Research Article

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Aeroallergens sensitization pattern at Taif city: Saudi

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ABSTRACT

Background: Taif city is an agricultural area with high altitude. Sensitization to aeroallergens (AA) in Taif city is not identified.

Methods: This study is a retrospective evaluation of a specific IgE (sIgE) blood results to AA of 149 patients. The study group was chosen from all age groups referred to AL BORG laboratory complaining of allergic diseases with expected sensitization to AA in Taif city, starting from January up to December in the year 2013.

Results: The commonest AA distributions in Taif city were to indoor AA followed by pollens. The indoor AA is dermatophagoides pteronyssinus 26%, dermatophagoides farina 25%, american cockroach 22% and cat epithelia/hair 21% respectively. While, the pollens are dessert palm pollens 18%, timothy grass 18%, rye grass 17%, bermuda grass 15%, ambrosia 15%, acacia 15%.

Conclusions: Indoor followed by pollen AAs are the commonest sensitization pattern at Taif city. This pattern is compatible with worldwide literature except for high percentage of desert palm pollens which is an amazing result that needs a further evaluation.

Keywords: Aeroallergens, Inhalant allergens, Inhalants, Allergy, House dust mites, Pollen, Cockroach, Mold

INTRODUCTION

Allergen is an antigen which can provoke type-I hypersensitivity in which there is an overproduction of immunoglobulin type E (IgE) against this triggering allergen. Source of allergens are food and inhalants mainly. Inhalant allergens are like house dust mites, molds, animals and pollens.¹

IgE is an antibody that land over the surface of mast cells in a process called sensitization. With the re-exposure to the same allergen, mast cells explode and release a lot of inflammatory mediators that can start the allergic cascade which is associated with the common allergic disorders.²

Allergic disorders are like: allergic rhinosinusitis, allergic conjunctivitis, asthma, atopic dermatitis, urticaria and angioedema, food allergy and drug allergy.

Unfortunately, many patients with allergies are underdiagnosed. While, others are overdiagnosed and take a lot of unnecessary medications for other diagnosis. Additionally, many patients diagnose allergies by themselves. Hence, performing allergy testing is a crucial step for establishing the triggering factors of these allergic disorders.³

It's an important practice to connect between the positive allergy test results and the appearance of allergic symptoms immediately after the exposure to allergen. If both are positive this is called an allergy and avoidance advice should be given to patients. However, if allergy test is positive while no clinical support this is called atopy with no need to give an avoidance advice.⁴

Specific IgE tests (sIgE) to diagnose AA are in vivo skin prick test (SPT) and in vitro blood tests. In vivo SPT is the more sensitive than RAST in detecting positive AA

results.⁵ Wide AA range of allergens are available in SPT kits from different companies like: mites, animals, mold, cockroach and pollens. It's better to advice patients to avoid antihistamine before SPT because it will suppress the test. Positive and negative controls are crucial to guide the test results. Severe reactions to SPT are rare.⁶

In vitro sIgE allergy blood testing's are immunoassays. Radioallergosorbent tests (RAST) is a type of immunoassays which is common in measuring SIgEs against allergens. This test uses the radioactive activities of allergens to detect its positivity. Another blood test is Enzyme-linked immunosorbent assays (ELISA) which depend on enzymes linked to allergens to measure its positivity. In the property of the prope

Taif is a high altitude city around 1,879 meter over the sea level, placed at the western region of Saudi Arabia. Its weather is characterized by a cold temperature, low humidity and a lot of rains most of the year. It's an agricultural area with a lot of trees, grasses and weeds.

Currently, choosing appropriate AA panel for diagnosing allergic patients at Taif city is incompetent. Up to our knowledge, no previous studies were published about the prevalence of AA sensitization pattern in Taif city.

METHODS

The study sample was chosen with full range of ages who visited AL BORG laboratory in Taif city complaining of allergic diseases with the doubt of AA sensitization in the period of January 2013 up to December 2013. SIgE to most prevalent AA of 149 patients were considered retrospectively.

AA in the test are, American cockroach, sheep wool, feather mix, cat epithelia/hair, dermatophagoides pteronyssinus, dermatophagoides farina, alfalfa, mesquite, rye grass, desert palm pollens, white goosefoot, bermuda grass, alternaria alternata, timothy grass, mugwort-leaved, ambrosia, plantain and acacia.

The handled device was the RIDA® Allergy Screen of R-Biopharm to give an idea about the level of allergies after taking the blood from the patients. This monitor is an effective and really cost effective apparatus for the diagnostic confirmation of allergies. It's a test procedure for the antibody detection by an immunoblot with 18 AA each. The test was done by digital images in RIDA® X-Screen or RIDA® maXi-Screen. SIgE results were evaluated between zero and six points according to the severity of allergies.

RESULTS

More than half of the patients 58.4% with suspected history of allergy seen in Taif city have positive sensitization to AA (Table 1). The top four AA in Taif city were indoor allergens mainly followed by pollens.

However, the least common AA in Taif is mold (alternaria alternatata) as 8%. Feather mix and sheep's wool are almost negligible (Table 2).

