Study of Serum Lipid Profile Level in Coronary Artery Disease Patients

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ABSTRACT

Background: 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. This study was undertaken to assess the serum lipid profile level in coronary artery disease patients.

Materials and Methods: 100 subjects aged between 35 to 60years, comprising of 50 normal control and 50 patients suffering from CAD were studied.

Result: The observed mean total cholesterol level in CAD patients was 258.92 ± 46.67 mg/dl and that of control group was 175.98 ± 21.67 mg/dl, which was highly significant ($p < 0.001$). Highly significant ($p < 0.001$) increase of LDL-cholesterol was seen in CAD patients (185 ± 42.10 mg/dl), when compared to controls (108.06 ± 24.06 mg/dl). The mean serum triglyceride level for CAD patients (161.46 ± 72.74 mg/dl) was found to be highly significant ($p < 0.001$) as compared to control (117.80 ± 46.82 mg/dl). HDL-cholesterol was found to be significantly low in CAD group as compared to control ($p < 0.05$).

Conclusion: This cross sectional study showed that high serum cholesterol, LDL, triglyceride and low HDL cholesterol were clinically significant in all the age groups.

KEYWORDS: Coronary artery disease, Cholesterol, Triglyceride, LDL, HDL.

INTRODUCTION

The situation of coronary heart disease in India is quite alarming. According to a report, mortality from cardiovascular diseases was projected to decline in developed countries from 1970 to 2015, while it was projected to almost double in the developing countries[1]. In the Global Burden of Disease study, it was reported that out of 9.4 million deaths in the whole world in 1990, cardiovascular diseases caused 2.3 million deaths (25%). It has been predicted that by 2020 there would be 111% increase in cardiovascular deaths in India. This increase is much more than 77% for China, 106% for other Asian Countries and 15% for economically developed countries[2]. The incidence of coronary heart disease in any population is associated with the relative shifts in its biological characteristics, such as serum lipids, blood pressure, blood glucose, insulin and thrombogenic factors. This hypothesis is based on Pickering's observation that sick individuals are just the extreme of a continuous distribution and Key's postulation of sick individuals and sick populations[3].These shifts are a consequence of changes in lifestyles-smoking, physical activity, alcohol intake and rich diet as well as

psychosocial influences that accompany economic transition[4].

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 thrombogenic.

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 event. 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.

MATERIALS AND METHODS

This descriptive study was conducted in the department of Biochemistry and Medicine in Prince Bijaysingh Memorial (PBM) Hospital associated with Sardar Patel Medical College, Bikaner. The study included 100 subjects aged between 35 to 60 years, comprising of 50 normal control and 50 patients suffering from CAD. Required permission for the research methodology was obtained from ethical committee of the institute. 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 anticubital 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 20). 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.

RESULTS

The observed mean total cholesterol level in CAD patients was 258.92 ± 46.67 mg/dl and that of control group was 175.98 ± 21.67 mg/dl, which was highly significant (p<0.001). Highly significant (p<0.001) increase of LDL-cholesterol was seen in CAD patients (185 ± 42.10 mg/dl), when compared to controls (108.06 ± 24.06 mg/dl). The mean serum triglyceride level for CAD patients (161.46 ± 72.74 mg/dl) was found to be highly significant (p<0.001) as compared to control (117.80 ± 46.82 mg/dl). HDL-cholesterol was found to be significantly low in CAD group as compared to control (p<0.05).

Table 1: Distribution of age and sex ratio

	No. of cases	Age	Sex ratio (Male:Female)
Control	50	50.8 ± 5.52	39:11
CAD Patients	50	52.9 ± 6.74	33:17

t=1.704, p>0.05

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

Variable	Control Mean±SD n=50	CAD Patients Mean±SD n=50	t value	Inference
Total Cholesterol	175.98 ± 21.67	258.92 ± 46.67	t=11.39	p<0.001
HDL	45.80 ± 6.53	41.88 ± 8.84	t = 2.52	p<0.05
LDL	108.06 ± 24.06	185.50 ± 42.10	t=11.28	p<0.001
Triglycerides	117.80 ± 46.82	161.46 ± 72.74	t = 3.56	p<0.001

DISCUSSION

The mean total cholesterol level was found to be 175.98 ± 21.67 mg/dl with a range of 150-200 mg/dl present in normal subjects and mean concentration of cholesterol level was increased to 258.92 ± 46.67 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 al[5] and Watson et al[6].

The mean HDL level was found to be 45.80 ± 6.53 mg/dl with a range of 30-60 mg/dl present in normal subjects and mean concentration of HDL level was decreased to 41.88 ± 8.84 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 al[7].

The mean LDL level was found to be 108.06 ± 24.06 mg/dl with a range of 80-150 mg/dl present in normal subjects and mean concentration of LDL level was increased to 185.42 ± 42.10 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 al[8] and Ritu et al[9].

The mean Triglyceride level was found to be 117.80 ± 46.82 mg/dl with a range of 75-150 mg/dl present in normal subjects and mean concentration of Triglyceride level was increased to 161.46 ± 72.74 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 JT[10] and Ambrose et al[5].

CONCLUSION

This cross sectional based study showed that high serum cholesterol and triglyceride and low HDL cholesterol are clinically significant in all the age groups. The importance of this study lies in the fact that it reveals a distinct association of dyslipidemia with CAD and highlights patients with dyslipidemia as potential targets for early intervention. Therefore, 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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