

Co-existence of Asthma with Allergic Rhinitis and Common Allergens in Al Ain, UAE: A Cross-Sectional Study

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Abstract

Objective: To describe and quantify, co-existence of Allergic Rhinitis (along with the serum levels of IgE and Eosinophils) in patients with Asthma and specifically to describe common allergens found in patients with Asthma and Allergic Rhinitis in Al Ain, UAE.

Method: A descriptive study was conducted from June 2014 to July 2015 at Al Ain Hospital, UAE, a Tertiary care health facility in the private sector. Patients (>12 years) diagnosed as having Asthma and or Allergic Rhinitis (as per clinical evaluation based on Global Initiative for Asthma (GINA) and Allergic Rhinitis and its Impact on Asthma (ARIA) Guidelines) were subjected to skin allergy test, serum IgE levels and Eosinophils count were obtained after informed consent.

Results: Seventy one percent patients were found to have co existing Asthma and Allergic Rhinitis. Serum IgE levels were significantly associated with a positive skin allergy test while serum Eosinophil counts were not. Dust mite, Cat fur, Cockroach, Russian thistle, Bermuda grass and Date palm were the commonest allergens detected.

Conclusion: These results suggest high prevalence of co-existing Asthma and Allergic Rhinitis in Al Ain, UAE. Since the main fraction of local population lives in this region of UAE, this data may represent UAE overall. Patient education about prevention from causal allergens may play an important role in management.

Keywords: Asthma, allergic rhinitis, allergen.

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Introduction

Asthma is a chronic inflammatory disorder of the airways. In susceptible individuals this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and coughing, especially at night or early morning. These episodes are usually associated with variable airflow obstruction, which is often reversible, either sponta-

neously or with treatment. The inflammation also causes an associated increase in existing bronchial hyper-responsiveness to various stimuli¹.

Rhinitis is an inflammation of the nasal mucosa characterized by nasal discharge, blockage, sneezing and itching, with two or more symptoms occurring for more than 1 hour on most days. It can be further classified as intermittent (symptoms occurring on <4 days out of 7 or for <4 weeks per year) or persistent (symptoms occurring on at least 4 days out of 7 or for >4 weeks per year)².

Asthma and Allergic Rhinitis commonly coexist^{3,4}. However, not only prevalence may vary from country to country but causative allergens may also vary. Many reasons have been postulated for their co-existence e.g. both have underlying type I hypersen-

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sitivity and involve a number of similar mediators⁵. It has also been shown that physiological processes communicate via cell signaling from nasal mucosa to bronchial epithelium and vice versa⁶⁻⁸.

Studies, both longitudinal populations based and at molecular level have suggested that Allergic Rhinitis may also play an independent risk factor for Asthma⁹⁻¹¹.

There are number of studies published internationally about the co-existence of these conditions but data in UAE and regional countries is limited. It has also been proven that unless both conditions are identified and treated simultaneously, the treatment effect may be suboptimal¹²⁻¹⁴. In this study we have also described common allergens found in patients diagnosed to have Asthma with or without Allergic Rhinitis. Objective of this study was to describe and quantify co-existence of Allergic Rhinitis in patients with Asthma and specifically to describe common allergens found in patients with Asthma and Allergic Rhinitis in Al Ain, UAE.

Serum levels of IgE and Eosinophils are also considered as majority of studies have used these to quantify Allergy and Asthma. However, the role of these markers remains variable. There is a lack of available literature on the coexistence of Allergic Rhinitis in patients of Asthma, globally and specifically in the Middle Eastern region, hence, this study was conducted at Al Ain Hospital, UAE.

Patients and Methods

A descriptive study was conducted from June 2014 to July 2015 at Al Ain Hospital, UAE, which is a Tertiary care health facility in private sector. Ethical Review and Research Committee of Al Ain Khaleej Hospital approved the study. In this period, patients were randomly selected to take part in the study. The sample size was calculated for the proportion. As the motive of this study was to address the lack of data on pattern and risk factors the variance was taken to be 0.05. The sample size was calculated with, Wald's method for the binomial distribution and confidence level was set to > 95%¹⁷. The sample size was calculated to be >380. This

study had a sample size of 397. Number of patients with Asthma or Allergic rhinitis; alone or co existing diagnosis were recorded. List of positive allergens, IgE levels and serum Eosinophils count were recorded for each subject and tabulated according to age groups from 12 to 30 years, 31 to 50 years and 51 years onwards.

