

STUDY OF ATOPIC DERMATITIS AND ABSOLUTE EOSINOPHIL COUNT

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Abstract

AD is a chronic, relapsing skin disease, usually beginning in early childhood. The clinical manifestations and locations of skin lesions depend on age, but the main symptom are intense pruritus, causing emotional distress and sleep disturbances. Severity of atopic dermatitis is graded only by clinical findings, which has greater means of individual variation, so a laboratory value may uniform the grading and eosinophils are always thought to be associated with allergic conditions. This study was done to see relation of Atopic Dermatitis and Absolute Eosinophil Count. 50 patients with AD were enrolled in the study. The diagnosis of AD was made according to the HanifinRajkacriteria. The age, gender, and history of personal or family history of allergic rhinitis or asthma were taken from the patients. After taking a history, a thorough clinical examination to assess the severity of eczema depending on the SCORAD index was performed. Absolute Eosinophil Count was done . 40 percent patients were of age group 4 to 6 years. 58 percent patients had mild SCORAD Index. Severe Atopic dermatitis patients had AEC 820.34 ± 402.46 per mm^3 . The results point to the role of eosinophils in etiopathogenesis of AD. AEC could serve as a diagnostic parameter in differentiating allergic AD from non-allergic AD.

Key words : Atopic Dermatitis , Absolute Eosinophil Count

Introduction

Atopic dermatitis (AD) is a chronic relapsing eczematous condition of the skin often associated with a personal or family history of bronchial asthma and allergic rhinitis. Pruritus, scratching and rubbing lead to lichenification most typically in the antecubital and popliteal flexural areas [1, 2]. The word atopy comes from Greek (a- topos= without a place). It was introduced by Cooke in 1923 and refers to the strange grouping of asthma, hay fever, and eczema in the medical classifications [1]. AD was extensively studied by Sulzberger in 1932 [3]. The Incidence of atopic diseases in the population is between 2- 20% and slightly more in girls than boys [3]. The highest incidence of AD is among children and about 3% of all infants suffer from AD. The prevalence of AD is 10.7% [3–5]. The cause of AD is unknown, but it may be the result of interaction between hereditary, immunological, pharmacological, environmental, and psychological factors [1]. AD is a multifactorial etiology that inherited from a mother rather than a father. The clinical features of AD are a chronic recurrent eczematous disease that may be presented in 3 phases infantile, childhood, and adult phase [6, 7].

SCORAD index is defined as sum of objective parameter and subjective parameter in which objective parameters includes extent of area involvement (A) and intensity of symptoms (erythema, oedema, population, excoriation, lichenification, oozing/crusting & dryness (B). The subjective parameters (C) include pruritus and sleeplessness. The extent of body surface area involvement is calculated by rules of nine, and the extent is graded (0-100 cm²). The intensity of each symptom is graded as (0-3). Subjective symptoms are graded as 10 cm visual analogue scale. According to the SCORAD index formula generated by European Task Force on Atopic Dermatitis (ETFAD) is $A/5 + 7B/2 + C$. where A= area (0-100), B= intensity of symptoms (0-18), C= subjective symptom (0-20)[8]

Eosinophils are cells of the immune system that are most commonly known for their role in defense against parasites and, along with basophils and mast cells, as mediators of allergy and asthma. They are derived from CD34+ hematopoietic progenitor cells in the bone marrow and represent approximately 1–6% of white blood cells. They can persist in the circulation for 8–12 h and in tissue for 8–12 days in the absence of stimulation. Under the physiologic conditions, the skin does not harbor eosinophils[9], but in disease like AD, eosinophil can be found in lesional skin. Proliferation, immigration, and local activation of eosinophils are characteristic features of AD. T cell activation by antigen-presenting cells leads to production of Th2 cytokines, such as IL-4, IL-5, and IL-10, that support humoral immunity and eosinophil functions. Eosinophilia (i.e., more than 500 eosinophils per microliter of blood) has been shown to be present in most patients with AD and correlate with the disease activity[10]. Also, more recent studies suggested that absolute eosinophil count could be used as a diagnostic tool in differentiating atopic AD from non-atopic AD[11] and that AD patients with other symptoms of atopy and family history of atopy have increased absolute eosinophil count. This study was done to see relation of Atopic Dermatitis and Absolute Eosinophil Count.

