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CHANGES IN SERUM IGE LEVELS BEFORE AND AFTER IMMUNOTHERAPY IN PATIENTS WITH ALLERGIC AIRWAY DISEASES

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ABSTRACT

The present study was aimed to assess the effects of allergen immunotherapy on total IgE in patients with asthma and allergic rhinitis. Allergen immunotherapy involves the repeated administration of specific allergen to patients with IgE mediated conditions in order to induce immunologic tolerance to the offending allergen. Total IgE was evaluate for 100 patients, 54 with allergic asthma (29 males, 25 females) their mean age was (33.28 ± 1.54) years, and 46 with allergic rhinitis (24 males, 22 females) their mean age was (33.46±2.55) years, who attended the allergy specialized center in Baghdad / Al- Russafa from October 2014 to February 2015. The effects of allergen immunotherapy on total IgE were assessed by comparing levels of this immunoglobulin before received immunotherapy and after received for at least six months. The levels of total IgE recorded to be significantly regressed in sera of both groups of asthma and allergic rhinitis patients to reach respectively (216.03 ± 42.41 IU/ml) and (203.98 ± 14.87 IU/ml) after they are (328.78 ± 41.65 IU/ml) and (379.76 ± 62.96 IU/ml) before receiving allergen immunotherapy.

KEYWORDS: asthma, allergic rhinitis, total IgE, allergen immunotherapy.

INTRODUCTION

Hypersensitivity is an immune disorder that occurs when the immune system reacts to non-infection and normally innocuous environmental antigens.[1,2] Allergic diseases are considered the epidemics of the twentieth century estimated to affect more than 30% of the

population in industrialized countries with a still increasing incidence.[3] Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, it is a major health problem throughout the world, affecting an estimated more than 300 million people worldwide, of these 10-15% have severe asthma.[4] Allergic rhinitis is inflammatory disorder of the nasal mucosa, which is triggered by an allergen-IgE mast cell immediate reaction.[5] Allergic and hypersensitivity reactions are the results of immune response to allergens, this response is mediated by IgE antibody specific to the allergen. Mast cells, basophiles are activated after IgE bindings, starting a serious of cellular and molecular events that results in the clinical manifestation of allergic diseases.[6] IgE determination is a valuble in the diagnosis of allergic diseases such as asthma, allergic rhinitis, urticaria, atopic dermatitis and some parasitic infections leads to increased IgE levels.[7] Allergen immunotherapy was introduced by Noon more than 100 years ago and is the only disease modifying treatment for allergic individuals.[8] It is an effective treatment modality for allergic disease when properly implemented standard allergen extract have been shown to be beneficial in the treatment of allergic rhinitis and asthma.[9] It reduces the symptoms of allergic diseases by inducing tolerance to specific allergens, a reduction of allergen-induced symptoms should occur within months, this benefit should be long-lasting if not permanent.[10]

MATERIAL AND METHODS

The study was carried out at Specialized Centre for Allergy in Baghdad / Al- Russafa from October 2014 to February 2015, it is included 100 patients (53 males, 47 females) with allergic airway diseases their ages range between 20-45 years who were classified into two groups: 54 with allergic asthma (54%) and 46 with allergic rhinitis (46%). Those patients diagnosed by the consultant medical staff at the clinic, patients who were smokers, pregnant, and history or current parasitic infections were excluded. Five milliliters of venous blood were collected from each participant for estimation of serum total IgE by ELISA technique using a kit supplied by Dr. Foke (Germany), the value over 100 IU/ml was considered high.

Statistical analysis

Statistical analysis was performed using the SPSS version 22 software package (SPSS, Inc. Chicago) categorical variables. Results were expressed as mean ± SE. Least significant difference, LSD was used to significant comparison between means.

RESULTS

Table (1) showed the mean age ± SE of studied groups.

Table 1: The mean levels of ages of studied groups.

