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Original Research Article

Study of Myeloperoxidase and LDL -C- in acute Coronary Artery Disease

Meenakshi Singh[1], Shrikant .W.Masram[2*]
[1]Associate Professor, Department of Biochemistry, Abhishek I Mishra Memorial Medical College & Research, Bhilai.
[2*]Professor and HOD, Department of Biochemistry, Abishek I Mishra Memorial Medical College & Research, Bhilai.
Corresponding Author: Shrikant .W.Masram, Professor and HOD, Department of Biochemistry, Abishek I Mishra Memorial Medical College & Research, Bhilai.
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ABSTRACT
Background: Coronary artery disease is the leading cause of death worldwide. Myeloperoxidase and its correlation with oxidized LDL have been studied and informative to the diagnostic, therapeutic and prognostic aspect of coronary artery disease.
Aim: To study the correlation of Myeloperoxidase (MPO) with LDL-C.
Material and Methods: Fifty each already diagnosed patient of coronary artery disease along with fifty control were studied for MPO and LDL-C.
Result:-MPO as well as LDL-C were increases significantly in coronary artery disease as compared to that of control.

INTRODUCTION
Our study revealed that MPO is significantly correlated with that of LDL-C and may be the important risk factor for coronary artery disease.

Introduction

By the end of 20th Century, CAD has become the most common cause of death and premature invalidity in the world [1,2] . Several risk factors such as age,sex,hypertension,Diabetes mellitus ,hypercholesterolemia and smoking have been investigated in epidemiological studies. Most commonly CVD is believe to be multifactorial[3].
Lipid profile is especially high plasma level of LDL-C is an established risk factor for development of coronary artery diseases and the adequate LDL-C lowering therapy with statins has been shown to reduce the prevalence of CAD by 30-40% [4]. Many phenotypes of LDL-C such as oxidized LDL-C and small dense LDL-C accelerate atherosclerosis much greater than native LDL-C, therefore efforts should be made to modulate LDL-C size and sub classes in order to decrease the residual cardiovascular risk[5].
Function of lipoproteins is impaired by MPO. MPO, member of heme peroxidase superfamily is stored in azurophilic granules of polymorphonuclear neutrophil and macrophage. MPO dependent halides tyrosyl radicals and reactive nitrogen species involved in generation of proatherogenic oxidized LDL-C [6].
In the present study therefore we evaluated serum MPO level and LDL-C in patient with CAD and tried to prove concept that MPO may be an important risk factor in coronary artery disease along with LDL-C.

Materials and methods

Patient were already diagnosed as having CAD and under treatment in medicine dept. of Govt. medical college and hospital Nagpur.
Group -1-: Cases -: A total of 50 cases with the following inclusion and exclusion criteria were selected for study.
Group 2-: Control Group-: 50 healthy age and sex matched individuals between 30-75 years.

Inclusion Criteria

1. Diagnosed cases of coronary artery disease
2. Patients with age between 30 years to 75 years.

Exclusion Criteria

1. Patients with Diabetes mellitus
2. Chronic smokers, tobacco chewers
3. Patients who have undergone major surgery in past

All the subjects included in the study were evaluated as per proforma and each patient underwent detailed clinical history, physical

examination and investigated after informed consent.

P value > 0.05: Non-significant (NS)
<0.05: significant (S)
<0.01: moderately significant (S)
<0.001: highly significant (HS)

Specimen Collection

A 5ml blood specimen was collected in clean, plain bulb after overnight fasting under all aseptic precautions. Samples were transferred to the laboratory where serum was separated and following biochemical tests were performed.

Equipment's for analysis:

1. Lisa Plus Microplate ELISA Reader and Washer Rapid Diagnostics
MPO METHOD: - Elisa Technique

2. Transasia Erba Chem Plus Semi-Automatic Analyzer:

No.	Parameter	Method
1	Total Cholesterol	Enzymatic method - Cholesterol esterase, cholesterol oxidase and peroxidise
2	HDL-C	Precipitation method – End point
3	LDL-C	Indirect method - Friedwald Equation
4	VLDL-C	Indirect method - Friedwald Equation
5	Triglycerides	Enzymatic method - Glycerol phosphate oxidase and peroxidase; End point

Measurement of MPO: It was measured by using solid phase enzyme immunoassay kit manufactured by AESKU.DIAGNOSTICS GmbH & Co.

