MEDICAL CHANNEL

Original Article

ASSOCIATION OF CRP LEVEL AN TROPONIN I IN PATIENTS WITH ACUTE CORONARY SYNDROME

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ABSTRACT

Objective: To determine the association of CRP level and Troponin I in patients with acute coronary syndrome.

Method: A cross-sectional observational study was conducted at Zia Uddin Hospital, Karachi from March 2015 to May 2015. Patients with symptoms of acute coronary syndrome were enrolled. After ECG, CRP levels and troponin I was sent from emergency department, on admission echocardiography and urgent PCI was done if required.

Result: Among 75 patients who were found to have the signs and symptoms of acute coronary syndrome were admitted. Man age of the patient was 67.32±18.7 years with 44 females to 31males. The risk factors of acute coronary syndrome were mostly smoking 40%, sedentary life style 26.7%, don't walk or exercise 17.3%, alcohol 10.7%, non smoker 5.3%. The mean CRP was 162.31± 145.39 while the mean troponin I was 8.79± 17.65. Higher levels of CRP were associated with mortality with statistically significant correlation found (p value-0.000). However the levels of troponin were also elevated in patients MI but no statistically significant correlation found (p value-0.34).

Conclusion: CRP levels are important predictors of myocardial damage and can be used as prognostic marker for acute coronary syndrome.

Key words : C - reactive protein; Acute Coronary Syndrome

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INTRODUCTION

Acute Coronary syndrome is a continuum of clinical presentation ranging from ST Elevation Myocardial Infarction to NSTEMI and Unstable Angina responsible for around one million hospital admissions annually in USA [1-4]. It is a major public health problem because of increasing morbidity and mortality. Early management is associated with better outcomes but the presence of risk factors ensures increased risk in future as well [3, 4].

According to guidelines of 2015 by the American heart association / American

college of cardiology (ACC/AHA) the workup of ACS should be initiated early to maximize the outcome of the patients [5, 6]. The measurement of Trop I within 3-6hrs of presentation of chest pain is essential and has prognostic significance in terms of myocardial necrosis. Recent Studies have shown that CRP in patients with unstable angina is also associated with adverse outcomes [5, 6]. The mechanism underlying higher CRP levels is the local and systemic inflammation responsible for progression of atherosclerosis. This inflammatory reaction endorses fissuring of plaque or erosion and can be responsible for initiation of acute coronary syndrome. However the role of CRP is controversial in the early stratification of patients with ACS. Aseri et al has found high sensitivity of CRP in the myocardial damage and has significant correlation with Trop I, CK-MB, and LDH [7]. Huang et al has found increased mortality associated with both higher CRP and Trop I levels [8]. Another prospective has found raised CRP levels to be prognostic marker of long term cardiac events [9]. Also the combined raised CRP and Trop I can be used as early predictors of unstable angina. A comparative evaluation by Bhagat et al has found sensitivity, specificity and positive and negative predictive value of CRP > or = 4 mg/L to be 78.9%, 96%, 93.75%, 85.74% respectively [10].

SUBJECTS AND METHOD

Present study was a hospital based cross sectional study conducted at Department Of Emergency
Zia-Uddin Hospital. Karachi from March 2015 to May 2015. The study was approved after ethical committee. All patients were prospectively enrolled. The sample size of all patients of both gender and ages of 20 years and above with co-morbids like Diabetes Mellitus, ischemic heart disease, hypertension, or etc presented with symptoms of acute coronary syndrome like chest pain, nausea, vomiting with either ST elevation myocardial infarction (STEMI), non ST elevation myocardial infarction (NSTEMI), unstable angina (UA) were included. Patients with relentless skeletal muscle injury, cardiac pulmonary resuscitation, any infectious disease or inflammatory signs, pregnancy and those patients who refused for consent. Informed consent was taken from the patient or next to kin. Careful history for symptoms and duration of chest pain was taken and thorough examination regarding signs of acute coronary syndrome was done. Risk factors for the acute coronary syndrome were also noted. Data was filled in the patients Performa include age, gender, risk factors, troponin I, CRP levels and echocardiographic findings. Blood was taken in heparin coated tubes and sent for analysis.

Troponin I was measured by ELISA keeping the upper reference limit of 0.1 ?g/L. For the CRP the upper reference limit was 3mg/dl measured by ELISA. Patients requiring urgent Primary coronary intervention (PCI) were offered angioplaty.

Data was analyzed by statistical software package SPSS version 20.0. Continuous variable that is patient's age , CRP and Trop I were expressed as mean ± SD. Qualitative variables like risk factors, levels of CRP and Trop I were expressed as frequencies and percentages. The outcome was determined by mortality in patients with troponin I and CRP levels when tested with chi square keeping p value <0.005 to be significant.

