Common allergens causes allergic rhinitis and bronchial asthma among hypersensitive patients in kirkuk province

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Abstract

Background: Type I hypersensitivity can express itself for example, as allergic rhinitis; bronchial asthma .The prevalence of allergy is affected by age, sex, race and seasonal variation. The aim: The present study was under taken to identify the most common allergen in which patients are sensitive to, and to find the relationship between age, sex and allergic rhinitis and bronchial asthma. Methodology: Retrospective study was conducted at Allergy and Asthma Centre in Kirkuk. Information from dossiers has been taken as sex, age, diagnosis state (allergic rhinitis and bronchial asthma) and types of allergens in which the patients were sensitive to them. Results: The prevalence of type I hypersensitivity was (40.5%) in male and (59.5%) in females. Perennial type was higher than seasonal. The types of hypersensitivity in this research were less common among (6- 15) years age group than age groups (16-30) and >30 years. The results showed that incidence of seasonal allergic rhinitis and bronchial asthma was less common than perennial. House dust (HD) and house dust mite (HDM) most common causative allergens in perennial allergic rhinitis while in the seasonal allergic rhinitis was house dust and grass. Conclusion: Incidence of allergic rhinitis and bronchial asthma among age group (>30) is more common. Perennial type is more common than seasonal type among hypersensitive patients. Hypersensitivity to house dust is prominent in kirkuk province.

Introduction

Immune responses to antigens may sometimes be excessive causing harm or inconvenience to the host. This said to be hypersensitive to these responses, and the responses are referred to as hypersensitivity reactions or just hypersensitivity. Production of immunoglobulin (Ig)E is central to the pathophysiology of pediatric allergic diseases such as allergic rhinitis, atopic dermatitis, and atopic asthma (1). After IgE binds to high-affinity mast cell surface FcεI receptors and is cross-linked by antigen, mast cell activation occurs and sets in motion a cascade of events resulting in the clinical manifestations of allergic disease (2).

Allergic disease is common; about 15-20% of the population experience some form of allergy and this imposes a substantial physical and economic burden on the individual and society. Some patients have an occasional mild allergic reaction, some react with severe or fatal anaphylactic shock. Multiple factors contribute to the overall risk of developing allergy, as; atopy, age (commoner in children than adults), gender (commoner in males than females), family size (less common in large families), smoking, high levels of antigen exposure and dietary factors, but the decline in family size and smoking habits partially account for the rising prevalence (3). Allergic reactions to antigens which enter the systemic circulation, through an insect bite / sting or intravenous administration of an antibiotic, can produce life threading anaphylactic reactions. More commonly antigens are inhaled or ingested, usually triggering more local reactions in the upper or lower respiratory tract (rhinitis or asthma) or in the mouth or upper gastro, intestinal tract (4).

The route of allergen exposure inducing a tolerant state may be the respiratory tract. Intranasal administration of pollen allergen has been shown to be effective in controlling allergic rhinitis and is associated with elevated IL-10 levels in nasal lavage obtained during subsequent exposure to natural pollen (5).

The tendency to develop type 1 hypersensitivity (atopy) is genetically inherited. Air pollutants such as sulphur dioxide and car exhaust fumes appear to be responsible for an increased incidence of asthma and hay fever. Passive cigarette smoking correlates with a higher incidence of asthma in children. These air pollutants are believed to predispose to allergies by increasing the permeability of the mucosal epithelium. There by facilitating the entry of allergens in to the tissue (3). Studies have shown that allergens are very important sensitizing agents in patients with asthma. Respiratory disorders such as asthma and allergic rhinitis are common in the United Arab Emirates (6).

This study aimed to identify the common type of allergens that cause bronchial asthma and allergic rhinitis, in relation to age and sex in kirkuk province.

Methodology

This retrospective study was conducted in Allergy and Asthma Centre in Kirkuk province from the period 11-2003 to 3-2004.

The study included 2221 dossiers of patients who attended the centre. Information from the dossiers has been taken as gender and age of the patients. They divided according to there age in to three groups: 6-15 years, 16-30years, and more than 30years. And the diagnosis of disease state was recorded as, allergic rhinitis either seasonal or perennial, bronchial asthma either seasonal or perennial or both. The types of allergens included house dust, house dust mite, mould type 1 mould type2, mould type3, mould type4, mite, mug, platiane, grass, bermuda, dermato, chenapoda, candida, and tree.

Results

A total of 2221 persons (900 male and 1321 female) were enrolled in this study. Most of them were perennial in duration particularly among female. Also, the type of hypersensitivity was distributed according to allergic rhinitis, bronchial asthma, and both. Also, the results showed that the incidence of seasonal allergic rhinitis, bronchial asthma and both of them was less common than perennial (Tables 1).Lower incidence of hypersensitivity was observed among age group (6- 15) while higher incidence observed among age group > 30 (Table 2).