Patients with diagnosis of Asthma and or Allergic Rhinitis (as per clinical evaluation based on current guidelines) were subjected to skin allergy test and serum IgE levels and Eosinophils count after informed consent. Inclusion criteria were female and male patients aged 12 years and above with a clinical diagnosis of Asthma and or Allergic Rhinitis. Patients showing signs of active skin disease or use of antihistamines in preceding 3 days were excluded from the study.

The data feeding and analysis was on computer package SPSS version 14.0 and R statistical package, which is a global standard in analysis of data, and was used to calculate the sample size. The results were obtained in numbers and percentages.

Results

We studied 397 patients, males 129 (32%) and females 268 (68%). Overall 283 (71%) patients had combined Asthma and Allergic Rhinitis. In age group 12 to 30 years, 74% had combined Asthma and Allergic Rhinitis while the percentage in age groups to 31 to 50 years and 51 years or above was 75% and 61% respectively, Fig. 1-2.

Results of positive and negative skin allergy test in cases of Asthma, Allergic rhinitis and coexisting Asthma and Allergic Rhinitis are shown in (Table 1-2).

Most common allergens found in age groups 12 to 30 years, 31 to 50 years and 50 years or above are shown in Fig. 1. Serum IgE and Eosinophils level with regards to positive and negative skin allergy test are shown in (Table 3).

Discussion

This study is first of its kind done in UAE as per our knowledge and describes coexistence of Asthma and Allergic Rhinitis. Shirina A and colleagues¹⁵ and Lisha JJ et al¹⁶ did cross-sectional surveys in UAE in school children and university students respectively regarding coexistence of Asthma and Allergic Rhinitis in 2008. However, their surveys were not conducted in a clinical setting and were, mainly, based on a questionnaire. In their survey the prevalence of coexisting Asthma and Allergic Rhinitis was surprisingly low.

As per international published data, the coexistence of the two conditions is very high and ranges from 70% to 80%^{17,18}. Our study has shown results that match with international data. Given the heterogeneous environmental factors in this part of the world, a high probability of coexistence of these medical conditions which share pathophysiological basis is more likely.

As per international data, house dust mite, pollens, animal dander are most common allergens implicated in Asthma and Allergic Rhinitis^{19,20}. However, in UAE we have no such published data in the past. We used an allergen panel for skin allergy testing comprising mainly the locally prevalent elements i.e. dust mite, common animals, birds and plants found in the region.

Another aspect of our study was serum markers of allergy i.e. serum IgE levels and serum eosinophilia. These allergy markers have variable role in Asthma and Allergic Rhinitis²¹⁻²³. In our study serum IgE has a more positive correlation with a positive skin allergy test in patients with Asthma with or without Allergic Rhinitis than serum eosinophil levels. Serum IgE levels and Eosinophilia were also used to quantify Asthma and Allergic Rhinitis because these markers have been classically used to quantify these two occurrences^{24,25}.

As this is a cross-sectional study, following limitations can be expected from it; the pattern of allergens may vary from year to year based on environmental conditions and patients of Al Ain hospital

