ORIGINAL RESEARCH PAPER

Volume-7 | Issue-11 | November-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

C-REACTIVE PROTEIN AS A PREDICTOR OF LEFT VENTRICULAR FAILURE IN ACUTE MYOCARDIAL INFARCTION

Cardiology

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ABSTRACT

BACKGROUND: Various biochemical substances rise in the serum in patients with Acute MI. C-Reactive protein is helpful in diagnosis and also in assessing the complications and efficacy of thrombolytic therapy in Acute myocardial Infarction

AIM OF THE STUDY : To assess the correlation between C-reactive protein level and cardiac failure and risk of cardiac rupture in Acute myocardial infarction.

MATERIALS AND METHOD: 50 patients admitted for Myocardial infarction in ICCU with typical chest pain and definitive ECG changes of ST segment elevation in at least two leads. Vital parameters were recorded. Serial ECG charges were followed in all patients. Blood sample drawn between 6 and 12hrs , 14 to30 hrs, 24to 30 hrs and 48-60 hrs after the onset of chest pain .Fifth Sample drawn at the end of one week. The sample was tested for C-reactive protein level by latex agglutination test. 20 patients who attended the outpatient department were kept as control.

RESULTS: Study population :50 . Males:42 Females:8,Age group: 30 to 76 yrs. Inferior Wall:16 AnteriorWall:34 .C-reactive protein level started raising after 12 hrs in most of the patients.

CONCLUSION: High Serum C-reactive protein levels correlate with development of Left ventricular failure in acute myocardial infarction. This study also predicts that no patient was at risk for subacute cardiac rupture since the peal values were not above 20mg/dl

KEYWORDS

C reactive protein, Acute myocardial infarction, left ventricular failure

BACK GROUND: Acute myocardial infarction is one of the most common diseases for which patients are admitted in Intensive coronary care units. Mortality with Acute Myocardial Infarction is approximately 30 percent, with more than half of deaths occuring before the patient reaches the hospital. Thus MI constitutes emergency requiring prompt hospitalisation.With the establishment of Intensive coronary care units, the mortality has come down, because of availability of various hemodynamic monitors, defibrillators and the presence of physicians in these coronary care units for 24 hours.Increased risk of death and another attack of myocardial infarction is there in patients who recover from the first episode of Acute Myocardial infarction.Myocardial ischaemia and necrosis occurs from subendocardial to subepicardial reginon.During necrosis various biochemical substances rise in the serum of such patients. C-Reactive protein, an acute reactant is raised in serum in Acute myocardial Infarction. C-RP is produced in the liver. It rise strikingly seen whenever there is tissue necrosis. CRP has major significance as a highly sensitive acute phase reactant. Clinical measurement of C-RP is valuable as a screening test for organic disease and as a sensitive object index of disease activity and response to therapy in inflammatory, infective and ischaemic conditions. Serium C-reactive protein Normal value is less than 0.6mg/dL. In acute Myocardial Infarction CRP raises within 24 hours, begins to fall by the third day, and becomes normal after 1-2 weeks. Serum C-reactive protein rises in acute myocardial infarection, correlating positively with infarct size if thromobolytic treatment is not given. Development of acute cardiac failure was more closely associated with the magnitude of the acute phase reaction than with infarct size. The peak serum values of C-reactive protein in patients with acute cardiac failure were higher compared to those without failure.C-reactive protein level can be used as a predictor of cardiac rupture after acute myocardial infarction. High serum CRP levels had a high diagnostic sensitivity 89% and specificity (95%) for cardiac rupture. Patients with persistently high serum CRP levels, particularly above 20 mg/dl might have high probability of occurrence of sub-acute cardiac rupture after acute myocardial infarction. CRP levels are also useful in clinical evaluation of such disorders as rheumatoid arthritis, systemic lupus erythematosus, vasculitic syndromes, inflammatory bowel disease, and myocardial infarction.

AIM OF THE STUDY: To assess the correlation between C-reactive protein level and its relation to cardiac failure and risk of cardiac rupture in Acute myocardial infarction.

