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To analyze how LDL-C/HDL-C ratio and inflammatory marker CRP are organized in acute myocardial infarction

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Abstract---There is an increasing incidence of coronary artery disease in India. We therefore need a tool to evaluate the severity and prognosis of this acute myocardial infarction. In acute myocardial infarction, the function of plaque rupture and inflammation has already been identified. Aim: To study the organization of LDL-C/HDL-C ratio and inflammatory marker CRP in acute myocardial infarction. Methods and Material: Patients who have been diagnosed as acute myocardial infarction (ST Elevation Acute myocardial Infarction or Unstable angina/Non ST Elevation Myocardial Infarction) and admitted to ICCU of Government of medical sciences, Kadapa, AP. July 2021 to December 2021, are the subjects. Sample consists of 100 cases of acute myocardial infarction. Case history was taken from the patients, and studied according to proforma. Conclusion: Elevated levels of CRP are independent indicators of adverse effects. When contrast with the LDL / HDL ratio, CRP is used for risk stratification and as a prognostic predictor. These findings suggest that in patients with acute myocardial infarction, raised CRP Levels is significant as compared to LDL/HDL ratio.

Keywords---Coronary artery diseases, acute myocardial infarction, LDL-C, HDL-C, CRP, hsCRP.

Introduction

The 20th century saw significant changes in cardiovascular disease trends. Cardiovascular disease accounts for about 12 million deaths per year and is the world's most common cause of death⁽¹⁾. Asian Indians have a much higher incidence of coronary artery disease than all other ethnic groups, whether living in their own country or elsewhere. In the developed world, cardiovascular system involvement throughout syphilitic and tuberculosis has become rare and rheumatic disease incidence has declined significantly. On the other hand, myocardial and tissue-related diseases were diagnosed with increasing frequency and the significance of arterial hypertension was well known⁽²⁾. Consequently, myocardial infarction remains an important health issue and needs ongoing attention from basic and medical clinicians, epidemiologists, and practitioners.

The advancement in atherosclerotic vascular disease pathophysiology has brought new insight into possible markers of secret atherosclerosis underlying and cardiovascular danger. Now, a number of novel inflammatory markers, particularly C-reactive protein (CRP), have been focused for a few days. The fact that inflammation is an important factor in acute myocardial infarction is becoming increasingly clear. Inflammatory cytokines from the inflamed tissue will be released with inflammation, which induces the liver to synthesize a variety of acute phase proteins, including the prototypic acute phase reactant, C reactive protein⁽³⁾.

For possible novel markers for cardiovascular risk assessment, prospective clinical studies have tested multiple acute phase proteins, cytokines and inter-cellular adhesion molecules in accordance with laboratory evidence. For this function, CRP has several features that make this inflammatory marker particularly attractive. In response to acute injury, infection, or other inflammatory stimuli, CRP is well defined as a marker of systemic inflammation and is known to increase several hundred folds. The concentrations remain stable in the absence of new stimuli over long periods of time and depend entirely on the level of hepatic development, rather than on factors that influence protein clearance⁽⁴⁾.

C reactive protein is a liver-produced plasma protein. This is a protein family member of pentraxin. CRP was originally discovered by Tillett and Francis⁽⁵⁾ in 1930 as a compound that interacted with C polysaccharide of pneumococcus in the serum of patients with acute inflammation. The two main plasma lipids are cholesterol and triglycerides that are insoluble in the plasma's aqueous setting and are solubilized by integrating them into lipoproteins. Lipoprotein consists of the central core of hydrophobic lipids (TG and cholesterol esters) and the outer monolayer which includes proteins called apoprotein or apolipoprotein which give their names to the complex.

Lipoproteins are lipid and protein complexes that are necessary for cholesterol, triglycerides and fat-soluble vitamins to be transported. The lipid reduction therapy presentation significantly reduces ASCVD's medical complications⁽⁶⁾. Diabetes raises the LP(a) excess CAD risk by more than 3 times. LP(a) excess is also associated with rapid development of atherothrombosis in hypertensive

patients and four fold higher risk of myocardial infarction. It should be noted that in those who had all 5 standard risk factors considered in the Framingham heart study, the risk of CAD was increased 20 fold⁽⁷⁾.

Material and Methods

Patients who have been diagnosed as acute myocardial infarction (ST Elevation Acute myocardial Infarction or Unstable angina/Non ST Elevation Myocardial Infarction) and admitted to ICCU of Government Medical college, Kadapa, AP. are the subjects. Study period July 2021 to December 2021 Sample consists of 100 cases of acute myocardial infarction. Case history was taken from the patients, and studied according to proforma.

