



TOTAL SERUM IMMUNOGLOBULIN E LEVELS AND SPECIFIC ALLERGENS IN PATIENTS OF URTICARIA, ATOPIC DERMATITIS AND PRURITUS: A COMPARATIVE STUDY

Dermatology

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ABSTRACT

Immunoglobulin E (IgE) plays an important role in allergic diseases. Although several studies have compared the serum total IgE and allergen specific IgE levels with allergic dermatitis there are few studies addressing this association for conditions of pruritus, urticaria including acute and chronic cases and atopic dermatitis. I sought to compare IgE levels in cases of pruritus, urticaria and atopic dermatitis and investigate the differences based on the disease. The patients of atopic dermatitis and urticaria showed statistically ($p < 0.05$) higher levels of IgE compared to pruritus. The Multiple allergen simultaneous (MAST) test was positive more in atopic and urticaria patients compared to pruritus group.

KEYWORDS

Atopic dermatitis, Urticaria, Pruritus, IgE and MAST

INTRODUCTION

Immunoglobulin IgE plays an important role in allergic reactions [1]. It is the least abundant Ig iso type and accounts for only 0.05% of the total Ig concentration [2].

IgE levels to specific allergens may be associated with the occurrence or exacerbation of some diseases.[3] IgE levels may be increased to over 1000 times in atopic dermatitis.

The role of IgE [4,5] in dermatologic diseases has been mostly studied in allergic diseases such as atopic dermatitis and urticaria .Although IgE levels have been studied in other skin diseases such as herpes zoster and alopecia areata ,there are few [5]studies addressing IgE levels in conditions like pruritus where patients complain of itching [1,2] with no visible skin lesions.

The skin prick test has been used to evaluate an individual sensitivity to specific allergens. This test cannot be performed in patients with severe skin manifestations or in patients on anti-allergic medications. [1, 2]False negative results occur in individuals with low skin reactivity such as in very young or old patients. False negative results may also be seen in patients with hyper active skin such as in patients with dermographism. [6, 7]

Multiple allergen simultaneous test (MAST) is less invasive and uses the patient's serum. It shows high sensitivity, since it does not have the limitations of the skin prick test. It has been more widely adopted in clinical practice. [8]

The aim of this study is to evaluate the total IgE levels and MAST tests in the three skin diseases namely atopic dermatitis, urticaria and pruritus and compare the differences according to the disease type.

MATERIAL AND METHODS

The prospective study was conducted at Nizam's Institute of Medical Sciences, Hyderabad in compliance with all applicable regulations and good clinical practice guidelines. The study was approved by Institute Ethics Committee. Written informed consents were obtained from patients before the enrollment.

The patients of atopic dermatitis, urticarial and pruritus attending the outpatient clinic of department of dermatology at Nizam's Institute of Medical sciences were assessed for total serum IgE levels, MAST results. The age of patients ranged from 12 to 65 years.

A priori sample size was calculated using G power software with $\alpha = 0.05$, $(1-\beta) = 0.90$, effect size of 0.3 and number of groups three the total sample size was 144, considering the dropout of cases 50 in each group, atopic dermatitis group I, urticaria group II and pruritus group III total of 150 cases were studied.

The following parameters were recorded, age, sex, total IgE levels and MAST test results in all the three groups.

Total serum immunoglobulin E levels (Total IgE) were measured by ADVIA centaur and ADVIA centaur x P systems. The sample serum

was taken was 30 I μ /L. Calibration B used and the sensitivity and assay range was 1.5- 3000 I μ /L.

Because IgE is a mediator of the allergic response, quantitative measurement of serum IgE, when integrated with other clinical indicators can provide useful information. Patients with atopic disease including allergic asthma, allergic rhinitis and atopic dermatitis have moderately elevated serum IgE levels.

After recording the data, the normality of distribution of data was assessed by Kolmogorov-Smirnov test for all the parameters. The continuous data were presented as mean and standard deviation (SD), categorical data as frequency and percentages. The three groups were compared with ANOVA followed by Tukey-Kramer multiple-comparison test. Pearson's Chi-Square test used to compare the positive percentage of immunological tests in all the three groups. P value < 0.05 was considered significant. NCSS version 10 statistical software was used for above calculations. [9]

RESULTS

The age and sex were comparable in all the three groups.[Table 1]

The total IgE levels differed significantly in all the three groups ($p < 0.05$) (Table 1) (Fig 1, 2, 3).The Tukey-Kramer multiple-comparison test showed that the IgE levels in group I (Atopic dermatitis) were significantly different from group III(Pruritus) but not with group II (Urticaria). The MAST test also differed significantly in all the three groups and the Tukey-Kramer multiple-comparison test showed that the positivity of MAST in group I was significantly different from group III but not with group II (Fig 3). The percentage of positivity of IgE > 160 I μ /L and MAST in different groups presented in table 2.

