



## Evaluation of Serum Lipid Profile in Ischemic Heart Disease: A Hospital Based Study

### KEYWORDS

Lipid profile and Ischemic heart disease.

### Dr. Tapan Kumar Mohapatra

Professor, Department Of Biochemistry Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India

### Dr. Rabindra Kumar Mohapatra

Professor, Department Of Biochemistry Hi-Tech Medical College & Hospital, Rourkela, Odisha, India

**ABSTRACT** Cardiovascular disease is the most frequent cause of adult death in industrial societies and is increasingly important in developing countries like India. Our aim was to the lipid profile of patients of Ischemic Heart Disease (IHD) in comparison with healthy controls. The mean value of total cholesterol, triglycerides, very low density lipoprotein cholesterol (VLDLc), low density lipoprotein cholesterol (LDLc) were significantly higher in patients clinically diagnosed for IHD as compared to the healthy control. High density cholesterol (HDLc) was significantly low in IHD patients.

### Introduction:

Cardiovascular disease is the most frequent cause of adult death in industrial societies and is increasingly important in developing countries like India<sup>1</sup>. It represents the major challenge that affects each of us professionally and personally. Extensive research by man over several decades has concluded that cure of coronary heart disease is very difficult hence prevention of such ischaemic events becomes mandatory. Atherosclerosis is a progressive inflammatory disorder of the arterial wall that is characterized by focal lipid-rich deposits of atheroma. Atherosclerosis begins early in life. Abnormalities of arterial function have been detected among high-risk children and adolescents, such as cigarette smokers and those with familial hyperlipidemia or hypertension<sup>2</sup>. In the recent past there has been an addition of several molecular markers to the well established risk factors of smoking, family history, hypertension, diabetes and high levels of LDL cholesterol<sup>3</sup>. In current strategies of coronary risk assessment, lipid testing in the blood routinely recommended<sup>4</sup>. Because of critical importance of LDL-C in atherogenesis, LDL-C is the focus for the determination of the risk of coronary disease<sup>5</sup>. Our aim was to the lipid profile of patients of Ischemic Heart Disease (IHD) in comparison with healthy controls.

### Material and Methods:

The present study was conducted in Hi-Tech Medical College & Hospital Bhubaneswar, Odisha, India during the period from June 2013 to March 2014. The study protocol was approved by the Ethics committee of Hi-Tech Medi-

cal College & Hospital, Bhubaneswar. The patients were taken from the Department of Cardiology, Hi-Tech Medical College & Hospital Bhubaneswar. Thirty five (20 were males and 15 were females) diagnosed chronic IHD patients of both sexes with age range of 35-70 years were taken as cases and Twenty five (15 were males and 10 were females) age and sex matched healthy volunteers were taken as controls. Cases were the diagnosed (positive ECG findings) chronic IHD patients of both sexes admitted in the hospital during the study period. Fasting lipid profile was measured in all study subjects using standard laboratory method. Data were analyzed by SPSS student t-test and one way ANOVA. A P-value <0.05 was considered statistically significant.

### Results and Discussion:

The mean value of total cholesterol, triglycerides, very low density lipoprotein cholesterol (VLDLc), low density lipoprotein cholesterol (LDLc) were significantly higher in patients clinically diagnosed for IHD as compared to the healthy control. High density cholesterol (HDLc) was significantly low in IHD patients.

**Table-1: Sex distribution of the study subjects:**

Sex	Cases (N=35)	Controls (N=25)
Male	20(57.1)	15(60.0)
female	15(42.8)	10(40.0)
Total	35(100)	25(100)

**Table-2: Lipid profile of the study subjects:**

Variables	Range	Cases (N=35) (Mean±sd)	Range	Controls (N=25) (Mean±sd)	P-value
TC(mg/dl)	160.00 -440.00	317.12±63.02	130.00 -210.00	165.15±16.23	0.001
TG(mg/dl)	171.00 -370.00	289.02±61.23	90.00 -150.00	1117.21±10.7	0.001
LDL-c (mg/dl)	150.00 -230.00	1175.21±21.50	104.00 -150.00	128.02±9.5	0.001
HDL-c (mg/dl)	20.00 -40.00	32.01±5.01	40.00 -48.00	41.03±1.8	0.001

\*Statistically Significant (P <0.05)

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<sup>2</sup>.

Coronary artery disease (CAD) is the chief single cause of death both in developed and developing countries. It affects the people in the prime of life, when they are in the most productive stage. It is established by now that CAD is potentially preventable, even reversible. It was considered that CAD is the disease of civilization but now the condition is different as CAD is also becomes more prevalent in low socioeconomic group as in rural area. In this study the significant increase in lipid profile was noted in patients IHD. These findings are agreement with the findings of Vakili et al<sup>6</sup>, Nazer et al<sup>7</sup>, and Passey et al<sup>8</sup>. Serum total cholesterol serum, triglycerides serum VLDLc, serum LDLc are statistically higher in IHD patients as compared to controls, where as serum HDLc was found to be low. Similar findings have been reported by various authors<sup>6,8</sup>. The present study underlines the fact that risk of IHD increases with age. Male predominance was noted in our study. Goldstand et al<sup>9</sup> in their study observed IHD to be much less common in premenopausal women than in men of same age. Our study documents that IHD in rural population is more common above the age of 50 years. In our study neither alcoholic nor smoker females reported. Females had slightly low values which correlate with findings of various Indian studies such as Dutta<sup>10</sup> and Vangsarkar et al<sup>11</sup>. The studies of Rifkind et al<sup>12</sup> and Tyroler H A et al<sup>13</sup> showed that lowering cholesterol by cholesterol lowering agents decreases the cholesterol level associated with the decrease in the incidence of coronary artery disease. Our finding shows that hypercholesterolemia is significant risk factor for CAD. Serum triglyceride levels were found to be significantly higher in IHD patients than in age and sex matched controls. Rosenman R H et al<sup>14</sup> observed high serum triglyceride value of in patients with angiographically demonstrated CAD.

