Immuno-Hematological Study of Cutaneous Leishmaniasis and the Role of Interleukin 8 in the Pathogenesis According to Sex in Babylon Governorate-Individuals

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***Abstract*— Using an immunological and hematological approaches, the leishmanial parasite strains were characterized, In comparison to control healthy groups (10.9 pg/ml), the mean concentration of the interleukin 8 (19.06 pg/ml) was considerably higher at the sera of patients suffering from cutaneous leishmaniasis. Patients with cutaneous leishmaniasis had higher levels of leukocytes, neutrophils and lymphocytes, and lower levels of hemoglobin and platelets. According to hematological investigations of Leishmania tropica and L. major are the two only known etiological agents of cutaneous leishmaniasis in the Babylon Governorate. In relation to ELISA-based detection of the disease. The sera from 41 patients and 31healthy donors were collected for assessment of IL-8 cncentration.The assessment of IL-8 serum levels was carried out by using two Elisa kits, IL-8 and CL (Ylbiont, china).The findings showed that individuals with cutaneous leishmaniasis had a significantly higher level of IL-8 (19.06 , pg/ml) than that of healthy control groups (10.9 pg/ml). In comparison to males (31.5 pg/ml) with cutaneous leishmaniasis, females had a lower level of IL-8 (26.58 pg/ml). Increased levels of IL-8 were found in the sera of cutaneous leishmaniasis-individuals, and according to this investigation. Ages and sexes of infected individuals with cutaneous leishmaniasis have correlated with levels of the interleukin 8.**

Aim of the study:

The main purpose of the present study is to look at of the fundamental role of IL-8 in the pathogenesis of cutaneous leishmaniasis-infected individuals according to their sexes in the Babylon Governorate.

***Index Terms*— Cutaneous Leishmaniasis, ELISA, IL8, Sex, Lesions, Hematological investigations**

I. Introduction

Leishmaniasis causes a broad range of illnesses in human beings, from widespread systemic infections to localized cutaneous lesions [1]. Due to their infection of macrophages, leishmanial parasites may be immune system resistant [2]. In other cases, most notably infections caused by cutaneous strains of Leishmania, the host responds by destroying the internal parasites and the illness normally goes away on its own [3]. It is well recognized that interleukins contribute to inflammation and that they have a variety of functions, including recruiting and activating leukocytes as well as inducing proinflammatory cytokines [4]. At this instance, the study has assessed how IL-8 functions in the etiology of cutaneous leishmaniasis could.

II. Material and Method

A. Blood samples:

Each patient has provided a gel tube containing five milliliters of venous blood. Personal data had also recorded, such as (age, sex, number of lesions and their position on the body, duration of the infection and the number of Pentostam treatments). After centrifuging blood samples, the serum had separated into an Eppendorf tube each containing at least 500 µl of pure serum and stored at -20°C for later investigation of experimental design [5].

B. Patients:

For the assessment of IL-8 concentration, sera from 31 healthy donors and from 41 CL-infected individuals respectively, were collected. Two kits of Elisa, one for IL-8 and the second for cutaneous leishmaniasis, were used for conduct the assessment (Ylbiont, china). This kit assays human interleukin 8 (IL-8) using the enzyme-linked immune sorbent assay (ELISA), which is based on the Biotin double antibody sandwich technique.

After pre-coating the wells with an Interleukin 8(IL-8), monoclonal antibody, add Interleukin 8(IL-8) and allow incubating. After that, has adding anti IL-8 antibodies labeled with biotin to unite with streptavidin-HRP, which forms immune complex, and the test is a sandwich enzyme.

When doing an immunoassay to quantify IL-8 concentration in human blood in vitro, just adding the stop solution, chromogenic solutions A and B and typical resolution nicely, and then adding 50µl of streptavidin-HRP and 50µl of standard.

After that, adding 40µl of the sample, 10µl of IL-8 antibodies, and 50µl of streptavidin-HRP. After giving, they were with a little shake to combine them, incubate at 37°C for 60 minutes. Next, add 50 µl of chromogenic solution A to each well, followed by 50 µl of chromogenic solution B. Gently shake to combine them. At 37°C, incubate them for ten minutes.

