Original Article

A Cross-Sectional Study on Evaluation of Ige Levels in Subjects with Atopic Dermatitis.

Dr. Rahul Tripathi[1], Dr. Anamita Khan Mandal[2], Dr. Arpita Agrawal[3]*

[1]Assistant Professor, Dept. of Dermatology and VD, Prasad Institute of Medical Sciences, Lucknow, UP
[2]Associate Professor, Dept. of Dermatology and VD, Prasad Institute of Medical Sciences, Lucknow, UP
*[3]Assistant Professor, Dept. of Dermatology and VD, Prasad Institute of Medical Sciences, Lucknow, UP

***Corresponding Author: -** Dr. Arpita Agrawal

*Assistant Professor, Dept. of Dermatology and VD, Prasad Institute of Medical Sciences, Lucknow, UP
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Abstract

Introduction: Atopic dermatitis (AD) is a chronic inflammatory skin disease characterized by itching and eczematous lesions. The prevalence of atopic dermatitis in children is about 15%. The pathogenesis of AD multifactorial and is involved with genetic susceptibility, skin barrier defects, environmental factors and immunologic dysregulation.

Aim and Objective of the study: The aim and objectives of the study were to estimate immunoglobulin E levels in subjects with atopic dermatitis and to correlate IgE levels with severity of AD symptoms.

Materials and Methods: Data were collected based on a questionnaire applied during the routine visit. Parents of illiterate children were asked to help them filling in the questionnaire, which comprised questions regarding symptoms and activities of daily life of patients. The questions were adjusted from the questionnaire validated by Yosipovitch et al., in 2002, describing pruritus in atopic dermatitis patients. The physical examination to assess severity of disease was performed by a dermatologist, according to the criteria established by Rajka and Langeland who divided AD into mild, moderate and severe disease.

Results: We included a total of 60 children presented with atopic dermatitis, based on the inclusion and exclusion criteria. Out of which 60 total study subjects 32 were males and 28 were females. The mean age in years was 9.6±5.47 years. We categorised 60 children based on association with other manifestations which include subjects with only atopic dermatitis 22 (36.6%), atopic dermatitis with asthma 28 (46.6%), atopic dermatitis with allergic rhinitis 27 (45%), and atopic dermatitis with asthma and allergic rhinitis 22 (36.6%). We further categorised the study subjects based on the severity of clinical symptoms of atopic dermatitis, we observed that 28% had mild symptoms, 54% had moderate symptoms and 18% had severe symptoms.

Discussion and conclusion: : In conclusion, hyper-IgE in patients with eczema is independently associated with asthma, more severe atopy and more severe eczema during early childhood and adolescence. IgE > 2000 IU/L may be a tool to aid prognostication of this chronic relapsing dermatological disease and its progression to other atopic disorders.

Keywords: atopic dermatitis, immunoglobulin E, asthma, allergic rhinitis, mild, moderate and severe.

INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin disease characterized by itching and eczematous lesions. The prevalence of atopic dermatitis in children is about 15%. The pathogenesis of AD multifactorial and is involved with genetic susceptibility, skin barrier defects, environmental factors and immunologic dysregulation. As per outside-in theory, the disorder in the epidermal barrier initiates the disease, followed by immunological changes. In contrast to the inside-out theory, the immune dysregulation is the primary cause of the disease, and the barrier changes are an epiphenomenon [1,2].

Food and inhalant allergens are associated with AD exacerbations. The prevalence of food allergy in AD is estimated to be 30%. Hen's egg, cow's milk, wheat, soy, shellfish, fish, and peanut are the most common offending foods for food allergy in AD. There are conflicting data regarding whether inhalant allergens have the role through direct contact with the skin, or inhalation and absorption through the respiratory tract [3,4].

Allergic or atopic individuals produce IgE after contact with allergens even at low concentrations. This response occurs in the site where the allergen penetrates the body (mucosal surfaces, skin and/or local lymph nodes). The produced IgE first sensitizes local mast cells, causing immediate allergic reactions (histamine release); the exceeding IgE enters circulation and binds to receptors both in circulating basophils and mast cells fixed in tissues throughout the body, and thus triggering systemic reactions [5,6].

Pruritus is the main symptom in all AD patients, in any phase of the disease, and the act of scratching leads to most skin lesions [7,8]. Different methods have been proposed to assess severity of AD [9,10] which include past or family history,

age at onset of eczema and pruritus intensity are some factors mentioned as extremely important to quantify the clinical manifestation of the disease. The most used method to verify intensity of the clinical picture of atopic patients was proposed by Rajka et al.[11], and it considers the extension of body surface with lesions, the natural history of the disease and intensity of pruritus. To understand and manage the situations that trigger and aggravate pruritus in atopic patients may lead to significant improvement of clinical manifestations and less severe cases. Therefor we have taken up this study to evaluate the IgE levels in patients with AD and to correlate the IgE levels with the severity of AD symptoms.

