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Free radical capacity in plasma of type 2 diabetic patients

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ABSTRACT

Type 2 diabetes is most common in middle age. This type of diabetes usually causes defects in insulin secretion. The disease worldwide is increasing day by day. The creation of free radicals that can occur in patients with diabetes on protein oxidation, lipid peroxidation; DNA can affect and damage the cells. The kidneys, eyes, cardiovascular system, blood vessels are so detrimental. This study aims to evaluate free radical capacity in plasma of type 2 diabetic Patients. This case - control study was conducted using random sampling. A survey was carried out on blood from samples, which included 30 type 2 diabetic patients, and 30-control sample of age and sex matched subjects. The free radical capacity level were significantly (P = 0.005) higher in control sample compared with type 2 diabetic patients. Free radicals have an important part in reducing cellular damage.

Key words: Radical capacity, type 2 diabetes, plasma

1. INTRODUCTION

The purpose of this study was to evaluate plasma levels of free radicals in the population of type 2 diabetic patients compared with control subjects. Diabetes mellitus is a chronic metabolic disease and currently more than 347 million people worldwide are infected with this disease (1). The cause of diabetes or to diminish insulin due to destruction of beta cells (type I diabetes) or decreased responsiveness of peripheral insulin receptors is due to insulin resistance (type II diabetes). Diabetes symptoms include Hyperglycemia (high blood sugar), polyuria, water load, and the binge eating is characterized by the appearance of glucose in the urine (2,3). This syndrome for a long period is serious and irreversible. For example, retinopathy, nephropathy, neuropathy and vascular damage are associated (4,5). The production process (ROS), accumulation of reactive oxygen radicals, oxidative stress in tissues, particularly the pancreatic beta cells, causes chronic hyperglycemia of diabetes (6,7). The formation of these radicals causes damage to critical macromolecules, cells, membrane lipid peroxidation and finally damages cell (8,9). Free radicals, including reactive oxygen species (ROS), nitrogen species (10). Antioxidant compounds in healthy subjects which deal With free radicals (11). Oxidative stress in type 2 diabetes increases the free radicals (12). The imbalance between the production of free radicals and radical scavenging capacity of antioxidants is called oxidative stress (13) . Diabetes is associated with oxidative stress-induced ROS production, which can potentially harm the DNA insert (14). Moreover, it can damage the kidneys, cataracts, cardiovascular system - blood vessels and so forth. Oxidative stress results from an imbalance between ROS production and consumption. The production of free radicals is exacerbated by the presence of metals. In the case of oxidative stress, many are injured of macromolecules, process of lipid peroxidation, protein oxidation, oxidation Dena, activation of enzymes and stimulates membrane dysfunction (15,16). Available evidence indicates that oxidative stress is involved Patvzhnr more than a hundred diseases, including diabetes mellitus (17). In this context, several works have been proposed to increase the production of free radicals because of auto-oxidation of glucose and the formation of

glycated proteins. In addition, reduced activity or capacity of antioxidants can also be effective in enhancing the state (18). Diabetes is associated with OH at C1 to C2 in the presence of superoxide which leads to hydrogen peroxide oxidizes and causes DNA damage etc(19). One of the most aggressive radicals is hydroxyl radical (20), oxidative stress in diabetes and diabetic complications now as a mechanism is proposed (21). In this study, we conclude that oxidative stress plays a major role in diabetic patients and strengthen the antioxidant system; and we can prevent some of the damages.

Table1) and free radical capacity. Biochemistry the Auto analyzer Model BT-3000, barking exams and Pars Azmon kit. Measurement of plasma free radicals: a 20 µm patient serum, phosphate buffer 380 µm with PH=7.4 and 400 µm 1, diphenyl-2-picrylhydrazyl (DPPH) mixture, incubated for 30 min at room temperature and the absorbance read at a wave length of 520nm. In addition, samples with the spectrophotometer Model EPOCH-Bio Tek readings. T-

2. MATERIALS AND METHODS

This case - control study, and samples were taken randomly and were matched with age and sex. Patients with type 2 diabetes were considered in this research. Heparinized blood samples were obtained from patients. Prepared plasma was isolated from blood samples with the help of red blood cells by centrifuging (3000 RMP min to 10 min). The isolated plasma was used for biochemical tests (FBS, TG, CHO, HDL-T, LDL _T and A1C) (Test was used to analyze the data. Values of P <0.05 was considered significant.

Blanch methanol was used in this test.

Dpph rate is obtained from the following formula: %

DPPH = (A-AX)/A *100 %Inhibition

A = DPPH absorption along with methanol

AX = DPPH absorption along with plasma

Table1. Clinical characteristics of studied subjects

P.Val	*Mean±SD Control case*	*Mean±SD Diabetic*	*Type for measurement*
0.000	8.335±93.100	51.746±219.733	F.B.S
0.000	18.172±193.600	30.049±269.200	Cho
0.000	33.609±203.533	87.118±288.466	T.G
0.000	0.628±6.860	1.156±8.906	A1C
0.188	4.141±50.466	4.107±51.766	Ag
0.001	1.201±28.330	1.113±27.046	B.M.I
0.003	6.441±37.560	3.518±33.033	HDL - C
0.000	5.343±130.000	12.976±146.866	LDL - C

Results are expressed as mean ± SD. Statistical significance was achieved, as P values were less than 0.05. All statistical analysis was performed using the SPSS (version 18) independent – samples T-Test.

