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Estimation of IgE level and Rh factor in patients with atopic dermatitis

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ABSTRACT

Atopic dermatitis (AD), also called atopic eczema, is a common chronic or recurrent inflammatory skin disease and affects 15–20% of children and 1–3% of adults worldwide; IgE is likely to be of more relevance in pediatric disease than in adult disease, in order to detect the incidence of AD and its association with elevated total serum IgE level, 68 people were involved in the current study, their ages were (1-45) years and from both genders fifty of them was with atopic dermatitis and the other healthy eighteen were considered as control groups. They are all subjected to the estimation of total serum IgE level by using Nephelometry methodology technique in the central health laboratory and Hilla Teaching Hospital the period Nov. 2017 to Feb. 201in Babylon Governorate. A significant increase in the level of IgE in AD patients was detected in all age groups in comparison with the control group. The results also showed that patients of blood group (o+) are the most frequent by percent (28%) followed by B+, AB+, A+ and AB^- with percent reached (24, 20, 14and 4%) respectively. Furthermore, there is a genetic tendency in the frequency of onset of AD as 10% in both parents and (30& 24%) in mothers and fathers respectively while 36% of the disease does not appear in their families. Results also showed a significant increase in the age groups (31-45) years in comparison with (1-15) and (16-30) years. The disease also rises in males compared with females. A significant increase in IgE for patients with Atopic Dermatitis.

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INTRODUCTION

Atopic dermatitis (AD), also define atopic eczema, is a common chronic or recurrent inflammatory skin disease and affect about 15–20% of children and 1–3% of adults around the world (Asher *et al*., 2006).

It is characterized by acute flare-ups of eczematous pruritic lesions over dry skin genetics has recently been shown to be an important risk factor for AD, and the strongest association so far with the gene encoding fila grin has raised the recent interest in the role of skin barrier impairment in the development of AD, Environmental factors and specifical exposure to microbes are also recognized to play a role in the development of the disease (Nutten, 2015).

The prevalence scale in the United Kingdom (UK) refers to ranges of infections; there are about 16% in children (6 to 7 yrs.) (with 2.2% classed as severe) and 10.6% for (13 to 14yrs) (with 1.5% classed as severe). (Williams *et al*., 2008).

Symptoms of AD include patches of skin that are red brownish, dry, cracked or scaly skin and itchy skin, especially at night. In infants, eczema usually appears as tiny bumps on the cheeks, while older children and adults often experience rashes on the knees or elbows (often in the folds of the joints) on the backs of the hands or on the scalp (Nutten, 2015).

A complex interaction between genetics, environmental factors and immune system define the pathophysiology of AE (Chan *et al*., 2017).

There are many studies relative with vitro, and murine-model evidence clarifies the role of Immunoglobulin-E (IgE) in the immunopathogenesis of atopic dermatitis, and reveal the link between higher IgE levels with more severe disease (Laske & Niggemann, 2004; Toit *et al*., 2013).

IgE is likely to be of more relevance in pediatric diseases than in adult diseases, where AE is thought to become less allergen-driven and more 'autoreactive'.

Even in the absence of known food allergies, eczema patients often have elevated specific and total serum IgE levels. Factors that influence IgE production include cytokines like interleukins(ILs) like (IL-4, IL-5, IL-6 and IL-13) and inflammatory cells. When antigen cross-links the specific IgE bound on mast cells and basophils, these cells initiate and amplify the inflammatory response in both the airways and atopic skin.

In the skin, these events are responsible for the hallmark features that include erythema, lichenification, exudation, and crusting (Paul *et al*., 2006).

MATERIALS AND METHODS

Study population

The study included 50 patients who attended to Hilla Teaching Hospital in Bable Governorate suffering from dermatitis during the period (Nov. 2017 – Feb. 2018). Their ages between (1-45) years old and from both gender. They were divided into three age groups (1-15, 16-30 and 31-54). In addition, (18) healthy person from the same age groups were involved and considered as a control group of the current study.

Collection of samples

Venous blood samples with volume (3cc) were collected or drawn from patients and normal people (control) in sterile coagulation tubes left for (60 min) at room temperature(37c°). Then, centrifuged at 3000rpm for (15) min. to separate the serum which was stored at-20 C° until used.

Statistical Analysis

Statistical analysis was performed with the SPSS, Version 23 (statistical package for social sciences) and also Excell 2013. Data analysis was done using the t-test for tables with means. P-value of ≤ 0.05 was considered as a level of significance. All statistical analysis was performed according to statistician directions.

