Study of immunological parameter (IL-0) of Entamoeba gingivalis in immunocompromised patients with periodontitis in Al-Najaf Al-Ashraf City

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Abstract

Objectives: The present study aimed to compare the presence of E. gingivalis in immunocompromised patients with periodontitis and control group by measuring immunological parameter (IL-10) by using ELISA.

Methodology: A Comparison study was done on 80 samples [40 case (20 immunocompromised patients with periodontitis + 20 immunocompromised patients without periodontitis) and 40 control (Diabetes Mellitus patients with poor oral sanitation)] , Age range of cases and control between (20 - ≥ 60) years.

Results: The concentration levels of IL-10 was (16.148 ± 2.68837 Pg/ml) in immunocompromised patients with Periodontitis. But was (24.808 ± 25.94778 Pg/ml) in immunocompromised patients without Periodontitis.

While was (152.665 ± 66.79611 Pg/ml in control group (Diabetic Mellitus Poor Oral Sanitation).

Conclusion: Interleukin-10 concentration levels have a significant effect on the results of Diabetic Mellitus Poor Oral Sanitation, and this indicates an association between diabetes mellitus and IL-10.

Key words: Entamoeba gingivalis, immunocompromised, periodontitis, Interleukin-10.

DOI Number: 10.14704/nq.2022.20.6.NQ22612

Introduction

Entamoeba gingivalis is considered an oral commensal but demonstrates a pathogenic potential associated with periodontal disease in immunocompromised individuals (Cembranelli et al., 2013), therefore E.gingivalis can be an important agent in the pathophysiology of periodontitis.

Periodontitis was identified by irritation, halitosis, discomfort, hemorrhage and loss of healthy gum or teeth. It is estimated that 5% - 20% of the world population suffer from at least one oral cavities disease (Punnia-Moorthy, 2019).

Immunocompromised means someone’s immune system isn’t working as well as it should be to protect them against infections (Martins-Chaves et al., 2020).

In cancer patients, being immunocompromised usually relates to the impairment of white blood cells, whether in number or function. Cancer often develops because the immune system fails to identify and eliminate abnormal cells. And in patients with blood cancers such as leukemia, lymphoma or multiple myeloma, the immune system may not function properly even if the person has a normal number of white blood cells (Di Pasquale et al., 2019).

Interleukin-10 (IL-10), a cytokine with anti-inflammatory properties, has a central role in infection by limiting the immune response to pathogens and thereby preventing damage to the host (Saraiva et al., 2020).

The present study aimed to evaluate the status of interleukin 10 (IL-10) in saliva of immunocompromised patients with periodontitis by ELISA technique.
Methods

Patients Group

Samples collection (40 Oral swap and 40 Saliva speci mens) were conducted for immunocompromised patients with periodontitis (20 participant) and immunocompromised patients without periodontitis (20 participant) during the period from the beginning of November 2021 to the end of February 2022 at Al-Sader Medical City/Middle Euphrates Cancer Center and their ages ranged between (20 - ≥ 60) years.

Control Group

A group of volunteers (diabetic patients with poor oral sanitation) who they were selected to participate in this study as the control group from Al-Najaf Center for Diabetes and Endocrinology / Al-Sadr Medical City. The control group was matched with the patient group in terms of age and sex.

For the control group (40 participant) during the period from the beginning of November 2021 to the end of February 2022 and their ages ranged between (20 - ≥ 60) years.

Saliva Samples Collection

Collection of 100 μl saliva into sterile tube after rinse mouth thoroughly with water 10 minutes before sample is collected. Collecting whole saliva by unstimulated passive drool. Donors may tilted the head forward, allowing the saliva to pool on the floor of the mouth, then passing the saliva through the SalivaBio Collection Aid (SCA) into a polypropylene vial. After collection, refrigerated samples within 30 minutes, and freezing at -20°C within 4 hours of collection. On day of assay, thawed the saliva samples completely, vortexed, and centrifuged at 1500 x g for 15 minutes.

Study Location

This case control study was conducted in Al-Najaf city of Iraq.

Excluded Criteria

Comprised consuming systemic antibiotics in the past two months, using immunosuppressive drugs, smoking, being pregnant and having systemic, heart or respiratory diseases.

ELISA Technique

Estimation concentration level of Interleukin-10 (IL-10) done in lab according to Mybiosource/USA protocol.

Statistical Methods

The following Statistical analysis approach by using social sciences (SPSS) version 20 in order to analyzed and assess the data of the study, t test and LSD was applied to find out the significant difference between the data. Differences were recorded as significant whenever the probability (P) was less than 0.05.

Results and Discussion

Salivary Test (Immunological Cytokine Assays) for IL-10 of the studied Groups

In the current study devided the immunocompromised patients into two categories (immunocompromised patients with Periodontitis infection and immunocompromised patients without Peri odontitis).

