The measurement of serum fibrinogen levels in patients with acute coronary syndrome

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ABSTRACT

Objectives: Serum fibrinogen level (SFL) is thought to be one of the risk factors for coronary artery disease (CAD). The purpose of this study was to measure the SFL in patients with acute coronary syndrome (ACS).

Methods: This study was performed in patients with ACS, admitted in Shahid Beheshti Hospital, Babol, Iran, from February 2005 to June 2006. Two hundred patients with ACS were divided into 4 groups: Group I - ST elevated myocardial infarction (STEMI); Group II - non-ST elevated myocardial infarction (NSTEMI); Group III - unstable angina (U/A) with ST-T change; and Group IV - U/A without ST-T change. Each group includes 50 patients. Twenty-four hours after admission, the SFL was measured using chromatography methods. The data were collected and analyzed.

Results: The mean SFL per mg/dl in each group are: Group I - 377.8 ± 28, Group II - 417.2 ± 26.8, Group III - 335.4 ± 19.8, and Group IV - 305.1 ± 13.8. The SFL in Group II was significantly higher than the other groups (p=0.002). The SFL in Group II was higher than in Group III (p=0.02), and much higher than in Group IV (p=0.000). The SFL in Group III was more than in Group IV (p=0.018).

Conclusion: The results show that SFL is an important marker in patients with ACS, with ST-T change.

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Coronary artery disease (CAD) is one of the most common causes of hospitalization throughout the world. Acute coronary syndrome (ACS), including acute myocardial infarction (AMI) and unstable angina (U/A) are one of the most common causes of death. Many risk factors increase the risk of atherosclerosis, and are associated with CAD.[1] Fibrinogen may be one of the factors that increases the risk for developing atherosclerosis.[2-7] Fibrinogen is converted to fibrin by thrombin, and this process precipitates clot formation.[1-3] Also, there is a relation between fibrinogen with age, obesity, smoking, diabetes mellitus, low density lipoprotein level, high density lipoprotein level, alcohol intake, exercise, and physical inactivity. Cigarette smoking, physical inactivity, and obesity increases serum fibrinogen levels.[8,9] Fibrinogen is one of the elements of acute inflammatory response, and is an inflammatory marker.[1] Fibrinogen contributes to the pathogenesis of atherosclerosis.[2] The study by Lin and Zairis[10,11] showed higher levels of serum fibrinogen in patients with ACS compared with the control group, while Danesh et al[12,13] showed the relation of high serum fibrinogen with CAD and stroke. In this study, we measured SFL in patients with AMI and U/A, and evaluated the relationship between SFL with ECG change.

Methods. This descriptive, analytical study was performed on patients with ACS admitted at the Department of Cardiology, Shahid Beheshti Hospital in Babol, north of Iran, from February 2005 to June 2006. Informed consent was obtained from all studied patients, and the study was approved by the ethical committee of Babol University of Medical Sciences. All patients with diagnosis of ACS were included in this study. The diagnosis of ACS was made due to the clinical findings, cardiac markers, and ECG changes. Smoker and patients with history of coagulopathy disease were excluded from this study. Two hundred patients with ACS were divided into 4 groups: Group I - ST elevated myocardial infarction (STEMI), Group

Table 1 - Baseline characteristics and results (n=50).*

Variable	Group I	Group II	Group III	Group IV	*P*-value
Age (years)	59.2 ± 12.8	65 ± 11.6	61.3 ± 11.1	62.2 ± 10.3	0.88
Male/Female	34/16	3/27	28/22	16/34	0.03
Cigarette smoker	12 (24)	8 (16)	13 (26)	5 (10)	0.149
Hypertension	35 (70)	30 (60)	25 (50)	31 (62)	0.236
Diabetes mellitus	13 (26)	16 (32)	17 (34)	35 (70)	0.843
Hyperlipidemia	14 (28)	12 (24)	18 (36)	15 (30)	0.614
Familial history	14 (28)	11 (22)	15 (30)	14 (28)	0.822
Serum fibrinogen level (mg/dl)	377.8 ± 28	417.2 ± 26.8	335.4 ± 19.6	305.1 ± 13.8	0.002

*Values are mean ± SDs or numbers of patients (percentages).

II - non-ST elevated myocardial infarction (NSTEMI), Group III - U/A with ST-T change, and Group IV - U/A without ST-T change. Each group has 50 patients. The SFL was measured 24 hours after admission, using chromatography (Fibrinogen with bio-fibrinogen kit, Biolabo Co., France). In this method, fibrinogen-clotting time was measured, and fibrinogen quantity levels were calculated. The findings were analyzed in 4 groups using Statistical Package for the Social Science, Chi-square, and Kruskal-Wallis and Mann whiten test.

Results. Among the 200 patients with ACS, males (n=101) were more than females (n=99) (p=0.03). The mean age of patients were 59.2 ± 12.8 (Group I), 65 ± 11.6 (Group II), 61.3 ± 11.1 (Group III), and 62.2 ± 10.3 (Group IV). In these 4 groups, there was no significant difference between the risk factors for atherosclerosis. The mean SFL per mg/dl on each group were 377.8 ± 28 (Group I), 417.2 ± 26.8 (Group II), 335.4 ± 19.8 (Group III), and 305.1 ± 13.8 (Group IV), (p=0.002) (**Table 1**). There were no significant difference between mean SFL in Groups I and II, (P=0.074), Group III, (p=0.823), and Group IV (p=0.077). There were significant differences between SFL in Groups II and III (p=0.02), and in Group IV (p=0.000). The SFL in Group II were more than those of Groups III and IV, while Group III was more than in Group IV (p=0.018).

Discussion. In this study, the SFL in Group II was more than those other groups. The SFL in Group III was more than in Group IV, while the SFL in Group I did not show any increase compared with the other groups. Taneli et al[14] measured the level of SF, and showed that the SFL in patients with stable angina were higher than that in the control group, but they did not show any difference between SFL in patients with AMI and the control group. However, the study by Lin et al[10] showed higher levels of SF in patients with ACS, as compared with the control group. Bennermo et al[15] did not find any association between CRP and fibrinogen levels in prognosis of the patients with non-Q-wave, AMI, and U/A, and patients with AMI that was treated by thrombolytic agents. In the study by Retterstol et al,[16] it showed that high SFL is one of the most important factors for the prognosis of patients with CAD. Danesh et al showed a relation between SFL, and complication, or mortality of patients with CAD,[12] and that high SFL is associated with CAD and stroke.[13] In our present study, we have concluded that there is a relationship between SFL and CAD, and the high SFL in patients with ACS associated with ECG change. We recommend that SFL should be measured in all patients with the diagnosis of ACS.

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