Al-Kufa University Journal for Biology / VOL.9 / NO.2 / Year: 2017
Print ISSN: 2073-8854 & Online ISSN: 2311-6544

Determination the IL-10 serum level for the T1DM al-diwanyah patients

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Abstract:
Background: The autoimmune disease T1DM (Type 1 diabetes mellitus) consider as important endocrine disorder described by the damage of beta cells of pancreatic islets. There is confirmation the IL-10 is a significant player on both immunity arms: innate and adaptive immunity. This study aimed to determined the essential role of IL-10 serum in the T1DM al-diwanyah patients as a vital immune factor for prevention and treatment of T1DM.
Patients and methods: A total of (33) patients (T1DM) patient. The cohort was divided into two groups according to gender (17 female, 16 male).in addition to (15) healthy control group to measure the serum level of IL-10 by ELISA. Data was evaluated by T-test analysis at ($P < 0.05$) significant level.
Results: the date displayed high significant mean of serum level for T1DM patients (424.9 ± 161.6 pg/ml) in comparative with healthy control (29.1 ± 7.1 pg/ml) at the ($P<0.05$) level, and could be seen from the result the serum level of IL-10 for the male group (454.8 ± 156.5 pg/ml) significantly higher than female group (47.4 ± 22.1 pg/ml) at the ($P<0.05$) level.
Conclusions: In conclusion IL-10 has been acknowledged as an important pleiotropic immunomodulatory cytokines were elevated under regulation of internal environment and homeostasis and involved in maintaining immune homeostasis .
Key words: IL-10, male, female T1DM

Introduction:

The (T1DM) is considering as a vital endocrine disease characterized by the damage of beta cells of pancreatic islets lead to the insulin deficiency [1]. The disease can noticed at different age, but is often occurred in early adulthood and adolescence. Although exact cause of T1D is unidentified; nonetheless, immunologic, genetic and environmental factors be responsible for the disease.[2,3] ,and there are numerous studies explained a correlation between the abnormalities in the function of T cell and the occurrence of diabetes mellitus [4,5] .There is growing evidence to suggest that altered Th1/Th2 balance and related cytokines have a significant effect on the development of autoimmune disorder such as T1DM [6]. There are numerous studies focused upon using several mediators (such as antibodies, cytokines, and macrophage precursors) that making Th2 active completely using variable grades of achievement to avoid the disease (7). the cytokine IL-10 Involved in the therapies through the immunomodulatory effect, and so other research refers to Th2 cytokines (IL-10 and IL-4) as protector from T1DM in NOD mice either by reverse T-cell unresponsiveness or via decreased Th1 within T-cell infiltrated pancreatic islet [8].
The pluripotent effect and immunoregulatory properties of IL-10 introduced it as a vital player on both innate and adaptive immunity. [9] by limiting the inflammatory response which could otherwise cause tissue damage; where act to avoid the effect of inflammatory [10]. A number of studies referred to IL-10 as a trigger of humeral immunity through inducing the expression of class II MHC on B cells and talk into production of antibodies [9].
Moreover, IL-10 can conserve the transcription factor Fox3 expression on Treg cells and suppressive roles in mice [11],so the IL-10 is a recognized as immunostimulatory in addition to immunosuppressive and anti-inflammatory properties [12].The purpose of this research was to estimate the interleukin (IL-10) serum level in T1DM paitents, and their relationship with sex and so evaluate its association with the disease development.

Subject and Method

Thirty-five Iraqi T1DM (19 female, 16 male) with (15 healthy) matched to T1DM patients group by age and gender contained within this research. Where they attending the Center of Diabetes and Endocrinology in al-diwanyah through the period of November -2015 to March-2016, from the venous blood collect Four milliliters blood from each subject (patients and controls). The drawn blood was moved into plain test tubes, then separated the serum by centrifugation at 2500 rpm in 10 min., separated into aliquots and kept at-20°C until used. IL-10 were measured by ELISA using human IL-10kit (R&D system). The samples were collect from (patients and control) group after an overnight fasting period.

Statistical Analysis :

The Student's t-test was used to assess the differences between study groups. All parameter were assessed as means ±SE. the significant was fixed at ($P<0.05$) level.

Result:

Simple statistical analysis was used to explain the concentration of IL-10 serum level in the investigated patients (424.9 pg/ml) comparative with healthy group (29.1 pg/ml), where the T1DM patients have significantly increased IL-10 serum level compared to health group (P1=**0.042)** as shown in table 1 and figure 1 .

Table 1: Means of interleukin-10 serum level in T1DM and healthy group

	No.	Mean ± SE(pg\ml)
		IL-10
Healthy	15	29.1 ± 7.18
T1 DM	35	424.9 ± 161.6
P-Value	--	*0.042
LSD	--	479.21
* (P<0.05)		

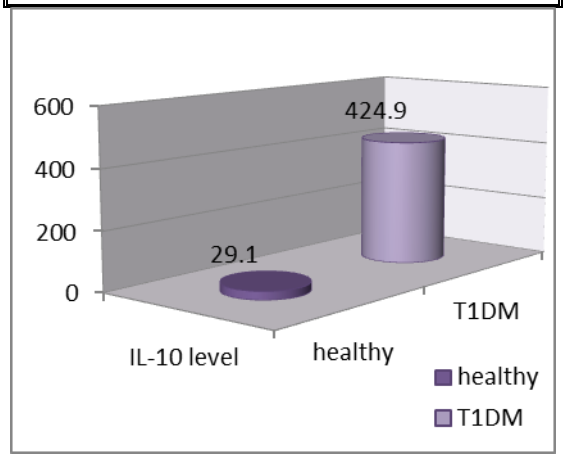

Figure-1: serum levels of interleukin-10 in T1DM and healthy group.