MATERIALS AND METHODS:

Study Design: Case control study. Venue: Department of cardiology, Kilpauk medical college hospital,Chennai. Study group:20 control patients and 50 patients admitted for Myocardial infarction in ICCU with typical chest pain and definitive ECG changes of ST segment elevation more tha 0.1mV in at least two leads. Informed consent and ethical committee approval were obtained. The rise and fall of cardiac enzyme markers level were estimated History of chest pain , site, duration were noted. Vital parameters like pulse, BP , JVP , respiratory rate , Heart sounds and rales were recorded. Serial ECG charges were followed in all patients In those patients who were given SK relief of chest pain ,decrease in ST segment elevation by 50%, reperfusion arrhythmias such as ventricular premature depolarisations, accelerated idioventricular rhythm and sinus bradycardia were noted..Blood samples were drawn between 6 and 12hrs(I) , 14 to30 hrs(II), 24to 30 hrs(III) and 48-60 hrs(IV) after the onset of chest pain Fifth Sample drawn at the end of one week. The samples were tested for C-reactive protein level by latex agglutination test. CRP slide test for detection of CRP is based on principle of agglutination The serum is mixed with CRP latex reagent and allowed to react. If C-RP concentration is more than 0.6 mg/dl a visible agglutination is observed. 20 patients who attended with no history of chest pain the outpatient department were kept as control and CRP was estimated in these patients.

RESULTS:

Study population : 20 patients age group between 37 and 73 attending cardiology outpatient department without recent history of chest pain were kept as controls and CRP values were less than 0.6mg/dl.50 inpatients . Age group: 30 to 76 yrs. Males:42, Females:8, Anterior wall infarction:34, Inferior Wall infarction :16. LEFT VENTRICULAR FAILURE: Total number of patients:20. In these patients all the samples showed higher C-reactive protein values than in other patients. Peak level in 19.2 mg/dl which never occurred in patients who did not develop this complication. C-reactive protein level started raising after 12 hrs in most of the patients. Peak value:2.4 mg/dl to 19.2 mg/dl. Most of the values were between 4.8 mg to 9.6 mg/dl. In patients who were not thrombolysed peak value was at 48-60 hrs (IVth sample) compared to those patients who were thrombolysed by streptokinase it reached its peak value at 24-30 hrs (III Sample).In patients who were effectively thrombolysed the values started falling from 48-60 hrs onwards (IV Sample)C-reactive protein values returned to normal at the end of 1 week except in patients who developed Left Ventricular failure.

STATISTICAL ANALYSIS : A. Those patients who developed LVF B.Those who did not develop LVF thrombolysed patients excluded.

	LVF			Without LVF			Value	Value
Sample	n (number)	X (mean)	S.D. (Standard deviation)	n (number)	X (mean)	S.D. (Standard deviation)	t-value	p- value
II	10	4.32	0.96	28	1.24	0.60	11.76	<0.01
III	10	9.12	1.44	28	2.87	1.30	12.64	<0.01
IV	10	27.28	14.4	28	6.17	2.43	4.01	<0.01

Analysis showed significant difference between Groups A& B in II, III and IV samples since p value is < 0.01. All the samples in patients who developed LVF had higher values of C RP compared to corresponding samples in patients who did not develop LVF.

DISCUSSION: In acute myocardial infarction acute phase reactants are elevated. C-reactive protein level in this study showed elevations in serum level following acute myocardial infarction in all the patients with chest pain and typical serial ECG findings. serum C-reactive protein was measured in 70 patients in this study. Among this, 50 patients admitted with typical chest pain in ICCU were studied, 20 patients who attended the cardiology out patient department without any recent history of chest pain were taken for control study. In their study of C-reactive protein in myocardial infarction Pepys MB et al have shown that all individuals with infarction developed increased CRP levels. In those patients who were effectively thrombolysed the level of C-reactive protein fell from the value at 24-30 hrs (III sample) to the value at 45-60 hrs IVth sample. All the patients who developed Left Ventricular failure showed higher CRP level in all the samples compared to patients who did not develop. The peak value was 19.2 mg/dl. This value was never reached by patients who did not develop Left Ventricular failure. In this study, no patient was at risk for cardiac rupture, since no patient had persistent peak serum C-reactive protein level more than 20 mg/dl which has a high diagnostic sensitivity and specificity for development of subacute cardiac rupture

CONCLUSION: High Serum C-reactive protein levels correlate with development of Left ventricular failure in acute myocardial infarction. This study also predicts that no patient was at risk for subacute cardiac rupture since the peal values were not above 20mg/dl

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