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A study on evaluation of levels of absolute eosinophil count in blood and serum IgE in patients with Atopic dermatitis

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Abstract

Background: Atopic dermatitis is a multifactorial chronic, commonly found dermatitis. Although many studies have shown the epidemiological distribution of atopic dermatitis, very few studies have shown a correlation between serum AEC levels, serum IgE levels and disease severity.

Materials and Methods: A total of 55 cases of atopic dermatitis and their matched disease free controls (n=55) were included in the study. This study was conducted in the Department of Dermatology, Sanbhram Institute of Medical Sciences, Kolar over a period of 1 year, i.e. from June 2019- May 2020

Results: Serum IgE levels and AEC levels are significantly higher in patients who have severe atopic dermatitis when compared to healthy controls.

Conclusion: The present study concludes that "SCORAD" index can be used as a prognostic marker of atopic dermatitis.

Keywords: Absolute eosinophil count, IgE levels, atopic dermatitis, Family history, disease severity

Introduction

Atopic dermatitis (AD)/ Atopic eczema(AE) is the most common type of dermatitis characterized by itchy, chronic or chronically relapsing inflammatory skin lesion that often begin before 2 years of age [1, 2]. Causative factors include defects in the function of skin barrier, reoccurring skin infections and allergen sensitization are associated. Clinical features include itch, rash on extensor surfaces and face, lichenification in flexure surfaces, family or personal history of atopic diseases: rhinitis, asthma, atopic dermatitis [3].

Defects in genes responsible for immune response (CD14, RANTES, toll like receptors) and those responsible for skin barrier (Genes for loricrin, filaggrin gene FLG, proteases) [4]; Increased Th2-derived cytokine activity, increased levels of serum IgE, increased expression of IgE receptor FcεR1 on Langerhans cells and dendritic cells [5]; and microbial colonization [6] are few of the etiological factors involved in atopic dermatitis

Atopic dermatitis is triggered by changes in temperature, humidity, presence of any food allergens, aeroallergens, and etc. [7]

Atopic dermatitis is seen in approximately 10% to 30% of children and 2% to 10% of adults in developed countries. The incidence of atopic dermatitis is higher at higher latitudes, which may be due to decreased sun exposure and lower humidity levels.

There is marked decrease in the skin barrier function because of reduced ceramide, down regulation of genes in the cornfield envelope (Filaggrin and Loricrin), enhanced transepidermal water loss and more endogenous proteolytic enzymes [9, 10].

The severity of AD is somehow correlated with IgE values and AEC, but this is not consistent. Therefore, in this study, the relation between severity of AD, serum IgE levels & absolute eosinophil count in blood is found out.

Materials and Methods

Our case control study was done in the Department of Dermatology, Venereology and Leprosy, Sanbhram Institute of Medical Sciences, Kolar from June 2019- May 2020. A total of 55 patients, of all age groups, with atopic dermatitis visiting the hospital were enrolled. 55 age matched healthy controls were also included in the study.

Inclusion Criteria

- Age range: 6 months to 40 years
- Patients who gave their consent
- Both males and females

Exclusion Criteria

- Patients who did not give consent
- Patients receiving any systemic drug (homeopathic, ayurvedic, unani and allopathic)
- Patients receiving oral contraceptives, hormonal therapies
- Patients who are immunocompromised, pregnant and lactating
- Patients with cancer, systemic and autoimmune disorders

Methods

A detailed clinical history with special mention regarding patients' age at onset, personal and family history of atopic diseases, duration of illness was taken. Physical examination was done to find the severity (SCORAD index) and the body surface area involved (Wallace's Rule of Nine). A written consent was taken from the subjects or their guardians. Severity of atopic dermatitis is measured by a scoring system - The SCORAD index (Scoring Atopic Dermatitis) [13]. The 5 signs include Erythema, Excoriations, crust formation, edema, Vesicles with scoring from 0-4 in each

0: Not seen/absent

1: Mildly present

2: Moderate but not severe

3: Severe [14].

Blood tests were done to find the AEC values and Ig E levels in each patient. The range and mean values of various parameters like age of onset, number of attacks, body surface area involved, and the blood counts were measured.

Results

In the present study, the onset of the disease was seen in patients from 4 months of age to 20 years with an average of about 4.8 years. Out of the 55 patients in the study, males and females were 22 and 33 respectively and amongst the controls, males and females were 25 and 30 respectively. The SCORAD index (Maximum value - 15 and minimum value - 0) was within a range of 10 to 1 with a mean of 5.8. We observed that the percentage of body surface area involved was recorded with an average of 8.1. In our study, the average of the number of disease attacks in patient was 5.2. The mean calculated for the duration of present illness was 3.7 months. In patients with atopic dermatitis the AEC was in the range 54 to 2981, with a mean of 672, and in controls ranged from 14 to 535 with a mean of 124.

In the present study, Serum IgE levels were in range 35-1541 IU, mean of 302.9 in patients, and range 11-111 IU, mean 32 in controls. Our results found that the serum IgE levels, AEC and severity of atopic dermatitis showed significant association with history of allergic rhinitis individually.

