Original article:

Study of relationship of serum Lipid Profile and etiological factors of Ischaemic Heart Diseases

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Abstract:

Introduction: Along with other conventional cardiovascular risk factors, such as hypertension, diabetes and smoking, dyslipidemia increase the risk of developing Ischemic Heart Disease (IHD). With this background the present study was conducted with the objectives to study serum 'Lipid Profile' patterns of Indian population in young Ischaemic Heart Disease (IHD) of age forty years and below.

Methodology: Considering the fact that young IHD patients are not so common, it was decided to include all patients attending OPD or admitted in the hospital diagnosed as having IHD. During the study period 40 eligible patients were admitted and all were included in the study.

Results: Taking alcohol on atleast 4 days a week was considered as alcoholic. Inquiry on alcohol drinking habit revealed that out of 40 patient of IHD, 15 (37.5%) were alcoholic while 25 (62.5%) were non alcoholic. Past history of diabetes mellitus indicates that out of 40 IHD patients 7 (17.5%) were diabetic while remaining 33 (82.5%) were non diabetic. Present blood sugar level as well as ant diabetic medication were considered to categorised them as diabetic. Mean pulse rate and respiratory rate of the patients were 75 and 15 per minute respectively. Mean SBP and DBP were 128 and 79 mmHg respectively.

Conclusion: From the present cross sectional study following conclusions are drawn - Between diabetic and non diabetic group no difference in Lipid profile, serum creatinine, Homocysteine, serum myoglobin, CKMB and hsCRP was found and HDL and VLDL values were higher in non hypertensive while LDL, TC and TG values were higher in hypertensive patients.

Keywords: Ischaemic Heart Disease

Introduction:

Along with other conventional cardiovascular risk factors, such as hypertension, diabetes and smoking, dyslipidemia increase the risk of developing Ischemic Heart Disease (IHD). [1] Primary prevention studies have shown that the early detection and aggressive treatment of risk factors prevent cardiovascular events. The analysis of 14 international clinical studies of patients with acute coronary syndrome (ACS) revealed that 85% had at least one of the conventional risk factors.[2] With this background the present study was conducted with the objectives to study serum 'Lipid Profile' patterns of Indian population in young Ischaemic Heart Disease (IHD) of age forty years and below; and also to study relationship of serum 'Lipid Profile' patterns and other risk factors of Ischaemic Heart Disease (IHD) like hypertension, diabetes mellitus, smoking, obesity in reference to premature IHD.[3]

Methodology:

This was a cross sectional observational study conducted in Dr. D. Y. Patil Medical College, Hospital and Research Centre located in Pimpri, Pune. The hospital is a tertiary care centre caters

urban population of Pune city as well as rural population from nearby districts.

Permission of Institute Ethics Committee was obtained before the start of the study. Informed written consent was also obtained from each and every patients agreed to participate in the study. The recruitment was purely on

voluntary bases. It was also ensure that those who do not give consent to participate receives services without any bias.

Considering the fact that young IHD patients are not so common, it was decided to include all patients attending

OPD or admitted in the hospital diagnosed as having IHD. During the study period 40 eligible patients were admitted and all were included in the study.

Inclusion Criteria

Patient fulfilling all of the below mentioned criteria was considered eligible for the study:

- Patients attending OPD/IPD in Dr. D.Y. Patil Hospital

- Patients diagnosed with ischaemic heart disease
- Age 40 years or less

Exclusion Criteria

Patient with following criteria were excluded from the study:

- Patient age > 40 years
- Patient who already taken/taking treatment for Dyslipidemia
- Individuals mentally or physically unfit to undergo the study

Results

Total 40 patients were included in the study. Observations of the study were described in the following tables and graphs.

All patients were less than 40 year of age as decided in the methodology. Mean age of the patients was 35 years with standard deviation of 2.91. Youngest case of IHD was 28 year old.

Table 1: Distribution of study subjects according to smoking habit

Smoking	Frequency	Percent
Never smoker	15	37.5
Smoker	25	62.5
Total	40	100.0

Inquiry on smoking habit revealed that out of 40 patient of IHD, 25 (62.5%) were smoker while 15 (37.5%) had never smoked.

