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Estimation of Serum Concentration Level Of Interleukin-37 In Patients with Chronic Tonsillitis In Diyala Province, Iraq

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Abstract: Chronic tonsillitis is a frequent inflammation that occurs in the tonsils due to their inflammation as a result of repeated infection with bacterial, viral and fungal pathogens. There are many environmental and immunological factors that contribute to the occurrence of chronic tonsillitis, This study was conducted from October 15, 2022 to December 28, 2022. 44 blood samples were collected from patients with chronic tonsillitis in private pathological analysis laboratories in several parts of Diyala Governorate, Iraq. The study included the age group 16-70 year. The number of males was 20 and the number of females was 24. Also, 44 apparently healthy blood samples from both gender were collected and used as a control group. The number of males was 26 and the number of females was 18 within the age group 18-56 years. They did not suffer from any acute disease within the period of conducting the study or a chronic disease previously. The study included an assessment of the concentration level Interleukin IL-37 using ELISA technique. The study found that the incidence of chronic tonsillitis in females was 54.5% which is higher than that of males (45.5%) at an average age of 26.02 ± 1.80 years, with a statistically significant difference between the gender. The results of the current study showed an increase in the level of interleukin IL-37 in patients with chronic tonsillitis (435.25 ± 110.35 pg/ml) compared with the control group (240.48 ± 82.40 pg/ml).

Keywords: IL-37, Chronic tonsillitis, Inflammation, Infection

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Introduction

Tonsillitis appeared for the first time as a medical concept at the end of the nineteenth century and is a common disease in the countries of the world. The occurrence of inflammation indicates the interaction of the lymphatic tissues of the tonsils

with the causes of inflammation, such as bacteria and virus, and this results in a number of pathological symptoms such as tonsil enlargement and congestion, poor functional performance and increase of body temperature. The disease

appears in two forms- the acute form, which occurs when the initial infection is infected with pathogenic microbes, and when the infection is repeated or persists, results in the chronic form, which is the second form of the disease (Oleksandr, 2020; Shuwaikh *et al.*, 2023).

The tonsils, which are located on either side of the back of the throat, are the two lymph nodes that act as a defense mechanism that prevents infection from entering the body. Tonsillitis due to infection is a common disease in childhood, where symptoms include swollen tonsils, fever, and sore throat. This condition is caused by a variety of common viruses or bacteria. It is contagious and if left untreated, it leads to serious complications (Chen, 2020).

Interleukin IL-37 is an anti-inflammatory cytokine in many inflammatory and autoimmune diseases. IL-37 is a dual-functional cytokine that acts both outside and inside the cell if it appears in immunofluorescence microscopy. IL-37 is located in both the cytoplasm and the nucleus and thus IL-37 is considered a bifunctional cytokine. The newly discovered anti-inflammatory IL-37 belonging to the IL-1 family, a pro-inflammatory family, was specifically associated with tonsillar hypertrophy, showing a slightly stronger anti-inflammatory response in chronic tonsillitis (Mikola *et al.*, 2018; Mei and Liu, 2019). In this study 44 blood samples were collected from patients with chronic tonsillitis and assessed the concentration of Interleukin IL-37 using ELISA technique.

Materials and Methods

Study Samples:

This study was conducted from October 15, 2022 to December 28, 2022, when 44 blood samples were collected from patients with chronic tonsillitis in private pathological laboratories in several parts of Diyala Governorate, Iraq. The study included the age group from 16-70 years, as the number of males was 20 and the number of females was 24. 44 apparently healthy blood samples from both gender were collected and

used as a control group. The number of males was 26 and the number of females was 18 within the age group 18-56 years, and they did not suffer from any acute disease during the period of conducting the study. 5 ml of venous blood was drawn from the study samples using medical syringes made of wine, and the blood was placed in test tubes for separating the serum and then conducting immunological tests on it. The level of interleukin 37 was measured using the ELISA test for 88 samples according to the instructions provided by Mybiosource.

