Evaluation of Interleukin 19 level in acne vulgaris patients

Talal A. Abd El-Raheem[1], Dina S. Abd-El Fattah[2], Nesreen M. M. Aboraia[1], Nada A. Mohammed[1*]

[1] Dermatology, STDs and Andrology Department, Faculty of Medicine, Fayoum University, Fayoum 63511, Egypt.

[2] Medical Biochemistry and Molecular Biology Department, Faculty of Medicine, Cairo University, Giza, Egypt.

* Correspondence: Nada A. Mohammed, nadaadelyasser@gmail.com; Tel.: (002) 01140436958.

Abstract

Introduction: Acne vulgaris is a disease that affects youth. The majority of patients present with various types of lesions, including papules, comedones, pustules, and nodules. Many criteria are present in the pathogenesis of acne, like increased keratinization of the follicle, abnormal follicular desquamation, high sebum secretion, proliferation of bacteria, inflammation, and a genetic role. IL-19 is a cytokine secreted by skin cells that initiates stimulation before inflammation. IL-19 is characterized by the ability of positive feedback to be magnified when activated during inflammation. They provide cytokines and aid in the inflammatory process.

Aim of the study: To detect the level of interleukin 19 in the serum of mild acne vulgaris cases.

Subjects and Methods: The study included 40 patients with mild acne and 100 healthy controls. Three ml of blood were collected from each participant in plain tubes, where the serum was separated and used for estimation of the IL-19 concentration level.

Results: The study revealed that there is a high increase in interleukin-19 levels in mild acne patients compared to normal controls.

Conclusion: This study suggested that there is a possible correlation between the serum level of interleukin 19 and acne vulgaris pathogenesis.

Keywords: IL-19; Acne vulgaris; pro-inflammatory cytokines; Anti-inflammatory cytokines.

1. Introduction

Acne is a disease of the sebaceous unit that affects youth. Cases present with different variations of lesions, representing papules, comedones, pustules, and nodules [1].

Many criteria are present in the pathogenesis of acne, like increased keratinization of the follicles, abnormal follicular desquamation, high sebum secretion, proliferation of bacteria, inflammation, and a genetic role [2].

Acne is a disease that takes time to develop; it happens once the hair follicles are filled with dead cells and sebaceous secretion [3]. It may be presented as blackheads, whiteheads, papules, nodules, oily skin, and scars [4].

The inflammatory process occurs in both early and late stages, so inflammation has an important role in the presence of inflammatory and non-inflammatory areas [5]. Interleukin 19 is a cytokine produced by the epithelium in response to pro-inflammatory stimulation [5]. Specific criteria of IL-19 are that they can give positive feedback action to magnify themselves when they are activated, they will produce cytokines in a continuous manner, and they help in inflammation [5].

The purpose of the current study was to detect the level of interleukin 19 in serum in mild acne cases.

2. Subjects and methods

2.1. Subjects

In the current case-control prospective study, 40 cases with mild acne and 100 healthy subjects, taken from the Dermatology Outpatient Clinic, Faculty of Medicine, were recruited after taking informed consent from all subjects.

Inclusion Criteria

Acne patients range in age from 16 to 30 years.

Exclusion Criteria

Patients with acne taking systemic treatment in the last month and topical creams in the last two weeks or those with diseases correlated with higher IL-19 production in serum or tissue, such as psoriasis, atopic dermatitis, and asthma, were excluded.

2.2. Methods

Medical History

That included the collection of different characteristics of the study populations, including medical history, sex, age, occupation, marital status, residence, and special habits of medical importance. Also, the onset, course, and duration of the disease; past history, including systemic and dermatological disorders, previous medications; and previous operations, family history, including systemic and dermatological disorders were reported

Laboratory Methods

Three ml of blood were collected from each participant in plain tubes, where the serum was separated and used for estimation of the IL-19 concentration level.

IL-19 concentration level assay by ELISA

The human IL-19 ELISA Kit (Novus Biologicals, Centennial, CO, United States) was used.

2.3. Statistical analysis

Data were coded and entered using the statistical package SPSS version 22. Data were statistically described in terms of mean, and standard deviation, for quantitative data and frequencies (number of cases) and relative frequencies (percentages) for qualitative data. For comparing categorical data, the chi-square test was performed. The independent t-test was used to compare quantitative variables between the two groups, and analysis of variance (ANOVA) with multiple comparison post hoc tests were used when comparing IL-19 levels in different severity grades in acne patients [6].

