ORIGINAL ARTICLE

C - REACTIVE PROTEIN AS A PREDICTOR OF EARLY OUTCOME FOLLOWING ACUTE MYOCARDIAL INFARCTION

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Abstract:

Background: *Acute myocardial infarction (AMI) which constitutes STEMI & NSTEMI triggers an inflammatory reaction, which plays an important role in myocardial injury. An inflammatory marker such as C - reactive protein (CRP) reflects the extent of myocardial necrosis.Circulatory levels of C-reactive protein (CRP) may be an independent risk factor for cardiovascular disease.* **Methods:** *An observational study was carried out in the department of Medicine and department of Cardiology of Faridpur Medical CollegeHospital, Faridpur from May 2012 to October 2012. One Hundred Patients were selected consecutively from acute Myocardial Infarction patients admitted in the department of medicine and Department of Cardiology of Faridpur Medical College Hospital. The sample was selected purposively. Quantitative value of CRP was done on first day of admission. Z test of proportion was done to analyze the data. Level of significance was < 0.05.* **Results:** *In this study, 84% of AMI had CRP level >6 mg/dl.86% patients had STEMI, and 14% patients had NSTEMI. Out of 86 patients with STEMI, 72 patients (83.72%) & out of 14 patients with NSTEMI, 12 patients (85.71%) had high CRP. Out of 72 STEMI patients with high CRP level, 22 patients (30.55%) & 6 patients (8.33%) were expired. Out of 12 NSTEMI patients with high CRP level, 2 patients (16.67%) developed left ventricular failure&no one was expired. STEMI was associated with worst outcome 30.55% vs 16.67% left ventricular failure and 8.33% vs 0% mortality rate.* **Conclusions:** *High CRP is a predictor of adverse early outcome in patients with acute coronary syndromes*

Key words: *C-reactive protein, predictor, early outcome, Acute myocardial infarction.*

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Introduction:

Ischemic heart disease (IHD) causes more deaths and disabilities and carries more economic costs than any other illness in the developed world. IHD is the deadliest disease in America, with 13 million people with IHD,>6 million with angina pectoris, and >7 million with myocardial infarction (MI). In the United States and Western Europe, it is growing among low-income groups rather than high income groups, while primary prevention has delayed to develop the disease in all socioeconomic groups. Prevalence of risk factors for IHD is increasing in low - income and middle income countries. Population subgroups that appear to be particularly affected are men in South Asian countries, especially India and throughout the world.By 2020, IHD could become the most common cause of death[1].

Acute coronary syndrome (ACS) is one of the leading causes of death and disability in the world. It includes ST elevation myocardial infarction (STEMI), non ST elevation MI (NSTEMI) and unstable angina (UA) [2].Acute myocardial infarction (AMI) causes an inflammatory response, which plays an important role in the myocardial injury. Inflammatory markers such as C-reactive Protein (CRP) reflects the extent of myocardial necrosis and correlate with cardiac

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outcomes following AMI[3,4,5,6,7]. Circulatory levels of C-reactive protein (CRP) may be independent risk factor for cardiovascular disease.

High C-reactive protein (CRP) level has been associated with higher mortality and morbidity rate in patient with acute myocardial infarction (AMI). Study shows that, among the patients with AMI, CRP was higher in patients with the heart failure (HF) than in patients without heart failure[8].

The aim of this study is to observe the significance of CRP level in patients with acute Myocardial Infarction (STEMI and NSTEMI) and to study the relationship between CRP and early outcome following AMI. Few studies have shown the relation between early outcome following acute myocardial infarction and high serum C - reactive protein level. Acute coronary syndrome is common in Bangladesh and is the major cause of death and disability, but there is no such adequate data in Bangladesh. The finding of this study will be able to strengthen the current knowledge. This will also help to observe and evaluate the importance of CRP level in STEMI & NSTEMI and their outcome in our country.

Methods:
An observational study was carried out in the department of Medicine and department of Cardiology of Faridpur Medical College Hospital, Faridpur from May 2012 to October 2012. One Hundred Patients were selected consecutively from acute Myocardial Infarction patients admitted in the department of medicine and Department of Cardiology of Faridpur Medical College Hospital. The sample was selected purposively. Data was collected by a semi-structured questionnaire. Quantitative value of CRP was done on first day of admission. Data are expressed in frequency and percentage. Collected data are tabulated in numerical tables. Z test of proportion was done to analyze the data. Level of significance was < 0.05.