AIM AND OBJECTIVES OF THE STUDY:

The aim and objectives of the study were to estimate immunoglobulin E levels in subjects with atopic dermatitis and to correlate IgE levels with severity of AD symptoms.

MATERIALS AND METHODS

A prospective observational study is conducted in patients presenting with presenting with atopic dermatitis children aged less than 17 years.

Place of study: The study was conducted at our tertiary care centre for the duration of one year in children aged less than 17 years based on inclusion and exclusion criteria, we included a total of 60 children.

Design of the Study: cross-sectional study

Study Population:

Inclusion criteria: patients presenting with complaints of atopic dermatitis willing to participate in the study were included.
Exclusion criteria: Individuals presenting pruritic dermatoses different from AD, patients on medications that cause pruritus as side effect, and suffering any disease that induces higher blood IgE levels, except for asthma or allergic rhinitis, which were analysed during the study.

Study Period: The study was carried out for a period of two years from April 2020 to April 2022.

Methods of Data Collection and Study Procedure:

Data were collected based on a questionnaire applied during the routine visit. Parents of illiterate children were asked to help them filling in the questionnaire, which comprised questions regarding symptoms and activities of daily life of patients.
The questions were adjusted from the questionnaire validated by Yosipovitch et al., in 2002, describing pruritus in atopic dermatitis patients. The physical examination to assess severity of disease was performed by a dermatologist, according to the criteria established by Rajka and Langeland who divided AD into mild, moderate and severe disease.

The serum IgE results of patients who had been recently submitted to examination were retrieved from the medical record. Patients who had no IgE results were asked to have the test performed during the enrollment visit. In order to compare IgE level with severity of AD, the Kruskal-Wallis test was used. Mann-Whitney and chi-squared tests were used for analysis. The significance level was □□= 0,05.

Data analysis and interpretation: The collected data were analyzed for their appropriateness and suitability. The interpretation was made for the collected data.

RESULTS:

We included a total of 60 children presented with atopic dermatitis, based on the inclusion and exclusion criteria.
Out of which 60 total study subjects 32 were males and 28 were females. The mean age in years was 9.6±5.47 years. We categorised 60 children based on association with other manifestations which include subjects with only atopic dermatitis 22 (36.6%), atopic dermatitis with asthma 28 (46.6%), atopic dermatitis with allergic rhinitis 27 (45%), and atopic dermatitis with asthma and allergic rhinitis 22 (36.6%) [table 1 and figure 1]. We further categorised the study subjects based on the severity of clinical symptoms of atopic dermatitis, we observed that 28% had mild symptoms, 54% had moderate symptoms and 18% had severe symptoms [figure 2].

Table 1: Shows demographic and clinical profile of the study subjects

Total study subjects	60
Number of males/females	32/28
Mean age in years	9.6±5.47

Figure 1: Shows distribution of subjects based on association of atopic dermatitis other conditions (atopic conditions)

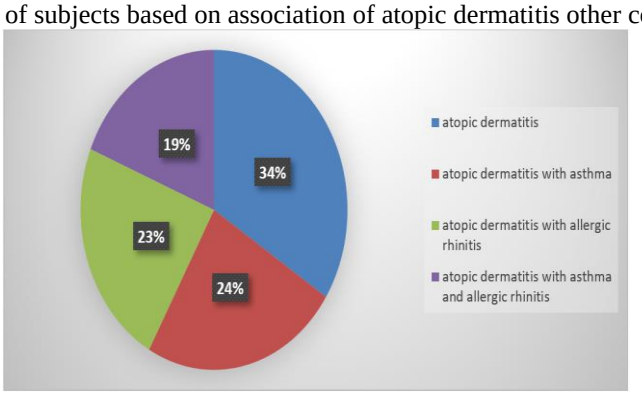

Figure 2: Shows distribution of subjects based on severity of clinical manifestations

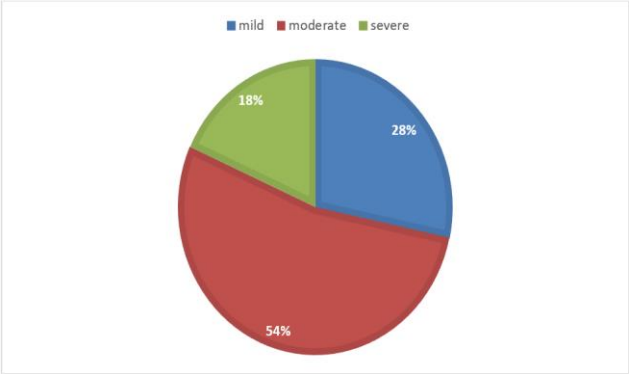

Table 2: Shows area of involvement of atopic dermatitis

Area of involvement	
Scalp	36%
Face	72.6%
Trunk	79.2%
Flexure	69.8%
Extensor	78%
Both flexor and extensor	73%
Palmoplantar	18%

In this study, the involvement of scalp, face, trunk, limbs, genitalia, and palmoplantar involvement was noted in 36%, 72.6%, 79.2%, 78%, 11%, and 18% of cases, respectively. Flexural involvement was present in 69.8% of cases, while extensors were involved in 78% of cases; both flexural and extensor involvement were present in 73% of cases [table 2].