3. Results

The present study was conducted on 100 healthy controls and 40 mild acne patients, matching age and sex, and the patients were taken from the dermatology clinic at Fayoum University from September 2018 to June 2019.

The subjects were divided into two groups, group (I) included one hundred healthy subjects, and group (II) included 40 patients with mild acne.

The healthy group includes 58 females (58%) and 42 males (42%), ranging in age from 16 to 30 years (27.24±5.25). The cases include 21 females and 19 males, ranging in age from 16 to 30 years (25.73±7.84) (Table 1).

There was no statistically significant difference in age between the healthy group and the cases *(P=0.15)* (Figure 1).

Table 3: Age, Sex, and Grade of acne.

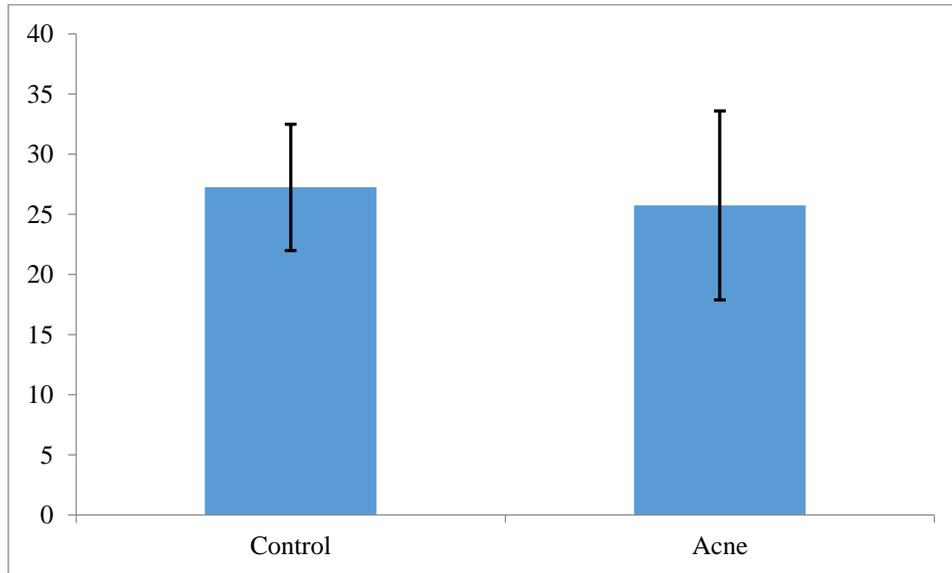|	**Variable**	**Control Group (I) n=100**	**Mild Acne Group (II) n=40**	*P-value*
Sex	**Females: n (%)**	58 (58%)	21(51%)	0.099
	Males: n (%)	42 (42%)	19 (49%)	
Average age (years)		27.24 ±5.25	25.73 ±7.84	0.15

Figure 1: Age range among the study group.

There was no statistically significant difference in sex between control and selected acne patients (*P =0.08*) (Figure 2). IL-19 level by ELISA Technique among study groups showed that the mean level of IL-19 among the control group was 276.22+61.68 while the mean level among the mild acne group was 453.14+93.38 with (*P <0.001*). There was a statistically significant increase in the mean level of IL-19 in mild acne patients compared to normal control subjects (*P < 0.001*) (Figure 3).
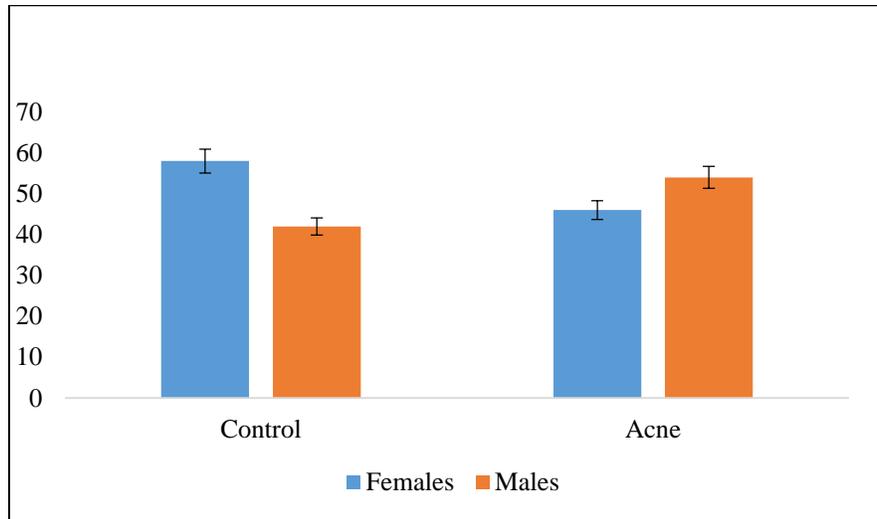