Table 1: Percentage of positive sIgE to common AA results.

SIgE to AA	Number	0/0
Positive	87	58.4
Negative	62	41.6
Total	149	100%

Table 2: Results of sIgE to common AA in Taif city.

AA common name	AA Laten name	Number of positive sIgE results	% of positive sIgE results	
House dust mite	Dermatophagoides pteronyssinus	39	26	
House dust mite	Dermatophagoides farina	37	25	
American Cockroach	Periplaneta americana	33	22	
Cat epithelia/hair	Felis catus	31	21	
Dessert palm pollens	Phoenix dactyllifera	27	18	
Timothy grass	Phleum pretense	27	18	
Rye Grass	Lolium perenne	25	17	
Bermuda Grass	Cynodon dactylon	22	15	
Ragweed	Ambrosia	23	15	
Acacia	Samanea saman	22	15	
Alfalfa	Medicago sativa	19	13	
Msequite	Prosopis	20	13	
White goosefoot	Chenopodium Album	19	13	
Mugwort	Artemisia vulgaris	19	13	
Plantain	Plantagolanccolata	18	12	
	Alternaria tenius	12	8	
Sheep's wool	Ovis aries	0	0	

The indoor AA is dermatophagoides pteronyssinus 26%, dermatophagoides farina 25%, american cockroach 22% and cat epithelia/hair 21%. The pollens are dessert palm pollens 18%, timothy grass 18%, rye grass 17%, bermuda grass 15%, ambrosia 15%, acacia 15%, alfalfa 13%, msequite 13%, white goosefoot 13%, mugwort 13% and plantain 12%.

Mild severity class 2 was the commonest to mites and some pollens like: timothy and acacia, while American cockroach is the commonest in class 1 severity. However, moderate severity classes 4 and 5 were mainly to pollens and cat, class 6 was pollen only like: desert palm pollen, timothy grass, Bermuda and ambrosia (Table 3).

Table 3: Severity Class of positive AA in Taif.

AA	Severity class of Positive AA					
	1	2	3	4	5	6
HDM						
(Dermatophagoides	4	17	12	3	1	
pteronyssinus)						
HDM						
(Dermatophagoides	4	20	10	2		1
farina)						
American Cockroach	14	9	10	1		
Cat epithelia/hair	2	6	12	6	1	2
Timothy grass	3	13	5	1		5
Dessert palm pollens	3	9	5	3	1	5
Rye grass	3	9	6	2	1	3
Ragweed	3	8	6	1	2	4
Msequite	4	9	4	2	2	2
Acacia	3	10	4	2	1	2
Plantain	5	6	4	2	1	1
Alfalfa	2	6	5	2	2	1
Bermuda grass	4	4	4	2		4
White goosefoot	3	4	4	2	1	2
Mugwort-leaved	3	6	2	3	1	
Alternaria alternate	6	3	3			
Sheep's wool	1					
Total	67	139	98	34	14	32

DISCUSSION

The top AA sensitizations in Taif city were to indoor allergens (mites, American cockroach and cat) followed by pollens (Table 2). Indoor AA sensitization pattern in Taif city is compatible with the national and international studies despite of the different environments, while pollens are expected in Taif environment because it's an agricultural area with high altitude and a lot of rains. 8.9

Indoor AA sensitization is a highly prevalent problem because people spend most of the day inside their homes. In spite of the high prevalence of house dust mites only a minority of patients use mite covers. ¹⁰ Additionally, Cat allergies prevalence is very high specially in children with near contact, however it still fount even without close interaction. ¹¹ Cockroach allergy is very common and cause a complex immune response in the mucosal linings of the airways witch is both innate and adaptive. ALBORG laboratory AA list have only American cockroach, other cockroach types like: German and Oriental cockroaches have to be added to this list. ¹²

Pollen distribution pattern in Taif city is predictable especially in asthmatic children with seasonal symptoms except the high prevalence of desert palm pollens 18%. ¹³ This pattern may be explained by the recent introduction of palm trees in Taif streets, however this is unlikely because palm pollens are heavy and will not cause

airborne sensitization easily. Cross reactivity with other trees is the logic explanation (Table 2). 14

It's a logic approach to think about pollens and cats with sever clinical allergies in Taif. In comparison, American cockroach is of low severity in spite of its high prevalence. This means that prevalence and severity are not related to each other's (Table 3).

Least common AA in Taif is mold, however this result is misleading because indoor fungi are a common cause of respiratory allergies. Additionally, ALBORG laboratory sIgE AA list contain only one fungus (*Alternaria alternatata*) which is not sufficient. These lists have to add the famous mold families like: *aspergillus*, *candida*, *cladosporium*, *penicillium and fusarium*. If this happen the pattern for mold prevalence in Taif city may change (Table 2). ¹⁵

CONCLUSION

Indoor allergens (mites, American cockroach and cat) followed by pollens are the commonest AA sensitization pattern in Taif city. This pattern is compatible with worldwide literature except for high percentage of desert palm pollens which is an amazing result that needs an further evaluation.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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