Studied groups	No.	Age (years)		
		Min	Max	Mean ± SE
Allergic asthma	54	20.00	45.00	33.28±1.54
Allergic rhinitis	46	22.00	43.00	33.46±2.55
NS				

In this study high increase in total IgE levels in patients before immunotherapy in asthma (X= 328.78 ± 41.65 IU/ml) and allergic rhinitis (X= 379.76 ± 62.96 IU/ml), the results also indicated that there was a significant (P<0.05) difference in mean serum total IgE between the gender and increased in male than in female Table (2).

Table 2: The mean±SE of T.IgE between studied groups before Immunotherapy.

Groups	No.	T.IgE IU/ml	Male		Female		LSD
			No.	T.IgE IU/ml	No.	T.IgE IU/ml	
Allergic asthma	54	328.78 ± 41.65	29	320.24 ±28.61	25	298.19 ±25.98	62.79*
Allergic rhinitis	46	379.76 ± 62.96	24	354.14 ±52.34	22	214.25 ±15.12	53.58*
Total	100		53		47		
*(P<0.05)							

On the other hand the levels of total IgE in allergic patients who received immunotherapy have been tabulated in Table (3) which indicate that there was high significant decreased in total IgE levels in patients after allergen immunotherapy, in asthma it was (X= 216.03 ± 42.41 IU/ml), while it was (X= 203.98 ± 14.87 IU/ml) in allergic rhinitis patients.

Table 1-3: The mean±SE of T.IgE between studied groups after Immunotherapy.

Groups	No.	T.IgE IU/ml	Male		Female		LSD
			No.	T.IgE IU/ml	No.	T.IgE IU/ml	
Allergic asthma	54	216.03 ± 42.41	29	210.14 ±15.76	25	188.27 ±13.80	44.23*
Allergic rhinitis	46	203.98 ± 14.87	24	220.24 ±16.24	22	160.25 ±12.34	58.37*
Total	100		53		47		
*(P<0.05)							

DISCUSSION

Allergic rhinitis and asthma have similar immunological mechanisms and it is possible that the factor contributing to the increase in total IgE levels in asthma are involved in the same process in allergic rhinitis.[11,12]

Allergen immunotherapy involves the repeated administration of gradually increasing quantities of allergen products to patients with IgE mediated conditions until a dose is reached that is effective in reducing disease severity from natural exposure.[13]

The present study showed a good response to immunotherapy with significantly lowered allergic symptoms. Regarding immunotherapy group, the levels of IgE recorded to be decreased. These finding are similar to the results of Marappan (2008) who showed that total IgE levels revealed significant reduction in asthmatic and allergic rhinitis group.[14] Zenku *et al.* (2014) in their study reported that after applying immunotherapy, the total IgE values are sitting to all age groups.[15] Study down by Sugiono *et al*. 2013 showed that administration of immunotherapy in asthmatic patients could decrease the total IgE level and improve clinical symptom.[16,17] Gomez *et al.* (2015) observed a decrease in IgE levels and an increase of IgG4 in the group of allergic patients that completed a year of allergen specific immunotherapy.[18]

The down regulation of the allergic response in a patient undergoing allergen immunotherapy is attributed in part to increases in IgG4 and a decrease in IgE. This alteration is affiliated with significant reductions in the numbers of infiltrating T cells, basophils, eosinophils and neutrophils. IgG4 antibodies also block allergen-induced IgE-dependent histamine released by basophils and able to compete with IgE for allergen and suppress mast cell and basophil activation and inhibit IgE-facilitated presentation of allergen-IgE complexes to dendritic cells and/or B cells.[9]

In this study, we verified that total IgE was different in both the gender higher in males than in females. It has been observed that males with asthma present higher total IgE levels compared with female patients.[19] In addition, adolescents and adult males with bronchial asthma exhibit higher serum levels of total IgE in response to environmental allergens.[20] Couto *et al.* (2014) demonstrated that total IgE levels are higher in young adult males than in females suffering from allergic rhinitis. The IgE mediated asthma and allergic rhinitis different in both genders may be due to physiological and differences and/or occupational factor.[21]

CONCLUSIONS

This study confirms that the allergen immunotherapy is an effective measure in the treatment of allergic airway diseases.

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