ORIGINAL RESEARCH PAPER

General Medicine

QUANTIFICATION OF C-REATIVE PROTEIN, DIFFERENTIAL COUNT AND BLOOD SUGAR IN ACUTE CORONARY SYNDROME PATIENTS WITH REDUCED EJECTION FRACTION -A PROSPECTIVE STUDY.

KEY WORDS: CRP, Blood sugar, Ejection Fraction, Differential count ,acute coronary syndrome.

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ABSTRACT

AIM: The aim of this study was to assess the extent of myocardial injury by ejection fraction, the level of CRP, differential count, blood sugar in acute coronary syndrome patients and to assess the risk of morbidity & mortality in acute coronary syndrome patients by studying the effects of these parameters in acute coronary syndrome patients.

MATERIALS AND METHODS: This is a prospective study done in the Govt. medical college hospital, omandurar govt. estate, Chennai from june 2016 to june 2017 with typical chest pain patients admitted in the medicine department. Complete blood haemogram, total and differential leukocyte counts were measured with an automated hematology analyzer . Serum CRP and other-metabolic profile were measured at hospital arrival. After patients was stabilized with proper treatment , patients was shifted to ECHO room for evaluating cardiac status utilized ejection fraction to analyze the cardiac performance after myocardial injury in acute coronary syndrome. These parameters were correlated with ejection fraction, differential count , raised blood sugar, C-reactive protein.

Results: Using chi-square test , statistically significant association between CRP and their EF% was found. Karl Pearson Co-efficient Correlation test indicates that there is statistically significant relationship between CRP, WBC , RBS and their reduced(<50) EF%. Hence, the calculated value of less than table value ($p<0.05$).

INTRODUCTION

Acute Coronary Syndrome (ACS) refers to any condition attributed to obstruction of the coronary arteries which reduces blood flow to the heart, and includes unstable angina and myocardial infarction (MI). The consequences depend on the degree and location of the obstruction and range from unstable angina to non- ST-segment elevation myocardial infarction (NSTEMI), ST-segment elevation myocardial infarction (STEMI), and sudden cardiac death. Symptoms are similar in each of these syndromes (except sudden death) and include chest discomfort with or without dyspnea, nausea, and diaphoresis. Diagnosis is by ECG and the presence or absence of serologic markers'. The term ACS was adopted because it was in to more clearly reflect the disease progression associated with myocardial ischemia. Unstable angina and myocardial infarction (MI) both come under the ACS.

The 2016 Heart Disease and Stroke Statistics update of the American Heart Association (AHA) has recently reported that 15.5 million persons >20 years of age in the USA have CHD , whilst the reported prevalence increases with age for both women and men and it has been estimated that approximately every 42 seconds, an American will suffer for an MI.

India has the highest burden of ACS in the world. The CREATE registry provided contemporary data on 20,468 patients from 89 centers from 10 regions and 50 cities in India. CAD occurs in Indians 5-10 years earlier than other populations around the world and the major effect of this peculiar phenomenon is on the productive workforce of the country aged 35-65 years.

The present study is aimed to investigate the blood sugar level, WBC count, CRP in ACS and to correlate with the severity of the disease. These parameters can be used to assess the cardiac performance like ejection fraction where there is scarcity of echo machine or non availability of bed side echo. Patients who are not able to shift to echo room, in that condition & can be utilized in govt. taluk hospital, block PHC where echo is not available. The study of these factors provides a new step in the advancement of the treatment.

AIMS & OBJECTIVES

1.To assess the extent of myocardial injury by ejection fraction, the level of CRP, differential count, blood sugars in acute coronary syndrome patients.

2.To assess the risk of morbidity & mortality in acute coronary syndrome patients by studying the effects of parameters such as CRP, differential count & blood sugars with ejection fraction.

