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Evaluation of IL-1α and IL-10 Asociation with Acne In The Province of Thi-Qar

Ayat S. Saleh[1], Ali N. Salman [2]

[1]University of Thi-Qar- College of Education for Pure Sciences, Biology Department
[2]University of Thi-Qar- College of Nursing

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Abstract:
This study was conducted in the labs of the College of Education for Pure Sciences, Al-Hussein Educational Hospital and Al-Nahrain Specialized Laboratory of the Health Department of Thi-Qar province, during the period from October 2018 to March 2019. The study included of 100 blood sample of patients with acne (39 males) and (61 females) and their age between 10-35 years. The patients were divided into groups according to age stages to three age groups. The age group 10-20 years is the most prevalent group 52/100 (52%). Followed by patients group 21-30 years was 42/100 (42%) and patients group more than 31years was 6/100 (6%). Blood serum was isolated by using centrifuge and examination was performed by using ELISA technique.

The current study showed detection of the level of some cytokines and their relationship to acne vulgaris, where included measuring the concentration of interleukins in the blood of persons with acne and comparing them with healthy persons including interleukin-1α and interleukin-10.

The results of the statistical analysis showed a high significant increase ($p < 0.05$) in patients with acne in concentration of the (IL-1α) and (IL-10), where they were examined for 70 samples of acne patients, and 20 healthy samples in the control group. The results showed a significant increase ($P<0.05$) in the levels of interleukins in the serum (IL-1α, IL-10) in all acne patients compared to control group.

Keywords: Acne vulgaris, IL-1α, IL-10.

Introduction:

Acne vulgaris is the most common a chronic inflammatory disease of the pilosebaceous unit and characterized by non- inflammatory lesion (comedones with black and white heads), inflammatory lesions like (papules, pustules and nodules) [1] [2]. Resulting from increased sebum production, inflammatory process, androgen excess states, abnormal follicular epithelial differentiation, insulin resistance, obesity and the proliferation of Propionibacterium acnes [3].

Acne can be classified according to its severity into: mild, moderate and severe using the Global acne assessment scale [4]. It occurs primarily in the oily (seborrheic) areas of the skin that involved face, neck, back and chest [5] [6].

Cytokines are small soluble polypeptides (8-20 kilodalton), nonstructural, highly active proteins which released by immune system cells. They are generated mainly by monocytes, macrophage, lymphocytes, granulocytes, epithelial cell, keratinocytes and fibroblasts intermediating complex interactions between cells [7].

In the normal state they are produced in very low amount with a transient short range of activity and their production is stimulated by infection stimuli. The cytokine consists of pro, anti - inflammatory cytokines and natural inhibitors of these cytokines which interact with each other. So, IL-1α and IL-10 are the most important cytokine [8].

The interleukin-1(IL) group involved 11 cytokines, also it is very important factors of immune system. Among them the interleukin- 1α (IL-1α) is the most studied member of this group and this is one of the best known cytokines in the participation pathogenesis of acne [9]. The biologic function of IL-1α is regulated by a naturally occurring receptor antagonist protein [10].

Interleukin -10 (IL-10) is a cytokine functionally described by anti-inflammatory effects and most important in immune response to infections, it is produce from T- helper cells type2 (Th 2) which inhibited cytokine production from Th 1 cells [11].

The aim of the current study was to assessment of IL-1α and IL-10 level in the same patients in Thi- Qar province.

Materials and Methods:

Subjects: - The study groups have the following included:

This study was conducted in the labs of the College of Education for Pure Sciences, Al Hussein Educational Hospital and Al-Nahrain Specialized Laboratory of the Health Department of Thi-Qar province, during the period from October 2018 to March. The patients in this study were divided into three groups According to age:

1-First group: acne patients less than 20 years, their number were 52.
2-Second group: acne patients 21-30 years, their number were 42.
3-Third group: acne patients more than 31 years, their number were 6.

In addition, the study included 30 people as a control group, with no history or clinical evidence of common acne or any other chronic disease, and have no obvious abnormalities, divided into three groups according to their age:

1-First group: acne patients less than 20 years, their number were 10.
2-Second group: acne patients 21-30 years, their number were 10.
3-Third group: acne patients more than 31 years, their number were 10.

