

Clinical Usefulness of IgE as a Serological Marker for Diagnosis of Nodular Scabies in Diyala Province

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Abstract

This study designed to evaluate the clinical usefulness of IgE as a serological marker for diagnosis of nodular scabies.

Sixty eight patients suffering from nodular scabies and twenty apparently healthy subjects as control group were included. The mean age of patients group was (31.67±1.67)years compared with (33.5 ±2.27) years in control group. Among patients group, males represent(76.5%) compared with (23.5%) females. Among control group males represent (55%) versus (45%) females. The mean of IgE concentration among control group was (59.25 ± 5.36 U/ml) compared with (160.16 ±16.78 U/ml) among patients group with statistical significant difference (p>0.05). In (34/ 68) of scabietic patients, the concentration of IgE was lower than cutoff concentration with the mean (46.23 ±5.09IU/ml). The rest (34/ 68) scabietic patients have elevated concentration of IgE(274.08 ±18.18IU/ml). There was a statistical significant difference (p>0.05) between patients groups in IgE concentrations.

This study concludes that the diagnostic value of IgE as a serological marker cannot be considered as a single parameter for diagnosis of nodular scabies without clinical manifestations. This study proved that the serological concentration of IgE not necessarily elevated in all cases of nodular scabies

Key words: nodular scabies, IgE, serology, diagnosis

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Introduction

Scabies is a common parasitic infection caused by the mite *Sarcoptes scabiei*. Infestations occur when the "itch" mite, *S. scabiei*, burrows into the skin and consumes host epidermis and sera. The predominant disease manifestations are mediated through inflammatory and allergy-like reactions to mite products, leading to intensely pruritic lesions. Scabies is a major global health problem in many indigenous and Third World communities. It causes outbreaks in

nursing homes and is recognized in those with human immunodeficiency virus and human T-cell leukemia virus type 1 infections [1],[2],[3],[4]. Scabies is transmitted by skin-to-skin contact, and direct person-to-person body contact was generally necessary for transmission of scabies[1]. Thus, it is a disease of overcrowding and poverty rather than a reflection of poor hygiene [5]. It has been estimated that 300 million people suffer from scabies infestation at any one time, although

this number has been disputed. Scabies is an important disease of children, but it occurs in both sexes, at all ages, in all ethnic groups, and at all socioeconomic levels[6].

Aim of the Study

This study designed to evaluate the clinical usefulness of IgE as a serological marker for diagnosis of nodular scabies.

Patients and Methods

Eighty six patients with clinical presentation of scabies attended to outpatient clinic of Baquba teaching hospital ,dermatology unit from march 2010 to september 2010 were chosen. Definitive diagnosis was based on the identification of mites, eggs, eggshell fragments, or mite fecal pellets from skin scrapings (e.g., from scabietic papules or from under the fingernails) or by the detection of the mite at the end of its burrow. One or two drops of mineral oil are applied to the lesion, which is then scraped or shaved(A superficial shave biopsy and the specimens are examined after clearing in 10% KOH with a light microscope under low power[7],[8].

The mean age of selected patients was (31.67±1.67)years with range (17-55) years .Males represent (76.5%) and (23,5%) were females. twenty apparently healthy individuals (11 males and 9 females) with mean age (33.5±2.27) years with range (18-55) years were enrolled in this study.

Venous blood specimens were collected from using 70% alcohol as disinfectant. The blood was collected in a sterile plastic plane tube and allows it to clot at room temperature for 1h.Once the clot has formed, loosen it from the walls of the container to aid retraction. Kept at 4°C and leave it there overnight. the expressed serum was collected and centrifuge at 150 g for 5 minutes (to sediment erythrocytes) and then at 350g for 15 minutes .Test serum was clear and non-hemolyzed refrigerated at (2-8 °c) until use ⁽⁹⁾.Total serum IgE was determined

using ELISA technique(DRG international-USA) according to manufacture instructions[9].The cutoff concentration was 100 IU/ml. [10].

Statistical analysis

Data were analyzed by SPSS for window TM version 17 for discriptive statistics and Microsoft excel for windows 2007 for T-test of two sample unequal variance .The level of significant was 0.05(two tail).

Results

This study includes sixty eight patients suffering from clinical manifestations of nodular scabies and twenty apparently healthy subjects. The mean age of patients group was (31.6765±1.67328)years compared with (33.5 ±2.27052) years in control group with range 38years in patients versus 37 years in control group as shown in table (1)

Among patients, males represent (76.5%) compared with (23.5%) females. Among control group males represent (55%) versus (45%) females as shown in table (2). The mean concentration of IgE among control group was 59.2500± 5.36356)U/ml with range 83 U/ml (7 U/ml -90 U/ml) compared with (160.1618±16.78078) U/ml with range 399 U/ml (1 U/ml -400 U/ml) among patients group. There is a statistical significant difference $p>0.05$ between patients and control group in IgE concentrations as shown in table (3).

In (50%) of scabietic patients the concentration of IgE was low than cutoff concentration . scabietic patients with low level of IgE the mean concentration of IgE was(46.2353 ±5.09413 IU/ml) with range 97 IU/ml (IU/ml -98 IU/ml) compared with (274.0882±18.18994IU/ml) with range 300 IU/ml (100 IU/ml -400 IU/ml) among patients group with Elevated level of IgE. There is a statistical significant difference $p>0.05$ between twopatients group in IgE concentrations as shown in table (4).

Table (1): Age in Patients versus control group.

Gender	Group	
	Patient	Control
	No.(%)	No.(%)
Male	52(76.5%)	11(55 %)
Female	16(23.5%)	9(45%)
Total	68(100%)	20(100%)

Table (2): Gender of patients and control group.