RESULTS& DISCUSSION

Serum Immunoglobulin E (IgE) Level

The results of the current study found a significant increasing (p-value < 0.01) in the level of total serum IgE in AD patients compared to the healthy persons (control group) as presented in the table (1).

Table 1: The concentration of IgE in AD patients and control groups

groups	Mean ± S.D(IU/ml)
AD patients	**365.70 ± 132.02
Control	92.12± 39.24

According to the age group, table (2) showing that total serum IgE levels were also increased significantly in all age groups of AD patients in comparison to the control group.

The Relationship between Immunoglobulin E (IgE)and the Gender

The results of the study showed a significant increase in the level of immunoglobulin IgE in AD compared to control group and for all age groups and both gender.

There was a (high) very significant increase in the level of immunoglobulin IgE in male and female AD patients in the age group 1-15 compared to control group, The average in males was (299.45±115.23) IU/ml while in the healthy it was (22.26 ±8.5) IU/ml and at a potential level p<0.01. The mean in the female's patients was (330.70±128.2) IU/ml while the average was (85.24±26.73) IU/ml in the control group and at the probability level p<0.01

The study also showed a significant increase in the level of antibody in AD patients, males and females in the age group (16-30) compared to the control group. The mean was (371.94± 130) IU/ml and (96.5±40.2) IU/ml in the male and healthy patients respectively and at the level of probability p<0.01 While the average (262.1±115.3) IU/ml and (85.65±36.0) IU/ml in women were patient and controlled respectively and at a potential level p<0.05.

The study also showed a significant increase in the level of antibody in AD patients, males and females in the age group (31-45) compared to the control group. The mean was (296.34± 130.32) IU/ml and (93.56±40.2) IU/ml in the male and healthy patients respectively and at the level of probability p<0.01

While the average (212.1±120.3) IU/ml and (95.38±39.0) IU/ml in women were patient and controlled respectively and at a potential level p<0.05. As shown in Table (3).

Table 2: The concentration of IgE in AD patients and control groups in different age groups

Age groups(years)	AD patients Mean ± S.D(IU/ml)	Control Mean ± S.D(IU/ml)
1-15	**325.90 ± 126.09	77.30±43.47
16-30	**327.6±123.47	90.58±37.36
31-45	**330.70 ± 128.52	85.42±26.73

**Significant differences compared to the control group at a potential level ($p<0.01$); -Normal range between 0-150 IU/ml in serum

Table 3: The relationship between gender and IgE concentration in AD patients and control group

Age groups (years)	AD patients Mean ± S.D(IU/ml)		Control Mean ± S.D(IU/ml)	
	Male	female	male	female
1-15	**299.45±115.23	**330.70±128.2	22.26 ±8.5	85.24±26.73
16-30	**371.94± 130	*262.1±115.3	96.5±40.2	85.65±36.0
31-45	**296.34± 130.32	*93.56±40.2	212.1±120.3	95.38±39.0

**Significant differences compared to the control group at a potential level ($p<0.01$);
*Significant differences compared to the control group at a potential level ($p<0.05$); -Normal range between 0-150 IU/ml in serum

Table 4: comparison of the frequency of blood groups and Rh factor in the samples of patients with atopic dermatitis and the control group

blood Groups &Rh Factor	A+	A^-	B+	B^-	AB+	AB^-	O+	O^-
Percentage of blood group frequency and Rh factor for AD Patients	12%	Ø	24%	Ø	20%	4%	28%	Ø
Percentage of blood group frequency and Rh factor of the control group	38.88%	5.55	11.11	Ø	16.66	Ø	11.11	16.66

Ø No samples in the group

Table 5: The Frequency of atopic dermatitis in families of AD patients

Frequency of AD in a patient's family	Number of patients	Percentage%
Both parents	5	10%
Mother	15	30%
Father	12	24%
No of AD in parents	18	36%

The relationship between blood groups and Rh factor with patients' atopic dermatitis.

Our results showed a difference in frequency of blood groups and Rh factor between samples of AD patients and control group, hence, the highest percent of AD patients was for O^+ group and reached (28%) followed by (20% and 12%) for the two groups AB^+ and A^+ respectively. On the other hand, A^+ was the highest percent of blood groups for the control group, as seen in the table (4).

Frequency of AD in family Patients

Results of the table (5) clarify that AD was diagnosed in both parents of (10%) of AD patients. However, the mother of (30%) of AD patients was also suffering from AD in addition to (24%) of the fathers of AD patients. Also, the results showed that (36%) of AD patients with no family history of AD.