Blood sample collection: -

Blood samples were collected by venipuncture from 100 patients (39 males, 61 females) and 30 controls (five milliliters of venous blood) were drawn by disposable syringe under aseptic technique. where, three milliliters were put directly in a sterile Gel tube and allowed to clot, then serum was separated by centrifugation at 4000 rpm for 15 minutes. The serum was stored at -20 C˚ freezing. These sera 70 acne patients (30 males, 40 female) and 20 controls (10 males,10 female) were used for estimating the concentration of interleukin (IL-1α & IL-10).

Serological assay: -

A number 1 kit was used for each type of interleukin, where IL-1α and IL-10 concentrations were measured for control group (non-infected) and infected group. by using the Enzyme-linked Immunosorbent Assay (ELISA) method and using the ELISA device and a measurement kit designed for this device for each of the interleukins.

Statistical analysis: -

The analyses of data were expressed as mean ± SD . The comparisons between each Acne patients group with age matched healthy control were performed with T-test using computerized Minitab program. The comparisons among the three age group of Acne patients were performed with analysis of variance (Chi – square, Odds Ratio) by using computerized Minitab 14 program. $P< 0.01$ was

considered to be the least limit of significance. All the statistical analysis was done by using Pentium-4 computer through the (SPSS program) Statistical Package for Social Sciences (version -23).

Results

Table (1) shows the value numbers of the two groups, patients and healthy controls by age group, where the results showed that the highest percentage of patients in the age group 10-20 and a percentage of 52% and then after the age group 21-30 and a percentage of 42% and finally the age group 31 and over to be a percentage of 6%. We found significant difference between healthy control group and patients in ($p< 0.05$).

Table (1): Distribution of the studied groups(Acne patients and apparently healthy control) according to Age.

Age group (Years)	Healthy		Patient		P.Value
	N	%	N	%	
10 - 20	10	33.3%	52	52 %	0.000*
21 - 30	10	33.3%	42	42 %	
≥ 31	10	33.3%	6	6 %	
Total	30	100 %	100	100 %	

$X2 = 61.75$ degree freedom (df) = 2 P.value < 0.05

Results of the current study showed a significant increase ($p\leq0.05$) in the rate of concentration of IL-1α, IL-10 in sera of patients with Acne, compared with the average concentration in the sera of healthy control group, as the rate of concentration of IL-1α in male patients (44.7 pg/ml) compared with the control group (29.76 pg/ml), while IL-1α concentration in female patients (41.31 pg/ml) compared with the control group (26.57 pg/ml) with significant difference (0.000), Table (2).

Table (2): Comparison of serum(IL-1α) concentration (pg/ml) of the patient groups with healthy control group

Parameter	Subject	No. of cases	Mean(%)	P.Value
IL- 1α	Male patient	30	44.7	0.000*
	Male control	10	29.76	
	Female patient	40	41.31	
	Female control	10	26.57	

$X2=26.16$ degree freedom(df) = 3 P.value ≤ 0.05

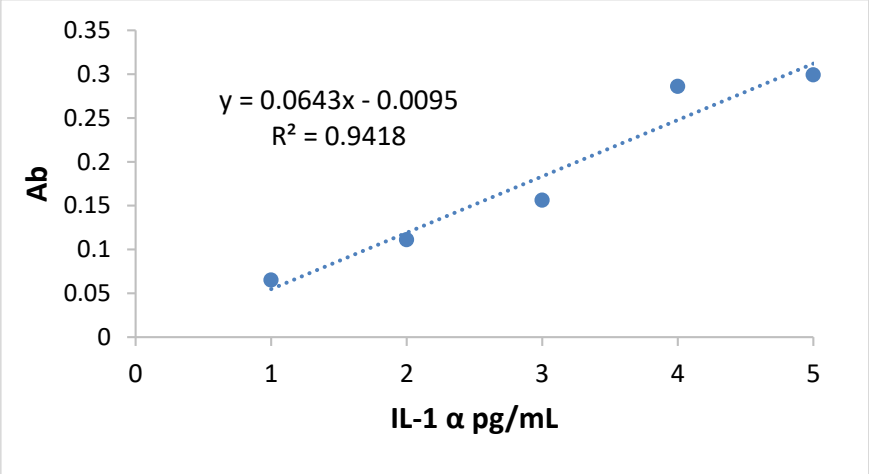

Figure (1): Standard curve of IL-1α

While the concentration rate of IL-10 in male patients (40.26 pg/ml) compared with the control group (21.98 pg/ml), and the concentration rate of IL-10 in female patients (37.46 pg/ml) compared with the control group (20.31 pg/ml) with significant difference (0.000), Table (3).