Inclusion Criteria:

100 patients admitted to ICCU of Rajiv Gandhi institute of Medical Sciences Kadapa, with the diagnosis of

1. ST Elevation Acute myocardial Infarction (STEMI)
2. Unstable angina/Non ST Elevation Myocardial Infarction (NSTEMI)

Diagnosis of Acute myocardial infarction was made by history, physical examination and electrocardiogram.

Exclusion Criteria:

1. Patients below 45years of age.
2. Individuals of rheumatic disease, chronic liver disease, renal disorders, diabetes, sepsis, and critically ill patients with infectious diseases of less than a month length and 3-month surgical procedure.
3. Patient on statin therapy.

In all patients, electrocardiography and echocardiography were done in addition to routine blood investigations. All patients were monitored and observed for complications development.

Results

Between 59 and 69 years of age, the maximum incidence of acute coronary syndrome was observed, representing 35 (35 percent) patients. Youngest, 42, suffered from STEMI. Eighty-one years oldest was a male with UA / NSTEMI. A rate equal to or greater than 0.5 mg / dL is detected as positive, according to the qualitative method of measuring the measurement of C reactive proteins. Negative is a point below 0.5 mg / dL. 76(76 percent) of patients in our sample had detectable levels of C reactive protein (i.e. equal to or greater than 0.5 mg / dL). The table below shows high levels of C reactive protein and its relationship to complications.

Distribution according to CRP and LDL/HDL ratio

C Reactive Protein Levels	LDL-C/HDL-C < 3	LDL-C/HDL-C > 3	Total
< 0.5 mg/Dl	18	6	24
> 0.5 mg/dL	60	16	76
Total	78	22	100

Price Chi Square found by correction Yates, $X^2_{yc} = 0.002$. The value of p at one degree of freedom is very significant ($p > 0.01$). It means that patients with high serum C reactive level also had LDL / HDL > 3 as opposed to patients with low serum C reactive level.

Discussion

In our sample mean age of incidence of ACS is 59 years. The mean age was seventh decade in the study of Foussas et al⁽⁸⁾, and Mohmoud Suleiman et al.⁽⁹⁾ And coronary artery diseases occur a decade earlier in the Indian subcontinent than in the western population. So, our patients' average age is equivalent to the above reports. Fifty (50%) patients had lipid abnormalities in our study. High triglycerides and low HDL levels were the most prominent lipid abnormalities. 65.6 percent of patients had lipid abnormalities in Foussas et al⁽⁸⁾, study. And 43 percent of patients had dyslipidemias in Mohmoud Suleiman et al⁽⁹⁾, study. LDL / HDL ratio was taken in all patients. The LDL/HDL ratio of 100 patients exceeded 3 in 18 patients and less than 4 in 82 patients. Thus the ratio with the incidence of myocardial infarction is not significant ($p < 0.01$).

A rate equal to or greater than 0.5 mg / dL is detected as positive, according to the qualitative method of measuring the measurement of C reactive proteins. Negative is a point below 0.5 mg / dL. 76(76 percent) of patients in our sample had detectable levels of C reactive protein (i.e. equal to or greater than 0.5 mg / dL). The table below shows high levels of C reactive protein and its relationship to complications. P Mishra et al⁽¹⁰⁾ studied 50 cases of acute myocardial infarction and found that serum CRP admission concentration is an important prognostic indicator of their hospital stay. According to these findings, more adverse events were also associated with increased levels of plasma C Reactive Protein in our research.

(JPMA 56:318;2006)High serum CRP levels rather than high LDL:HDL are associated with myocardial infarction in patients with myocardial infarction in NICVD. This study found that high serum C-reactive protein is significantly associated with myocardial infarction rather than high LDL:HDL, particularly in the 46-60 year age group. Low serum levels of high density lipoproteins were also associated with acute myocardial infarction ⁽¹¹⁾.

Conclusion

In the setting of acute myocardial infarction, plasma CRP levels on admission are used to identify high risk patients. The successful risk stratification given may be of particular value in the heterogeneous population of patients with acute myocardial infarction for early clinical decision-making and patient care. In fewer patients, the significant LDL / HDL ratio was increased. In contrast to the LDL / HDL ratio, the raised C reactive protein level is therefore more significant with the acute myocardial infarction. Elevated levels of CRP are independent indicators of adverse effects. When contrast with the LDL / HDL ratio, CRP is used for risk stratification and as a prognostic predictor. These findings suggest that in patients

with acute myocardial infarction, raised CRP Levels is significant as compared to LDL/HDL ratio.

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