

# Prognostic Value of C - reactive protein in Acute Myocardial Infarction Patients treated conservatively and Undergoing Percutaneous Coronary Intervention

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## ABSTRACT

**Aim:** To determine C-reactive protein levels at the time of admission, 06 hours and 24 hours after thrombolytic therapy in index patients suffering from acute myocardial infarction and correlating with major adverse coronary events (MACE).

**Methods:** The study was conducted in the Department of Physiology, Federal Postgraduate Medical Institute, Shaikh Zayed Medical Complex, Lahore and Armed forces institute of Pathology, Rawalpindi over 2 years period from June 2014 through June 2016. Sixty consecutive patients suffering from acute myocardial infarction (STEMI) admitted to coronary care unit were included in the study. Thirty patients were treated conservatively and 30 patients had undergone percutaneous coronary intervention (PCI). C-reactive protein levels were measured at the time of admission in all these patients suffering from acute myocardial infarction. serial blood samples were taken before and after the percutaneous coronary interventions for the determination of C-reactive protein levels in both groups at different time interval by immunoturbidimetry.

**Results:** The baseline c-reactive protein levels were found to be raised in all the patients suffering from acute myocardial infarction >5mg/L (p-value <0.001). The mean CRP value was found to be 11.3±3.0mg/dl in patients undergoing percutaneous coronary interventions and 11.3±3.1 mg/dl in group without PCL. The serial pre-procedural and post-procedural CRP levels measured at different time intervals show significant prognostic association of serum C-reactive protein levels with the development of primary end point (p-value <0.001) and secondary endpoint (P-value <0.003). The comparison of CRP levels between two groups at 30 days follow up in patients is significant with the p-value <0.001.

**Conclusion:** An increased CRP level is an independent predictor for the prognosis of acute myocardial infarction at time of admission and even after the percutaneous coronary intervention. Short term clinical outcome is markedly influenced by pre-procedural systemic activation of inflammation and thus raised C-reactive protein levels lead to the development of major adverse coronary events (MACE).

**Keywords:** Prognostic value, Inflammatory marker, Ischemic heart disease

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## INTRODUCTION

Acute Myocardial infarction AMI is the common consequence of ischemic heart disease. The WHO Criteria for the diagnosis of AMI requires at least two of the following three elements are present, a history of ischemic type chest discomfort, changes on serially obtained ECG recordings and rise and fall in serum cardiac markers<sup>1</sup>.

The diagnosis of the infarction requires increase in the molecular markers of myocardial injury.<sup>2</sup> Inflammation plays a key role in the pathogenesis of coronary atherosclerosis and acute coronary events. During inflammation, the tissue injury occurs which causes increase in serum levels of C-reactive protein

by a factor of up to several thousand. C-reactive protein level is a strong prognostic predictor of mortality and subsequent cardiac event e.g. clinical stenosis<sup>3</sup>. C-reactive protein, an inflammatory marker produced by liver and act as both a predictor of cardiovascular risk and also prognostic marker for prognosis of Ischemic heart diseases<sup>4</sup>. C-reactive protein is a novel risk indicator and it also identifies the patients who are at particular risk for recurrent ischemic events related to the development progression of multifocal ischemic heart disease<sup>5</sup>.

## PATIENTS AND METHODS

We conducted the Cross sectional study in the Department of Physiology, Federal Postgraduate Medical Institute, Shaikh Zayed Medical Complex, Lahore, Armed forces institute of Pathology, Rawalpindi over 2 years period from June 2014 through June 2016. Sixty consecutive patients

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suffering from acute myocardial infarction (STEMI) admitted to coronary care unit were included in the study. Out of these 30 patients were treated conservatively after acute myocardial infarction and the rest of the 30 patients had undergone percutaneous intervention. C-reactive protein levels were measured in all these patients suffering from acute myocardial infarction at the time of admission and after the percutaneous coronary interventions. Pre-procedural (base-line) and post-procedural serial blood samples were taken for CRP levels and C-reactive protein were measured in both groups at different time intervals by immunoturbidimetry. The follow-up time was of about 30 days after discharge of these patients from CCU and the serial values of CRP were taken in both groups of patients. C-reactive protein CRP levels were taken significant for the prognosis of future cardiac events. The endpoint of the study was taken as primary or secondary endpoint in the enrolled patients suffering from AMI and undergoing percutaneous coronary intervention.

