cholesterol, LDL cholesterol, between Subjects with and without IHD among hypertensive patients. All these parameters were higher in patients affected by IHD. There was no statistically significant difference between the two groups in other parameters, including Triglycerides, HDL, VLDL cholesterol, TC/HDL ratio and LDL/HDL ratio (**Table - 5**).

Discussion

The present cross sectional study has targeted mainly from rural patients of Guntur district of Andhra Pradesh, among 30-70 years age group. In this study, we have done screening of biochemical parameters mainly lipid profile in both non hypertensive and hypertensive individuals with or without obesity.

There are quite a few patient population based prospective studies [14-18] also conducted to assess the impact of dyslipidemia and hypertensive disorders were observed both in Northen and Southern part of India. Borghi, et al. [19, 20] suggested in his studies that treating dyslipidemia has beneficial effects on blood pressure.

Conclusion

Biochemically there was significant difference was observed in total cholesterol, LDL cholesterol, TC/HDL ratio and LDL/HDL ratio between obese and non obese hypertensive patients. The similar discrepancy was noticed in

CVA, IHD patient population. The HDL value was low down in all hypertensive patients compared to control group. Hence there is an urgent need for a clinical trial in large Indian population with regards to treatment of dyslipidemia is warranted.

Table - 2: Comparison of lipid levels between hypertensive patients and healthy controls (Mean ± S.D).

Parameter	Hypertension (N=100)	Healthy (N=50)	P-value
Total Cholesterol	194.0±39.49	155.6±15.4	<0.001
Triglycerides	163.6± 60.8	125.5±22.7	<0.001
HDL cholesterol	39.78±6.37	54.5±4.2	<0.001
LDL cholesterol	121.0±41.2	76.1±11.4	<0.001
VLDL cholesterol	32.7±12.2	25.3±4.5	<0.001
TC/HDL ratio	4.96±1.31	2.8±0.2	<0.001
LDL/HDL ratio	3.10±1.25	1.4±0.2	<0.001

Table - 3: Comparison of lipid levels between obese and non obese subjects among hypertensive patients (Mean ± S.D).

Lipid profile	Obese (N=25)	Non-obese (N=75)	Significance (P-value)
Total Cholesterol	250.0±41.4	187±38.8	<0.01
Triglycerides	163.0 ±49.3	164.0±64.8	0.943
HDL cholesterol	40.1±7.01	39.7±6.23	0.788
LDL cholesterol	141.0±43.0	114.0±38.6	<0.01
VLDL cholesterol	32.7±9.85	32.74±13	1.00
TC/HDL ratio	5.49±1.43	4.79±1.23	<0.01
LDL/HDL ratio	3.55±1.55	2.95±1.11	<0.01

Table - 4: Comparison of lipid levels between CVA and non-CVA patients with hypertension.

Subjects	CVA (N=15) (Mean±SD)	Non-CVA (N=85) (Mean±SD)	Significance (P-value)
TC	227±25.7	188.0±38.9	<0.01
TGL	181.0±71.9	161.0±58.9	0.244
HDL	38.8±5.13	40.0±6.61	0.506
LDL	152.0±28.8	115.0±40.7	<0.01
VLDL	36.2±14.1	32.1±11.8	0.231
TC/HDL	5.91±0.95	4.80±1.30	<0.01
LDL/HDL	3.93±0.89	2.96±1.26	<0.01

Table – 5: Comparison of lipid levels between IHD and non-IHD patients with hypertension.

Lipid profile	IHD (n=29) (Mean±SD)	Non-IHD (n=71) (Mean±SD)	Significance (p-value)
TC	209±36	188±39.7	<0.05
TGL	161±50.2	165±65.3	0.768
HDL	40.8±6.3	39.4±6.45	0.323
LDL	146±65.5	115±39.6	<0.01
VLDL	32.1±10.0	33.0±13.1	0.74
TC/HDL	5.22±1.17	4.86±1.36	0.214
LDL/HDL	3.32±1.30	3.01±1.23	0.263

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