Table 2: Distribution of study subjects according to alcohol habit

Alcohol	Frequency	Percent
Non alcoholic	25	62.5
Alcoholic	15	37.5
Total	40	100.0

Taking alcohol on atleast 4 days a week was considered as alcoholic. Inquiry on alcohol drinking habit revealed that out of 40 patient of IHD, 15 (37.5%) were alcoholic while 25 (62.5%) were non alcoholic.
The following graph shows the same information in graphical format.

Table 3: Distribution of study subjects according to presence of diabetes

DM	Frequency	Percent
Non diabetic	33	82.5
Diabetic	7	17.5
Total	40	100.0

Past history of diabetes mellitus indicates that out of 40 IHD patients 7 (17.5%) were diabetic while remaining 33 (82.5%) were non diabetic. Present blood sugar level as well as ant diabetic medication were considered to categorised them as diabetic.

Table 4: Pulse, respiratory rate and blood pressure among the study subjects

Variables	N	Mean	Std. Deviation	Minimum	Maximum
Pulse Rate (per minute)	40	75.25	6.188	64.00	84.00
Respiratory rate (per minute)	40	14.78	0.974	14.00	17.00
SBP mmHg	40	128.15	10.391	116.00	150.00
DBP mmHg	40	79.05	5.023	70.00	88.00

Mean pulse rate and respiratory rate of the patients were 75 and 15 per minute respectively. Mean SBP and DBP were 128 and 79 mmHg respectively.

Table 5: Distribution of study subjects according to presence of hypertension

HT category	Frequency	Percent
Non hypertensive	20	50.0
Hypertensive	20	50.0
Total	40	100.0

Measurement of current blood pressure and antihypertensive medication history revealed that among the 40 IHD patients, 20 (50%) were hypertensive while remaining 20 (50%) were non hypertensive.

Discussion

This cross-sectional study reported serum 'Lipid Profile' patterns of Indian population in young Ischaemic Heart Disease (IHD) below forty year of age and also the relationship of serum 'Lipid Profile' patterns and other risk factors of Ischaemic Heart Disease (IHD) like hypertension, diabetes mellitus, smoking, obesity in reference to premature IHD.Total 40 patients were included in the study. All patients were less than 40 year of age with mean age of the patients was 35 years with standard deviation of 2.91. Youngest case of IHD was 28 year old.

The present study found that out of 40 patient of IHD, 15 (37.5%) were alcoholic while 25 (62.5%) were non alcoholic. From their study Ronksley Paul E[88] concluded that the pooled adjusted relative risks for alcohol drinkers relative to non-drinkers in random effects models for the outcomes of interest were 0.75 (95% confidence interval 0.70 to 0.80) for cardiovascular disease mortality (21 studies), 0.71 (0.66 to 0.77) for incident coronary heart disease (29 studies), 0.75 (0.68 to 0.81) for coronary heart disease mortality (31 studies), 0.98 (0.91 to 1.06) for incident stroke (17 studies), and 1.06 (0.91 to 1.23) for stroke mortality (10 studies). In the same study dose-response analysis revealed that the lowest risk of coronary heart disease mortality occurred with 1–2 drinks a day, but for stroke mortality it occurred with ≤1 drink per day. Secondary analysis of mortality from all causes showed lower risk for drinkers compared with non-drinkers (relative risk 0.87 (0.83 to 0.92))[88].

The present study revealed that out of 40 patient of IHD, 25 (62.5%) were smoker while 15 (37.5%) had never smoked. In present study lipid profile indicated significant different between mean HDL, LDL, VLDL, Total cholesterol and triglyceride level in smoker and non smoker (p value <0.05). HDL and VLDL values were higher in non smoker while LDL, TC and TG values were higher in smoker patients. Similarly mean serum creatinine level was found to be significantly higher among never smoker compare to smoker (p value <0.05). A study by Haddad FH et al[4] found high percentage of patients are smokers (35.5%) in the CAD group. Although the recent ex-smoker rate was not considered in this calculation as of non-agreement of definition of exsmoker, nevertheless this figure is still high and alarming, as smoking is one of the important modifiable risk factor for CAD.