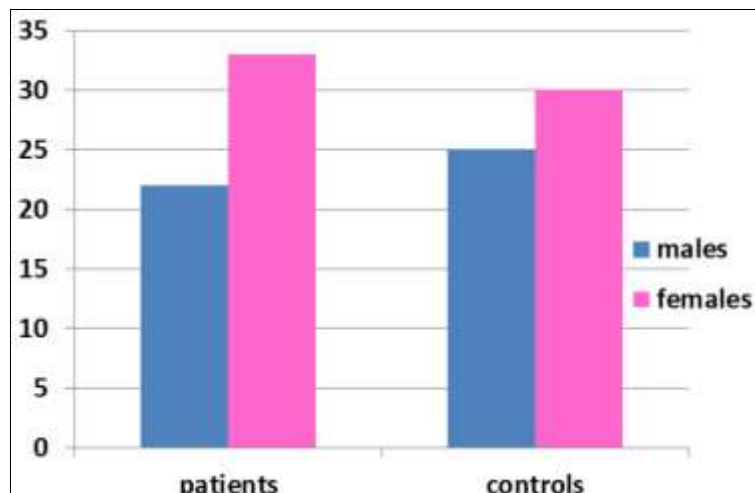


Fig 1: Proportion of male and female in the study

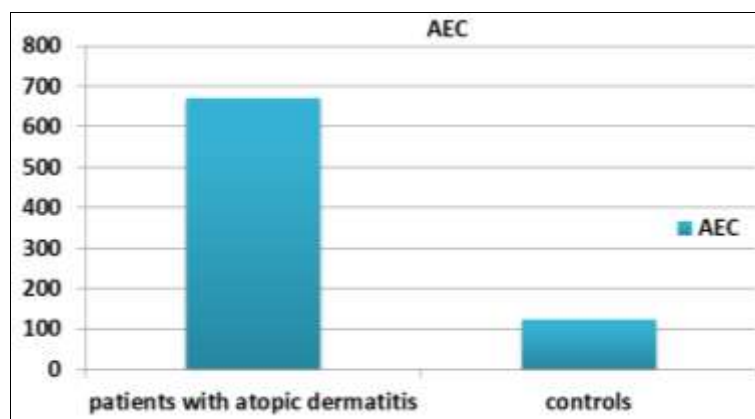


Fig 2: Levels of Absolute eosinophil count (AEC) in patients with AD compared with controls

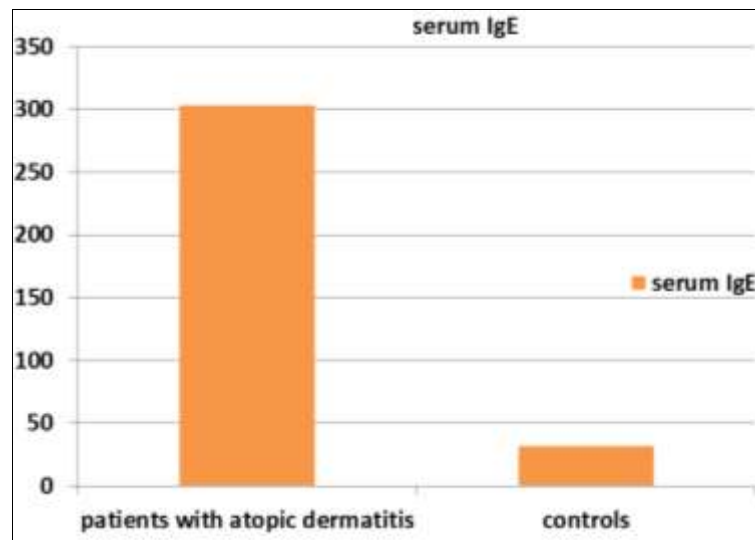


Fig 3: Levels of serum IgE in patients with AD compared with controls

Discussions

The mean age of onset, as shown in various studies, was 4.3 months in the infantile group, and was 4.1 years in the childhood group^[15]. Our study had a similar finding to that of childhood AD i.e. mean age at onset of AD was found to be 4.8 years.

We also found that in patients with AD, the mean AEC was 672 and the mean IgE levels were 302.9 whereas in controls, it was 124 and 32 respectively. Majority of the study cases had raised values of AEC and IgE. This is accordance with a study done in Japan^[16]. Patients with severe AD who had a personal or family history of atopy, had high eosinophil counts, while normal or slightly elevated levels were seen in severe cases of AD with no personal or family history of atopy. This shows that personal or family history of atopy and disease severity are responsible for high eosinophil levels in atopic dermatitis. Likewise, we found that both AEC and IgE had a correlation with severity of the disease. Also, history of allergic rhinitis was found to be significantly associated with these parameters in the patients. The clinical activity of AD (SCORAD index) illustrated in the study can be used as both measure of haematological irregularities and also prognostic indicator in the majority of patients.

Conclusion

The study concludes that the patients with atopic dermatitis had significantly higher levels of AEC count and the IgE than in controls. Also, there is a significant correlation between serum IgE levels and AEC levels with severity of atopic dermatitis. History of allergic rhinitis was found to be significantly associated with these parameters in the patients.

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Conflict of interest: None

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