Table (3): Comparison of serum(IL-10) concentration (pg/ml) of the patient groups with healthy control group

Parameter	Subject	No. of cases	Mean(%)	P.Value
IL- 10	Male patient	30	40.26	0.000*
	Male control	10	21.98	
	Female patient	40	37.46	
	Female control	10	20.31	

X2=75.84 degree freedom (df)= 3 P.value ≤ 0.05

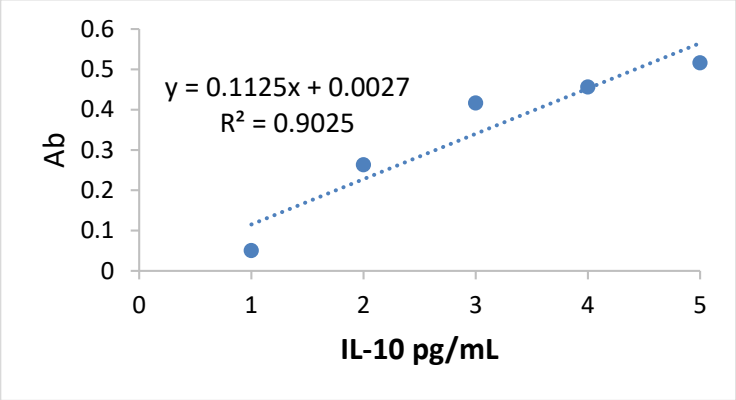

Figure (2): Standard curve of IL-10

Discussion

The distribution of samples according to the age group the current study of acne patients and control groups showed a difference in the age-group rate, with the highest age group being 10-20 years old. This may be due to hormonal changes and disorders at this age. In addition, the lack of hygiene habits that indicate that adolescents do not care to clean their skin as required to it protect from microorganisms. In addition to the type of food, where dairy products (foods produced from cow's milk or local buffalo milk) contain 5α steroid hormones and other steroids of dehydrotestosterone (DHT) that drive sebaceous gland function. Drinking milk causes a direct rise in IGF-1 through a disproportionate elevation in blood sugar and serum insulin levels. IGF-1 levels during adolescence are closely parallel acne activity and are likely synergistic with the steroid hormones. Recently there have been several epidemiological studies linking certain foods to acne. Of the foods showing a positive correlation, high glycemic load foods have been the most extensively studied. This study agrees with [12] [13] [14].

Followed by the age group (21-30), and finally the age group ≥31, the rate of acne infection in this category is low (6%) This result is acceptable and may be due to the fact that adults are more interested and aware of adolescents. In addition to the complete immune system at this age gives more support to protect the body from infection. Therefore, the results of this study are consistent with the results of the study [13].

Cytokines are medically soluble proteins with low molecular weight peptide chains (approximately 25 KDa), and are important mediums involved in all forms of autoimmune and adaptive immune responses before and after inflammation to induce the host to interact permanently with pathogens, are produced by a wide range of white and non- white cells, and their work is "autocrine action" on the same cell or on the rest of the neighboring target cells " Paracrine action", or its work is hormonal "Indocrine action" on the tissues with long distances [15].

The results of the current study show a high level of concentration of IL-1α in the patient group compared to the healthy control group and a significant difference (p≤0,000) for male patients (44.7%) and the healthy control group (29.76%) and female patients (41.31%) and the healthy control group (26. 57%).The reasons of observation high levels of IL-1α in current study may be that patients had a higher percentage of macrophages. As well as, neutrophils, epithelial cells, and endothelial cells, which is the main source of IL-1α and the role of IL-1 in the starting of acne lesions is important where IL-1α immunoreactivity is shown in early phase. This study agrees with [16] [17].

The results of the current study show a high level of concentration of IL-10 in the patient group compared to the healthy control group and a significant difference (p≤0,000) for male patients (40.26 %) and the healthy control group (21.98%) and female patients (37.46%) and the healthy control group (20.31%). The reason for the increase in the concentration of IL-10 is associated with elevated concentration of IL-1α may be its function includes promotion of B cell survival, growth and differentiation [18] [19]. As well as suppression of inflammatory cytokine synthesis by macrophages,

monocytes and the down-regulation of T cell responses, both directly and through effects on DC [20] [21]. IL-10 has also been implicated in the generation and maintenance of regulatory T cells, further emphasizing its important role in immune regulation [22] [23].

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