



STUDY OF CORRELATION BETWEEN SKIN PRICK TEST AND TOTAL SERUM IGE IN RESPIRATORY ALLERGY CASES.

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ABSTRACT

BACKGROUND: Allergic disorders of respiratory system are among the most common causes of OPD visits as well as indoor admissions around the globe. A number of epidemiologic studies have shown an association between asthma and allergic rhinitis. Diagnosis of an allergic disease is largely based on medical history, which can be confirmed by means of measurement of antigen-specific IgE levels or skin prick tests. **AIM:** To investigate the relationship between total serum IgE and skin prick test in patients of respiratory system allergy. **OBJECTIVES:-** (1) to study dermal sensitivity by skin prick test and to test blood for Total IgE. (2) to determine the correlation between skin prick tests and Total serum IgE level.

MATERIALS AND METHOD: Total 40 patients were studied with history of respiratory system allergy with 40 controls. Questionnaire was filled with clinical history and examination. Skin prick test was performed and serum level of total IgE was evaluated. Data analysis was done with help of master chart and statistical analysis.

RESULTS: The association of total serum IgE and Absolute eosinophil count came out to be significant statistically ($p=0.015$). 39 patients were *skin prick test* positive. Only 17 patients had *raised IgE level* above normal range which was compared by data analysis by using spearman procedure showed *non-significant* correlation between the two variables among the total subjects. Result of allergen avoidance-53.3% patients of allergy became asymptomatic after avoidance of all relevant positive allergens, 40% shows reduced intensity of symptoms.

INTERPRETATION AND CONCLUSIONS: only 42.5% of patients had increased total IgE level, it means it can be within normal range. Increased total IgE should not be expected in all allergic cases. On the other hand, prick test in our study showed 97.7% positivity. Statistical analysis revealed that correlation between total IgE and Skin Prick Test was *not significant*. For making the diagnosis clinical history is very important to correlate with result of skin prick test and lab investigations. Result of allergen exposure avoidance was fruitful.

KEYWORDS :

INTRODUCTION

A number of epidemiologic studies have shown an association between asthma and allergic rhinitis. In a review of five large studies that included population of children and adults [1], the relevance of asthma ranged from 3.6% to 5% in subject without rhinitis versus 10.8 % to 32% in subject with rhinitis. In a 23 year follow up study in university students [2], asthma developed in 10.5% of subjects with AR, whereas it developed in only 3.6% of subjects without AR [3].

Diagnosis of an allergic disease is largely based on medical history, which can be confirmed by means of measurement of antigen-specific IgE levels or skin prick tests. For evaluation of allergic patients and determination of the allergic disease frequency in communities, total serum IgE measuring and skin prick testing are simple and widely available laboratory tools [4-8]. Triggering of mast cells by IgE is a convincing explanation for events immediately following allergen exposure. [9,10]. Specific IgE-mediated allergic reactivity can easily be tested for by an in vivo skin prick test or by an in vitro enzyme or fluorescence-based immunoassay, commonly called a radioallergosorbent test (RAST) [11]. Allergen-specific IgE determination is widely used in the diagnosis of IgE-mediated atopic diseases, but the relative merits of in vitro measurement of IgE antibody in comparison to in vivo skin tests are still being debated [12,13].

Studies have shown a relationship between allergens and asthma and findings represent a strong association between specific immunoglobulin E antibodies or total IgE and the allergic conditions [14]. This study was planned to investigate

the correlation between total serum IgE levels and skin prick test methods in diagnosing respiratory allergic diseases.

MATERIAL AND METHODS:

We selected 40 patients who were attending our hospital on OPD basis who had respiratory system allergy. A thorough clinical history and relevant clinical examination was performed and history, symptoms and signs of respiratory allergy were specifically focused. We took 40 persons as controls after matching demographic parameters to exclude bias. Dermal sensitivity test was performed. All patients were tested for a panel of 221 allergens. Redness or indurations of more than 3 mm was taken as 3+ positivity (16). Results of dermal test to allergens were compared to their total serum IgE levels.

INCLUSION CRITERIA:-

As per GINA (Global Initiative for Asthma) definition for Asthma. As per ARIA (Allergic Rhinitis and its Impact on Asthma) definition for allergic rhinitis.

EXCLUSION CRITERIA:- Uncooperative, Patients, persons with prior skin disorders or skin reaction like urticaria or dermatographism, HIV & HBsAg reactivity, Patient with acute exacerbations of acute asthma or rhinitis, Co-morbid conditions and bleeding diathesis. Serum IgE levels were estimated in all the subjects taken for the study by ELISA using kits from RADIM diagnostics. The standard protocol as mentioned in the kits was thus followed for quantitation of IgE in IU/ml [15].

STUDY DESIGN: Observational study in epidemiology.

PERIOD OF STUDY: 1 year, from June 2017 to June 2018.

OBSERVATIONS:

Majority (65%) of patients were in middle age group (21-40 yr) and 11 (27.55%) patients are above 40 years. 26 (65%) were male and 14 (35%) female. 70% cases from rural population and 30% from Urban population. So majority of rural population is allergic in our study. 20% patients had more symptoms in Indoor, 32.5% in Outdoor and 47.5% patients had similar symptoms in indoor as well as outdoor. 19(47.5%) patients had more symptoms during day time and 52.5% patients during night time. 72.5% patients had more symptoms during winter season and 27.5% patients had similar symptoms throughout the year. out of 40 patients 70% from rural area and 30 % from urban area.

