



The Effect of Type II Diabetes Mellitus on Some Prostate Markers in Iraqi Men

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Abstract

Aim: Diabetes mellitus is a spread disease in the whole world and this study was conducted on Iraqi diabetic men to know the relation between type II diabetic and some prostate related markers including (prostate size, total prostate antigen, random blood sugar and zinc). Material and methods: This study included one hundred men their age ranges between (40-60 year), fifty males were suffering from type II diabetes mellitus, and other fifty men were non-diabetics. Some parameters such as (Prostate size, total prostate specific antigen (tPSA), random blood sugar (RBS) and Zinc (Zn^{+2}) were studied. Results: The results have showed significant increase in prostate size 50.5000 ± 3.748 and random blood sugar 203.55 ± 13.629 mg/dl compared with non-diabetic group 39.650 ± 2.484 and 125.750 ± 5.396 mg/dl, respectively but there is non-significant difference in total prostate specific antigen 1.543 ± 0.087 ng/ml and zinc 9.725 ± 0.344 $\mu\text{mol/l}$ in diabetic group compared with non-diabetic group 1.612 ± 0.152 ng/ml and 11.025 ± 0.582 $\mu\text{mol/l}$ respectively at $P \leq 0.05$. Conclusions: Patients with type II diabetes mellitus are more liable to suffer from increase in prostate size and increase in RBS levels in Iraqi men under study.

Keywords: *Diabetic patient, Prostate size, RBS, Zinc and tPSA.*

Introduction

Generally, diabetes mellitus (DM) considered one of the main incommunicable disorders and the prevalence of this disease in developing countries was highly over the past decades [1]. The incidence of this disease in 2015 was more than 415 million people worldwide, while in Chinese was one fourth in the population are affected with diabetes [2].

Occasionally, people with inactive lifestyles and insanity dietary behavior showed highly documented to have risk factors of diabetes. In addition, several studies indicated that some environmental chemicals like (heavy metals) play a crucial role in the enhancement of T2DM [3].

Therefore, the general people during the daily life are in direct contact with these kinds of metals such as dietary intake, inhalation of ambient air, water drinking and dermal contact of consumable goods [4].

The correlation between diabetes and prostate illnesses (for instance prostate cancer and benign prostatic hyperplasia (BPH) is complex.

Diabetes has the possibility to decrease the danger of prostate cancer. Men who diagnosed with type II DM have lower androgen levels; therefore, they have been immediately connected with prostate cancer hazards. Accordingly, diabetes relates to changes in insulin levels and demand, which seems to be higher in pre-and early diabetic cases. These procure to reduced insulin-like growth factor-I (IGF-I), binding protein levels and eventually, to higher IGF-I, therefore, all factors are probably relating to BPH development and the risk of prostate cancer. Thus, in this presented study, we tested the association between type II diabetes mellitus and some prostate markers (P. Size and tPSA) and Zinc (Zn) on some of the Iraqi men who affected by diabetic and who has not.

Material and Method

The study took place in Anbar province in Iraq at the department of medicine of Ramadi Teaching Hospital. It started from Nov2017 to Apr2018. In the beginning, we got the approval from all men who would be used as samples in this study. The ages of those men range between (40-60 years old). Our study performed on fifty men who diagnosed by diabetes type II, and another fifty men who doesn't have diabetics. All the data results have been recorded according to administering a questionnaire, and all men's prostates size have been checked and examined.

Also, we drawn five milliliters of venous blood and the serum separated and send to our laboratories at Ramadi Teaching Hospital. Serum samples have been divided into Eppendorf and stored at -20 C until used.

In this study, the following aspects have been considered for all the patients:

- Prostate size was calculated by using abdominal ultrasonography

- Total prostate specific antigen (tPSA) was determined by (ELISA) method followed using kit purchased from bioactiva diagnostica company (Germany) [5, 9].
- Random blood sugar (RBS) was measured by enzymatic colorimetric method [10].
- Zinc was determined by using atomic absorption spectrophotometric (AAS) [11].

