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Research Article

PATTERN OF C-REACTIVE PROTEIN IN SUDANESE PATIENTS WITH ACUTE CORONARY SYNDROME

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A R T I C L E   I N F O

A B S T R A C T

Background and objective: C-reactive protein (CRP) is an acute phase protein that is produced predominantly by hepatocytes under the influence of cytokines such as interleukin (IL-6) and tumor necrosis factor-alpha. C-reactive protein is an extensively studied inflammatory factor whose prognostic value in cardiovascular diseases in recent years has become increasingly important. This study aimed to determine pattern of C-reactive protein in patients admitted with acute coronary syndrome to the coronary care unit at Elobied Teaching Hospital.

Patients and methods: This is a prospective hospital-based study. The study included 102 patients who were consecutively admitted to the coronary care unit with the clinical diagnosis of acute coronary syndrome (ACS).

The data were obtained through well-designed data sheet including age, gender, clinical presentation, risk factors together with complications and ECG findings. A written consent was obtained from each patient. Five milliliters of venous blood was withdrawn from each patient within 24 hours of admission, serum Troponin and C- reactive protein levels were measured. The data were analyzed using SPSS version18.

Results: In this study, the mean age of patients was 58 ± 12 years. More than half of the patients were male (54%). Hypertension was found in 33% while 28% of patients were diabetic and 18% were smoker. In this series, STEMI was diagnosed in 40 % of patients. Mean level of serum troponin was12 ng/ ml. The level of CRP was remarkably high (Mean47 mg/l).

Conclusion and recommendation: In this study, the level of CRP was high in patients with acute coronary syndrome.Further studies are needed to evaluate the role of CRP as a predictor of cardiovascular outcome after ACS.

INTRODUCTION

C-reactive protein (CRP), an acute phase protein produced mainly by the liver in response to interleukin 6, is a marker of inflammatory processes that contribute importantly to atherogenesis, plaque disruption, and thrombosis. Indeed products of thrombosis, including thrombin and platelet derived growth factor, themselves cause vascular smooth muscle cells within the ruptured plaque to augment production of interleukin 6 (IL-6), amplifying hepatic CRP release, and completing a vicious cycle of thrombosis and inflammation in acute coronary syndromes.

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CRP may have additional pathogenic effects—specifically by activating the complement system and promoting tissue factor release from monocytes. Thus CRP is intimately involved with the pathogenic mechanisms that drive acute coronary syndromes, and is predictive not only of cardiovascular events in apparently healthy middle aged men and women but also of outcomes following presentation with unstable angina and myocardial infarction.[1]

Joint analysis of troponin and CRP has shown that these makers are independent and additive. A simultaneous increase in the levels of both markers is associated with a very high risk, an increase in just one of them is associated with an intermediate risk, while there is good prognosis when there is no increase in either.[2]

This study aimed to determine the pattern of C reactive protein in patients admitted with acute coronary syndrome to the coronary care unit at Elobied Teaching Hospital.

PATIENTS AND METHODS

This is a prospectivehospital-based study. The study included 102 patients who were consecutively admitted to the coronary care unit with the clinical diagnosis of acute coronary syndrome (ACS).

The data were obtained through well-designed data sheet including age, gender, Clinical presentation, risk factors together with complications and ECG findings. A written consent was obtained from each patient. Five ml of venous blood was withdrawn from each patient within 24 hours of admission, serum Troponin and C- reactive protein levels were measured. The data were analyzed using SPSS version18.

RESULTS

In this study, the mean age of patients was 58 ± 12 years. More than half of patients were male (54%). Hypertension was found in 33% while 28% of patients were diabetic and 18% were smoker. In this series, STEMI was found in 40 % of patients.ST segment depression was found in 12% of patients, LBBB in 4%, T wave inversion in 21%, while 23% of patients hadnormal ECG. The mean level of serum troponin was 12 ng/ml. The level of CRP was remarkably high (Mean 47 mg/l). In thecurrent study 9 % developed heart failure, arrhythmias and stroke were in 8% and 4% respectively. Three patients died with a mortality rate of 3%.

In patients with heart failure mean CRP was 94 mg /L. The mean levels of CRP were 44 mg/L and 10 mg/L in patientswho developed arrhythmias and stroke respectively. The level of CRP was significantly high in patients with STEMI compared with other pattern of ECG changes (mean 102 mg/L). (table 1) Mortality was associated with high level of CRP (mean 74mg/L)

DISCUSSION

In this study the level of CRP in patients with ACS was measured.The level of CRP was significantly high in patients with STEMI compared to other pattern of ECG changes, similar results were reported by Magdalena Krintus etal.[3] Patients with complications had significantly high level of CRP. Patients with heart failure had the highest level of CRP followed by arrhythmias and then stroke. The level of serum troponin, on the other hand is highest in patients with arrhythmia (mean 24ng\ml) followed by heart failure (mean 20ng\ml). The lowest level of serum troponin was found in patient with stroke (mean 4ng\l). These findings suggest that serum CRP and troponin have relatively independent prognostic significant. GUSTO IV ACS trial had demonstrated similar result.[4] This study showed that high level of CRP was associated with high in-hospital mortality. The correlation between the level of CRP in ACS and the long term risk of mortality was not addressed in this study, nevertheless some studies confirmed CRP as a predictor of one year and 20 months' mortality.[5, 6]

Another study indicated that patients presenting with ACS and high level of CRP have significant risk for death after 5 years and congestive heart failure after 2 years.[7] nevertheless, one study showed that there is no correlation between the level of

CRP and ejection fraction.[8] Other studies showed weak association with the extent of coronary disease on angiography[9,10]

CONCLUSION AND RECOMMENDATION

In this study, the level of CRP was high in patients with acute coronary syndrome. Further studies are needed to evaluate the role of CRP as a predictor of cardiovascular outcome after ACS.
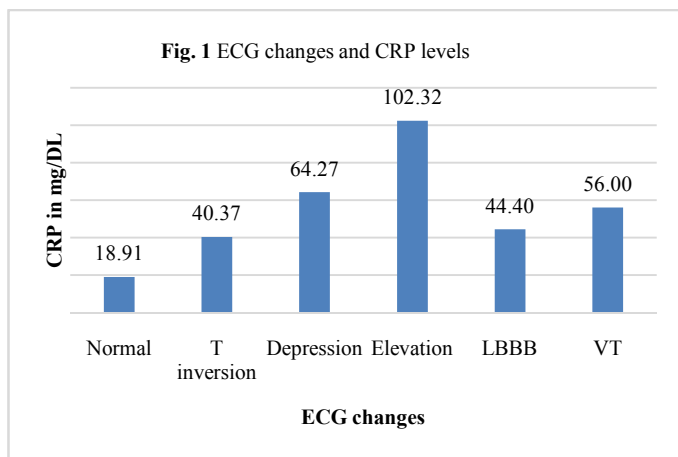

Fig. 1 ECG changes and CRP levels

Table 1 ECG changes

ECG change	Frequency	Percent %
Normal ECG	23	22.5 %
T wave inversion	21	20.6 %
T wave depression	12	11.8 %
T wave elevation	41	40.2 %
LBBB	04	3.9 %
Ventricular tachycardia (VT)	01	1.0 %
Total	102	100 %

Table 2 Complications of ACS

Complication	Frequency	Percent %
No complication	79	77.5 %
Arrhythmias	08	7.8 %
Heart failure	09	8.8 %
Stroke	04	3.9 %
Arrhythmia and heart failure	02	2.0 %
Total	102	100 %

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