Tables (3) showed that house dust (HD) and house dust mite (HDM) were most common causative allergens in perennial allergic rhinitis while in the seasonal allergic rhinitis were house dust and grass. There is no difference in the occurrence of hypersensitivity due to house dust in both sexes. against house dust in seasonal bronchial asthma and allergic rhinitis plus bronchial asthma in same patients is less than others (tables 4,5).

Table (6) states the percentage of patients sensitive to number of allergen distributed according to durational type.

Table (1): Distribution of hypersensitive patients according to type of duration

Disease	Total	Type of duration					
		Seasonal No.(%)		Total No.(%)	Perennial No.(%)		Total No.(%)
		Male	Female		Male (%)	Female (%)	
Allergic rhinitis	1145	165 (45.9)	194 (54)	359 (31.4)	257 (32.7)	529 (67.3)	786 (68.6)
Bronchial Asthma	840	39 (48.8)	41 (51.2)	80 (9.5)	341 (44.9)	419 (55.1)	760 (90.50)
Both	236	27 (44.3)	34 (56.7)	61 (25.8)	71 (40.6)	104 (59.4)	175 (74.2)
Total	2221	231 (46.2)	269 (53.8)	500 (22.5)	669 (38.9)	1052 (61.1)	1721 (77.5)

Table (2): Distribution of hypersensitiv patiens among age group

Disease	Total	Age Groups No. (%)		
		6-15	16- 30	>30
Allergic rhinitis	1145	62 (5.4)	450(39.3)	633 (55.3)
Bronchial Asthma	840	207 (24.6)	239 (28.5)	394 (46.9)
Both	236	19 (8.5)	92 (39)	125 (53)
Total	2221	288 (13)	781 (35.1)	1152 (51.9)

Table (3): Distribution of hypersensitive patients acording to type of duration

Disease	Total	Type of duration					
		Seasonal No.(%)		Total No.(%)	Perennial No.(%)		Total No.(%)
		Male	Female		Male (%)	Female (%)	
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Table (3): Percentage and distribution of allergens according to type of disease and duration of disease.

Type of disease	Type of duration	No. of patients (%)	Allergens* No. (%)														
			HD	HDM	M1	M2	M3	M4	Mite	Mug	PL	G	Ber	Dr	Ch	Cand	T
allergic rhinitis	perennial	786 (35.38)	460 (26.72)	183 (10.63)	72 (4.18)	72 (4.18)	96 (5.58)	18 (1.05)	44 (2.56)	12 (0.69)	12 (0.69)	57 (3.31)	20 (1.16)	20 (1.16)	20 (1.16)	90 (5.23)	7 (0.40)
	seasonal	359 (16.16)	104 (20.8)	44 (8.8)	26 (3.2)	16 (5.2)	28 (5.6)	2 (0.4)	7 (1.4)	34 (6.8)	20 (4)	102 (20.4)	84 (16.8)	38 (7.6)	46 (9.2)	10 (2)	4 (0.8)
Bronchial asthma	perennial	760 (34.21)	431 (56.71)	226 (29.73)	110 (14.47)	101 (13.28)	97 (12.76)	28 (3.68)	44 (5.78)	8 (1.05)	1 (0.13)	47 (6.18)	9 (1.18)	9 (1.18)	3 (0.39)	78 (10.26)	3 (0.39)
	seasonal	80 (3.60)	22 (27.5)	20 (25)	12 (15)	12 (15)	7 (8.75)	1 (1.25)	4 (5)	3 (3.75)	4 (5)	17 (21.25)	17 (21.25)	4 (5)	7 (8.75)	4 (5)	---
Both	perennial	175 (7.87)	111 (63.42)	52 (29.71)	26 (14.85)	12 (6.85)	22 (12.57)	3 (1.71)	9 (5.14)	1 (o.57)	2 (1.14)	16 (9.14)	7 (4)	8 (4.75)	3 (1.71)	18 (10.28)	---
	seasonal	61 (2.74)	20 (32.78)	7 (11.47)	7 (11.47)	4 (6.55)	3 (4.91)	1 (1.63)	----	10 (16.39)	6 (9.83)	17 (27.86)	12 (19.67)	4 (6.55)	9 (14.75)	1 (1.63)	---

* HD: House dust, HDM: House dust mite, M1-4: Mould type 1-4, PL: Platiane, G: Grass Ber: Bermuda, Dr: Dermato, Ch: Chenapoda, Can: Candida, T: Tree.

Table (4): Distribution of hypersensitive patients due to house dust allergen according to sex and duration type.

Sex	No. of patient (%)	Type of duration No. (%)	
		Perennial	Seasonal
Female	645 (29.04)	569 (25.61)	76 (3.42)
Male	503 (22.64)	433 (19.49)	70 (3.15)
Total	1148 (51.68)	1002 (45.11)	146 (6.57)

Table (5): Distribution of hypersensitive patients due to house dust allergen according to type of duration.