Table-I
Age distribution of patients (n=100)

Age range(years)	No. of patient	Percentage
18-29	4	4%
30-39	4	4%
40-49	24	24%
50-59	27	27%
60-69	30	30%
≥70	11	11%

Table I showed the distribution of patients of Acute Myocardial Infarction according to age. Number of patient was higher in the age range of 60-69.

Table-II
Distribution of Cardiac events according to types of Myocardial Infarction

CRP level	Types of MI	No of Patients	Type of cardiac event		Proportion of cardiac event	
			LVF	Mortality	No	%
Â 6 mg/dln=16	STEMI	14	2(14.28%)	0	2	14.28
	NSTEMI	2	0	0	0	0
Ã 6 mg/dln=84	STEMI	72	22(30.55%)	6(8.33%)	28	36.88
	NSTEMI	12	2(16.67%)	0	2	16.67
Z value			2.9	2.6		
P value			0.003	0.01		

Out of 16 patients with low CRP level (< 6mg/dl), 14.28% developed cardiac event, on the other hand out of 84 patient with high CRP level (6mg/dl>) was much cardiac events 53.55%.

Table-III
Odds ratio of cardiac events in logistic regression analysis including CRP

	CRP Level> 6 mg /dl	CRP Level< 6 mg /dl	OR	95% CI
Cardiac Event	28	2	3.5	0.601 to -3.632
No Cardiac Event	56	14		

The odds ratios for Cardiac event with high CRP were 3.5 (95% confidence interval 0.601 to 3.632)

Discussion:

This observational study was carried out among one hundred patients of acute Myocardial Infarction admitted into department of Medicine, and department of Cardiology of Faridpur Medical College Hospital, Faridpur. In my study, 84 patients of acute Myocardial Infarction (AMI) had high C-reactive protein (>6 mg/L).A study[9] showed that 49.39 % of acute coronary syndrome were associated with high serum C-reactive protein level.Another study[10] showed that 70.9% of patients with acute Myocardial Infarction were associated with high serum C-reactive protein level.Another study by[11] showed 79.9% patients were associated with high serum C-reactive protein level. Observations of last 2 studies are in conformity with my present study.

In this study, 86 patients had STEMI, and 14 patients had NSTEMI. Out of 86 patients with STEMI, 72 patients (83.72%) had high CRP. Out of 14 patients with NSTEMI, 12 patients (85.71%) had high CRP. A study[11] showed that 71% STEMI and 78%NSTEMI patients had high serum CRP level.Another study[12] showed that 75%STEMI and 79%NSTEMI had high CRP. My study is comparable with these studies.

In my study, out of 72 STEMI patients with high CRP level, 22 patients (30.55%) developed left ventricular failure and 6 patients (8.33%) were expired. Out of 12 NSTEMI patients with high CRP level, 2 patients (16.67%) developed left ventricular failure, but there was no mortality. STEMI was associated with worst outcome 30.55% vs 16.67% left ventricular failure and 8.33% vs 0% mortality rate.

A study[9] conducted in our country showed that 3.61% patients of acute Myocardial Infarction with high CRP were died.

Another study[10] showed that mortality rate were 8.9%, left ventricular failure rate were 27.9% in STEMI with high CRP versus 11.9% mortality rate, 31.1% left ventricular failure in NSTEMI with high CRP level. My study is similar in case of STEMI but not similar in case of NSTEMI.The difference in left ventricular failure between high and low CRP group is statistically significant (p- 0.003).The difference in mortality rate between high and low CRP group is statistically also significant (p-0.01).

 An acute increase in high sensitivity CRP (hs-CRP) shortly after ST-elevation myocardial infarction (STEMI) reaches its peak value within 48–72 h and gradually decreases over the next several weeks to reference range < 10 mg/L. [13,14] This evidence has been supported by De Servi, *et al.*[15] depicting that in AMI patients there is a large variability in hs-CRP levels. In our study Table -3 showed that adverse outcome of acute MI patient with high CRP level is 3.5 times higher than patient with low CRP level.

So in the present study there is a positive association between high CRP level and adverse early outcome following acute Myocardial Infarction**.**

Conclusions:

This study concludes that high level of CRP in patients of acute myocardial infarction is associated with adverse early outcome. By doing CRP at the time of admission we can get the idea that patients are at risk.

Conflict of Interest:

The authors stated that there is no conflict of interest in this study

Funding:

Ethical consideration:

The study was conducted after approval from the ethical review committee. The confidentiality and anonymity of the study participants were maintained.

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