**RESULTS**

The age of the patients was 51.27±5.78 in PCI group and 52.37±4.56 years in conservative group with 14 male and 16 females in each group. The mean CRP level was found 11.3±3.0 mg/dl in group with PCI and 11.0±3.0 ng/dl in group without PCI. The difference was found insignificant with p value 0.574.

Table 1: Comparison of serum CRP level for cases in groups with and without percutaneous intervention in various times

CRP level	PCI required	PCI not required	p-value
Baseline	11.3±3.0	11.0±3.1	0.574
6 hours after thrombolytic therapy	8.5±2.1	9.1±2.4	0.549
24 hours after thrombolytic therapy	7.7±2.2	8.2±2.3	0.325

When thrombolytic therapy was done and CRP recorded after 6 hours was 8.5±2.1mg/dl and 9.1±2.4 mg/dl in groups with and without PCI respectively. This difference was also significant with p-value 0.549. The difference of CRP was also significant between the two groups after 24 hours of thrombolytic therapy with p-value of 0.325.

**DISCUSSION**

Inflammation is an important feature of arteriosclerotic disease. In our study, increased C-reactive protein at the time of admission correlates with the results of study by Leiuza et al (1997) with the p-value of 00.02<sup>6</sup>.

In the same clinical setting, this study correlates with the results of the study done by de Winter et al<sup>7</sup> with a p-value of 0.001 which also shows a higher incidence of major adverse coronary events in the patients suffering from acute myocardial infarction and having increased baseline CRP levels.

Our study is conflicting with the result of study by Rittersma et al<sup>8</sup> in which preprocedural CRP demonstrated lack of association between preprocedural plasma CRP concentration at the time of admission and clinically driven MACE with the p-value of 0.44.

Our results also correlate with the study by Waulter et al<sup>9</sup>, in which it was demonstrated that base line CRP values were taken as an independent prognostic indicator of future MACE (p-value of 0.003) and with the highest quartile of CRP associated with an odd ratio for 30 days death and acute MI of 3.68, even when adjusted to coronary risk factors.

Our results also correlate with RISCA study done in 2008 in which CRP was measured in acute myocardial infarction and 30 days discharge has the modest predictive value for the occurrence of unstable angina and recurrent admission into the hospital with the p-value of 0.001 unadjusted odd ratios OR 0.120 for CRP determination. The p-value for prediction of primary outcome was to be 0.01 which is consistent with our findings with the p-value of <0.001<sup>10</sup>.

Our results also correlate with the previous study by Alamgor in 2003 in which small number of patients with unstable coronary artery disease was selected and serum C-reactive protein was elevated at the time of admission (baseline) with the p-value of 0.003 (Group II). But there was less uniform increase in the C-reactive protein levels after stent implantation with the p-value of 0.98 which is consistent with the findings of our study with the p-value of 0.5 after PCI<sup>11</sup>. C-reactive protein is found to be an independent indicator of prognosis of disease. It correlates with the results of previous studies done by Zairis et al<sup>12</sup> with a p-value of 0.005. In our study, we have found that a pro-inflammatory serum marker is significant and independent determinant of short term outcome which also correlate with a study by James et al<sup>13</sup>.

**CONCLUSION**

An increased CRP level in patients suffering from Acute MI is a powerful independent prognostic indicator and predictor for subsequent cardiac events MACE. Short term clinical outcome is markedly effected by pre-procedural systemic activation of inflammation.

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