MATERIALS & METHODOLOGY

This is a prospective study done in the Govt. medical college hospital, omandurar govt. estate, Chennai from 2016 to 2017 with typical chest pain patients admitted in the medicine department. Patients admitted with typical chest pain not relieved by rest , STEMI ,NSTEMI with CPK-MB positive are included in this study .Patients like known CAD, severe renal or liver disease, hematologic disorders, infectious or inflammatory disease, patients on statin therapy were excluded confounding anti-inflammatory effect of statin are excluded in this study. Severe ischemia and complication of myocardial infarction are evidenced by electrocardiogram and raised CPK-myocardium bound. Then patients were categorized according to electrocardiogram, creatinine kinase-myocardium bound, and duration of pain. They were classified as Category I-ST segment elevated myocardial infarction , Category II-non STEMI and Category III-unstable angina. For category I, treatment was started in the form of streptokinase injection 1.5million international unit by 1 hour who had elevated ST segment in electrocardiogram. Category II & III patients was treated with inj.low molecular weight heparin 5000 IU sixth hourly . Asprin, clopidogrel, atorvastatin was given all three category patients. After treatment was initiated, venous blood samples was collected & the following parameters such as random blood glucose , cholesterol profile & renal function test were measured using standard techniques. Complete blood haemogram, total and differential leukocyte counts were measured with an automated hematology analyzer . Serum CRP and other-metabolic profile were measured at hospital arrival. After patients was stabilized with proper treatment then patients was shifted to ECHO room for evaluating cardiac status from that utilized ejection fraction to analyze the cardiac performance after myocardial injury in acute coronary syndrome. Then patients was assessed for failure symptoms in the form of pulmonary edema, reduced urine output and raised jugular venous pressure and blood pressure. These parameters were correlated with ejection fraction, differential count , raised blood sugar, C-reactive protein.

Results and Data analysis:

A total of 100 ACS patients was included in the study . Among 100 ACS patients included in the study 79 were males and 2l were females. The mean age was 51.50 ± 11.66 . Mean systolic blood pressure was 115.72 ± 17.40 & diastolic blood pressure 77.02±12.77. Mean pulse rate was 97.61 ±17.5. Age distribution

in which 9 patients belongs to below 35 yrs, 27 patients belongs to 36 to 45 yrs, majority of 30 patients is in the age group of 46 to 55 yrs , 23 belongs to 56 to 65 yrs , 8 were in the age of 66 to 75 yrs and few of about 3 patients belongs to 75 to 85 yrs. About 60% of ACS patients had raised JVP, 53% patients had lung signs, 43% patients had symptoms of pulmonary edema, 42 % patients had symptoms of decreased urine output . Also 73 % of the ACS patients had elevated level of CRP and remaining 27 % had normal level of CRP. And 70 % had normal level of EF% and remaining 30 percent had reduced (less than 50) level. This study also revealed that more than 58 % had elevated level of RBS and remaining 42 % had normal level of RBS.

Table no-1 reveals that the chi-square test indicates that out of 30 patients, vast majority (86.7 per cent) of the patients had elevated level of CRP when compared to EF%. Therefore, CRP will have more influence over EF%. Hence, the calculated value less than table value (.044<0.05). There is statistically significant association between CRP and their EF%.

Table no-1 Association between CRP AND their EF%

CRP	EF%						Statistical Inference
	Decreased <50%		Normal >50%		Total		
	n	%	n	%	n	%	
NORMAL	4	13.3	23	32.9	27	27	X2=4.061 Df=1.044 <0.05 significant
ELEVATED	26	86.7	47	67.1	73	73	
TOTAL NO OF PTS	30	100	70	100	100	100	

Table no-2 reveals that the chi-square test indicates that out of 30 patients, vast majority (83.3 per cent) of the patients had elevated RBS level when compared to EF%. Therefore, RBS will have more influence over EF%. Hence, the calculated value less than table value (.001<0.05). There is statistically significant association between RBS and their EF%.