Table 1: The Presentation of different variables in all the groups

Variables	Group I (Atopic dermatitis)	Group II (Urticaria)	Group III (Pruritus)	pValue
Age yrs	27 $\pm$ 6.25	38 $\pm$ 11.24	41 $\pm$ 12.87	0.056
Sex M/F	24/26 (48 %/52 %)	21/29 (42%/58%)	27/23 (46%/54%)	0.060
IgE I μ /L (Mean $\pm$ SD)	333.76 $\pm$ 244.22	300.22 $\pm$ 265.09	206.56 $\pm$ 139.08	0.012*
IgE > 160 I μ /L, M/F	41/9 (82%/18%)	29/21 (58%/42%)	25/25 (50%/50%)	0.000*
MAST M/F	34/16 (68%/32%)	25/25 (50%/50%)	14/36 (72%/28%)	0.001*

Note: '*' Means significant ($p < 0.05$)

Table 2: Percentage of positivity of IgE > 160 I μ /L, and MAST in all three groups.

Variables	Group I (Atopic dermatitis)	Group II (Urticaria)	Group III (Pruritus)	P Value
IgE > 160 I μ /L	82	58	50	0.0025*
MAST	68	50	25	0.0003*

Note: '*' Means significant ($p < 0.05$)

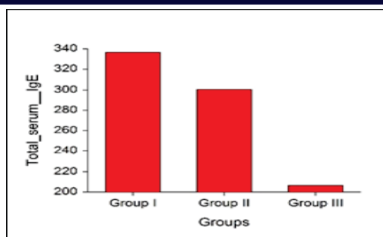


Fig 1: Total IgE Levels in all the three groups.

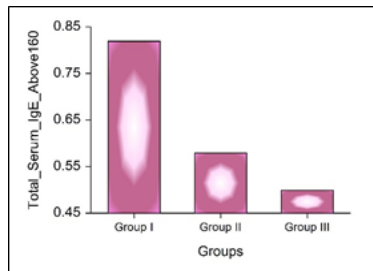


Fig 2: Total IgE Levels > 160 Iu/L in all the three groups.

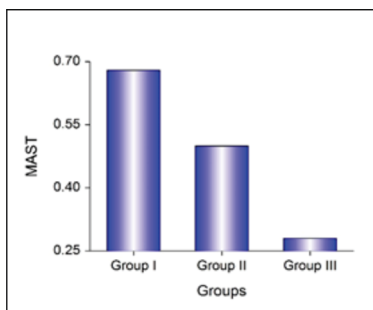


Fig 3 : MAST in all the three groups.

DISCUSSION

The allergic skin diseases atopic dermatitis and urticaria usually mediated by IgE, and has a key role in pathogenesis. Pruritus which causes sensation and leads scratching. All these conditions are associated with immunological reaction. In the present study we compared IgE levels and MAST test in these three clinical conditions.

The mean age of the patients of all the groups: atopic dermatitis, urticaria and pruritus were similar and do not differ statistically ($p > 0.0560$).

There is no statistical difference ($p > 0.060$) in distribution of male and female patients in atopic dermatitis, urticaria and pruritus groups.

My study groups patients with atopic dermatitis showed a statistically significant higher levels of total serum IgE and serum IgE > 160 Iu/L compared to pruritus group and no statistically significance between atopic dermatitis compared to urticaria. These findings were similar to the results of previous studies [1]. The mean total IgE level and serum IgE > 160 Iu/L of patients with urticaria were higher than pruritus group.

The proportion of patients with MAST positivity are again statistically significant in atopic dermatitis compared to pruritus but not significantly high compared to urticaria. Which are similar to the study by Shin JW et al. [2]

The percentage of positive serum IgE > 160 Iu/L was positive 82% in atopic dermatitis, 58% in urticaria and 50% in pruritus patients. MAST positivity was 68 % in atopic dermatitis, 50% in urticaria and 25% in pruritus patients. A study by Shin JW et al [2] reported that MAST positivity 57 % in atopic dermatitis, 37.1% in urticaria and 20.8% in pruritus patients. These tests are highly diagnostic for atopic dermatitis and urticaria compared to pruritus.

LIMITATIONS

IgG plays a key role in the immune response rather than IgE and we have not measured IgG levels. Disease severity in each case could also be different and can affect the IgE levels.

CONCLUSIONS

There were diverse differences in the total and specific serum IgE levels according to diagnostic groups and clinical conditions. Cases of atopic dermatitis and urticaria showed higher levels of IgE than pruritus patients. The Multiple allergen simultaneous (MAST) test positivity is more in atopic and urticaria patients compared pruritus group.

Conflict of Interest: Nil

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