Table (1) shows the highest concentration level of IL-10 appear in control group (Diabetic Mellitus Poor Oral Sanitation) and was (152.665 ± 66.79611 Pg/ml). While was (16.148 ± 2.68837 Pg/ml) in immunocompromised patients with Periodontitis. But was (24.808 ± 25.94778 Pg/ml) in immunocompromised patients without Periodontitis. The state of hyperglycemia in people with diabetes mellitus can interfere with the function of macrophages and neutrophils. This condition can cause an imbalance in the cytokines IL-1β, TNF-α and IL-10 that are produced by macrophages and thus will affect the wound healing process (Hendrijantini et al., 2020).

Interleukin 10 is an anti-inflammatory cytokine that plays a crucial role in preventing inflammatory and autoimmune pathologies. Elevated levels of IL-10 can hinder host response to microbial pathogenesis and prevent resolution of associated tissue damage and hemodynamic disturbances (Naz et al., 2020).

In diabetic conditions, the macrophages phenotypic switch from pro-inflammatory to anti-inflammatory macrophages that play a role in IL-10 production could be delayed or fail to occur. As a result, in patients with DM, there is excessive production of pro-inflammatory cytokines that can lead to tissue damage and delayed wound healing process (Hendrijantini et al., 2020).
Cytokines such as IL-10 downregulate the production of pro-inflammatory cytokines, which impair proper function of insulin. So any mutation in the IL-10 gene results in increased production of proinflammatory cytokines, which in turn affect insulin action and cause Diabetic mellitus (Naz et al., 2020).

The results of the present study indicated to highest concentration of IL-10 occured in control group rather than immunocompromised patients with periodontitis and without periodontitis and this un compatible with the results of (Al et al., 2014) mentioned the highest mean concentration of IL-10 was obtained for gingivitis group (1128.19 ± 532.90 mg/ml) and lowest for control group (648.96 ± 505.75). was statistically significant difference (p<0.05).

Yang et al., 2021 mentioned at the site of periodontitis, the levels of proinflammatory cytokines such as IL-6 was significantly increased while anti-inflammatory cytokines are decreased (IL-10). And this does not agree with the results of our current study.

**Table (1): Cytokine Concentration in Studies Groups of immunocompromised patients with Periodontitis, Without Periodontitis and Control subjects (DM Poor Oral Sanitationand).**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Periodontitis</td>
<td>20</td>
<td>16.148</td>
<td>2.68837</td>
<td>.60114</td>
<td>14.8903</td>
<td>12.27</td>
<td>20.34</td>
</tr>
<tr>
<td>Without Periodontitis</td>
<td>20</td>
<td>24.808</td>
<td>25.94778</td>
<td>5.80210</td>
<td>12.6641</td>
<td>12.61</td>
<td>100.01</td>
</tr>
<tr>
<td>DM Poor Oral Sanitation</td>
<td>40</td>
<td>208.680</td>
<td>66.79611</td>
<td>10.5613</td>
<td>131.3026</td>
<td>30.22</td>
<td>310.41</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>86.571</td>
<td>82.45854</td>
<td>9.21915</td>
<td>104.9219</td>
<td>12.27</td>
<td>310.41</td>
</tr>
</tbody>
</table>

**Conclusions**

1. Interleukin-10 concentration levels have a significant effect on the results of Diabetic Mellitus Poor Oral Sanitation, and this indicates an association between diabetes mellitus and IL-10.

2. Interleukin-10 concentration levels have a significant effect on the results of Diabetic Mellitus Poor Oral Sanitation, and this indicates an association between diabetes mellitus and IL-10.

3. IL-10 highly increase in Control group infected with *E.gingivalis* followed by immunocompromised patients without periodontitis and immunocompromised patients without periodontitis respectively.

**Recommendations**

1. It was recommended to study the immunological relationship between IL-10 and Diabetes mellitus.

2. Molecular diagnostic study for detection sub species of *E.gingivalis* in patients with Diabetes mellitus suffered from periodontitis.

**Acknowledgements**

I would like to thank all physicians and staff members of AL-Najaf Center for Diabetes and Endocrinology / Al-Sadr Medical City and Al-Sader Medical City/Middle Euphrates Cancer Center in AL-Najaf Province for their help in samples’ collection.

Also, my deepest appreciation is directed to the patients who expressed their assistance and made this work possible.

**Funding**

The source of funding for this work was personal finance.

**Ethical Standards**

The current study obtained ethical approval by the Department of Medical Laboratories in the College of Health and Medical Technologies / Kufa, Najaf
Health Department / Training and Development Center, and written consent was taken from all participants in the research (patient group and control group).

References


