



(RESEARCH ARTICLE)



Assessment of fibrinogen level among Sudanese patient with myocardial infarction in Khartoum City- Sudan

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Abstract

Fibrinogen has been identified as a major independent risk factor for cardiovascular diseases. Myocardial infarction is cardiomyocyte death as result of a prolonged ischemia. The aim of this study was to determine fibrinogen level in Sudanese patients with myocardial infarction.

A case control study was conducted in AL-Shaab Hospital and Sudan heart center at Khartoum state, Sudan. A total of 100 study participants were enrolled in the study; 50 were myocardial infarction patients and 50 were apparently healthy individuals as control. The blood Samples were collected in 3.2 % trisodium citrate and Fibrinogen level was measured using ready kits principle. The data were analysed by statistical package of social sciences version 21.

The study revealed that fibrinogen level was higher in Myocardial infarction (MI) patients compared with normal individuals. There is a significant strong positive correlation between fibrinogen and Troponin-1 Level at the 0.05 level.

Keywords: Fibrinogen level; Myocardial infarction; Troponin

1. Introduction

Cardiovascular disease remains the leading cause of mortality and morbidity despite the identification of major risk factors and risk reduction strategies. Myocardial infarction (MI) is a relevant cardiovascular worldwide event for morbidity and mortality. In most cases, sudden cardiac death is triggered by ischemia-related ventricular tachyarrhythmia and accounts for 50% of deaths from cardiovascular disease in developed countries [1]. Clinically, MI is a syndrome that can be recognized by a set of symptoms, chest pain being the hallmark of these symptoms in most cases, supported by biochemical laboratory changes, electrocardiographic (ECG) changes, or finding on imaging modalities able to detect myocardial injury and necrosis. In Sudan the literature about the association of fibrinogen level and myocardial infarction are scarce [2]. In the pathogenesis of acute myocardial infarction (MI), common risk factors for atherosclerosis as well as haemostatic factors are important determinants. The development of a first MI is attributed to many contributing factors and is influenced by multiple genetic, environmental and lifestyle factors. Thrombosis is generally accepted as a common pathogenic pathway for the risk of MI and is itself also influenced by several risk factors [3]. Myocardial infarction occurs when myocardial ischemia, a diminished blood supply to the heart, exceeds a critical threshold and overwhelms myocardial cellular repair mechanisms designed to maintain normal operating function and homeostasis [4]. There were many previous studies conducted in Sudan about the association of fibrinogen levels, D-dimer and other coagulation factors with hypertension and other heart disease. A fibrinogen level has been identified as a major independent risk factor for cardiovascular disease and measurement of fibrinogen level may be beneficial to avoid the complication of hypertension [5-8]. The present study aimed to determine the fibrinogen level among Sudanese patients with myocardial infarction in Khartoum.

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2. Material and methods

A case control study was conducted in AL-Shaab Hospital and Sudan heart center at Khartoum state, Sudan. A total of 100 participants were selected, 50 myocardial infarction patients and 50 apparently healthy individual as control. 1.8 ml of venous blood was collected from each subject in 3.2% trisodium citrate (9:1 vol/vol). The samples were centrifuged at 2000g for 15 minutes to obtain platelet-poor plasma (PPP). Plasma was separated from cells into plane container. PPP was stored at (- 20 °C) till used. Fibrinogen was measured using automatic analyzer (STAGO) with ready kits principle. The principle of the test is that, in the presence of excess thrombin, the clotting time of the plasma is direct proportional with the level of fibrinogen in the plasma. Troponin-1 levels were obtained from patients records. Data analysis was performed using statistical package for social science (SPSS) software version (21). Data was collected using structure questionnaire and direct interview to collect information. Evaluation of patient’s data with control data was performed using the t-test. Determination of the correlation between fibrinogen level and Troponin-1 was performed using Spearman correlation test. Results with p-value < 0.05 were considered as statistically significant.

