Evaluation of Serum Immunoglobulins and Complement Components Level in Children with Atopic Dermatitis in Al-Hilla City

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Abstract

Immune status was examined in 30 children with atopic dermatitis, their ages ranged between 1-10 years, were clinically diagnosed in dermatology consultation at Merjan teaching hospital and 15 apparently healthy children were included as a control in the study which lasted from September to December 2012.Immunological parameters test were done by taking venous blood from the patients and healthy children to determine the level of immunoglobulins of IgM, IgG, IgA and complement proteins C3 ,C4 level in their serum .It was shown that positive changes in an immunological assays that were significant increases in IgM, IgG ,IgA , C3 and C4 levels in serum of patients in comparison to healthy children .
Key wards: atopic dermatitis, serum immunoglobulin, C3, C4 level, children

الخلاصة:

تم فحص الحالة المناعية لدى 30 طفلا" مصابا" بالتهاب الجلد الاستشرائي تراوحت أعمارهم بين 1-10 سنوات والذين شخصوا سريريا"في الاستشارية الجلدية في مستشفى مرجان التعليمي و15 من أطفال الاصحاء كعينة ضابطة للدراسة التي امتدت للفترة من ايلول الى كانون الاول 2012 .اختبار المعايير المناعية قد أجريت وذلك بسحب الدم الوريدي من المرضى والأطفال الأصحاء لتحديد مستوى الكلوبيولينات المناعية IgMو IgG و IgA وبروتينات المتممة C3 و C4 . وقد أظهرت الفحوصات المناعية تغيرات ايجابية إذ كانت هناك زيادة معنوية في مستوى IgM وIgG و IgA وبروتينات المتممة C3 وC4 في مصل المرضى مقارنة بالأطفال الأصحاء.
الكلمات المفتاحية :التهاب الجلد الاستشرائي ,الكلوبيولينات المناعية , بروتينات متممة c4,c3 للاطفال

Introduction

Atopic dermatitis (AD) often called eczema or atopic eczema is a chronic inflammatory skin disease that occurs in persons of all ages and in both sex in the same proportion, the condition affect individuals who live in urban areas and in climates with low humidity, however specialists claim that is resulting from interactions between environmental and genetic factors (Grendelmeier and Weber, 2010; Leung and Bieber, 2003). Many mucosal inflammatory disorders have become dramatically more common at the 20th. century, atopic eczema is a classic example of such a disease, it is now affects 10-20 % of children and 1-3 % of adult in an industrialized countries and its prevalence in the United States alone has nearly tripled in the past thirty to forty years (Nickoloff and Nestle, 2008). The increasing prevalence and severity of atopic diseases including AD over the last three decades has been attributed to decreased exposure to microorganisms during early life, which may result in an altered in Th-1/Th-2-balance and or reduced T cell regulation of the immune response (Grewe *et al.*, 1998). Patients with AD exhibit defects in innate and acquired immune responses resulting in a heightened susceptibility to bacterial, fungal and viral infections, most notably colonization by *S. aureus*. Toxins produced by *S. aureus* exacerbate disease activity by both the induction of toxin-specific IgE and activation of various cell types including Th-2 cells, eosinophils and keratinocytes (Baker, 2006). Atopic dermatitis is due to a hypersensitivity reaction in the skin, which leads to long – term swelling and redness (inflammation) of the skin. People with atopic dermatitis may lack certain proteins in the skin, which leads to greater

sensitivity (Flohr *et al*., 2006). Approximately one third of children with refractory, moderate-severe AD have IgE-mediated clinical reactivity to food proteins. The prevalence of food allergy in this population is significantly higher than that in the general population and an evaluation for food allergy should be considered in these patients (Grove *et al*.,1975; Romagnani, 2004). The complement is one of the major effect or system in the process of inflammation (Sergeev, 1989). Complement activation has been shown to occur in atopic dermatitis (Valdes, 1991). The skin of a patient with atopic dermatitis reacts abnormally and easily to irritants (harsh soap and detergents), environmental allergens (pollen, mold, dust mites and animal dander) and food (eggs, milk, fish and soya products) (Abreu-Velez, 2010).So, the aim of this study was to assess serum immunoglobulin M, G, A and complement proteins C3 and C4 levels in children less than ten years with atopic dermatitis in Al-Hilla city.

