

Levels of HS-CRP among Patients with Cardiovascular Disease Attending Emergency Units in Khartoum Hospitals

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Abstract

Background and Objective: The role of inflammatory markers and its relation with risk factors of coronary artery disease is important issue. One of these markers is hs-CRP that has been indicated to increase in patients with coronary artery disease (CVD). The objective of this study was to determine serum levels of hs-CRP among patients with CVD attending emergency units in Khartoum state Hospital. **Methods:** In the present study, 60 patients met with the criteria of the study were selected out of 260 patients attending ER with chest pain suggestive angina. Levels of hs-CRP and Troponin I (Tnl) using immunoassay method. **Results:** The included patients with CVD were 60 (68.3% male, and 31.7% female), with mean age of (52±17.55 years). Abnormal ECG was found in 38 patient of them 37 were positive troponin. The remained were with normal ECG (22) out of them 5 patients with positive troponin, and 17 patient with negative troponin. The best adjusted cut off value for CRP for diagnosis of AMI was 40 mg/l with sensitivity of 98% and specificity of 90%. **Conclusion:** Our data suggest a strong correlation between hs-CRP levels and CVD, the best cut off value is 40 mg/l for diagnosis of AMI.

Keywords: Coronary artery disease, hsC-reactive protein, UA, ECG.

INTRODUCTION

A feature of most forms of inflammation, tissue damage, and infection is the increase in the circulating levels of various plasma proteins known as acute-phase reactant, such as C-reactive protein (CRP) and serum amyloid A protein (SAA). These reactants are mainly produced by hepatocytes through increased expression of their genes by cytokines, which are produced by activated macrophage. Sensitive assays for CRP and SAA have been developed. In healthy persons, CRP concentrations are very low, but they can rise tremendously in response to a wide variety of stimuli. The exact role of CRP re-

mains unclear, but it can stimulate mononuclear cells to release tissue factor, which initiates coagulation, activates the complement pathway, and neutralizes platelet-activating factor, De Beer *et al.*, 1982.

Earlier studies have examined CRP concentrations during the course of acute myocardial infarction. These studies were followed by several angiographic series and by cross-sectional studies, suggesting that CRP concentrations correlated directly with the presence and severity of coronary, cerebral, and peripheral arterial atherosclerosis, Moti *et al.*, Heinrich *et al.*, 1995. In addition, various studies examined CRP concentrations among patients with angina pectoris.

In addition, increased CRP concentrations in atherosclerotic patients usually reflect the inflammatory condition of the vascular wall, which may play an important role of changes in plaque morphology, rupture, and thrombosis, Cermak *et al.*, 1993; Jacobijn, *et al.*, 2000. We hypothesized that in patients referred to the emergency

room (ER) with chest pain and no other sign of active coronary disease, and with normal CRP concentration, active coronary disease can be ruled out and the patients may be released from the ER.

MATERIALS AND METHODS

A cross sectional hospital based study was conducted in Khartoum state during the period from August to December 2016. This study included 60 Sudanese patients referred to Emergency Room (ER) with chest pain.

The age range was 20–80 years. All patients who have any source of inflammation were excluded. Demographic data of patients and results of ECG were obtained from Sudan Heart Center and Alshaab Teaching Hospital in Khartoum state using structured questionnaire. Oral consent was taken from people participate in this study. Serum CRP level was estimated by Mispas instrument-Swiss. Troponin was detected by Immunochromatography test (Acone-ICT-china).

RESULT

The level of CRP was defined in 60 patient, of 260 consecutive patient who were referred to the ER for chest pain, 200 were excluded from this study because they were found to have variable clinical condition that could provoke high serum CRP concentration. The remaining 60 patient were 68.3% male, and 31.7% female, mean age (52±17.55 years) table 1. The patient hospitalized were released following evaluation ER. Abnormal ECG was found in 38 patient of them 37 were positive troponin. The remained were with normal ECG (22) out of them 5 patient with positive troponin, and 17 patient with negative troponin (Table 2).

The limit of CRP (cut off) is more than 40 mg/l .CRP positive were found in 42 patient, 18 negative. table 1. The final diagnosis in 42 patients with positive CRP and CVD. 17 were found with AMI, 6 patient with unstable angina, 2 patients with angina. All patients with negative CRP were found with atypical chest pain and no evidence for AMI (table 2). So CRP have sensitivity of 98% and specificity of 90% in diagnosis of AMI.

