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Role of interleukin-4 and IgE antibody in scabies infected patients of Thi-Qar province

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Abstract---Scabies is a skin illness that affects humans and many other mammals. It is caused by the obligatory parasite *Sarcoptes scabiei*, which lives and reproduces in the epidermis and causes severe human and animal morbidity. The current study aimed to determine the effect of interleukin-4 and the antibody IgE in inducing an immune response against the scabies patients who visited a private clinic at Nasiriyah Teaching Hospital in Thi-Qar Province. Total serum levels of (IgE, IL-4) in were evaluated patients infected with scabies and compared with healthy controls (control group). The present study showed significant differences ($P < 0.05$) in the mean of IL-4 and IgE serum levels for the patient infested with scabies when compared with control.

Keywords---scabies, IL-4, IgE, ectoparasite.

1. Introduction

Sarcoptes scabiei var *hominis* causes scabies, an itchy parasitic infectious dermatosis. Scabies is a neglected global health issue; it is estimated that 300 million people globally contract scabies each year (Feldmeier & Heukelbach, 2009).

Scabies is a major public health issue worldwide. It causes severe morbidity, particularly among underprivileged individuals living in resource-poor settings with overcrowding (Walton & Currie, 2007). The extremely pruritic sores generated by the infestation cause significant discomfort and might lead to secondary infection. Scabies spreads in families and other settings where people have close personal touch (Burns, 2010). Scabies is a serious disease that affects both genders, all ages, all ethnic groups, and all socioeconomic levels (WHO, 2005). IgE is important in the host defence against a variety of parasites constitutes an essential element in allergic and parasitic inflammation. Type (Th2) helper T cells produce anti-inflammatory cytokines, IL-4 one of which is

cytokinesis (Makhseed *et al.*,2001).The current study aimed to determine the immunological responses in patients infested with scabies (IL-4,IgE).

2. Materials and methods

The study included 60 cases of scabies patients from both genders who attending to AL-Nassirya teaching Hospital,Dermatology,in period between November 2021 to May 2022.Thirty healthy persons were selected as control.

2.1. Sample Collection

All subjects (patients and healthy controls)had three milliliters of venous blood drawn and placed in a clot-activator tube to separate serum.The serum was separated and centrifuged at 3000rpm for 10 minutes before getting frozen at - 20C°.IL-4 and IgE levels in the blood were determined using an ELISA kit and following the manufacturers in structions (Bioassay-China).

2.2. Statistical Analysis

The data of the current stud were statistically analysis by using SPSS (Statistical Package of Social Science software) version 26, Independent Sample T test, at p.value <0.05.

3. The Results

3.1. Estimation of Immune Parameters in Scabies Disease and Control

The current study showed a significant increase of all studied immune parameters in scabies disease patients compared with control group at p. value < 0.05 as shown in table 1.

Table 1: Estimation of Immune parameters in patients and control groups

Groups immune parameters	Patient No. 60	Control No. 30	p. value
	Mean ± SD		
IL-4 ng/L	147.7±41.9	83.4 ± 26.1	< 0.001**
IgE ng/L	242.9±71.0	135.2 ± 34.8	< 0.001**

3.2. Estimation of Immune Parameters in scabies Disease according to treatment

The current study showed anon-Significat increase of all studied immune parameters treated in scabies disease patients compared without treated scabies disease patients at p.value <0.05 as shown in table 2.

Table2: Estimation of Immune parameters in scabies disease

Groups Immune parameters	With Treatment No. 26	Without Treatment No. 34	p. value
	Mean $\pm$ SD		
IL-4 ng/L	145.0 $\pm$ 42.2	149.7 $\pm$ 42.2	0.666
IgE ng/L	240.5 $\pm$ 70.8	244.8 $\pm$ 72.0	0.819

4. Discussion

The current study's findings revealed an increase in the rate of (IL-4) in scabies patients compared to the healthy group, where the rate reached (147.7 $\pm$ 41.9)ng/L while in the healthy group it reached (83.4 $\pm$ 26.1)ng/L. This result is in agreement with Walton *et al.*, (2004), agunatha Karthikeyan, (2011), AL-Musawi *et al.*, (2014) Who showed an increase in the level (IL-4) of scabies patients compared with the control group. The elevated level of IL-4 suggests a preferential activation of TH2 cells in the scabietic patients IL-4 affects the generation and recruitment of mast cells and eosinophils, as well as IgE synthesis. Mast cells and activated eosinophils can also produce IL-4, hence amplifying the inflammatory response (Zamorano *et al.*, 2003).

The current study findings revealed an increase in the rate of antibody (IgE) in scabies patients compared to the control group, where the rate reached (242.9 $\pm$ 71.0)ng/L while in the healthy group it reached (135.2 $\pm$ 34.8). This result is in agreement with AL-Rawi, (2000), Elmaraghy and Elmeghawry, (2011) who showed an increase in level IgE. This explains the type 1 hypersensitivity reaction in scabietic patients, which is responsible for removing the parasite and its products from the skin through extreme itching and scratching, resulting in a dramatic decrease in parasite density at the moment itching began (AL-Rawi, 2000). The current study found no significant differences in immune parameters (IL-4, IgE) between treated and untreated people with scabies. This is due to the fact that treating scabies takes a long time before the signs and symptoms such as itching disappear, because the female parasite digs tunnels under the skin and lays eggs. One of the reasons is the adoption of an unsuitable therapy for scabies cases since the signs and symptoms of scabies are similar to those of other skin disorders.

5. Conclusion

The results of current study showed that the scabies infestation caused immunological reaction in patients when compared with control. The immune response had an important effect on the IL-4 and IgE in patients when compared with control.

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