Material and Method

50 patients with AD were enrolled in the study. The diagnosis of AD was made according to the HanifinRajka criteria [12]. The age, gender, and history of personal or family history of allergic rhinitis or asthma were taken from the patients or their caregivers, 50 patients with AD were enrolled in the study. After taking a history, a thorough clinical examination to assess the severity of eczema depending on the SCORAD index was performed [13]. This index composed of three component extent, intensity, and subjective. The extent depends on the involved area of the body. Calculation of the area depends on the Wallace's Rule of Nine: head and neck 9%, upper limb left 9%, upper limb right 9%, lower limb left 18%, lower limb right 18%, anterior trunk 18%, back 18%, and genitalia 1%. The intensity is measured according to 6 signs redness, edema, oozing or crust, scratching, lichenification, and dryness. Three points for each sign and the total points will be 18 for intensity. The last component of the score is subjective symptoms including itching, and sleeplessness, 10 points for each and the total are 20 points. Finally, the SCORAD Index is a summation of all these 3 scales with an equation: $A/5+7B/2+C$, where A (0-100) is the area or extension of eczema, B defined as intensity depending on 6 lesions (0-18), and lastly, C is defined as a subjective feeling of itching (0-10), and sleeplessness (0-10), the total of both (0-20). The patients were divided according to the SCORAD index into mild (<25), moderate (26-50), and severe (>50). Informed consent was taken from all the patients or parents of the patient (if age of the patient is less than 18 years) included in the study. Before initiating the study the proposal of the study was submitted to the Institutional Review Board. The will of the subjects was fully respected and those who did not give consent for participation were excluded from the study.

A written consent was taken from each patient after explaining the relevant details of the study, its importance and implications. Confidentiality was maintained to utmost. Detailed history was taken and detailed clinical examination, investigation was performed, and the details were recorded.

Evaluation of the blood eosinophil count using these steps: 1- Take 2 ml of blood from the patient put one drop on the slides and one drop of Leishman stain, wait 2 minutes for all cells to be stained, then the sample is diluted with distilled water and wait 10 minutes then wash and read with high power field microscopy to calculate the number of eosinophil cells per 100 white blood cells (WBC) to calculate the percentage of eosinophil. 2- Take 0.02 ml of blood with a pipette and add 0.4 ml of glacial acetic acid, then put one drop of this mixture on the Neubauer chamber and read on lower power to calculate the WBC counts. 3- Multiply the eosinophil percentage by total WBC counts to get absolute eosinophil count. Results were tabulated in frequency and percentage.

Results

Table 1: Age Groups in Years

Age group (Years)	Number of Subjects n =50	Percentage
<3	08	16 %
4-6	20	40 %
7-10	12	24 %
11-15	06	12 %
16-20	04	08 %

40 percent patients were of age group 4 to 6 years.

Table 2: Distribution according to Gender

Gender	Number of Subjects n =50	Percentage
Male	32	64 %
Female	18	36 %

64 percent patients were male and 36 percent females.

Table 3: Distribution according to SCORAD Index

SCORAD Index	Number of Subjects n =50	Percentage
Mild (25)	29	58 %
Moderate (25-50)	13	26 %
Severe (>50)	08	16 %

58 percent patients had mild SCORAD Index.

Table 4 : Absolute Eosinophil count according to severity of disease

Severity of disease	Absolute Eosinophil count per mm ³ Mean ± SD
Mild	406.28 ± 201.42
Moderate	680.02 ± 304.24
Severe	820.34± 402.46

Severe Atopic dermatitis patients had AEC 820.34 ± 402.46 per mm^3

Discussion

Atopic dermatitis is a common and difficult to manage allergic condition. Once thought to be the disease of developed countries with rapid urbanization the prevalence of disease is increasing in developing countries like India. Not many studies are done in regard to atopic dermatitis. Different studies have suggested different age of onset for the disease. A study done by Illi S *et al* showed a total of 45% of all cases of atopic dermatitis begin within the first 6 months of life, 60% begin during the first year, and 85% begin before 5 years of age [14]. In our study 40 percent patients were of age group 4 to 6 years. 64 percent patients were male and 36 percent females. 58 percent patients had mild SCORAD Index. Severe Atopic dermatitis patients had AEC 820.34 ± 402.46 per mm^3 . Eosinophil plays a role in AD owing to the presence of eosinophilia in AD subjects and the infiltration of the eosinophil in AD lesions. Moreover, eosinophil production, recruitment, and activation are associated with cytokines and chemokines release in patients with AD [15]. AEC is a common laboratory finding in cases with AD. It was not influenced by the age or gender of the patients. Also, it was not affected by the presence of a history of asthma or allergic rhinitis. The level of blood eosinophil can be used as a prognostic factor for AD patients because it has a significant effect on the severity of the disease. However, the level of blood eosinophil is not used as one of the diagnostic criteria of AD.

Conclusion

The results point to the role of eosinophils in etiopathogenesis of AD. Absolute eosinophil count could serve as a diagnostic parameter in differentiating allergic AD from non-allergic AD.

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