Disease	Total	Type of duration No. (%)	
		Perennial	Seasonal
Allergic rhinitis	564 (25.43)	460 (20.75)	104 (4.68)
Bronchial asthma	453 (20.39)	431 (19.40)	22 (0.99)
Both	131 (5.89)	111 (4.99)	20 (0.90)
Total	1148 (51.73)	1002 (45.15)	146 (6.57)

Table (6): Type of duration according to allergens number in hypersensitive patients.

Durational type	Number of patients (%)	one Allergen (%)	two Allergen (%)	three Allergen (%)
Perennial	1721 (77.48)	1054 (47.46)	443 (19.94)	224 (10.08)
Seasonal	500 (22.51)	259 (11.66)	155 (6.98)	86 (3.87)

Discussion

The data of 2221 patients in the present study collected from dossiers in the allergy and asthma centre in Kirkuk. Type I hypersensitivity distributed commonly into two diseases, allergic rhinitis and bronchial asthma in this centre. The results showed that allergic rhinitis was most common (51.5%) than bronchial asthma (37.8%).

The occurrence of allergic rhinitis and bronchial asthma in the same patient is less frequent (10.6%). Having into consideration the above mentioned cases, type I hypersensitivity can be divided into two durational types, seasonal (22.5%) and perennial (77.48%) according to sex. The rates are highest among females (59.5%) than males (40.5%). The results also showed that less occurrence of allergic rhinitis and allergic rhinitis plus bronchial asthma was among age group (6-15) years in comparison with the other age groups, on the other hand there was no difference in the incidence of bronchial asthma among the three age groups. The incidence of seasonal allergic rhinitis in both sexes is close but variation can be seen in perennial allergic rhinitis between females and males. House dust allergen was the most common cause of hypersensitivity in the three cases in both durational types. While grass was common among patients with seasonal duration type and house dust mite was common among perennial. Two studies found that house dust mites are one of the most common sources of world wide allergen (7,8).

Seasonal type was less common among patients with allergic rhinitis, bronchial asthma and both. There is no variation between the rates of hypersensitivity against house dust between males and females. In both durational types, seasonal and perennial, the house dust allergen in the three cases was the most common causative allergen; this may be related to our environment which is dusty

A significant body of literature has been generated regarding the role of common household allergen**s**; particularly dust mite, cockroach, and pet allergen**s**. In a recent review article by Platts-Mills et al., a clear dose-response relation between dust mite exposure and sensitization was supported by studies of different communities and climates (9). A high level of aeroallergen exposure was initially demonstrated, using the Poole England birth cohort, to be related to the development of sensitization and subsequent asthma, with a statistically significant, although unadjusted relative risk of 4.8 for asthma at age 11 years associated with high household levels of dust mite allergen at 1–2 years of age (10). For many years it has been suggested that allergens derived from the house dust mite played a major role in the pathogenesis of asthma, eczema and some cases of allergic rhinitis. Recently, house dust mite allergens have been purified and specific immunoassays developed with which exposure to house dust mites and their allergens can be more easily determined. Using these tools, epidemiological studies have provided confirmatory evidence that not only is house dust mite exposure associated with the majority of cases of asthma in children and young adults, but that it is causally related to the development of asthma (11).

Immediate skin test responses to Bermuda grass were the most prevalent among children with allergic rhinitis and control subjects, whereas responses to the mold, Altenaria alternata, were the most prevalent among asthmatics. Skin test responses for crude house dust, Dermatophagoides farinae, and cat had low prevalences in all groups. By logistic regression, Alternaria was the only allergen independently associated with increased risk for asthma at both ages 6 and 11. Allergic rhinitis showed independent association with sensitization to Bermuda grass and mulberry tree pollen at age 11 but did not show an independent relation to any single allergen at age 6. Logistic regression further revealed that persistent asthma (diagnosed before age 6) was independently associated with Alternaria skin tests at both ages 6 and 11, whereas new asthma (diagnosed after age 6) was associated with Alternaria skin tests at age 6 but not at age 11. Alternaria is the major allergen associated with the development of asthma in children raised in a semiarid environment and that skin test responses at age

6 are more closely linked to asthma than those at age 11 (12).

It has been demonstrated that the percentage of patient's sensitivity against one allergen was higher (47.46%) than the sensitivity to two allergens or more than two.

The frequency of indoor and outdoor allergens in state of Qatar, based on skin prick test study which showed the dominance of house dust mites, pollen, and grasses.

Conclusion

Incidence of allergic rhinitis and bronchial asthma was more common among age group (>30). Perennial type is more than seasonal type among hypersensitive patients. Hypersensitivity to house dust is prominent in kirkuk province.