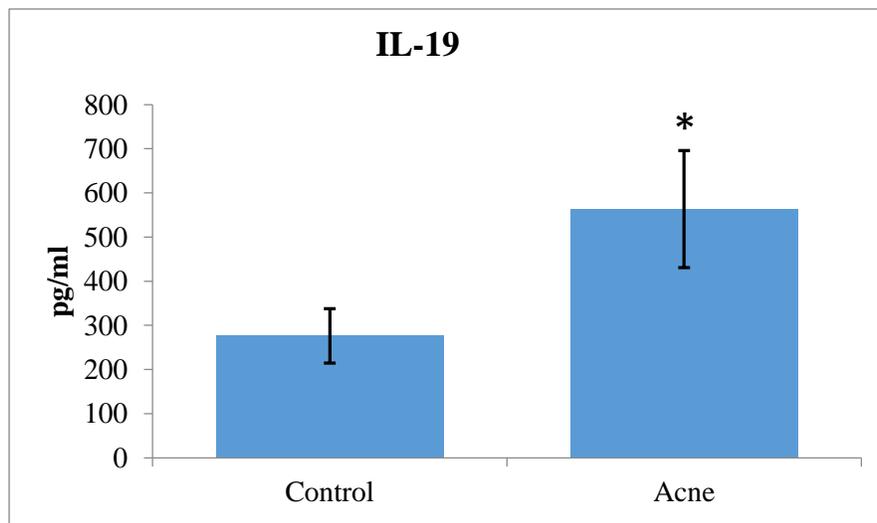**Figure 2:** Sex distribution among the study group.

Figure 2: IL-19 among the study group. Data were expressed as Mean ± SD, *P-value <0.05* was significant. (*) Denotes significant difference versus control subjects.

4. Discussion

Acne vulgaris is a a disease that occurs in youth. Cases of acne present with a wide variety of lesions representing papules, blackheads, whiteheads, nodules, and pustules [1].

The mechanism of acne includes increased sebaceous secretion, increased follicular keratinization, the proliferation of bacteria and follicular colonization, and an inflammatory process [3].

Interleukin 19 is a cytokine produced by the epithelium in response to pro-inflammatory stimulation [5]. The specific criterion of IL-19 is that they can give positive feedback actions that are amplified when they are activated. They will produce cytokines in a continuous manner and help in inflammation [5].

The purpose of this study was to detect the Interleukin-19 serum levels present within mild acne cases and compare them with those of normal subjects to detect possible action of Interleukin-19 in acne pathogenesis.

The present study included 40 patients with mild acne and 100 subjects free from disease, taken from Fayoum University, dermatology outpatients after obtaining informed consent. The study included 40 cases of mild acne and 100 normal subjects. There was a significant increase in interleukin-19 levels in mild acne cases in comparison to healthy subjects (P<0.001).

That agreed with what was observed by Mochtar *et al.,* 2018, who observed the rise of interleukin-19 in severe cases in comparison to moderate cases (P<0.05) and also a rise in interleukin-19 serum levels in severe cases compared to mild acne cases (*P<0.05*) [5]. They found no statistical difference in the serum level of interleukin-19 in mild acne compared to moderate acne (*P = 0.312*).

Also, a study was done by Oka *et al.,* 2017, on the relation between the Il-19 serum level to inflammatory skin diseases like atopy and cutaneous lymphoma. In patients with cutaneous T cell lymphoma and atopic dermatitis, there is a high level of interleukin 19 in tissue and serum, and the serum IL19 levels positively correlate with clinical disease markers [7]. In another study done by Witte *et al.,* 2014, they said that IL-19 is highly produced in both lesional and healthy skin of psoriatic patients. Tissue IL-19 secretion is reflected by higher IL-19 levels in blood, and that is related to the severity of psoriasis [8]. In another study done by Lin *et al*., 2016, on the detection of serum interleukin 19 in SLE, they found the interleukin 19 level is high in SLE patients with ulceration in the oral cavity, blood, and protein in the urine, and lower levels in patients with discoid lesions [9].

Conclusion

The study suggested that there is a possible correlation between the serum level of interleukin 19 and acne vulgaris pathogenesis.

Ethical considerations: The study took the acceptance by the Ethical committee of the Faculty of Medicine at Fayoum University. To get informed consent from subjects, after discussion of the study, the aim of the study, and they had the right not to participate.

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