RESULTS

Out of 75 patients enrolled in the study the mean age of the

TABLE 1
DEMOGRAPHIC DATA

Demographic variables	Frequency (percentages)
	n=70
Age in years	
Mean± SD	67.32±18.7
Gender	
M:F	31:44
(41.3%:58.7%)	
Marital status	
(unmarried/ married)	39:36
CRP in mg/dl	
Mean± SD	162.31± 145.39
Trop I in ng/ml	
Mean± SD	8.79± 17.65

TABLE 2

Variables	Outcome (Mortality)		
	Yes	No	P value
CRP in mg/dl			
10-50	0	26	0.000
51-100	0	16	
101-200	0	8	
201-300	5	13	
301-400	0	1	
401-500	5	4	
Trop I in ng/ml			
10-40	10	60	
41-80	0	5	0.364

FIGURE 1

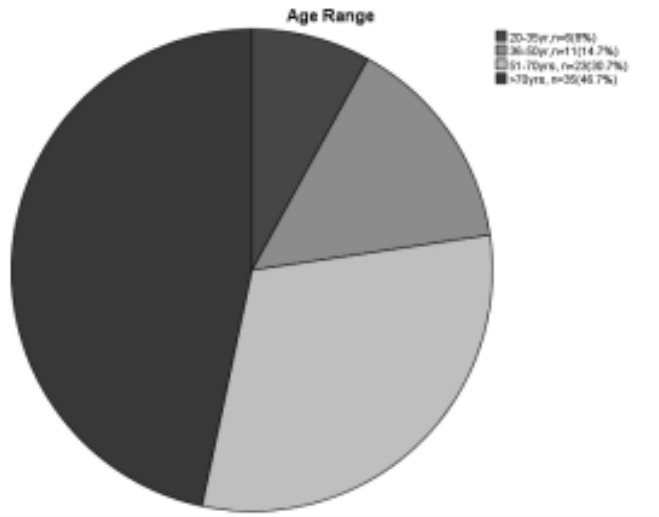


FIGURE 2

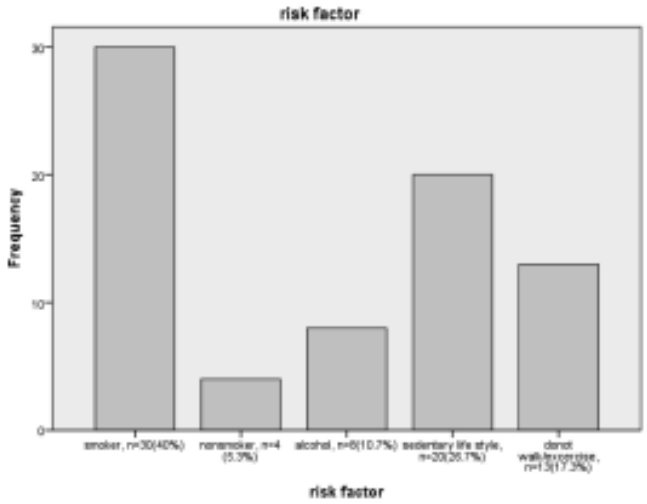


FIGURE 3

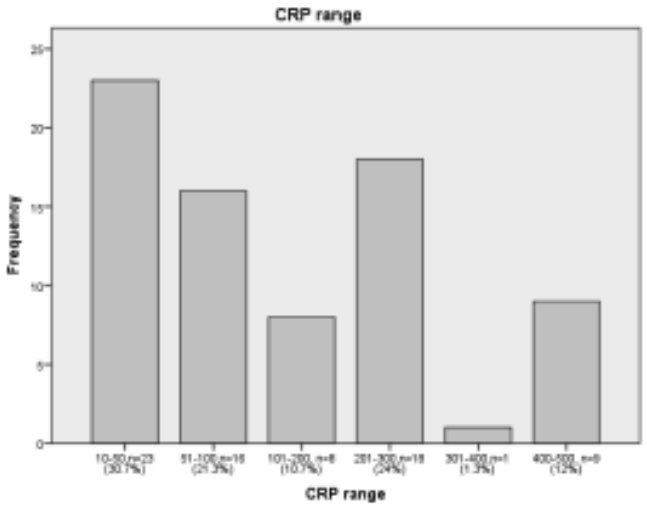
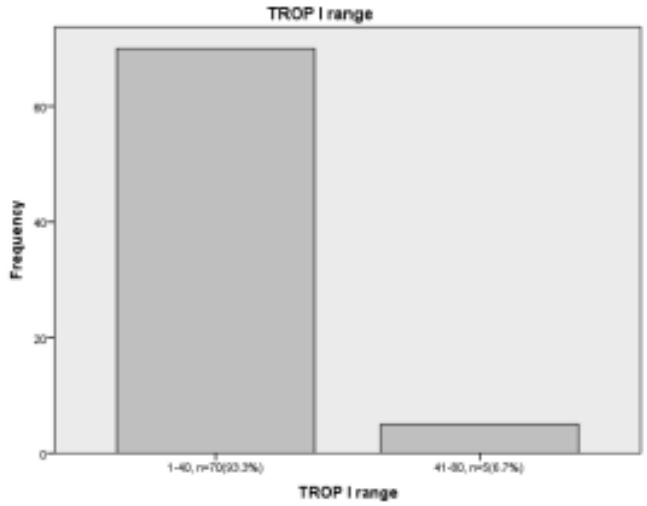