References

1. National Heart, Lung, and Blood Institute. Guidelines for the diagnosis and management of asthma. NIH Asthma Expert Panel report. Bethesda, MD: National Heart, Lung, and Blood Institute, 1991. (DHHS publication no. 91-3042).
2. Siraganian RP. Biochemical events in basophil or mast cell activation and mediator release. In: Middleton E Jr, Reed CE, Ellis EF, et al, eds. Allergy: principles and practice. 5th ed. St. Louis, MO: C V Mosby, Inc, 1998:204–27.
3. Johnson CC, Ownby DR, Zoratti EM, Alford SH, Williams LK, and Joseph CL. Environmental epidemiology of pediatric asthma and allergy. Epidemiol. Rev. 2002: 24: 154-175.
4. Helen Chapel , Masel Haeney, Siraj Misbah and NeilSnowden, Anaphylaxis and allergy, Essential of clinical immunology. 4 Black well science P. 77-109.
5. Gaglani B, Borish L, Bartelson BL, et al. Nasal immunotherapy in weed-induced allergic rhinitis. Ann. Allergy Asthma Immunol. 1997;**79**:259–65.
6. Bener A, Safa W, Abdulhalik S, Lestringant GG. An analysis of skin prick test reactions in asthmatics in a hot climate and desert environment. Allerg. Immunol. (Paris). 2002:34(8): 281-286.
7. Tovey ER, Chapman MD, Platts — Mills TAE . Mite Faeces as a major source of house dust allergins. Nature 1984; 3 89:592-3
8. Malainual N, Vichyanond P, Phan-Urai P. House dust mite Fauna in Thailand. Clin EXP Allergy 1995;25:554-60
9. Platts-Mills TA, Rakes G, Heymann PW. The relevance of allergen exposure to the development of asthma in childhood. J. Allergy Clin. Immunol. 2000;105:S503–8.
10. Sporik R, Holgate ST, Platts-Mills TA, et al. Exposure to house-dust mite allergen (Der p I) and the development of asthma in childhood: a prospective study. N. Engl. J. Med. 1990;323:502–7.
11. Sporik R, and Platts-Mills TA. E. Epidemiology of dust-mite-related disease. Experimental and Applied Acarology. 1992:16(1-2): 141-151.
12. Weiland SK, Mundt KA, Ruckmann A, Keil U. Self-reported wheezing and allergic rhinitis in children and traffic density on street of residence. Ann. Epidemiol. 1994: 4(3): 243-247.
13. Sattar HA, Mobayed H, al-Mohammed AA, Ibrahim AS, Jufairi AA, Balamurugan P, Mary VP, Bener A.The pattern of indoor and outdoor respiratory allergens in asthmatic adult patients in a humid and desert newly developed country. Allerg. Immunol. (Paris). 2003: 35(8): 300-305.

أكثر المستضدات المسببة لالتهاب الأنف الارجي والربو القصبي لدى مرضى فرط الحساسية في محافظة كركوك

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الملخص

إن فرط الحساسية من النوع الأول ممكن أن يسبب التهاب الأنف الارجي والربو القصبي. يعتمد انتشار الحساسية في الأشخاص على عدة عوامل منها العمر والجنس والرس والتغاير الموسمي. تهدف الدراسة الحالية على تحديد أهم المستضدات التي تسبب الحساسية في محافظة كركوك وإيجاد علاقة بين عوامل العمر والجنس ونوع الحساسية (دائمي أم موسمي) وبين التهاب الأنف الارجي والربو القصبي.

باستخدام الدراسة الأسترجاعية تم جمع المعلومات من سجلات مركز الحساسية والربو في مدينة كركوك وشملت العمر والجنس والتشخيص الطبي لنوع المرض ونوع المستضد الذي يسبب الحساسية.

شكل الذكور ٤٠،٥% من مجمل ٢٢٢١ من مرضى فرط الحساسية، بينما شكل الإناث ٥٩،٥%. وكان نوع الحساسية الدائمة أكثر شيوعا من النوع الموسمي. وان فرط الحساسية لدى الفئات العمرية ٦-١٥ سنة اقل منه في الفئات العمرية ١٦-٣٠ و أكثر من ٣٠ سنة.

فرط الحساسية بسبب غبار المنزل وعث غبار المنزل أكثر المستضدات المسببة لالتهاب الأنف الارجي من النوع الدائمي في حين كان غبار المنزل والعشب أكثر المستضدات المسببة للمرض من النوع الموسمي. تبين من خلال الدراسة الحالية بان التهاب الأنف الارجي والربو القصبي أكثر شيوعا بين الفئات العمرية التي أعمارهم أكثر من ٣٠ سنة ومن النوع الدائمي وان أكثر المستضدات المسببة للحساسية في محافظة كركوك هي غبار المنزل.