Mean HDLc concentration was low in IHD patients. Serum HDLc levels has an inverse relationship with development of CAD. Marisaki et al<sup>15</sup> observed low HDLc levels in the obese diabetic persons. Our findings were similar to that of Miller et al<sup>16</sup>, Castelli<sup>17</sup>, Gordon et al<sup>18</sup> and Garg et al<sup>19</sup>. The mean VLDLc as well as mean LDLc levels were significantly increased in IHD cases as compared to controls. LDLc level above 130mg% is considered to be a risk factor for development of IHD<sup>20</sup>. Kabi et al<sup>20</sup> and Steven A et al<sup>21</sup> showed the positive co-relation of with IHD. Results of Lipid Research Clinic Prevalence Study showed that the ratio of total cholesterol / HDLc was better predictor of CAD<sup>21</sup>. Thus the increase ratio was associated with increased IHD mortality for both young and old patients. This ratio was more in males as compared to that of females of the same

age. This finding co-relates with the observation of Castel and Neaton<sup>22</sup>.

### Conclusion:

This study suggests that the study of lipid profile is must to evaluate the risk of IHD patients as the raising tendency of different lipid fractions were noted. Thus, lipid profile still is a promising predictive biomarker of coronary risk assessment.

### References:

- Kundu S C, Bhattachajee T D: Profile in Myocardial Infarction among the rail road workers I Eastern India a 6 year study. *Indian H Journal*. 1982; 34:151-155.
- Newby DE, Grubb NR, Bradbury A. Cardio Vascular Disease. NR College, BR Walker, SH Ralston (eds). Davidson's Principles & Practice of Medicine; 2010, 21st edition, Churchill Livingstone Elsevier Limited New Delhi, pp. 577-579 .
- Brown DA, Breit SN. CRP and Vascular Risk. *Sydney*; (06/06/2002); Available from: [http://www.sydney.stvincent.com.au/ tests/ CRPRisk.Htm](http://www.sydney.stvincent.com.au/tests/CRPRisk.Htm).
- Ridker PM, Glynn RJ, Hennekens CH. C-Reactive Protein Adds to the Predictive Value of Total and HDL Cholesterol in Determining Risk of First Myocardial Infarction. *Circulation* 1998; **97**: 2007- 2011.
- Ridker PM, Rifai N, Rose L, Buring JE, Cook NR. Comparison of C-Reactive Protein and Low Density Lipoprotein Cholesterol Levels in the Prediction of First Cardiovascular Events. *N Eng J Med* 2002;**347**: 1557-1565.
- Vakili R J: Ischaemic Heart Disease in India. *Brit. Heart J*. 1963; 25:283-290.
- Nazer Y A, Das B et al: Experience with aortic bypass surgery. *Indian Heart J*. 1985;37:165-168.
- Passy M N, Mittal R B Khare U et al: A clinical profile of ischaemic heart disease. *Ind. Heart J*. 1986; 38:334 (abstract).
- Goldstein J L, Brown M S: Low density lipoproteins pathway and it's relation to atherosclerosis. *Ann. Rev. Biochem*. 1977; 40:897.
- Dutt M: Plasma lipids in coronary heart disease. *Indian J of medical Research*. 55, 12; 1967.
- Vengsarkar A S et al: Serum cholesterol and triglycerides and uric acid levels in ischaemic heart disease in low income population in Mumbai. *Indian J of Medical sciences*: vol 22; 12 1968.
- Rifkind B: Policies for prevention of coronary heart disease through cholesterol lowering Drugs. *British Medical Bulletin*, 46; 4, 1059-1947, 1990.
- Tyroler H A: Total serum cholesterol and IHD risk in clinical trials and observational studies. *AMJ Epidemiol*. 1987. 125(1):62- 72.
- Rosenman R H: Role of type A behaviour pattern in pathogenesis and prognosis of IHD. *Adv. Cardiol* . 1982; 29: 77-84.
- Marisaki N et al: Role of obesity in development of IHD in elderly Diabetic patients. *Gerontology* , 1992;38(3): 167-73.
- Miller N E, Forde O H, Mjos O D: The Tromso Heart Study: The high density lipoproteins and CAD – a prospective case control study. *Lancet*, 1977;965-968.
- Castelli W P: Cardiovascular risk and multifactorial Risk: challenge of the 1980s. *American Heart Journal*: 1983;1191-1200.
- Gordon T, Castelli W P: High density lipoprotein as a protective factor against CAD, Framingham study. *American Journal of Medicine*.1977;62:70.
- Garg R K, Arora R C and Agrawal N: Update article, High Density Lipoprotein, *JAPI*, 39, 3:1991.
- Kabi B C, Somani P N: Serum Triglycerides and lipoprotein cholesterol in men survivors of IHD in Eastern U P, North India. *Indian Heart journal*: 37; 176-196.
- Steven A et al: Serum Lipid Screening to identify high risk individuals for coronary death, *Rich. Intern. Med*. 1994; 154: 679- 684.
- Neaton and Wentworth: Heart Disease. *Arch. Intern. Med*. 1992; 152:59-63.