Principle: Serum samples diluted 1:100 are incubated in the microplates coated with the specific antigen. Patient´s antibodies, if present in the specimen, bind to the antigen. The unbound fraction is washed off in the following step. Afterwards anti-human immunoglobulins conjugated to horseradish peroxidase (conjugate) are incubated and react with the antigen-antibody complex of the samples in the microplates. Unbound conjugate is washed off in the following step. Addition of TMB-substrate generates an enzymatic colorimetric (blue) reaction, which is stopped by diluted acid (color changes to yellow). The intensity of color formation from the chromogen is a function of the amount of conjugate bound to the antigen-antibody complex and this is proportional to the initial concentration of the respective antibodies in the patient sample.

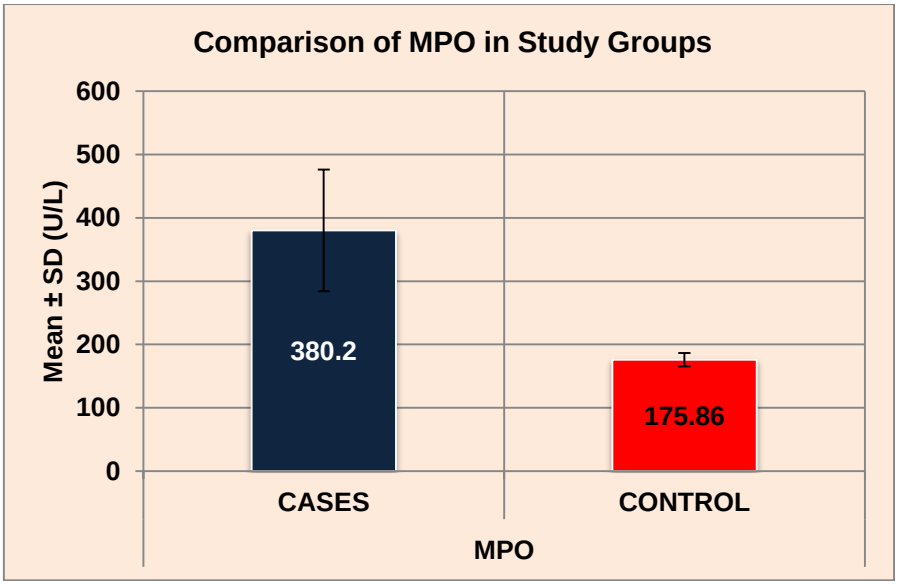
RESULTS AND OBSERVATION

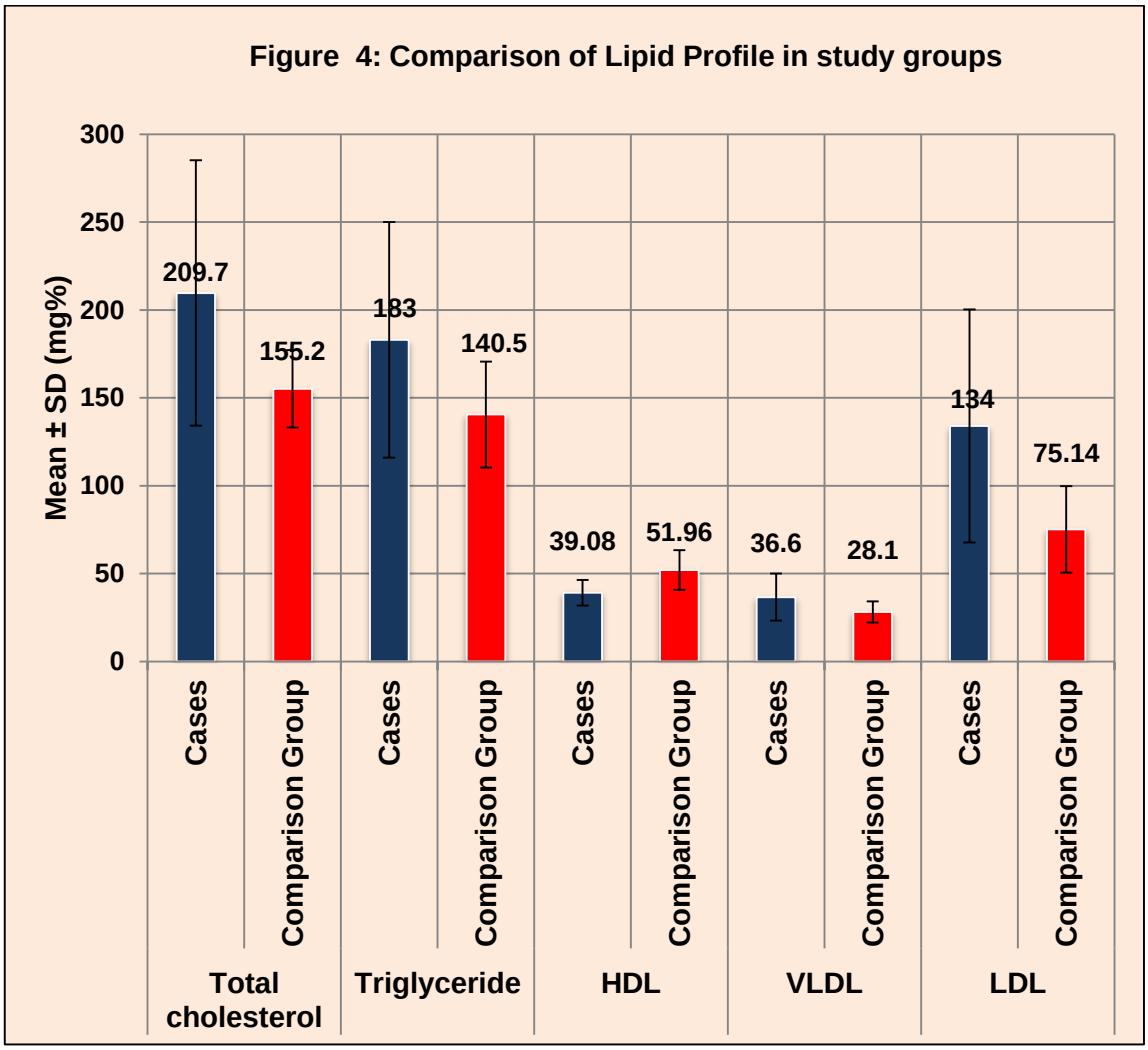
Table no. 1 Statistical analysis and comparison of MPO and LDL-C in cases of coronary artery disease (N:-50) and comparision group (N:-50).

Laboratory Parameters	Group	Mean	Standard Deviation	Standard Error Mean	P Value
MPO (U/ML)	Cases	380.2	96.07	13.59	<0.001
	Control	175.66	10.72	1.52	
LDL-C Mg/dl	Cases	134.02	66.35	9.38	<0.001
	Control	75.14	24.62	3.48	

Above table shows that mean value of MPO in cases with CAD was found to be 380.2±96.07 (U/ml) and in comparision group it is175.86±10.72 (U/ml).
And after applying unpaired T-test it was found to be highly significant (P<0.001).

1. Mean value of LDL in cases with CAD is found to be 134±66.4 (mg/dl) and in comparison group it is 75.1±24.6 (mg/dl) (Figure 4) and after applying unpaired t-test it was found to be highly significant (p<0.001).





DISCUSSION

Serum Markers

A) Serum MPO level and Cardiovascular risk

