Study the Elevation of Fibrinogen level in Plasma Patients with Diabetes Mellitus Type 2 in Babylon Governorate

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Abstract

Objective: The incidence of diabetes mellitus type 1 and type 2 has increased dramatically worldwide in the past 20 years. Type 2 diabetes is probable to increase further in the future owing to the increase in obesity and the lack of exercise. This may rise the danger of unindustrialized cardiovascular illness in patients with type 2 DM. It may be because fibrinogen has an important role in the increased risk of cardiovascular disease. The aims of current study to find out the level of fibrinogen and its relationship to the level of blood glucose in patients with type 2 DM. **Methods:** The study contain 50 patient with diabetes mellitus type 2 as patient group and 50 adult apparently healthy as control group. All plasma samples were collected from all subjects. The age for both groups concerning (43-75) years. The collected data include measures, plasma fibrinogen and HbA1c. **Results**: The present study revealed a significant increase in plasma fibrinogen, HbA1c concentration in patients compared with control group ($p<0.01$). **Conclusion**: The results of this study reveal a significant increase in fibrinogen level in patients with diabetes mellitus type 2 without cardiovascular disease.

Keywords: *toxicity; patients; diabetes; cardiovascular; plasma*

Introduction

The incidence of diabetes mellitus in the worldwide has risen melodramatically over the past two decades Although of both types of diabetes mellitus prevalence is increasing worldwide, occurrence of type 2 diabetes mellitus is predictable to rise extra speedily in impending because of increasing obesity and reduced activity levels [(1)]. One of major and important diabetes complication is diabetic foot syndrome (DFS) [(2)].

Diabetic Foot Ulcer (DFU) is well-defined as "Infection, ulceration and/or destruction of deep tissues linked with neurological abnormalities and numerous degrees of 2 peripheral vascular disease in the lower limb" [(3)].

diabetic polyneuropathy and peripheral arterial disease are a chief risk aspects for foot ulcer [(4)]. In many stages, the immune system is necessary and very important, especially in the case of chronic wound healing, and at sometimes stimulation of the immune system negatively affects the body by afflicting the patient with diabetes mellitus with diabetic foot ulcer disease and coronary heart disease. [(5)].

Fibrinogen, plays a vital role in hemostasis, precisely in clot development and stabilization with a 340 kDa glycoprotein molecular weight [(6)]. The level of fibrinogen in the plasma is one of the most important components of the clotting chain. It is also considered an essential factor or component of blood flow and its viscosity. It is known that the high level of fibrinogen in the plasma is considered a cause of vascular disease and heart disease, and very high levels may affect the rise of fibrin clots, blood viscosity, and the stimulation of arteriosclerosis. Continuous impairment of metabolic control leads to an overproduction of fibrinogen, and thus may effect On the usual process of wound healing [(7)]. Impaired glucose tolerance induces the effect by increasing clotting factors such as fibrinogen in diabetics [(8)]. Fibrinogen itself is potent through many modifying and non-modifiable factors such as body mass index . gender, age, smoking, glycemic control, and urine albumin excretion rate [(9)].

In view of above notions this planted project assumed to know the significance of fibrinogen and glycemic control as accepted risk factors in diabetes mellitus type 2 with ability to make it as pointers to evaluate the severity of DFU.

Method

The study contain two groups (T2DM and control group), the age was between (43-75) years and body mass index (BMI) was 29.3. The practical part of the study took place in the laboratories of the Department of Biochemistry at the College of Medicine / University of Babylon. The patient group contain 50 individual were collected from Marjan Medical City and Al-Hilla General Teaching hospital in Hilla city. other group contain 50 adults were collected from medical staff which were apparently healthy as control group. All individuals in this group have no signs of diabetes mellitus and its complications. All individual in tow groups that suffered from disease such as, diabetes, circulating diseases, stroke, hypertension and malignancy which affect oxidation state were excluded.

Blood Sampling

Five milliliters of venous blood was aspirated from all participants in fasting status. The samples were stored at -20˚C. plasma were used to measure fibrinogen level and HbA1c by Enzyme Liked immune-sorbent assay (ELISA) technique**.**

Statistical Methods

all results were measured as mean ± SD. Student's, A p-value <0.05 was considered statistically significant. SPSS software version 18 was used.

Results

Serum fibrinogen level with HbA1c in T2DM group were showed in the table (1). A significant increase in fibrinogen level was found in T2DM group by compared with control group (P<0.01). Also a significant elevated in HbA1c was found in T2DM group in comprison with control group (P<0.01).

Table (1) Fibrinogen with HbA1c in studied groups

Parameter	T2DM mean±SD	Control mean±SD	P. Value
No.	**No.50**	**No.50**	
HbA1c	5.75±0.4 (6.1-5.3)	4.3±0.4 (4.7-3.9)	P < 0.01
Fib.* mg/ml	6.7±0.9 (7.6-5.8)	3.09±0.5 (3.59-2.59)	P< 0.01

* Fibrinogen

Discussion

Fibrinogen level in the blood is one of the very important components in the blood clotting process, in addition to it playing an important role in blood flow and blood viscosity. There are many studies that indicate that a high level of fibrinogen in the blood is often linked with an increased risk of cardiovascular disease, including stroke and thromboembolism [10].

Depending on the present results we notice a noticeable increase in fibrinogen level in patient with T2DM by compared with control group and the result was agree with many research like Bembde AS et al originate fibrinogen to be advanced in diabetic patients group than the control group [11].

A previous study in Italy showed that there is an increase in the level of fibrinogen in the blood and that

it is associated with hemoglobin HbA1 in patients with type II diabetes. The results also showed that there is a close relationship between fibrinogen and hemoglobin HbA1c, as the level of fibrinogen is one of the signs of the physiological changes of blood vessels in diabetic patients The second type [12].

Parag Gupta and et al suggests that this increase in blood fibrinogen may be related to primary inflammation in patients with type 2 diabetes, which may lead to vascular complications in the future. [13]. And that there are many studies that have confirmed strong evidence that of fibrinogen levels in the blood are individualistically related to the likelihood of vascular disease or its later development [14].

In patients with type 2 diabetes, an increase in the concentration of insulin and amino acids in the blood is observed, and this occurs with insulin therapy or in the absence of treatment [15].

From these observations, an increase in the level of fibrinogen in the blood of type 2 diabetics can be attributed to an increase in the concentration of insulin that stimulates the production of fibrinogen, and this result is consistent with a previous report on the production of fibrinogen in the laboratory from stimulating liver cells after prolonged exposure to insulin [16;17]. The role of insulin in overproduction of fibrinogen in patients with type 2 diabetes indicates a relationship between hyperinsulinemia and insulin resistance with the change in acute-phase reactant production[18;19].

Conclusion

The results of this study reveal a significant increase in plasma fibrinogen concentrations in patients with diabetes mellitus type 2 without cardiovascular disease. And there is still an increase in hyperfibrinogen in patients with diabetes mellitus type 2.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: None

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