FIGURE 4



PERFORMA

1. Age in years _____
2. Gender _____
3. Education status _____
4. Marital status _____
5. Family income _____
6. Comorbid illness
   - DM
   - HTN
   - Hypercholestrolemia/dyslipidemia
   - Others _____
7. Risk factors

Smoking: y/ n

Alcohol: y/ n

Sedentary life style: y/ n

Walk or exercise: y/ n

Others _____

8. Presenting symptom in ER:_____
9. ECG findings_____
10. Trop I levels
11. CRP levels
12. Other cardiac biomarkers_____
13. Echocardiographic findings_____
14. Intervention done:_____
15. Conservative management_____
16. Outcome : discharged/ LAMA/ death

patients was 67.32±18.7 years (table 1). There were 31 males 44 females (table 1). Female to male ratio was 1.4:1. Most of the patients belong to elderly age group (figure 1). The average age among males was 64.90 years compared to average among females 69.02years. The patients enrolled were mostly unmarried n=39 while the rest n=36 were married. The risk factors were mostly smoking n=30(40%), sedentary life style n=20(26.7%), don't walk or exercise n=13(17.3%), alcohol n=8(10.7%), non smoker n=4(5.3%) (Figure 2).

The mean CRP was 162.31± 145.39 while the mean troponin I was 8.79± 17.65 (table 1). There were variations in the level of CRP. Most of the patients have levels in the range of 10-40mg/dl n=23(30.7%), 51-100mg/dl in n=16(21.3%), 101-200mg/dl in n=8(10.7%), 200-400mg/dl in n=18(24%), 301-400 n=1(1.3%), and 400-500 in n=9(12%) (Figure 3). The level of troponin I was in the range of 1-40ng/ml in 93.3% of patients. While the remaining n=5(6.7%) had levels ranging from 40-80ng/ml. (figure 4). The patients with STEMI had higher levels of troponin I and also higher CRP levels compared to patient with NSTEMI and UA. Some of the patients with STEMI had an urgent PCI done. While some were critical and had multiple comorbids and did not survived. There were 10 (13.3%) patients who suffered from mortality secondary to acute myocardial damage. The outcome or mortality was then compared with two variables i-e; troponin I and CRP. Higher levels of CRP were associated with mortality with statistically significant correlation found (p value-0.000). However the levels of troponin were also elevated in patients MI but no statistically significant correlation found (p value-0.34).

DISCUSSION

Acute coronary syndrome is the most common emergency presentation with an increasing incidence seen due to increasing risk factors worldwide [1-3, 15]. Immediate diagnosis and early intervention are important management steps to prevent morbidity and mortality. The CRP is an acute phase reactant which has been widely studied in different studies in relation to other bio markers of tissue injury. In acute coronary syndromes CRP is of prognostic significance which is also evident from our study. The results of our study

have found statistical significant correlation of CRP with acute coronary syndrome and its relative outcome. In an observational study by Aseri et al has also found CRP to be significant predictor of mortality and morbidity in patients with myocardial damage [7]. In his study patients with STEMI have markedly increased levels of CRP compared to patients with NSTEMI but statistical correlation was not established. Munir et al has also found a positive correlation of WBC count, CRP and cardiac biomarkers with WBC count to be the independent predictor of mortality [11, 12].

In our study patients presenting in emergency with ACS belong to elderly age with mean age around 67yrs with slightly increased incidence among females compared to males. However this is contrary to studies where increased incidence among males was found compared to females [15].The patients most commonly presented had either the risk factors positive for smoking, obesity, family history of either hyperlipidemia or cardiac disease. The patients also had comorbid illness present most commonly Diabetes Mellitus, hypertension. Different studies have also revealed association of risk factors and co morbidities in patients presenting with ACS. Zaidi et al in his descriptive series found major risk factors to be smoking (64.5%), hypertension (45%), diabetes mellitus (37%) and alcoholism (4.5%). Also dyslipidemias were found in 86.6% cases [13]. Another cross-sectional study has also found hypertension, diabetes mellitus, hyperlipidemias if combined with sedentary lifestyles, smoking and lower socio-economic status predispose to ACS. In ours study too, the higher levels of Trop I were also found in patients with co morbidities and increasing risk factors. In our study too smoking, sedentary life styles, patients don't exercise or walk, alcohol are the risk factors for myocardial damage.

In our study higher CRP value was associated with increasing morbidity with statistical significant value achieved. However in patients with raised levels of troponin I there have been increasing morbidity but statistical significant value wasn't achieved. Munir et al has revealed mean CRP to be raised at the time of admission as well as after 24 hours in an increasing pattern compared to troponin I, mostly in patients with STEMI and NSTEMI patients compared to patients with unstable angina [13].

From our study we have concluded that patients with acute coronary syndrome reveal higher levels of CRP in addition to troponin I and also was associated with mortality, thus further measures should be taken to stratify the patients with higher CRP as it is a short term and an important predictor of mortality.

CONCLUSION

CRP levels are important predictors of myocardial damage and can be used as prognostic marker for acute coronary syndrome.

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