3. RESULTS AND DISCUSSION

We observed a significant (P=0.005) decrease level of free radical capacity 1, diphenyl-2-picrylhydrazyl (DPPH) method in type 2 diabetic patients in comparison to Control samples (0.942 ± 0.164 vs. 1.133 ± 0.276) (Chart 1) (Table2). The outcome of this study suggests that oxidative stress occurs in patients with type 2 diabetes as increased levels of blood glucose and related metabolic differences. Hyprglaysmy antioxidant system occurs in the body by increasing the production of free radicals (18). Several studies have been done based on this knowledge. Plasma total antioxidant power level was decreased in diabetes (22-24). Oxidative stress can accelerate clinical complications in type 2 diabetes (25-27). ROS damage by stimulating the beta cells to produce insulin can cause diabetes (28). Glucose concentration increases with the Russians in vivo as well as in cell cultures are associated (29,30). Sheikh-Ali studies diabetic patients by increasing free radicals and ROS can damage the cell (31). Lipins K studies in diabetes foundation continuous glucose increased free radicals are produced (32). Due to the presence of oxidative stress in diabetic patients and further production of free radicals, lipid levels also increase the need for increase in antioxidants. Varieties of mechanisms of oxidative stress in diabetes mellitus have been reported in the press. Moreover, it is a sugar oxidation. Building components with alpha - hydroxy aldehydes (such as glucose) can become Enol form, with the revival of intermediate elements and oxygen free radicals. The first is the creation of radical. Superoxide radical and superoxide dismutase enzymes produce H_2O_2. It is the active species in the presence of transition metals to produce hydroxyl radicals, which can be extremely dangerous and aggressive (33). When blood glucose increases the sugar binding proteins, compounds are produced that are involved in the production of free radical Superoxide (34). radicals produced during the reaction shown in addition to the decrease in GSH levels, resulting in the activation of the NADPH production disturbance occurring poly-ol, a reconstruction of vitamins E and C, resulting in an

effective decrease in antioxidant capacity (35). It seems that in diabetes, oxidative stress causes due to the over production of free radicals and decreased levels of antioxidants during oxidative stress.

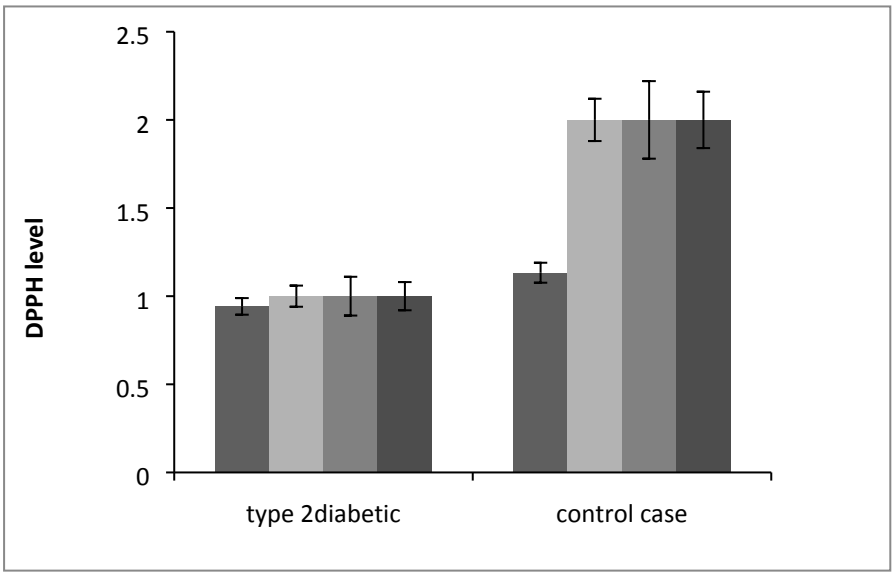

Chart 1: DPPH level in type 2 diabetic and control case

*P<0.05. The value is mean±SD.

Table2. Free radical capacity method DPPH

P.val	*Control case mean±SD*	*Type 2diabetic mean±SD*	
0.005	1.133 ± 0.276	0.942 ± 0.164	DPPH

4. CONCLUSION

Our study showed that there is a change of free radicals in type 2 diabetic patients. These changes can create irreparable damage in the lipid peroxidation, protein oxidation DNA and so on. In this state of diabetic patients, to minimize the harm vitamins E, C and antioxidants are beneficial.

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AUTHORS CONTRIBUTION

This work was carried out in collaboration between all authors.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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