ORIGINAL RESEARCH

Assessment of correlation between cardiac enzyme markers and lipid profiles in coronary artery disease

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Revised date: 20 December, 2023 Acceptance date: 24 January, 2024

ABSTRACT

Background: Despite notable progress in prevention and treatment, coronary artery disease (CAD) continues to be the most common cause of mortality and one of the primary causes of ischemic heart disease.The present study was conducted to assess correlation between cardiac enzyme markers and lipid profiles in coronary artery disease. **Materials & Methods:** The study was conducted at Department of Medicine, Patna Medical College and Hospital, Patna during Jan 2023 - June 2023. 36 patients with coronary artery disease of both genderswere put in group I and healthy control in group II. 5ml blood samples were collected under aseptic precautions for the estimation of lipid profile and cardiac enzymes such as total cholesterol, triglycerides, LDL, HDL, CK-MB, AST. **Results:** Out of 36 patients, males were 20 and females were 16. Total cholesterol was 231.6 mg/dl in group I and 170.5 mg/dl in group II. LDL was 143.8 mg/dl in group I and 115.0 mg/dl in group II. HDLwas 52.9 mg/dl in group I and 42.7 mg/dl in group II. TG was 124.6 mg/dl in group I and 105.3 mg/dl in group II. The difference was significant (P< 0.05). The mean CK- MB level in group I was 56.3 and in group II was 17.4. AST level was 75.8 in group I and 25.9 in group II.The difference was significant (P< 0.05). There was significant positive correlation between CK-MB and AST =. CK- MB showed positive correlation between TC, LDL, HDL and TG. AST showed positive correlation between TC, LDL, TG and negative correlation between HDL. **Conclusion:** There was a notable positive connection between CK-MB and AST. On the other hand, there is no discernible relationship between TC, HDL, and LDL. The assessment of lipid parameters and cardiac enzyme indicators in CAD patients would be used as a tool for future prevention of coronary artery disease patients, either for medication or lifestyle changes.

Keywords: coronary artery disease, AST, lipid

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INTRODUCTION

Despite notable progress in prevention and treatment, coronary artery disease (CAD) continues to be the most common cause of mortality and one of the primary causes of ischemic heart disease.[1] Even in developing nations, the number of MI cases has sharply increased due to a combination of factors including a stressful yet sedentary lifestyle, food intake high in fat and energy, smoking, and a lack of physical activity that leads to obesity.[2] As per the WHO's 2005 report, coronary heart disease is responsible for 7.6 million deaths worldwide, accounting for 13.2% of all deaths. Fewer developing nations were the site of more than 80% of these fatalities. It is projected that by the end of 2020, IHD will rank as the leading cause of death globally. Lipid deposits in arteries result from high TC, LDL, TG, and low HDL levels, which leads to atherosclerosis. In order to prevent CAD, lipid profiles are routinely examined for risk assessment.[3]

Total cholesterol determines a patient's total cholesterol by measuring each lipoprotein subclass. Elevated blood cholesterol levels are linked to atherosclerosis and a higher chance of developing heart disease. Therefore, cholesterol testing is essential to the provision of preventative healthcare.[4] Levels less than 5 mmol/l are advised by the European Society of Cardiologists (ESC) and the American National Cholesterol Education Programme (NCEP). Serum CK-MB kinetics gives useful information regarding the extent and timing of myocardial injury. It begins to increase between 3-5 hours after the onset of infarction and peaking at 16-20 hours. It has been considered as the 'Gold Standard' for confirmation of MI.[5]The present study was conducted to assess correlation between cardiac enzyme markers and lipid profiles in coronary artery disease.

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MATERIALS & METHODS

The study was conducted at Department of Medicine, Patna Medical College and Hospital, Patna during Jan 2023 - June 2023. The present study was conducted on36 patients with coronary artery disease of both genders.All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were put in group I and healthy control in group II. 5ml blood samples were collected under aseptic precautions into plainvacutainer tubes, heparine tube and the serum obtained after centrifuging the blood is proceeded for the estimation of lipid profile and cardiac enzymes such as total cholesterol, triglycerides, LDL, HDL, CK-MB, AST. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 36		
Gender	**Male**	**Female**
Number	20	16

Table I shows that out of 36 patients, males were 20 and females were 16.

Table II Assessment of lipid profile

Lipid profile	Group I	Group II	P value
Total cholesterol	231.6	170.5	0.05
LDL	143.8	115.0	0.02
HDL	52.9	42.7	0.04
TG	124.6	105.3	0.03

Table II shows that total cholesterol was 231.6 mg/dl in group I and 170.5mg/dl in group II. LDL was 143.8mg/dl in group I and 115.0mg/dl in group II. HDL was 52.9mg/dl in group I and 42.7mg/dl in group II. TG was 124.6mg/dl in group I and 105.3mg/dl in group II. The difference was significant (P< 0.05).