Test Principle:

This assay used a number of off-the-shelf enzymes as per the enzyme-linked immunosorbent assay (ELISA) technique used to estimate the IL-37 level. Incubated and then biotin-tagged anti-IL-37 antibody was added to bind to HRP, leading to formation of the immune complex. After incubation, the plate was washed and the substance added to stop the reaction, so the solution turns from blue to yellow and the absorbance is measured at a wavelength of 450 nm.

Results and Discussion

The current study included 44 patients with chronic tonsillitis in Diyala Governorate, with an average age of 26.02 ± 1.80 years, and 44 samples of people without chronic tonsillitis, with ages ranging from 18-56 years, with an average age of 29.39 ± 1.39 . As the number of infected males was 20, at a rate of 45.45%, while the number of infected females was 24, at a rate of 54.54%, under the probability ($P \leq 0.20$), as shown in Figure 1 and Table 1. These results indicate that the percentage of infected females is higher than the percentage of infected males, compared to the results of healthy subjects, as the results showed that the percentage of healthy males is higher than the percentage of healthy females, as the number of healthy males reached 26 males with a rate of 59.1%, and the number of healthy females was 18 with a rate of 40.9%.

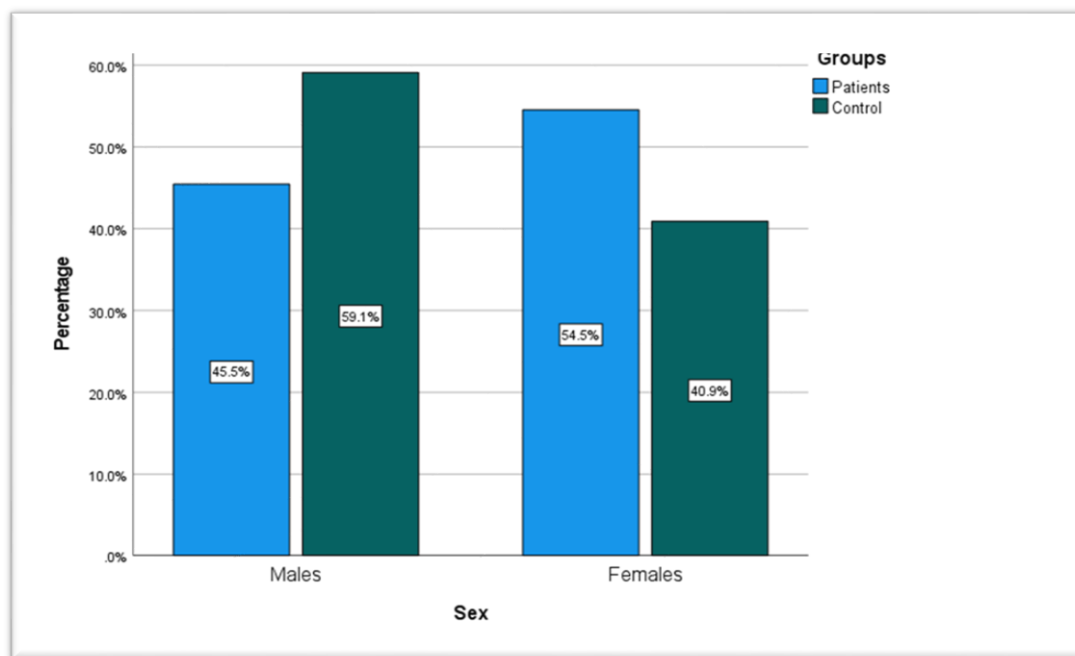


Fig. 1: Male and female percentage of patients and control.

Table 1: Distribution of chronic tonsillitis patients and control groups according to gender and age

Data		Frequency (%)		Probability
		Patients group	Control group	
Sex	Males	20 (45.5)	26 (59.1)	0.20
	Females	24 (54.5)	18 (40.9)	
		Mean $\pm$ SE (Years)		
Age		26.02 $\pm$ 1.80	29.39 $\pm$ 1.39	0.142

The results of this study indicated a higher incidence of chronic tonsillitis in females than in males. The results of the current study agreed with the results of a study conducted by Khadilkar and Ankle (2016) They showed that the incidence of chronic tonsillitis among females is higher than that of males The current study also in agreement with Haidara *et al.* (2019), who indicated that the incidence of the disease is higher in women than in men, for several possible reasons, including females who are more susceptible to the disease as a result of pregnancy and lactation. Hormonal factors, such as contraceptive factors, where

estrogen deficiency occurs, and this leads to a decrease in calcium absorption and osteoporosis, which leads women to take progesterone and estrogen, and this leads to a decrease in their immunity.