Our results is similar to zhang and co-workers [7] who have demonstrated that elevated levels of MPO were associated with coronary artery disease in patient with angiographic confirmation of coronary artery disease when compared to control.

In another study carried out by brennan et al [8] who recruited all patients presenting with chest pain including 23.5 % of patients with a final diagnosis of a AMI, MPO levels were found to be higher. It suggest that there is neutrophil activation which precede AMI.

Baldus S et al [9] in his study proved that there is an association between MPO level and risk of coronary artery disease.

B) LDL –C in coronary artery disease.

Serum level of LDL-C was found to be significantly high in cases of coronary artery diseases than in comparision group ($P<0.001$)

Study carried out by Stocker R et al[10] they showed that oxidized LDL has several proatherogenic effects such as the inhibition of endothelial nitric oxide synthase, promotion of vasoconstriction and adhesion, cytokine stimulation and stimulation of platelet aggregation. It may be reason for increase in risk coronary artery disease in population with high concentration of LDL-C.

Our study shows that there is proportional rise in serum MPO level with serum LDL-C. This may be due to decrease in Lipoprotein lipase activity in patients with CAD. Furthermore inflammation plays a major role in atherosclerotic development and role of MPO can be explained by firstly its ability to affect chemotactic ability of neutrophil, secondly it participate in inflammatory process and ability to regulate inflammatory response.

CONCLUSION

After collecting all the data statistical analysis was done and it was found that LDL-C was positively correlated with MPO in patient with CAD.

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