

Original article:

Study of serum 'Lipid Profile' patterns of Indian population in young Ischaemic Heart Disease

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Abstract:

Introduction: The relationship between lipid profile and obstructive disease in coronary arteries is well known. Data from the OPERA registry suggests that in patients with different ACS, the strongest predictor of in-hospital death was untreated dyslipidemia. 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: 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.

Conclusion: From the present cross sectional study we can conclude higher level of LDL value were associated with young IHD and 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 non smoker

Keywords: Ischaemic Heart Disease , Lipid Profile

Introduction:

The relationship between lipid profile and obstructive disease in coronary arteries is well known. Data from the OPERA registry suggests that in patients with different ACS, the strongest predictor of in-hospital death was untreated dyslipidemia.¹ It has been recognized that alterations in lipid levels, consisting of reductions in total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) and increases in triglycerides (TG), occur after an ACS. An accurate knowledge of baseline lipid levels may affect the initiation of lipid-lowering therapy and the patient's willingness

to adhere to a recommendation for long-term lipid-lowering therapy.²

Although strong associations exist between risk factors and the occurrence of CAD, angiographic studies in patients without ACS have shown conflicting results between the correlation of risk factors and the severity of coronary atherosclerosis. Previous reports of the prevalence of the risk factors and lipid profiles in ACS have been done in patients without considering the presence or absence of coronary lesions. The aims of our study were to investigate the prevalence of conventional risk factors and the lipid profiles at the time of admission in a cohort of patients with ACS and

significant CAD (stenosis $\geq 50\%$) determined through coronary angiography.³

Studies stating correlation between lipid profile and Ischaemic Heart Disease were conducted by many researchers. However, very few studies were conducted in young patients of Ischaemic Heart Disease, specifically local studies. 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:

This cross sectional study was 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.

Period of study: This study was conducted from July 2013 to September 2015.

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

All the eligible patients were contacted personally and explained the objectives of the study and were provided details about the study procedure in their vernacular language. Data collection included an interview questionnaire prepared locally so that it can accomplish the objective of the study.

Further, a clinical examination, including BP measurement and WHR, was performed. Finally, venous blood was drawn for the measurement of blood lipids (TG, TC, LDL-C, and HDLC), and capillary blood was drawn for the measurement of hemoglobin Hb concentration.

Results:

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: Lipid profile of the study subjects

Variables	N	Mean	Std. Deviation	Minimum	Maximum
HDL mg/dl	40	39.03	4.605	30.00	47.00
LDL mg/dl	40	116.30	22.474	91.00	164.00
VLDL mg/dl	40	17.03	4.605	8.00	25.00
TC mg/dl	40	175.63	23.513	145.00	223.00
TG mg/dl	40	138.35	16.920	118.00	170.00

Table 2: Cardiac marker of the study subjects

Variables	N	Mean	Std. Deviation	Minimum	Maximum
Homocysteine	40	11.35	3.159	3.00	16.00
S Myoglobin (ng/mL)	40	99.33	49.328	25.00	190.00
CK-MB	40	49.55	51.883	8.00	238.00
hsCRP (mg/dl)	40	11.996	17.6850	0.01	86.40

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.

Mean waist was 94 cm with standard deviation of 9.16 cm while mean hip size was 105 cm with standard deviation of 14.78 cm. Average Waist Hip Ratio was 0.91 with standard deviation of 0.13. WHR ranges from 0.74 to 1.20. Central obesity has been identified as a risk factor for coronary heart disease (CHD). The WHR measurements were correlated with coronary risk factors and CHD prevalence. In a study by Gupta

R, Majumdar S. found mean WHR 0.88 +/- 0.11 in cardiac patients.⁴

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 who reported lipid profile for patients with acute coronary syndromes admitted to cardiac care unit.⁵ 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.

A study by Haddad FH et al⁴ proved higher mean lipid levels in those with proven IHD, thing that was more pronounced in the diabetic subgroup. The slightly lower but insignificant mean total cholesterol and LDL-C in the diabetic patients may be explained by the fact that there were more patients on antihyperlipidemia drugs in this group.

Although other risk factors such as obesity, sedentarism and alcoholism were not considered in this study, nevertheless it showed with no doubt that hyperlipidemia namely hyper LDL-C and low HDLC remain the strongest risk factor for CAD. Diabetic patients are at 3-fold increased risk of CAD than non-diabetic patients with same risk factors and lipid profile.⁴

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. Extracellular 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.⁶ The study by BA Ferduos et al has⁷ revealed the mean±SD of serum TC, TG, HDL-C and LDL-C 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 al⁹⁸TC, 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.^{8,9,10}

In present study lipid profile indicated significant different between mean LDL, Total cholesterol and triglyceride level in alcoholics and non alcoholics (p value <0.05). LDL, TC and TG were significantly lower in non alcoholics compared to alcoholic patients. In the present study between diabetic and non diabetic group no difference in Lipid profile, serum creatinine, Homocysteine, serum myoglobin, CKMB and hsCRP was found.

In present study lipid profile indicated significant different between mean HDL, LDL, VLDL, Total cholesterol and triglyceride level in hypertensive and non hypertensive (p value <0.05). HDL and VLDL values were higher in non hypertensive while LDL, TC and TG values were higher in hypertensive patients.

In present study lipid profile indicated significant different between mean HDL and VLDL level in Trop-I cTnT positive and negative (p value <0.05). HDL and VLDL values were significantly higher in Trop-I cTnT negative patients compare to Trop-I cTnT positive patients. Serum myoglobin, mean CK MB and mean hsCRP was significantly higher in Trop-I cTnT positive patients compare to negative patients (p value <0.05). Because blood lipids, obesity, and CHD risk increases with increasing age, higher CHD in men in this study may be confined to men in older age groups. To account for differences in lipid levels that may occur owing to changes in temperature.¹¹ The same study found a higher mean TC level and lower LDL-C level with no difference in TG and HDL-C levels when compared with the reference laboratory. To some extend it is likely that these differences may have occurred owing to variation in the storage method (Rehak and Chiang, 1988)¹² and or storage time (Shih et al., 2000)¹³

Conclusion

From the present cross sectional study following conclusions are drawn:

- Higher level of LDL value were associated with young IHD.
- 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 non smoker

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