Table no.1 Distribution of Clinical diagnosis

Diagnosis	Frequency	Percent
Bronchial Asthma	8	20.0
Allergic Rhinitis	15	37.5
BA+AR	17	42.5
Total	40	100.0

Table No 2: Total Number Of positive Skin Prick Test in study patients

S. NO	Group of allergens	No. of test performed	No of positive Reaction	Percentage (%)
1	Pollens	1400	124	8.8%
2	Fungi	600	95	15.8%
3	House Dust mites	120	52	43.3%
4	Inhalants	440	83	18.8%
5	Dander's & Epithelia	320	30	9.3%
6	Insects	400	87	21.7%
7	Foods	5560	430	7.7%
8	Total Allergens	8840	901	10.16%

Above table shows that most common allergen in our study is house dust mites (43.3%), then insects(21.7%), inhalants(18.8%), pollens (8.8%). and Fungi(15.8%). Overall 10.15% patients showing allergy. our study, revealed that house dust mites give largest number of positive reactions (43.3%), followed by insects (21.7%), inhalants (18.8%), Fungi (15.8%) and pollens (8.8%).

Table No. 3 Correlation between Total serum IgE and AEC.

Total Serum IgE(iu/ml)	AEC(per mm ³)		Total cases
	< 500	> 500	
< 300	17	6	23
	42.50%	15.00%	57.50%
>300	6	11	17
	15.00%	27.50%	42.50%
	23	17	40
	57.50%	42.50%	100.00%

Chi-Square = 5.966 p-value= 0.015

AEC-Absolute eosinophil count

Above table shows correlation between IgE and AEC in which we found that 11(27.5%) patients out of 40 having raised both total IgE and AEC . and 17(42.50%) patients have within normal range total IgE level and AEC. And it was found statistically significant.

Table No. 4: Correlation between IgE and Skin Prick Test:

Total IgE	Skin Prick Test		Total
	Negative	Positive	
<300 IU/ml	1	22	23
>300 IU/ml	0	17	17
Total	1	39	40

Chi-square=0.758, P- value 0.384,

Above table shows that 39 patient out 40 were skin prick test positive and out 39 only 17 patients had raised IgE level above normal range. 53.3% patients of allergy became asymptomatic after avoidance of all relevant positive allergens, 40% shows reduced frequency of symptoms. Above table shows no correlation between serum total IgE and skin prick test.

DISCUSSION:

For diagnosis of allergic diseases, the patient's history and physical examination are the most important factors. Total eosinophil count, IgE (total and specific) and skin prick allergy testing are some of the other tests which are useful for further helping in the diagnosis and identifying potentially important environmental allergens. Since increased level of total serum IgE are in favor of atopic diagnosis, some physicians consider it as the first laboratory test and some others try to do more investigations like skin prick test also.

Patients included in our study were divided into three groups: Bronchial Asthma (n=8), allergic rhinitis (n=15); and both bronchial asthma and allergic rhinitis (n=17). It was observed that in our study that majority of patients i.e. 42.5% had both allergic rhinitis and bronchial asthma (**table no.1**)

Total 8840 skin prick test were performed (**table no.2**) 899 (10.5%) were positive reaction of various allergens. Most common allergens are house dust mites (43.3%), then insects (21.7%), inhalants (18.8%) and Fungi (15.8%). Overall 10.16% patients showing dermal sensitivity. our study revealed that house dust mites give largest number of positive reactions (43.3%), followed by insects(21.7%), inhalants(18.8%), Fungi(15.8%) and pollens (8.8%). *Pherwani et al (1985)*[16] (studied at Bombay, 81.25% gave a positive reaction for insects followed by dust 71.9%, fungi 40.6%, pollen 37.5% which differ to our study.

The association of total serum IgE and Absolute eosinophil count came out to be significant statistically (**table no.3**) as level of both can be seen raised or normal in patients simultaneously (0.015) . we found that 39 patient out of 40, were **skin prick test** positive and out of 40, only 17 patients had **raised IgE level** above normal range which was compared by data analysis by using spearman procedure showed **non-significant** correlation between the two variables among the total subjects (**table no.4**). **Result of allergen avoidance:** Interestingly in follow up of the patients we observed that 53.3% patients of allergy became asymptomatic after avoidance of all relevant positive allergens, 40% shows reduced intensity of symptoms.

CONCLUSION:

The dermal sensitivity pattern of allergens showed that the house dust mite was most common allergen, followed by insects, inhalants, and fungi. Total serum IgE is quite variable in allergic patients, in our study we found that only 42.5% of patients had increase in total IgE level, it can be also within normal range. Thus, increased total IgE should not be expected in all allergic cases. On the other hand, prick test in our study showed 97.7% positivity. Statistical analysis revealed that correlation between total IgE and Skin Prick Test was not significant. For making the diagnosis clinical history is very important to correlate with result of skin prick test and lab investigations. Thus, avoiding the relevant allergen can significantly help in better control of allergic rhinitis and bronchial asthma and reduce the frequency of symptoms.

LIMITATIONS

1. Sample size is small.
2. It was a time bound study so cases could not be studied for longer period.
3. Few follow up were not regular so allergen avoidance

could not be assessed well.

4. Due to financial restrictions specific IgE and immunotherapy could not be done.

Conflicts of interest – None.

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