Frequency of atopic dermatitis and its relation to gender and age.

The study showed significant differences in the frequency of atopic dermatitis in both genders. As the number of patients in the age group (1-15) years 8and 2 in male and female, respectively.

The number of patients in the age group (16-30) years was 12 in male and 4 in female while the number of males in the age group (31-45)14 and female 10.

The total number of infections reported by atopic dermatitis shows that the number of infected males was 34 and 68% while females had 16 and 32%, the frequency of infection in males was higher than in females, and the study showed an increase in frequency of atopic dermatitis in the age group (31-45) years compared with the age group (1-15) years and (16-30) years as the incidence rate of infection 48% in age group (31-45) years while reaching 32% in (16-30) years and 20% in (1-15).

DISCUSSION

Immunoglobulin IgE

The study indicated that there was a significant increase in the level of allergic antibody in patients with dermatitis in comparison with the control

group and for all age groups. This is in line with (Wang *et al*., 2006; Nikoloff and Nestle, 2008) also indicated that the stimulation of Th2 cells leads to the IL-4 and Il-13, which mediate the evolution of acid cells (eosinophils) and B cells into IgE –Producing Cells in AD patients, (Altrichter *et al*., 2008) confirmed the high level of IgE and acid cells in the infected tissue and peripheral blood of AD patients due to the production of IL-4 and IL-5 produced by active Th2 cells. In another study in 2009, Schmutch and Elias explain that the level of allergic antibody in dermatitis patients is increased in patients. IgE stimulates mast cells on the degranulation found in the cytoplasm and releases its contents and interferes with inflammatory reactions in the serum activate the cells of the allergic T - lymphocyte this means that IgE plays two essential roles in the immune response to patients with incontinence as it T activates on the one hand and the release of inflammatory media, on the other. He pointed out that patients with extrinsic dermatitis who have a high level of an allergic reaction. (Eichen field *et al*., 2003) and (Wang *et al*., 2006) are mentioned that one of the most important criteria for diagnosing dermatitis in children is the high level of allergic antibody in children with exogenous dermatitis.

The Relationship between the frequency of blood groups & Rh factor with Atopic Dermatitis

Results of the study showed a difference in the frequency of blood groups and Rh between samples of AD patients with a control group.

The relationship between the frequency of the injury, the blood group and the Rh factor may be due to the genetic susceptibility of the allele responsible for the determination of the blood group, which may have an effect on the susceptibility of dermatitis, which is consistent with what he referred to (Friedl and Lize, 2004). The inheritance of blood groups is determined by three alleles I, I, i is responsible for determining the blood group and the frequency of the group means the frequency of the allele in the affected individual, which means that the people who have this allele, which determines the blood group are more susceptible to the infection of atopic dermatitis than the others and this is consistent with the use of methods of correlation analysis to identify genetic elements responsible for the diseases mentioned by the researchers (Lize and Friedl, 2004)and this by determining the frequency of alleles in infected individuals compared with other alleles in the control group and this is called (Relative risk with population).

Frequency of AD in the family of patients: The results showed that there is a genetic tendency in the frequency of atopic dermatitis in the families of patients, as the frequency of the disease in most patients in both parents to the family of the patient and showed some cases that do not recur in their families and this is consistent with what he mentioned (Williams *et al*., 2006) and (Werfe, 2011), He pointed out that the genetic components of individuals have an important effect in the emergence of the disease and that families affected by the atopic dermatitis inductive shows in their children the incidence of AD disease, asthma and hay fever in any society also increase the risk of the developments of dermatitis in the skin if both parents are infected (Mohrenschlager *et al*., 2006) while Liu and (Shortman, 2002) said that if one of the parents had an Atopic Dermatitis)AD), more than half of his sons or daughters develop symptoms of skin allergies at the age of two years, and this rate rises if both parents have AD.

Atopic dermatitis inherited to the fetus from his mother, transmitted to the fetus through the placenta as it passes the IgG and the interleukin separated from the mother, which in turn participate in the emergence of the proliferating early after the birth of the fetus (Moore *et al*., 2004).

CONCLUSION

1. There was a significant increase in IgE for patients with Atopic Dermatitis compared with the control group and in all age groups.
2. Patients with family history to AD are at high risk to develop AD.
3. 3-Males found to have a high incidence of AD compared with females.
4. 4-Persons of o+ blood groups may be at high risk to have AD.

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