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Immune response of scabies infected patients in Thi-Qar province

Alyaa Talib Jawad

University of Thi-Qar /College of Education for pure science

*Corresponding author email:Alyaa778talib.bio@utq.edu.iq

Nadia Ahmed Hadi

University of Thi-Qar /College of Education for pure science

Abstract--Scabies is a prevalent ectoparasitic infectious skin infestation throughout the world, particularly in developing countries. Infestation generally causes localized cutaneous irritation, pruritis, and skin lesions. The current study aimed to determine the immune response in patients with scabies compared with control group the current study includes a study of immunological parameters of tumor necrosis factor (TNF- α) and white blood cells (WBC). patients who visited a private clinic at Nasiriyah Teaching Hospital in Thi-Qar Province. Total serum levels of (TNF- α) in was 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 (TNF- α) serum level for the patients infested with scabies when compared with control group. Except for neutrophils, there were differences in absolute leukocyte counts between scabies-infested patients and the control group when $p < 0.05$.

Keywords--scabies, TNF- α , WBC, ectoparasite.

Introduction

Scabies is a parasitic infestation of the skin caused by the mite *Sarcoptes scabiei* (Chandler and Fuller, 2019). it transmitted through close personal contact. The manifestation begins with itching, which results in complications of bacterial infections (Azene *et al.*, 2020). Scabies is known as a major public health problem in many countries and is responsible for many diseases due to secondary bacterial infection of the skin that causes abscesses and cellulitis, which can lead to serious systemic complications such as septicaemia, kidney disease and possibly rheumatic heart disease (Romani *et al.*, 2015). The first papules appear within (2 to 5) weeks. These are in the form of tunnels, and their length ranges from a few millimeters to 1 cm. The most common areas of the body where the

parasite is present is the navel area and the interdigital folds. These papules cause severe itching, which is the hallmark of a cellular immune response (Dressler *et al.*,2016) Tumor necrosis factor (TNF) is a critical cytokine, which contributes to both physiological and pathological processes (Wen-Ming chu,2013). Leukocytes are bone marrow-derived cells of various shape and function that circulate in the circulation in a low-adhesive state before migrating into tissues to protect against invading pathogens, participate in immunological responses and wound repair (Harris *et al.*,2000).

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.

Method and 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°.TNF- α level in the blood was determined using an ELISA kit and following the manufacturers in structions (Bioassay-China). two ml of venous blood was drawn from both scabies patients and healthy subjects, and the blood was placed in a test tube containing an anticoagulant (EDTA) substance with mild shaking Using a hematology system To measure the differential count of white blood cells (CBC).

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.

Results

Estimation of Hematological Parameters in Scabies Disease and Control

The current study showed a significant increase of all studied hematological parameters in scabies disease patients compared with control group with exception neutrophil was recorded a non-significant difference at p. value < 0.05 as shown in table 1.

Table 1
Estimation of hematological parameters in patients and control groups

Groups Hematological parameters	Patient No. 60	Control No. 30	p. value
	Mean ± SD		
WBCs *10 ³	9.10±2.33	8.05 ± 1.17	< 0.001*

Lymphocyte %	34.5 ±9.43	23.1 ± 1.07	< 0.001**
Monocyte %	7.02±2.00	5.11 ± 1.33	< 0.001**
Eosinophil %	7.13±2.17	2.43 ± 0.52	< 0.001**
Basophil %	0.62±0.19	0.40 ± 0.12	< 0.001**
Neutrophil %	63.6 ±13.1	59.9 ± 13.1	0.204

Estimation of Immune Parameters in Scabies Disease and Control

The current study showed a significant increase of studied immune parameter in scabies disease patients compared with control group at p. value < 0.05 as shown in table 2.

Table 2
Estimation of Immune parameters in patients and control groups

Groups Immune parameters	Patient No. 60	Control No. 30	p. value
	Mean ± SD		
TNF-α ng/L	104.9 ±26.2	57.6 ± 15.9	< 0.001**

Discussion

The current study's findings revealed an increase in the rate of(WBC) in scabies patients compared to the healthy group except neutrophil , where the rate reached of WBC(9.10±2.33%) while in the healthy group it reached(8.05 ± 1.17%), lymphocyte(34.5 ±9.43%) while in the healthy group it reached (23.1 ± 1.07%), Monocyte (7.02±2.00%) while in the healthy group it reached (5.11 ± 1.33%), Eosinophil(7.13±2.17%) while in the healthy group it reached (7.13±2.17%), Basophil(0.62±0.19%) while in the healthy group it reached (0.40 ± 0.12%),Neutrophil(63.6 ±13.1%) while in the healthy group it reached (59.9 ± 13.1%) .This study is in agreement with previous studies Shelley and Bart(2007)and Walton *et al* (2010) there was an increase in the differential count of white blood cells in these trials.. Granulocytes are innate effector cells in the host immune system that defend against a variety of multi cellular parasites Cadman and Lawrence,2010). In this study, persons with scabies had higher levels of eosinophil cells than healthy people This observation could be related to an allergic condition. This is one of the signs of *sarcoptes scabies* infection and could be caused by cellular response to parasite infestation (Walton *et al.*,2010). (Arlian and Morgan,2000;Arlian *et al.*,1996).

In this study, persons with scabies had higher levels of tumor necrosis factor(TNF-α) than healthy people, where the rate reached(104.9 ±26.2)ng/L while in the healthy group it reached(57.6 ± 15.9)ng/L. This result is in agreement with (Morsy *et al.*, 1995). Previous research demonstrated an increase in tumor necrosis factor in scabies patients compared to healthy controls Arlian *et al.*,(2004),Abd EI-Aal *et al.*,(2016), These studies concluded that this cellular kinetics has an important role in the pathogenesis of human scabies, as the current study agrees with the results of AL-Musawi *et al.*,(2014) Which showed an

increase in the rate of tumor necrosis factor in the group of patients compared with the control group.

Conclusion

The current study found that there was an immunological response against scabies disease via tumor necrosis factor and white blood cells, with an increase in tumor necrosis factor (TNF- α) as well as an increase in all white blood cells except neutrophils in scabies patients compared to the control group.

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