And so, a significant difference between male (male 454.8 pg/ml) and female(47.4 pg/ml) groups in interleukin-10 serum level was evident at the level ($P< 0.05$), as presented in table 2& figure 2

Table 2: interleukin-10 serum level in male and female T1DM patients

	No.	Mean ± SE(pg\ml)
		IL-10
male	16	454.8 ± 156.5
female	19	47.4 ± 22.1
P-Value	--	0.035*
LSD	--	
		*(P< 0.05)

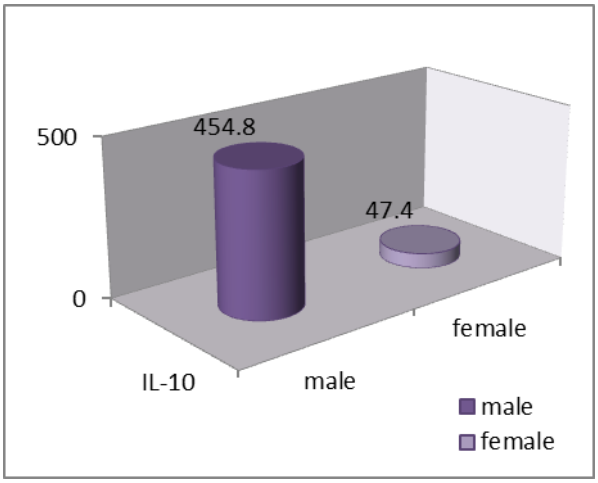

Figure-2: serum levels of IL-10 in male and female T1DM patients

Discussion

The current study found that IL-10 serum level in T1DM patients higher than healthy group and this result disagreement with the some research, which determine the lower IL-10 serum level in T1DM patients (13,14).neither Geerlings et al. (31) nor Foss-Freitas et al. [35] determined differences in IL-10 serum level between diabetic patients and control individuals, and agreement with other study noticed that concentration of IL-10 peripheral blood form T1DM was significantly higher than those in normal group[15,16].

The significant result for this study showed an elevated level of serum IL-10 in T1DM group compared with healthy controls, where it was across to many other reports, which establish that T1DM could be treated by stimulation the T helper 2 cells or via treatment with T helper 2 interleukin(IL-10 and IL-4) [8], and then limited the cascade of proinflammatory interleukin activation [10] and, downregulated T cell-mediated immune responses [17].

Schloot and his group referred to an first elevated level of serum IL-10 was detected primarily at T1DM patients , but after that get down the IL-10 level when the T1DM was developed, so that approving the fact that IL-10 was necessary for diabetes developing (18). IL-10 is inducer , act as B-cell activator, increases MHC class II expression on B-cells, therefore stimulating periinsulitis and insulitis (19) ,thus inducing the collecting of macrophages and B-cells (20), and because of its role as cytotoxic T-cell activator agent , IL-10 may induce activated T-cells and its essential for an early phase of diabetes (21). Anyway, T helper 2 interleukin can no longer be regarded as"protective" of T1DM.

So, the high level of Interleukin-10 in critically ill and septic patients saved them from death [22], whereas the decrease concentration was establish in non-survivors [23]. In contrast, other reports pointed against the anti-inflammatory action of Th2 cytokines. Th2 cytokines (IL-10 but not IL-4) were presented to be involved in T1DM disease by assistance the infiltration of mononuclear cells in pancreas and producing strong and generalized

pancreatitits and insulitis related with islet destruction in NOD mice (24). The other researchers explained the initial systemic cure with exogenous murine Interleukin-10 can prevent T1DM in NOD mice, but the (intra islet) expression speed up the onset of disease (25).The abnormalities in IL-10 concentration or role have been related with T1DM in both humans and NOD mice (14, 26).It was clearly that "Th2-induced" element of anti B cell immunity due to the experiment, which describe the local construction of Interlukin-10, but not Interlukin-4, enhanced autoimmune damage of b islet cells (27).

Functionally, Th2 exert their effects by direct or indirect pathway. Interlukin -10 may encourage necrosis by obstruction of the microvasculature, thereby resulting in hypoxia and reducing the viability of the larger islets (28).

In addition this study explain a strong relationship between IL-10 cytokines and patients gender , in the Instead of there were no differences in T1DM occurrence between male and female, the T1DM incident in male and female are equally affected in young populations, even though most common autoimmune diseases disproportionately affect females [29], but when described the serum level between two gender in this study , it was clearly that a significant differences between them, may be due to the effect of testosterone hormone, where Liva and Voskuhl had observed the testosterone hormone acted straight upon T helper cells to rise Interlukine-10 expression [30], In agreement with IL-10 anti-inflammatory activity, this explain the elevated serum level of IL-10 in protected the critically patients from death [22], whereas decrease serum levels were found in non-survivors[23]and this clarify the high mortality in women with T1DM than man, as mention Huxley and his colleagues, that excess risk of mortality is much greater in women with type 1 diabetes in compared with men[31].

In conclusion, IL-10 has been recognized as important pleiotropic immunomodulatory cytokines were elevated under the regulation of internal environment and homeostasis and involved in maintaining immune homeostasis under steady-state conditions.

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