There are also environmental factors that increase the chances of women being exposed to microbes, such as mixing with children and husbands, and this causes them to transfer pathogens from the work and school environments. These are all factors that increase the chances of women developing tonsillitis, which is the body's first line of defense. Chronic

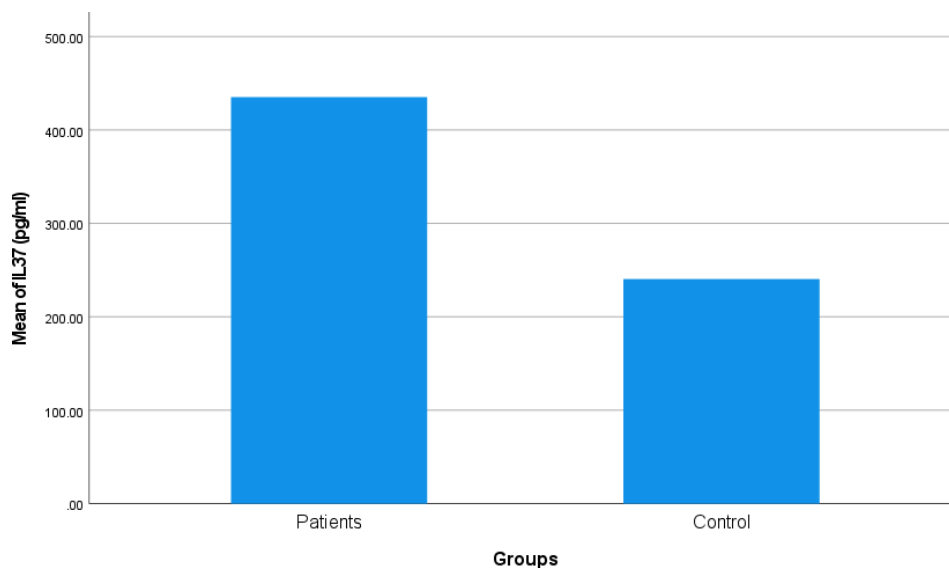


Fig. 2: Interleukin -37 concentration rate (pg/ml) in serum of control and patients.

Table 2: Interleukin -37 concentration rate pg / ml in serum of both study groups

Parameters	Mean ± SE (pg/ml)		Probability
	Patients group	Control group	
IL37	435.25 ± 110.35	240.48 ± 82.40	0.161

tonsillitis is also a trigger for the occurrence of autoimmune diseases, one of its causes as a result of the stimulation of helper T cells that have a role in the onset of inflammation (Krishnan *et al.*, 2003; Kindt *et al.*, 2007).

The results of the current study, which was conducted on 88 samples divided into two groups, 44 patients and 44 healthy people, indicated an increase in the percentage of IL-37 in patients with chronic tonsillitis compared to the healthy group, where its ratio in the patients group was 435.25 ± 110.35 pg/ml compared to healthy group as shown in Figure 2 and Table 2. The present study concluded that the percentage of IL-37 was slightly increased in patients with chronic tonsillitis and was almost equal to its percentage in the control group with a significant difference. The results of the current study agreed with the results of Mei and Liu (2019), who reported an

increase in IL-37 in patients with chronic tonsillitis.

The current study is also in conformity with the findings of Mikola *et al.* (2018), as they have stated that a newly discovered anti-inflammatory cytokine was specifically associated with tonsil hypertrophy, which showed a slightly stronger response than anti-inflammatory in patients with tonsillitis. The study also reported an increase in IL-37 in patients with tonsillitis, especially in young age groups. This study concluded that IL-37 showed a positive and negative relationship with tonsillitis in patient samples.

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