Group	No.	Range	Minimum	Maximum	Mean± Std. Error
Control	20	37	18	55	33.5 ±2.27052
Patients	68	38	17	55	31.6765±1.67328

Table (3): Descriptive statistics for IgE among patients and control group.

Group	NO.	Range IU	Minimum IU/ml	Maximum IU/ml	Mean± Std. Error IU/ml	P value
patients	68	399	1	400	160.1618±16.78078	P<0.05
control	20	83	7	90	59.2500± 5.36356	

Table (4): Descriptive statistics for IgE among patients.

Patients group	No	Range	Minimum	Maximum	Mean± Std. Error	P value
Low level of IgE	34	97	1	98	46.2353±5.09413	P<0.05
Elevated level of IgE	34	300	100	400	274.0882±18.18994	
Total				68		

Discussion

Scabies, a parasitic skin infestation by the burrowing “itch” mite *Sarcoptes scabiei*, causes significant health problems for children and adults worldwide. The predominant disease manifestations are mediated through inflammatory and allergic-like reactions to mite products, leading to intensely pruritic skin lesions. [11]

This study recorded that the mean age in the majority of scabietic patients was 31.67 years which come in concordance with that reported by Mustafa et al (1997) [12], they reported that in Turkish sample of scabietic

patients the mean age was (28.2) years. The similarity between the present study and that of Mustafa et al (1997) [12] may be attributed to similarity in socioeconomical and demographical conditions between Iraq and Turkey. Walton et al (2004) [13] reported that the prevalence of scabies is not affected by age. Walton et al (2007) [8] reported that scabies is most commonly observed in the very young, followed by older children and young adults. The results of this study disagree with that recorded by Lassa et al (2011) [14] they reported that the age group 10-19 years had the highest

infestation rates while age groups (20-29) years and (30-39) years had the smallest infestation rates. The differences might be attributed to the study design and groups under investigation.

In the present study male patients represent (76.5%) compared with (23.5%) females which come in concordance with that reported by Mustafa *et al* (1997) ⁽¹¹⁾ reported that in turkey scabietic males represent (52.38%) compared with (47.62%) females. This may be attributed to similarity in socioeconomical and demographical conditions between Iraq and turkey. This result disagree with that recorded by Lassa *et al* (2011) [14], they recorded that there was a significantly greater infestation rate among females relative to males in UK which might be attributed to study design and the possibility of exposure to infestation as results of the type of works that achieved by femals beside hiegenic measures. Walton *et al* (2004) [13] dicordance with this study they reported that the prevalence of scabies is not affected by sex. This difference may be attributed to large sample size of population under investigation.

There was obvious elevation with significant statistical difference in the mean concentration of IgE in scabietic patients compared with healthy control. this come in concordance with results reported by Cabrera *et al*, (1993) [15]; Morsy *et al*, (1993) [16] in Egypt; Arlian *et al* (1994) [17]; Morsy *et al*, (1994) [18] in Egypt; Morsy *et al*, (1995) in Egypt [19]; Arlian *et al* (1997) [20]; Mustafa *et al* (1997) [12]; Walton *et al* (2008) [21].

In fifty percent of patients with nodular scabies the concentration of IgE was low than cutoff concentration. This result come in agreement with Morgan *et al* (1994) [22] they observed elevated levels in approximately 50% of patients with active ordinary scabies. Walton (2010) [23] and Rama *et al* (2011) [24], reported that Scabies infestations are

difficult to diagnose clinically and current serologic tests have less than 50% accuracy.

In (50%) of scabietic patients the mean concentration of IgE was lower than cutoff concentration compared elevated concentration in rest (50%) of scabietic patients with a statistical significant difference between groups. The possible cause in this difference in IgE concentration among patients may be due to immunoregulatory mechanism in response to scabies mites infestation. Human responses to parasitic infections have often been difficult to define as either Th1 or Th2, as characteristics from both response types are often reported [25]. There is accumulating evidence that the host immune response to crusted scabies resembles a nonprotective Th2 allergic response, and ordinary scabies resembles a Th1 cell-mediated protective response [26,27,28]. Th1-biased immune reactions are dominated by CD4+ and CD8+ T cells secreting IFN- γ and IL-2. Th2-biased T cells (secreting net IL-4, IL-5 and IL-13) are dominant effector cells in the pathogenesis of IgE-mediated hypersensitivity including attracting, activating and prolonging the survival of nonspecific effector cells. The Th1 / Th2 concept has also been extended to T-regulatory populations expressing IL-10 and transforming growth factor-b (TGF-b) [29,30].

Immunomodulatory and cross reactivity of house dust mites with scabies mites due to molecular mimicry also play a role in modulation of immune response in scabietic patients. Walton, (2010) [25] agree with our explanation, he found that patients with both crusted scabies and ordinary scabies have strong Peripheral blood mononuclear cells (PBMC) proliferative responses to multiple *S. scabiei* homologues to house dust mite allergens. Quantitative analysis of cytokine levels showed the IFN- γ / IL-4 ratio was

significantly higher in supernatant from *S. scabiei* stimulated PBMC from patients with ordinary scabies with low level of IL-5 and IL-13 [28]. Additionally, scabies mites have been reported to secrete unknown antigens that stimulate the proliferation of T-regulatory cells and their secretion of IL-10, which would inhibit the inflammatory and immune responses in humans to the mites [30].

This study conclude that the diagnostic value of IgE as a serological marker, cannot be considered as a single parameter for diagnosis of nodular scabies without clinical manifestations also this study proved that the serological concentration of IgE not necessarily elevated in all cases of nodular scabies

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