Statistical Analysis

Data were analyzed by using version 18.0 of SPSS program (SPSS, IBM Corporation, Chicago, IL, USA). The P value was supposed to be significant at ≤ 0.05 .

Results

The results of this study (Table 1 and Fig. 1) found out that there is a significant increase in prostate size and random blood sugar but, they showed no significant difference in total prostate specific antigen and zinc in diabetic group compared with non-diabetic group at $P \leq 0.05$.

Table.1: Shows the relationship between P. Size, TPSA, RBS and Zinc in type II diabetic and non-diabetic men at $P \leq 0.05$

Groups	Diabetic (Mean± SE) no= 50	Non-diabetic (Mean± SE) no=50	P
P. Size	50.5000 ± 3.748	39.650 ± 2.484	0.220
tPSA (ng/ml)	1.543 ± 0.087	1.612 ± 0.152	0.696
RBS (ng/dl)	203.550 ± 13.629	125.750 ± 5.396	0.000
Zinc (µmol/l)	9.725 ± 0.344	11.025 ± 0.582	0.640

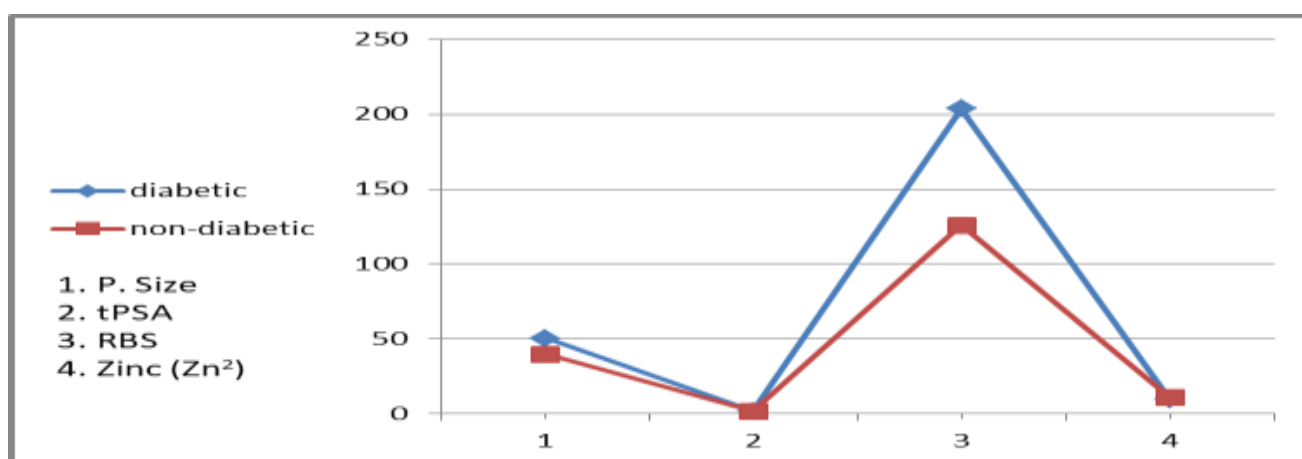


Figure 1: shows the relationship between P. Size, TPSA, RBS and Zinc in type II diabetic and non-diabetic men

Discussion

The results of this study in (Table 1 and Fig. 1) showed significant increase in prostate size and random blood sugar in diabetic group compared with non-diabetic group. These outcomes were in agreement with

other global study among aged men are above 50% related to the occurrence of benign prostatic hyperplasia (BPH) [12], BPH became as important medical public health problem. Nevertheless, there are some etiologic agents need to understand for

developing the mechanism of BPH. Previous studies suggested that some factors play a main role in this matter such as diabetes, obesity, alcohol consumption, physical activity, dyslipidemia, hypertension, diet, smoking, and the environment [13, 14]. Since the most common benign tumor in men is BPH and these events are age development related.