Patients and Methods

1- Patients

A total of thirty (30) children (18 males and 12 females) with atopic dermatitis admitted to dermatology consultation at Merjan teaching hospital. Their ages ranged between (1 – 10) years and 15 apparently healthy children were taken as a control group their ages matched to patient's ages. This study lasted from September to December 2012.

2- Immunologic measurements

Blood samples were taken from children with atopic dermatitis a volume of five milliliters of venous blood in a disposable sterile plastic tube after clotting, the serum was separated and kept at – 20 C˚ until immunological analyzes done .We measured serum values of IgM ,IgG ,IgA and complement proteins C3 and C4 by radial immunodiffusion plate (LTA- Italy) in serum of patients and controls according to an instructions of manufacturer.

3-Statistical analysis

Data were analyzed using SPSS (statistical package for social science) of Mean, Standard deviation and T- test (P- value < 0.01) were used as statistical parameters in this work.

Results

Tables (1, 2) show data obtained from analysis of IgM, IgG, IgA,C3 and C4 of patients with atopic dermatitis and healthy children. The means of IgM, IgG, IgA, C3 and C4 level reached (159.2040,1441.3280,246.7730, 107.6060,22.0130) mg/dl respectively of AD patients ($P< 0.01$), while the means of this immunological parameters in healthy children recorded (90.1760,939.2210,119.7650,72.3600,
14.7920) mg/dl respectively ($P< 0.01$). It was a statistically significant difference ($P < 0.01$) in patient's serum values in comparison to healthy children.

Table 1: levels of immunoglobulins IgM, IgG and IgA (mg/ dl) in atopic dermatitis patients and healthy children sera

		IgM	IgG	IgA
Patient N. 30	M	159.2040	1441.3280	246.7730
	SD	69.1690	759.1500	116.6350
Healthy N. 15	M	90.1760	939.2210	119.7650
	SD	52.7620	511.4310	68.4320
Significance		Significant P < 0.01	Significant P< 0.01	Significant P < 0.01

M= mean SD= standard deviation

Table 2: levels of complement proteins C3 and C4 (mg/ dl) in atopic dermatitis patients and healthy children sera

		C3	C4
Patients N. 30	M	107.6060	22.0130
	SD	34.1270	8.6240
Healthy N. 15	M	72.3600	14.7920
	SD	32.9300	10.2210
Significance		Significant P < 0.01	Significant P < 0.01

M= mean SD= standard deviation

Discussion

Atopic dermatitis (AD) is an important chronic or relapsing inflammatory skin disease. New insights into the genetics and pathophysiology of AD point to an important role of structural abnormalities in the epidermis as well as immune dysregulation not only for this skin disease but also for the development of asthma and allergies (Boguniewicz and Leung, 2011). Result of this study shows a significant increase in level of immunoglobulin IgM, IgG and IgA in children with atopic dermatitis (AD) in comparison to healthy children (Table 1).

The defective barrier function of the skin in patients with AD allows foreign proteins to enter the body and interact with components of the innate and adaptive immune systems (Benedetti, 2009). The immune response characteristic of AD is complex with the majority of patients making IgE in response to ingested and/or inhaled antigens. Although IgE-mediated mechanisms may represent initial immune responses, they are

only one element of a biphasic inflammatory response (Kaminski, 2008). This findings were agreed with number of studies results in Iraq and world (Al-saimary and Al-Hamdi, 2006; Wenzel and Bieber, 2004 and Chiarelli *et al.*, 1987).

Table (2) shows significant differences in levels of C3 and C4 in children with atopic dermatitis in comparison with healthy. The complement protein is an important mediator of the acute inflammation response and an effective inhibitor would suppress tissue damage in much autoimmune and inflammatory disease (Kapp *et al.*, 1989). These findings agreed with some of studies such as (Kapp and Schopf, 1985 ; Sergeev *et al.*, 1989) which suggest that the complement system activate and participate in the inflammatory process in AD patients and is connected with increasing in humoral immunity especially IgE and defect in cellular immunity (Chiarelli *et al.*, 1987 and Ohmen *et al.*, 1995)

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