3. Results

The study included 50 myocardial infarction patients and 50 apparently healthy individuals as control, the mean age of cases was 61.1±11.6 year.

Mean fibrinogen level was significantly higher among case group (674.5±151.49) than control group (304±70.85) (p value = 0.000) as shown in table (1).

Table 1 Show the comparison of fibrinogen level between patients and controls

	Mean Fibrinogen level mg/dl	STD	P value
Patients	674.5	151.49	0.000
Controls	304	70.85	

There was no significant difference in mean fibrinogen level between males and females as shown in table 2.

Table 2 Show the comparison of fibrinogen level between males and females.

	Mean Fibrinogen level mg/dl	STD	P value
males	674.4	152.5	0.995
females	674.7	154.2	

Mean Troponin-1 level of the cases was 3.14±3.692, there was a significant positive correlation between Troponin-1 and fibrinogen levels (R2 = 0.839, p value = 0.019).

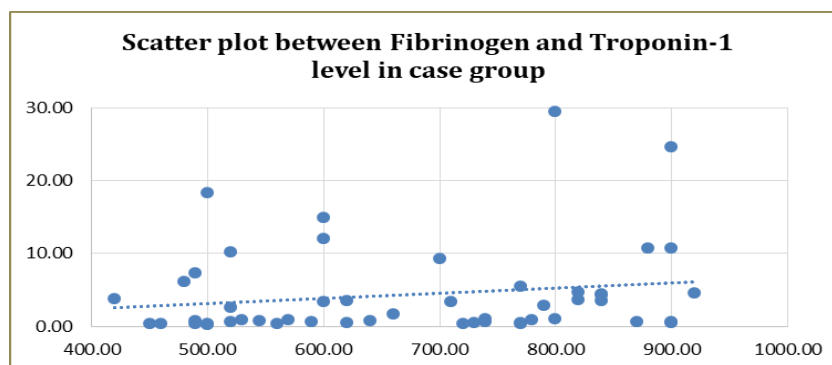


Figure 1 The Fibrinogen and Troponin-1 level among case

4. Discussion

Myocardial infarction is recognized as one of the principal risk factors for cardiovascular disease and may be associated with impaired fibrinolysis [9]. Fibrinogen is a major determinant of blood viscosity, and it is involved in hemostatic and thrombotic pathways. Elevated plasma fibrinogen is implicated in cardiovascular disease. However, it's not clear whether fibrinogen levels predict the development of Myocardial infarction. Our finding demonstrated that, the plasma fibrinogen level was significantly higher in the Myocardial infarction patients than in control group. This result is agreed with several studies conducted among Myocardial infarction patients [10] [11]. Also, this finding is contrary to the findings reported by other workers [12] [13]. Although Sechi et al. didn't observe differences in fibrinogen between Myocardial infarction patients and normal controls, their study demonstrated a strong and independent association between fibrinogen and the presence and severity of Myocardial infarction related damage in different target organs [14].

Our study show that the genders of the patient have no effect on the fibrinogen level, both sexes has same level of fibrinogen.

This finding is in agreement with study done by Anoop et al. found that elevated plasma fibrinogen level was positively associated with prevalent Myocardial infarction both among men and women [15]. Another study conducted by Folsom et al and concluded that despite a moderately strong positive association between fibrinogen levels and prevalent Myocardial infarction in both sex-es, there was only a weak positive association between fibrinogen levels and incident Myocardial infarction in men and no association in women. Whether an elevated fibrinogen level is a risk factor for, or a consequence of, Myocardial infarction remains unclear [16]. Our study is limited by the low number of subjects and other thrombotic markers like D-dimer.

5. Conclusion

The study concluded that fibrinogen level was higher in MI patient compared with normal individuals, that's mean fibrinogen consider risk factor for myocardial infarction. There's significant strong positive correlation between fibrinogen level and troponin-1 level.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

All the authors hereby disclose no conflict of interest.

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