

Study of Serum Lipid Profile Level in Coronary Artery Disease Patients

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Abstract

Background: Lipid disorder often leads to myocardial infarction and heart failure. This study was undertaken to assess the serum lipid profile level in coronary artery disease patients.

Materials and Methods: 100 subjects aged between 30 to 65years, comprising of 50 normal control and 50 patients suffering from CAD were studied.

Result: The observed mean total cholesterol level in CAD patients was 262.92 ± 41.67 mg/dl and that of control group was 172.92 ± 20.61 mg/dl, which was highly significant ($p < 0.001$). HDL-cholesterol was found to be significantly low in CAD group as compared to control ($p < 0.05$).

Conclusion: The early detection of abnormal lipid profile and its proper management by life-style modification and by drugs, if needed may play a key role in preventing the progression of atherosclerotic process in coronary artery disease.

Keywords: Coronary artery disease (CAD), Cholesterol, Triglyceride, LDL, HDL.

Introduction

Coronary artery disease (CAD) is a condition that develops due to the accumulation of atherosclerotic plaque in the pericardial coronary arteries leading to myocardial ischemia. It is a common multifarious public

health crisis today and a leading cause of morbidity and mortality in both developing and developed countries. By 2020, the disease is forecasted to be the major cause of morbidity and mortality in most developing nations.¹

Adverse lipid profile has been recognized as an independent risk factor for atherosclerosis and coronary artery disease (CAD). Lipid disorder often leads to myocardial infarction and heart failure. The relationship between cholesterol and saturated fat with CAD is identified as early as in 1950s. It has been shown that control of total serum cholesterol levels can reduce the incidence and mortality from coronary artery disease. At present, it is firmly believed that dyslipidemia is both atherogenic and thrombogenic².

During dyslipidemia, a major biochemical change in the arteries take place due to accumulation of lipids either in the form of free cholesterol or its ester and this leads to formation of plaques in inner wall of artery. If total cholesterol level is below 150 mg/dl, no new plaques will be formed. Acute coronary event is expected when the plaques with thin fibrous cap ruptures. It is not the degree of narrowing of the coronary artery but the nature of the plaque, which determines the onset of acute coronary event³. Dyslipidemia is known to increase platelets aggregation, fibrinogen levels and platelets activation inhibitor. CAD is associated with several factors,

including raised serum lipid and lipoproteins, an increase in LDL oxidation (free radical damage), increased platelet aggregation (clumping), increased plasma fibrinogen, coagulation factors, hypertension, alterations in glucose metabolism, smoking, genetic and environmental factors.⁴

Materials and Methods

This descriptive study was conducted in the department of Medicine in S.N.Medical College Jodhpur. The study included 100 subjects aged between 30 to 65 years, comprising of 50 normal control and 50 patients suffering from CAD. Patients with renal disease, liver disease, diabetes mellitus, respiratory disease and heart failure were excluded from the study.

The blood sample of CAD patients including controls group was taken after fasting for 10-12 hours. 7-10ml of venous blood was drawn from the antecubital vein by aseptic technique in plain vial. Serum was separated from the collected sample for biochemical analysis. Lipid profile investigations that included serum cholesterol, triglyceride, High density lipoprotein cholesterol (HDL-cholesterol) and Low density lipoprotein cholesterol (LDL-cholesterol) were carried out on a semi automated analyzer using standard kits. Statistical analysis was done using SPSS software (version 22). T-test was used for the comparison of two groups. P-value of <0.05 was considered statistically significant and a p-value of <0.001 was considered to be highly significant.

Lipid profile measured following methods

- 1) **Serum total cholesterol:** was measured by Enzymatic method Normal serum cholesterol: 150-250 mg/dl
- 2) **Serum HDL cholesterol:** was measured by "Phosphotungstate method. Normal HDL – Cholesterol: 30 – 70 mg/dl.
- 3) **Serum LDL cholesterol:** If the value of Triglycerides is known, LDL-cholesterol can be calculated based on

Friedewald's equation. LDL – chol mg/dl: Total CHOL – TRIGLYCERIDES – HDL – CHOL 5

4) **Serum Triglycerides:** was measured by enzymatic colorimetric method Normal Serum Triglycerides: Male: 60-165 mg/dl Female: 40-140 mg/dl.

Results

Table 1: Distribution of age and sex ratio

	No. of cases	Age	Sex ratio (Male: Female)	p-value
Control	50	52.3 ± 6.22	34:16	p>0.05
CAD Patients	50	53.2 ± 2.44	33:17	

Table 2: The level of lipid profile among the cases of CAD and control group

Variable	Control Mean ± SD n=50	CAD Patients Mean ± SD n=50	p-value
Total Cholesterol	172.92 ± 20.61	262.92 ± 41.67	p<0.001
HDL	44.60 ± 6.10	40.22 ± 7.80	p<0.05
LDL	112.04 ± 23.50	187.70 ± 43.30	p<0.001
Triglycerides	118.22 ± 41.60	172.40 ± 70.40	p<0.001

Discussion

The mean total cholesterol level was found to be 172.92 ± 20.61 mg/dl with a range of 150-200 mg/dl present in normal subjects and mean concentration of cholesterol level was increased to 262.92 ± 41.67 mg/dl in CAD patients. The increase was statistically highly significant (p<0.001) and the result of present study resembled with the findings of Ambrose et al⁵ and Watson et al⁶.

The mean HDL level was found to be 44.60 ± 6.10 mg/dl with a range of 30-60 mg/dl present in normal subjects and mean concentration of HDL level was decreased to 40.22 ± 7.80 mg/dl in CAD patients. The decrease was statistically significant (p<0.05) and the result of present study resembled with the finding of Connor WE et al⁷.

The mean LDL level was found to be 112.04 ± 23.50 mg/dl with a range of 80-150 mg/dl present in normal subjects and mean concentration of LDL level was increased to 187.70 ± 43.30 mg/dl in CAD patients. The

increase was statistically highly significant ($p < 0.001$) and the result of present study resembled with the findings of Tibblin et al⁸ and Ritu et al⁹.

The mean Triglyceride level was found to be 118.22 ± 41.60 mg/dl with a range of 75-150 mg/dl present in normal subjects and mean concentration of Triglyceride level was increased to 172.40 ± 70.40 mg/dl in CAD patients. The increase was statistically highly significant ($p < 0.001$) and the result of present study resembled with the findings of Knuiman JT¹⁰ and Ambrose et al⁵.

Conclusion

The early detection of abnormal lipid profile and its proper management by life-style modification and by drugs, if needed may play a key role in preventing the progression of atherosclerotic process in coronary artery disease.

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