Detection of Coxsackie virus B Measurement Level of Interleukin 1 Beta(IL1β) in patients suffered in T1DM with Coxsackie virus infection

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ABSTRACT

Objective: Insulin dependent diabetes mellitus (IDDM), which is brought on by viral-induced pancreatic cell destruction, has long been linked to Coxsackie virus infection. Production of pro-inflammatory cytokines may be stimulated by this illness, one of this cytokine is interleukin 1 beta

Materials and Methods: Blood sample were collected from 180 Iraqi participants. 90 of them is type 1 diabetic patients and other 90 is healthy control. both groups were tested for the incidence of Coxsackie virus B IgG. So the patients groups is divided to two groups according to sero positivity of CVB-IgG. all 180 patients tested to measure of level of IL1β.

Results. The Results showed increasing in levels of IL-1β in CBV positive Type 1 Diabetes mellitus was (17.97 ± 5.65 pg/ml). The level of this interleukin in Type 1 Diabetes mellitus negative to that virus was (16.17 ± 4.09 pg/ml). While the results of this interleukin in control group was (2.92 ± 4.40 pg/ml) as shown in Table (4-5) and (Figure 4.5). There was significant differences (P<0.05) of IL-1β level in CBV positive Type 1 Diabetes mellitus than the others in which negative to them.

Conclusion: The concentration of the IL-1β, according to our results, has been shown to be associated with the type 1 of diabetes mellitus patients with CBV and also shows a susceptibility of individuals to developed T1DM.

Keywords: Viral diseases, T1DM, IL1β, and Coxsackie virus.

Introduction

One of the most frequent kinds of diabetes in young adults is type 1. Daily monitoring of blood glucose levels (BGls) and a lifelong requirement for exogenous insulin delivery are required due to pancreatic -cell autoimmune destruction.(1) Infancy affects both sexes equally, but early adulthood is when males are most typically afflicted.(2) Type 1 diabetics who experience polyuria, polydipsia, polyphagia (extreme appetite), weight loss, lethargy, eyesight loss, and ketoacidosis require lifelong insulin augmentation.(3)

Infection with Coxsackie virus recently been linked with to produce some pro-inflammatory cytokine such as IL1β. Interleukin 1 (IL-1) the broad cytokine family, located on chromosome 2q12 Small proteins called cytokines are produced by cells and are involved in inflammation and cellular communication. Proteins called cytokines control a variety of functions, including pain, inflammation, and immunological response. They fall within the pro-inflammatory and anti-inflammatory cytokine
categories.(4) DCs, blood monocytes, and tissue macrophages are the principal producers of IL-1, but it is also generated by B cells, N K cells, endothelial cells, lymphocytes, smooth muscle cells, and fibroblasts. Both acute and chronic inflammation are facilitated by IL-1β.(5)

**Material and Methods**

90 type 1 diabetes mellitus patients were attended to Imam Hassan center for Endocrinology and Diabetes at the holy Karbala province and 90 healthy control (non-diabetic patients). All of two groups is tested for detection of Coxsackie virus so this groups is divided according to sero-positivity of CVB-IgG to following groups : first groups : type 1 diabetes mellitus with Coxsackie virus ,second groups : is type 1 diabetes mellitus without Coxsackie virus and third groups is healthy control, The following step is measurement of level of IL-1β for the three groups. The laboratory diagnosis was done for detection of Coxsackie virus and determination of level of IL-1β is biotek ELISA system.

**Statistical Analysis**

The statistical analysis approach by using social sciences (SPSS) version 20 in order to analyzed and assess the data of the study, t test for (cause and control ) and ANOVA test were used to analyzed the difference between three groups .

**Results**

The 90 sample of T1DM patients and 90 sample of control groups were tested for Coxsackie virus B ,the result show 18(28%) patients were positive for specific anti –Coxsackie virus B (anti-CVB-IgG) in T1DM patients .In other hand ,all the serum sample of non-diabetes patients is negative to anti CVB-IgG.

**Measurement of IL-1β concentration level**

The Results showed increasing in levels of IL-1β in CBV positive Type 1 Diabetes mellitus was (17.97 ± 5.65 pg/ml). The level of this interleukin in Type 1 Diabetes mellitus negative to that virus was (16.17 ± 4.09 pg/ml). While the results of this interleukin in control group was (2.92 ± 4.40 pg/ml) as shown in Table 1 and Figure 4. There was significant differences (P<0.05) of IL-1β level in CBV positive Type 1 Diabetes mellitus than the others in which negative to them.
Table 1. Concentration levels of IL-1β in the presented study: CBV positive Type 1 DM, CBV Negative Type 1 DM and Control group

<table>
<thead>
<tr>
<th>Cytokines</th>
<th>Groups</th>
<th>NO.</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F_test</th>
<th>P_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β</td>
<td>T1DM with CBV</td>
<td>18</td>
<td>17.97</td>
<td>5.65</td>
<td>37.054</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>T1DM without CBV</td>
<td>72</td>
<td>13.19</td>
<td>4.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>90</td>
<td>2.92</td>
<td>4.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p-value 0.05

Discussion

The result of anti-CVB-IgG of this research which was 28% sera positivity of anti-CVB-IgG results would refer to previous Coxsackie virus B infection that had been neutralized by adaptive immune response. IgG antibody response are crucial for adaptive immunity because they reflect the immunological memory for previous pathogen exposure (6). The induction of adaptive immunity is associated with clearance of virus. B cell regulates and conducts the production of specific antibodies which either deactivates the virus opsonisation and neutralization processes or initiates destruction of infected cells (7).

According to figure 1, the result showed showed that the age group less than 10 years had the highest percentage (66.7%). The high prevalent within 1-10 years age might be due to more predisposing related to poor hygiene habits in that age, which increased transmission of viral infection among them readily (8).

According to figure 2, sex showed that the highest percentage of them which constituted 64.28% female groups. According to figure 3, ABO blood system results of type 1 diabetic patients with Coxsackie virus, the highest percentage O blood group 50%. Human blood is organized into 34 groups, each of which carries hundreds of genes and antigens that are inherited as polymorphic features. Changes in expressed blood group antigens can affect a person’s ability to withstand infectious illnesses in a variety of situations. Blood groups may play a key role in the acquisition of viral illnesses by increasing cellular adhesion and virus engulfment as virus receptors and co-receptors (9).

Our findings showed that blood cytokine IL-1 levels were considerably higher in T1DM positive CBV patients than in T1DM negative CBV patients and control persons in the current investigation. This finding is consistent with Guda, who found that blood cytokine IL-1 levels were considerably greater in T1DM patients compared to controls (11). Also Fatima uncovered that the supportive of fiery cytokine IL-1β showed higher serum level in T1D patients contrasted with controls (12). Previous research has suggested that the pro-inflammatory cytokines IL-1 and TNF may play an important role in the pathophysiology of T1D (13)(14).

Conclusion

This study show, the Coxsackie virus B(CVB) was detected 28% from the serum of type 1 diabetes mellitus. The result of CVB-IgG antibodies revealed that IgG antibody has levels were higher age group less than 10 years than other age groups. The result showed that CVB was predominant in
females patients more than male patients. Also the result shows the O blood groups is more susceptible to Coxsackie virus infection.

The concentration of the IL-1β, according to our results, has been shown to be associated with the type 1 of diabetes mellitus patients with CVB and also shows a susceptibility of individuals to developed T1DM

References