Graph I Assessment of lipid profile

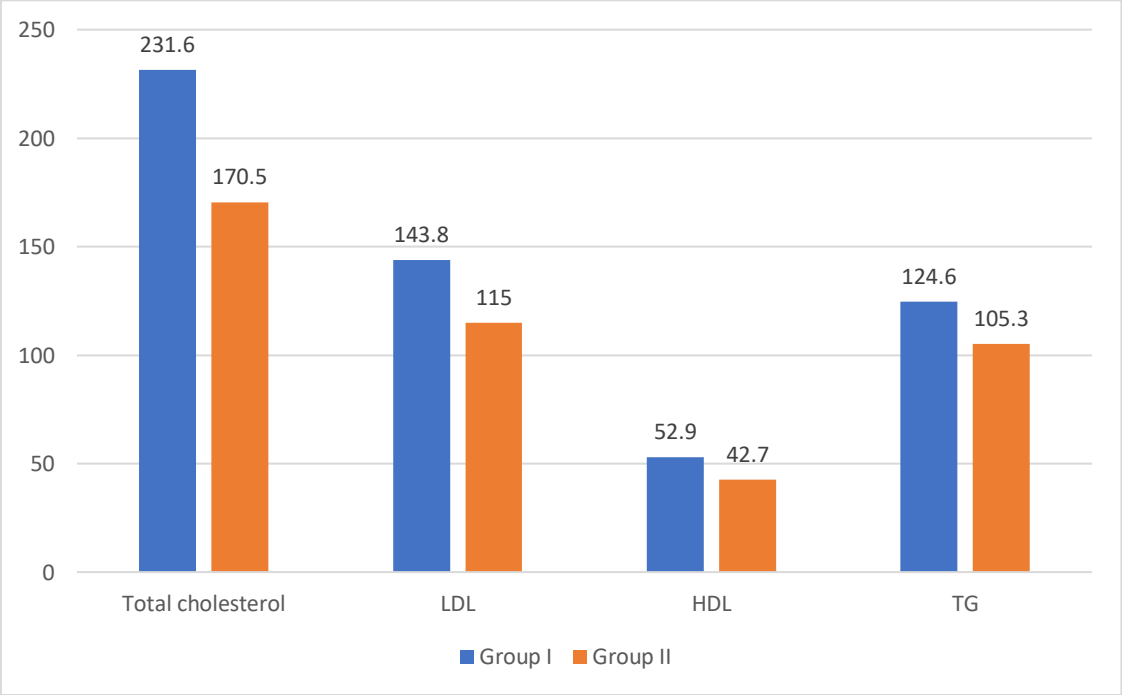

Table III Assessment of cardiac enzymes

Cardiac enzymes	Group I	Group II	P value
CK-MB	56.3	17.4	0.01
AST	75.8	25.9	0.01

Table III shows that mean CK- MB level in group I was 56.3 and in group II was 17.4. AST level was 75.8 in group I and 25.9 in group II.The difference was significant (P< 0.05).

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Table IV Pearson correlation values for cardiac enzyme markers with lipid profile

Parameters	Variables	r value	P value
CK-MB	AST	0.82	0.03
	TC	0.08	0.17
	LDL	0.07	0.54
	HDL	0.04	0.24
	TG	0.31	0.77
AST	TC	0.05	0.89
	LDL	0.72	0.12
	HDL	-0.19	0.18
	TG	0.01	0.11

Table III shows that there was significant positive correlation between CK-MB and AST =. CK- MB showed positive correlation between TC, LDL, HDL and TG. AST showed positive correlation between TC, LDL, TG and negative correlation between HDL.

DISCUSSION

Atherosclerosis is the primary cause of AMI. Research conducted in the past 20 years has disproved previous theories by demonstrating that atherosclerosis is not a degenerative condition or an unavoidable result of aging.[6] In contrast, it appears that atherosclerosis is a persistent inflammatory condition that triggers a plaque rupture, which subsequently results in thrombosis.[7] Therefore, inflammation plays a crucial role in every stage of atherosclerosis, even though it takes decades for inflammation to manifest clinically as an AMI.[8,9]The present study was conducted to assess correlation between cardiac enzyme markers and lipid profiles in coronary artery disease.

We found that out of 36 patients, males were 20 and females were 16.Vijaitha et al[10], patients with coronary artery disease (n=30) and healthy controls (n=30) were the subjects of this study. Patients with Coronary artery disease had shown significant rise in CK-MB and AST and the lipid parameters like Low Density Lipoprotein (LDL) and Total cholesterol (TC) had shown significant increase in cases compared to normal healthy individuals. The CK-MB showed a significant positive correlation with AST and also showed positive correlation with increase in TC, HDL, LDL.

We found that total cholesterol was 231.6 mg/dl in group I and 170.5 mg/dl in group II. LDL was 143.8 mg/dl in group I and 115.0 mg/dl in group II. HDLwas 52.9 mg/dl in group I and 42.7 mg/dl in group II. TG was 124.6 mg/dl in group I and 105.3 mg/dl in group II. Some studies showed that there are correlations between the occurrence of AMI and abnormality of lipid profiles. Some other study showed that there was an increase in serum triglycerides during AMI. Elevated serum cholesterol has depended on elevated consumptions of fat and genetic basis. LDL carries the most of cholesterol in the plasma and increasing of LDL depend on increasing of total cholesterol level.[11,12]

We found that mean CK- MB level in group I was 56.3 and in group II was 17.4. AST level was 75.8 in group I and 25.9 in group II.There was significant positive correlation between CK-MB and AST =. CK-MB showed positive correlation between TC, LDL, HDL and TG. AST showed positive correlation between TC, LDL, TG and negative correlation between HDL. According to the study conducted by Sharbari Basu et al[13], CKMB appears to be a better indicator of AMI as compared to cardiac troponins especially within the first few hours of AMI.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that there was a notable positive connection between CK-MB and AST. On the other hand, there is no discernible relationship between TC, HDL, and LDL. The assessment of lipid parameters and cardiac enzyme indicators in CAD patients would be used as a tool for future prevention of coronary artery disease patients, either for medication or lifestyle changes.

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