The present study found that the mean HDL level and LDL level were 39.03 mg/dl and 116.3 mg/dl respectively with 4.6 and 22.5 mg/dl standard deviation. Mean VLDL level was 17.03 mg/dl with standard deviation of 4.6. Mean TC level and TG level were 175.63 mg/dl and 138.35 mg/dl respectively with standard deviation of 23.5 and 16.9 mg/dl respectively.

In a study by Hammoudeh[5] who reported lipid profile for patients with acute coronary syndromes admitted to cardiac care unit. He found the mean TC, LDL and TG to be 202, 131 and 154 mg/dl which are higher than the group studied by the present study. High density lipoprotein level was 38 mg/dl, which is slightly lower than our findings.

In atherosclerosis, fatty streaks tend to occur at sites of altered arterial shear stress such as bifurcations and are associated with abnormal endothelial function. They develop when inflammatory cells, predominantly monocytes, bind to receptors expressed by endothelial cells, migrate into the intima, take up oxidized lowdensity lipoprotein (LDL) from the plasma and become lipid laden foam cells or macrophages. Extra-cellular lipid pools appear in the intimal space when these foam cells die and release their contents. Smooth muscle cells then migrate from the media of the arterial wall into the intima, in response to cytokines and growth factors produced by the activated macrophages, change from a contractile to a repair phenotype in an attempt to stabilise the atherosclerotic lesion. If they are successful, the lipid core will be covered by smooth muscle cells and matrix, producing a stable atherosclerotic plaque that will remain asymptomatic until it becomes large enough to obstruct arterial flow. [6] Jelovesk (1997) has categorically proposed hypercholesterolemia and hyperlipidemia as risk factors for vascular disease. [92] The study by BA Ferduos et al has[6] revealed the

mean±SD of serum TC, TG, HDL-C and LDLC in IHD cases were 314.54±73.72 mg/dl, 288.04±60.45 mg/dl, 36.02±4.12 mg/dl and 178.62±22.7 mg/dl respectively. In study by BA Ferduos et al[7] TC, TG and LDL-C values were found to be significantly higher and HDL-C value was found to be significantly lower in IHD cases compared to that of healthy controls. These findings are in agreement with that of other studies.[6,7,8]

The present study found diabetes mellitus among 7 (17.5%) IHD patients out of 40 subjects included in the study. The mean HbA1c was 6.38% with standard deviation of 0.66. Mean FBS was 102.25 mg/dl with standard deviation of 13.91. Mean PPBS was 117.33 mg/dl with standard deviation of 14.587. A study by Haddad FH et al[89] had shown a high prevalence of diabetic females with CAD (16.9% in the diabetic group versus 6.1% in the non-diabetic group, p=0.008), confirming that diabetic females lose their natural protection against CAD and at a younger age. [9]

Measurement of current blood pressure and antihypertensive medication history revealed that among the 40 IHD patients, 20 (50%) were hypertensive while remaining 20 (50%) were non hypertensive. While the pathogenesis of atherosclerosis is still incompletely understood, the role of lipid and blood pressure appear to be of paramount importance. Carefully conceived and executed animal experiments have convincingly demonstrated that atherosclerosis can be induced by procedures which produce an elevated blood lipid content and the process further accelerated by also inducing hypertension by a variety of techniques.[10,11,12,13]

A study by Bonna et al found an association between blood pressure and TC and LDL. There was an inverse association with SBP, but a positive one for DBP (Bonaa et al., 1991)[14] Differences in blood pressure with a significantly higher DBP among high altitude natives and no difference in SBP between low and high altitude natives have been reported (Smith, 1999)[15]. Hypoxia and cold temperature increase plasma catecholamines (Moncloa et al., 1965)[16]. Because catecholamines are likely to be involved in the development of atherosclerosis, it seems paradoxical to find the inverse relation between SBP with TC and LDL-C.

Conclusion:

From the present cross sectional study following conclusions are drawn:

- Between diabetic and non diabetic group no difference in Lipid profile, serum creatinine, Homocysteine, serum myoglobin, CKMB and hsCRP was found.
- HDL and VLDL values were higher in non hypertensive while LDL, TC and TG values were higher in hypertensive patients.

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643

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