C. Ethical approval:

The study has conducted in accordance with the ethical principles that have their origin, in the declaration of Helsinki. Carried out with patients, verbal and analytical approval, before samples taken the study protocol. In addition, the subject

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information and consent form were reviewed and approved by a local ethics committee, according to the document number 563(including the number and the date in 5/9/2023) to get this approval.

III. Results and Discussion:

Table (1): Displays the results, which indicate that patients with cutaneous leishmaniasis had a significantly higher concentration level of IL-8 (19.06, pg/ml) in comparison with the healthy-control groups (10.9, pg/ml). The amount of IL-8 in females with cutaneous leishmaniasis (26.58, pg/ml) was lower than in men (31.5, pg/ml).

TABLE I
COMPARING THE IL-8 LEVELS IN THE SERUM OF CUTANEOUS LEISHMANIASIS- INFECTED INDIVIDUALS WITH THOSE OF A CONTROL GROUPS.

Groups	Serum levels of IL-8: mean ± Standard Error(Pg/ml)
Infected individuals	19.06 ± 3
Control	10.9 ±2
Infected males	31.5± 4
Infected female	26.58 ± 3

There are significant differences, at the level of $p \leq 0.05$

B cells are impacted by IL8, a cytokine produced from bone marrow. Thymocyte, mature T cell, and killer cell proliferation are all accelerated by it [6]. Human monocytes that are vital to the body's defense against Leishmania have been demonstrated to secrete cytokines in response to interleukin 8 [7]. Investigations were conducted on the possible function of IL8 as an immune regulating cytokine during the anti-parasite immune response and phagocyte activation to kill Leishmania parasites [8]. The present study-obtained results of a higher level of IL-8 in the sera of patients with cutaneous leishmaniasis is in line with previous studies and suggests a promising stimulatory capacity for various immune system cell types that are crucial in the defense against leishmanial parasite, including macrophages, which are activated by IL-8 to eradicate the parasite.

Table (2): The results verified that patients with cutaneous leishmaniasis had positive C-reactive protein cases (18.5%). These positive instances were more common in male patient groups (21.6%) than in female patient groups (14.7%), and no positive cases were found in uninfected person categories. One of the primary acute phase protein produced in the liver and controlled by IL6, IL1 and TNF-α, is this protein. Its concentration is rising as a preventative measure against bacterial and parasite infections as well as tissue damage. The present study's findings corroborated those of Nemati et al.; 2013 [9], who reported that because of its relationship to nitric oxide and its involvement in most infections, C-reactive protein is a crucial component.

Hematological investigations showed that individuals with cutaneous leishmaniasis had lower rates of measuring RBC, hemoglobin, and platelets. It has been demonstrated the sequence of CD4 + T cells causes an abnormality in the environment of the bone marrow, which causes an abnormality in precursor cells and hematopoietic stem cells [10]. Conversely, individuals with cutaneous leishmaniasis will have high average rates of WBC, lymphocytes and neutrophils. The reason for this increase can be attributed to fact that neutrophils and other cell types arrive at the infection site first and perform their protective role of engulfing and eliminating the parasite (11).

TABLE II
THE PREVALENCE OF THE C-REACTIVE PROTEIN'S POSITIVE CASES AMONG LEISHMANIASIS-INFECTED INDIVIDUALS IN BABYLON GOVERNORATE.

Groups	Number	%	Positive cases mg/L
Infected Patients	41	18.5	8
Male	22	21.6	5
Female	19	14.7	3
Control	31	0.0	0.0

TABLE III
DISPLAYS THE TYPICAL BLOOD COMPONENTS IN INDIVIDUALS WITH CL

Test	Infected patients	The control
RBC (cell/mm3) ± Standard Error	4.45 x 107 ± 0.1	4.85 x 107 ± 0.15
Hb (g/dL)	11.1 ± 0.31	13.1 ± 0.4
PLT (cell/mm3. Blood)	203 x 103 ± 18	311.48 x 103 ± 23
WBC (cell/mm3)	6531 ± 62	5522 ± 42
Lcell (cell/mm3. Blood)	5501 ± 39	1825.03 ± 31
Nutrophilis (cell/mm3Blood)	3701 ± 66	2512.9 ± 49

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