DISCUSSION

Chest pain is considered to be the main complaint for which patients are usually referred to emergency room. Determining the cause of chest pain is one of the key tasks of physicians, although it is one of the main manifestation of cardiac disease, Braunwald, 1997. Marker of inflammation, such as C-reactive protein, were found to be related to risk for cardiovascular disease

event in patients with angina pectoris. The level of CRP was defined in 60 patient, of 260 consecutive patient who were referred to the ER for chest pain. Abnormal ECG were found in 38 patient in these patient 37 positive troponin and 22 are normal ECG and 5 patient positive.

The final diagnosis in patient with positive CRP and CVD. were found AMI, unstable angina patient, angina patient, patient atherosclerosis, and acute coronary syndrome. All patient negative CRP were found no sing for AMI. This is agree with The study conducted in 2002 by Auer *et al.*, record that CRP as marker of inflammation is significantly increase in patient with AMI and unstable angina shortly after onset of symptoms. Supporting the hypothesis of an addition of inflammatory mechanism in patients with an acute coronary syndrome or AMI. And also agree with several cross sectional and cohort studies have reported an association between serum marker of inflammation such as CRP and coronary heart disease in Caucasian population and Iranian population done by Kazemi Bajestawi in 2007.

Human CRP inflammatory factor is mostly associated with CVD study done in 2013 by Coli also agree with this study, Shahid and Al Masri, 2013. Also another study done in 2013 by Syed and Abeer show significantly higher level of CRP in patients with angiographically evaluated CAD when compare to control and correlate with presence and severity of CAD also this is in agree with the present study, Yousuf *et al.*, 2013. Study done by Johann Auer in 2015 reported a statistically significantly difference in CRP values between patient with stable CAD and patient with UA also agree with the present result, Leite *et al.*, 2015.

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Table 1. The general description of patients

Parameters	Mean±SD
Age	52±17.52
Gender	
Male	68.3%
Female	31.7

Table 2. showing relationship between CRP and ECG

		Cardiac marker			
			Troponin +ve	Troponin -ve	Total
ECG	Abnormal	Count	37	1	38
		Percent	88.1%	5.6%	63.3%
	Normal	Count	5	17	22
		Percent	11.9%	94.4%	36.7%
Total		Count	42	18	60
		Percent	70.0%	30.0%	100.0%

Pearson Chi-Square *P-value* (0.000) Spearman Correlation *R-value* (0.785)

Table 3. Showing the percentage of Sensitivity and Specificity of CRP test

CRP	Value
Sensitivity	98%
1-Specificity	90%
Cutoff	40 (mg/L)

The result revealed that there was positive correlation between CRP and age with (*Pvalue*=0.004) and (*R.value*.0.364) figure (3.1).

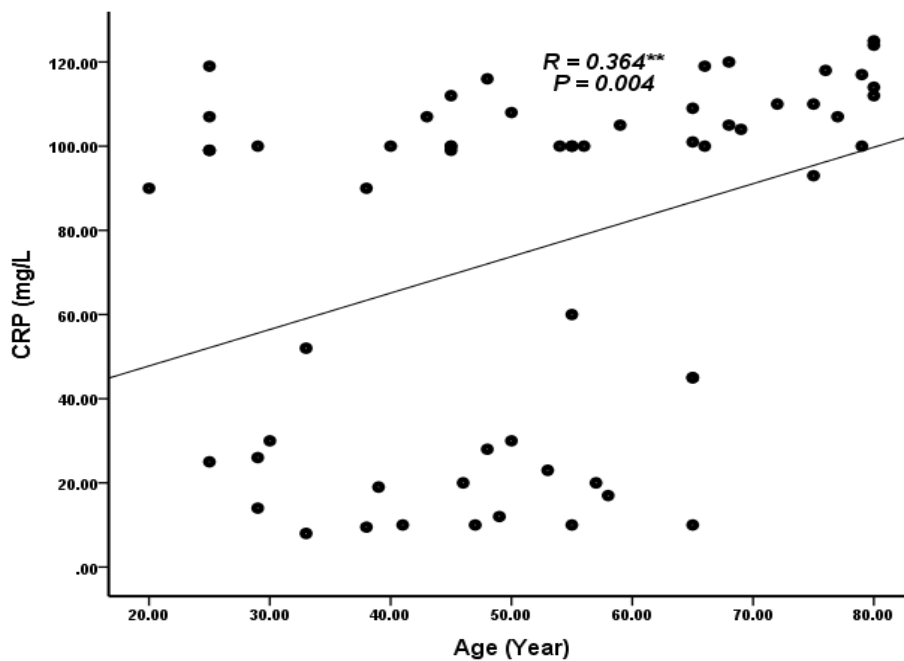


Figure 1. Showing correlation between CRP and Age p-value consider as ≥ 0.05

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