Pathologically the BPH exhibit a type of nonmalignant cells growth with unregulated shape leading to an increase in stromal cells size and prostate epithelial especially in the end stage. Therefore, there are some corresponding systems are likely to be involved in the etiology of BPH to be solved. These systems in addition to the resident aspects are nerve, endocrine, immune, and vascular system [15]. A study by [15] indicated that the pathogenic of BPH is controlled by endocrine mechanism; this will keep the loss of specific pathway which remains to be more investigated. Regarding some medical opinions about the dissimilarity of the pathogenesis between T2DM and BPH, these still misgivings the relation between these public diseases.

On the contrary, however, T2DM and BPH are different in some clinical features; both diseases have the same epidemiological characters related with age and diet which probably associated in the pathogenic pathways [16, 17]. The results of our study are consistent with many studies that found the large prostate volume is associated with the components of metabolic syndrome [18, 19]. In fact, both type II DM and BPH seem to share similar epidemiological features, possibly related to aging and diet [20] Barnard *et al* [21] found that the reduction of insulin level leads to decrease of stem epithelial prostate cells growth.

Other possible mechanisms have been suggested to correlate the improvement of type II diabetes mellitus with BPH, [22] such as the enhancement activity in the autonomic nervous system caused by hyper-insulinemia, and peripheral sympathetic nerve tone and hypoxia caused by DM-induced vascular damage [23].

Also, many previous studies found a positive correlation between the levels of fasting blood glucose and prostate size [24]. Serum PSA concentration is age- dependent, i.e. it tends

to increase with age because the prostate enlarges with years and contains more PSA-producing tissue [25]. Results from epidemiologic findings on the relationship between prostate cancer and diabetes risk are often confusing. Some studies suggested that diabetic's patient has a low risk of prostate cancer. This relationship investigated in the follow-up study conducted from 1986 till 1994 in the United States.

The basis of this relationship is unclear, however, it may reflect hormonal changes associated with diabetes or it may due to being low testosterone level [26]. The theory related to the increasing total or bioavailable testosterone levels and prostate cancer risk-factor have been supported by some studies [27]. Results of the Cancer Prevention Study (1959-1972) have indicated that men without diabetes had a low risk of prostate cancer than men who had DM for five years or more [28]. Another study also found a relationship among diabetes and prostate cancer [29]. Results of a population-based study of Chinese men documented that in Chinese men with high levels of serum insulin may encourage the risk of prostate cancer [30].

In addition, another study in north Italy found no association between the risk of prostate cancer and diabetic patient (increased risk of liver cancer, pancreas and endometrium was observed) [31]. Our study has shown no significant high defect in Zinc element between the diabetic and non-diabetic group. Since, the metabolic characteristics and biological functions are affected by some elements such as selenium, manganese, and zinc [32]. Numerous studies indicated that glucose homeostasis process regulated by zinc elements.

The association of type II diabetes and plasma zinc concentrations has been illustrated in a study among Chinese population in 1796 [33, 34]. However, our study has found no significant results in the reduction of zinc levels in serum among men with diabetes. In contrast, different findings observed by a study among postmenopausal women indicated that a woman with diabetic has significant increase level in serum zinc than in the healthy group [35].

Recent evidence indicated that the role of zinc transporter is diverse between ISG zinc ZnT8, this different pathway perhaps

considered with protection or risk of diabetes [33]. A study by [36] confirmed that the sensitivity of peripheral insulin was improved by zinc through the role of activated insulin stimulated glucose transports [36]. In addition, zinc plays an important action in the physiology of β cells [37]. The recent genetic study demonstrated that the specific β cells islet of zinc ZnT8 (SLC30A8) transporter expression which is

the best regulator of the insulin secretion might change the risk of T2DM development [38].

Conclusions

Patients with type II diabetes mellitus are more liable to suffer from increase in prostate size and increase in RBS levels in Iraqi men under study.

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