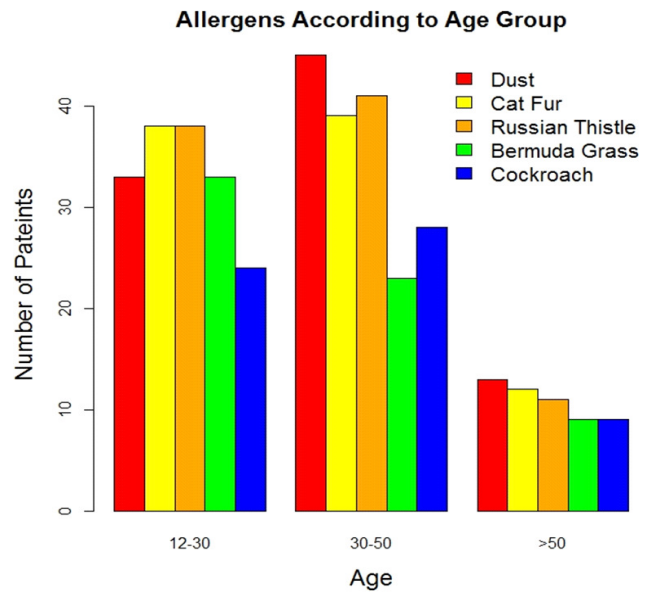


Fig 1. Shows Common Allergen and their distribution among age groups

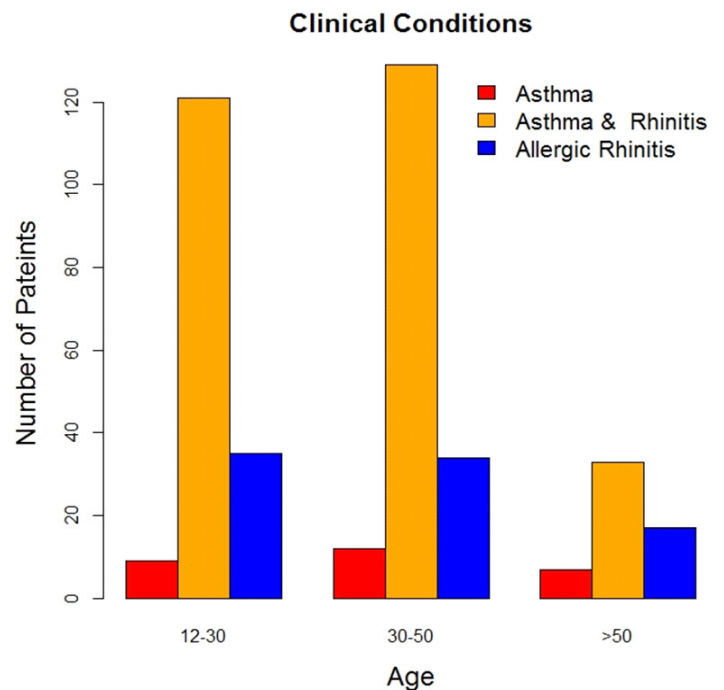


Fig 2: Shows Distribution of Clinical Conditions

Table 1. Results of positive and negative skin allergy test in cases of Asthma, Allergic Rhinitis and coexisting Asthma and Allergic Rhinitis

	Clinical Condition			Allergens				
	Asthma	Asthma & Allergic Rhinitis	Allergic Rhinitis	Dust	Cat fur	Russian Thistle	Bermuda grass	Cockroach
12 -30	9(5.39%)	121(72.45%)	35(20.95%)	33(19.76%)	38(22.75%)	38(22.75%)	33(19.76%)	25(14.97%)
31-50	12(7.18%)	129(73.30%)	34(19.31%)	45(25.565)	39(22.15%)	41(23.29%)	23(13.06%)	28(15.90%)
>50	7(4.19%)	33(61.11%)	17(3.48%)	13(24.07%)	12(22.22%)	11(20.37%)	9(16.65%)	9(16.65%)

Table 2. Positive and negative skin allergy test in patients with Asthma, Asthma α^2 Allergic Rhinitis and Allergic Rhinitis alone.

Clinical condition	Skin allergy test		α^2 Statistic	p-Value
	Positive	Negative		
Asthma (28)	19 (67%)	9 (33%)	6.88	0.032
Asthma and Allergic Rhinitis (283)	240 (84.8%)	43 (15%)		
Allergic Rhinitis (86)	76 (88.3%)	10 (11.6%)		

Table 3. Positive and negative skin allergy tests in patients with IgE and Eosinophils

Skin Allergy Test	IgE		Eosinophils	
	Raised	Normal	Raised	Normal
Positive Skin test (335)	204 (60.8%)	131 (39.1%)	83 (24.7%)	252 (75.2%)
Negative Skin test (62)	29 (46.7%)	33 (53.2%)	16 (25.8%)	46 (74.1%)

may or may not be true representatives of entire UAE population. Hence, further large-scale studies with meta analysis may be required. Our study forms the basis for the need of large-scale multicenter studies given the high prevalence of the two conditions and the high probability of coexistence as been shown in our study.

Conclusion

The prevalence of coexisting Asthma and Allergic Rhinitis appears to be high in UAE in all studied age groups. A properly selected skin allergy-testing panel not only helps detecting the allergens in a given patient but also plays an impor-

tant role in patient education and effective management.

Conflict of interest

Authors have no conflict of interests and no grant/ funding from any organization.

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