Table no-2 ; Association between Random blood sugar and their EF%

RBS	EF%						STATISTICAL INFERENCE
	DECREASED <50%		NORMAL>50%		TOTAL		
	n	%	n	%	n	%	
NORMAL	5	16.7	37	52.9	42	42	X2=11.291 Df=1.001<0.05 significant
ELEVATED RBS >140	25	83.3	33	47.1	58	58	
TOTAL NO OF PTS	30	100	70	100	100	100	

Table no-3 reveals that the Karl Pearson Co-efficient Correlation test indicates that there is statistically significant relationship between CRP (-0.269"), WBC (-0.217), RBS (-0.461**) and their reduced (<50) EF%. Hence, the calculated value less than table value (p<0.05)*

Table no-3; Karl Pearson Co-efficient Correlation relationship between CRP, WBC, RBS and their EF%

Ejection Fraction	Correlation Value	Level Of Significant
CRP	-0.269**	.007<O.01
WBC	-0.217*	.030<0.05
RBS	-0.461**	.000<0.01
****Correlation is significant at the 0.01 level *Correlation is significant at the 0.05 level**		

Discussion

In our study, we have quantified the effects of C-reactive protein, white blood cells ,random blood sugars ,ejection fraction in Acute Coronary Syndrome patients. Depending on the patients load in our emergency department we have taken a total of 100 patients which include 79 males & 21 females in the mean age of 51.50 ± 11.66.

Recent studies have found that inflammation plays important major role in atherosclerosis and Acute Coronary Syndrome. CRP is synthesized in hepatocytes and some extrahepatic tissues, such as vascular smooth muscle, atherosclerotic plaques, intracardial tissues. In our study we found that the serum level of these C-reactive protein was higher in ACS patient which was in consistent with other studies done by Dubey Rk etal (2), they gave the similar report that serum levels of CRP are higher in patients with ACS39.

We also found that there is significant association between CRP and ejection fraction, that is patient with low ejection fraction showed significant raise in serum CRP when compared to normal ejection faction. Similar result was obtained by the study conducted by Christian stump et al in 2017(3) correlated the CRP level and risk of developing significant heart failure in patients with acute STEMI. CRP is not only a marker of systemic vascular inflammation but also plays an important key role in plaque disruption and subsequent thrombosis. With increasing levels of any of the markers, there is a commensurate rise in mortality. At any detectable troponin, there is also a raised risk of a later MI. The combination of both markers allows the best prediction of mortality. The use of the combination of these markers will provide an important tool for the selection of patients for clinical trials and also for identification of patients for different treatment alternatives. Patients with elevated WBC counts have been shown to have a higher risk of developing an AMI 'and to be at higher risk for adverse events during the acute setting. we reviewed the clinical data on the association between WBC count of AMI patients (on admission) and the prognostic outcome of these patients, and found the possible correlation between high WBC count and the development of reperfusion injury, the no-flow phenomenon and congestive heart failure. In our study, data showed that there is a strong association between leucocytosis and ejection fraction, which was made more effective by the previous study done by Tahil abmad munins et al in 2010, their study revealed that higher prevalence of total leucocytes and its sub types (i.e) neutrophils and monocyte in patients of ACS.

Our study result was in consistent with Samad Ghaffari study, they performed a single CBC analysis for the risk stratification in post STEMI complication patients. Similar result was obtained by Ratime Eskandarian et al, (6) they concluded that leucocytosis and neutrophilia in the acute phase of MI are important predictive factor for the development of LV systolic dysfunction. So leucocytosis can be used as risk stratification of ACS patients.

Acute hyperglycemia on admission for acute coronary syndrome worsens the prognosis in patients with and without known diabetes. Postulated mechanisms of this observation include prothrombotic effects.. Our study shows strong association between hyperglycemia & ejection fraction, as the hyperglycemia increases, EF decrease.

According to Jitender Mokta et al., in 2017(5), Unrecognized diabetes and stress hyperglycemia at admission to coronary care unit in ACS patients increase the risk of cardiovascular events and intervention improves the outcome. This suggests that improved glucometabolic care reverse the negative effect of hyperglycemia on cardiovascular complications.

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