Table 3: Shows IgE values association with severity of clinical manifestations (median values)

Clinical manifestations	**Median IgE values in IU/mL**
Mild	301
Moderate	398
Severe	896

Correlating clinical severity of AD with IgE levels, in mild patients we found a median of 301 IU/mL in patients with moderate manifestations, a median of 398 IU/mL and in severely affected individuals, a median of 896 IU/mL (Mann-Whitney test) (Table 2). The median IgE found in females was 1284 IU/mL, whereas in males it was 1987 IU/ml and the difference in IgE level was statistically significant (p= 0.002).

DISCUSSION

We included a total of 60 children presented with atopic dermatitis, based on the inclusion and exclusion criteria. Out of which 60 total study subjects 32 were males and 28 were females. The mean age in years was 9.6±5.47 years. We categorised 60 children based on association with other manifestations which include subjects with only atopic dermatitis 22 (36.6%), atopic dermatitis with asthma 28 (46.6%), atopic dermatitis with allergic rhinitis 27 (45%), and atopic dermatitis with asthma and allergic rhinitis 22 (36.6%) [table 1 and figure 1]. We further categorised the study subjects based on the severity of clinical symptoms of atopic dermatitis, we observed that 28% had mild symptoms, 54% had moderate symptoms and 18% had severe symptoms [figure 2].

In this study, the involvement of scalp, face, trunk, limbs, genitalia, and palmoplantar involvement was noted in 36%, 72.6%, 79.2%, 78%, 11%, and 18% of cases, respectively. Flexural involvement was present in 69.8% of cases, while extensors were involved in 78% of cases; both flexural and extensor involvement were present in 73% of cases [table 2]. Correlating clinical severity of AD with IgE levels, in mild patients we found a median of 301 IU/mL in patients with moderate manifestations, a median of 398 IU/mL and in severely affected individuals, a median of 896 IU/mL (Mann-Whitney test) (Table 2). The median IgE found in females was 1284 IU/mL, whereas in males it was 1987 IU/ml and the difference in IgE level was statistically significant (p= 0.002).

AD is a chronic inflammatory cutaneous disease causing great morbidity and psychological stress in both patients and their parents. The prevalence of clinical features and intensity of symptoms of AD may vary with genetic background, climate, geographical locations, food habits, socioeconomic status, availability of healthcare facilities, and many other factors.

Correlation between IgE levels and severity of clinical presenattaion od atopic dermatitis. Serum IgE levels have been shown to correlate with the severity of atopic eczema. In this study, IgE correlated with severity of clinical manifestations in atopic dermatitis (mann-whitney test). In a prospective correlational study of 117 patients, we demonstrated that the IgE level correlates significantly with various objective clinical scores (including Scoring Atopic Dermatitis (SCORAD)) and chemokine markers of AD.

Furthermore, higher IgE levels were seen in subjects with atopic dermatitis with no improvement in skin eruptions, whereas those with improvement had low IgE levels. Total serum IgE has also been shown to increase with age, but Sampson and colleagues reported that patients with persistent disease are not as severely affected as they were in infancy However, the strength of association between IgE and atopic eczema varies between studies. In the present cohort of 330 patients with atopic eczema, hyper-IgE (IgE > 2000 IU/L) is significantly correlated with the severity of eczema in childhood and adolescence. This suggests a role for IgE > 2000 IU/L as a prognostic implicator for eczema severity and intractability [12].

Hyper-IgE is a factor, among other clinical features of atopy, that may alert clinicians to a more severe and prolonged course when they manage their young eczema patients. New studies proposed a novel concept of atopic eczema/dermatitis syndrome (AEDs) that is classified into being intrinsic and extrinsic. The extrinsic form of AEDs is the IgE-mediated form and it is associated with respiratory allergies and high serum IgE levels. This classification remains a topic of controversy, with higher serum levels of IgE being the only subjective way to differentiate between the two [12].

The precise cut off value for IgE has not been determined, however. Our study showed that those with hyper-IgE had significantly increased eczema severity during childhood and adolescence which matched the observation that milder disease severity is seen in those with non-IgE-mediated–type AEDs. More research has to be done to evaluate whether this could serve as a simple cut off value for the classification of AEDs [12].

CONCLUSION:

In conclusion, hyper-IgE in patients with eczema is independently associated with asthma, more severe atopy and more severe eczema during early childhood and adolescence. IgE > 2000 IU/L may be a tool to aid prognostication of this chronic relapsing dermatological disease and its progression to other atopic disorders.

STUDY LIMITATIONS:

sample size was less; we need more sample size to further evaluate the correlation between IgE levels and severity of atopic dermatitis.

CONFLICT OF INTEREST:

None

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