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ORIGINAL ARTICLE

Mite hypersensitivity in patients with rhinitis and rhinosinusitis living in a tropical environment

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Storage mites

Abstract
Purpose: Rhinitis and rhinosinusitis are major concerns in public health. Mites are important aetiological agents in the tropics. The present study investigated the in vivo response to mite allergens in patients with rhinitis and rhinosinusitis.
Methods: All patients with presumptive nasal allergy were included. Skin tests were done with inhalants and mite extracts. Patients were classified as allergic or non-allergic according to skin tests and history.
Results: Out of 229 patients, 175 (76.4%) showed positive skin tests. Allergic patients showed positivity to mites in 97.1% of cases, 51.4% to dog dander; 40.5% to cat dander; 36.5% to German cockroach; 22.8% to moulds; and 21.1% to grass pollens. *Dermatophagoides farinae* induced responses in 90.8% of patients, *D. pteronyssinus* in 90.1%, *Blomia tropicalis* in 74.8%, *Glycyphagus domesticus* in 62.2%, *Chortoglyphus arcuatus* in 58.2%, *Acarus siro* in 46.2%, *Lepidoglyphus destructor* in 35.4%, and *Tyrophagus putrescentiae* in 35.0%. Higher correlations were found between skin test diameters induced by mites from the same family.
Conclusions: Sensitisation to inhalant allergens is present in 76% of allergy clinics' patients with rhinitis or rhinosinusitis. Our results confirm previous observations showing that mites constitute the most important cause of respiratory allergy in tropical settings and suggest that mite allergen cross-reactivity is responsible for the positivity of skin tests to mites not present in the patient's environment since the species Glycyphagus, Chortoglyphus, Acarus, Lepidoglyphus and Tyrophagus have not been found in Caracas house dust.

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Introduction

Allergic rhinitis is the most common form of non-infectious rhinitis, affecting between 10% and 30% of all adults and as many as 40% of children, with a tendency to continued prevalence increase.[1] According to the ISAAC study, the prevalence of rhinitis and rhinoconjunctivitis in 13–14-year-old children has recently increased worldwide.[2] Rhinosinusitis affects about 31 million subjects in the United States per year, and allergic and non-allergic rhinitis are the most common underlying causes.[3] In Venezuela, the prevalence of current symptoms of rhinoconjunctivitis in 6–7-year-old children is 20.4% whereas in children aged 13–14 years it is 24.9%.[4]

In Latin America the prevalence of allergic rhinitis in children is high. ISAAC Phase Three Study reported 37.6% prevalence with a 0.8% yearly increase during the last few years.[5] Under-reporting and decreased patient recognition of the disease have also been noticed.[6] A high prevalence of sensitisation to mite allergens has been observed in patients with respiratory diseases living in various Latin American cities.[7] In a previous study, we reported sensitisation rates of 97.2% for *Dermatophagoides pteronyssinus* and 91.6% for *Blomia tropicalis* in Venezuelan patients with rhinitis and/or asthma attending two allergy clinics in Caracas, Venezuela.[8]

The purpose of this study was to investigate the in vivo allergic response to eight mite allergenic extracts in patients with persistent rhinitis and rhinosinusitis living in a South American tropical city.

Materials and methods

Patients

This was a prospective study where all patients with symptoms suggestive of rhinitis or rhinosinusitis referred to our allergy clinics between August 2010 and September 2011 were included after written informed consent was obtained. The protocol was approved by the Institutional Review Board of the participating institution. The clinical data on age, gender, previous diagnostic and surgical procedures, and comorbidities were obtained by direct patient questioning. The diagnosis of persistent rhinitis was done according to ARIA Guidelines,[9] whereas the diagnosis of chronic rhinosinusitis was established according to the EAACI Position Paper on Rhinosinusitis and Nasal Polyps (EPOs).[10] Patients were classified into allergic or non-allergic according to the presence or absence of at least one positive skin test to tested inhalant allergens.

Skin tests

Immediate hypersensitivity skin tests were done by the prick method. Inhalant allergenic extracts were obtained from ALK Abelló (Madrid, Spain), while mite extracts were provided by Laboratorios Diater (Buenos Aires, Argentina). The following allergen extracts were tested: Dog dander (10 HEP), Cat dander (10 HEP, Feld 1 60 μg/ml), *Blatella germanica* (1:100, w/v), Mould mix (1:20, w/v), Bermuda grass pollen (30 HEP, containing Cyn d 1 30 μg/ml), Weed pollen mix (30 HEP), Feathers (1:100, w/v), Tree pollen mix (1:20, w/v), *Dermatophagoides farinae* (50,000 HEP/ml) *Dermatophagoides pteronyssinus* (50.000 HEP/ml), *Blomia tropicalis* (50.000 HEP/ml), *Glycyphagus domesticus* (50.000 PNU/ml), *Chortoglyphus arcuatus* (50.000 PNU/ml), *Acarus siro* (50.000 PNU/ml). *Lepidoglyphus destructor* (50.000 PNU/ml), and *Tyrophagus putrescentiae* (50.000 PNU/ml). Reading was performed after 20 min of application and wheal sizes 3 mm higher than negative control were considered as positive reactions. Glycerosaline solution and histamine phosphate 1 mg/ml were employed as negative and positive controls, respectively.

Statistical analysis

Differences in percentages between the groups were compared by Fisher's exact test. Correlations were determined using the Pearson's test. All p values of less than 0.05 were considered statistically significant.

Results

Demographic and clinical features

Two hundred and twenty-nine patients were included in this study, which included 153 male and 76 female patients, with mean age 25.5 ± 17.9 years (range 5–76 years). One hundred and seventy-five (76.4%) were allergic, as demonstrated by means of skin test positivity to one or more inhalant allergens, and 54 (23.5%) were not allergic. Mean age was significantly higher in non-allergic patients (40.3 ± 20.7 years versus 27.9 ± 15.9 years, $p = 0.0001$). No statistically significant differences were observed for gender (Table 1). Age distribution of allergic and non-allergic patients is presented in Table 2.

Rhinosinusitis was more frequent in non-allergic patients, and rhinitis was more prevalent in allergic subjects, although these differences were not statistically significant (Table 1). The comorbidities observed in allergic and non-allergic patients are shown in Table 3. Eighty-two allergic patients (46.8%) and 13 non-allergic patients (24.0%) had comorbidities ($p = 0.004$), with asthma, conjunctivitis, atopic dermatitis, NSAID hypersensitivity, and chronic spontaneous urticaria/angio-oedema being the most frequent.

CT scans of paranasal sinuses were performed in 29 allergic and 14 non-allergic patients. Sinusitis, septum deviation and polyposis were the most common abnormalities present in both groups of patients. Previous history of surgical treatment was present in 34 allergic (45 procedures) and 12 non-allergic patients (28 procedures), including functional endoscopic nasal surgery, adenoidectomy, tonsillectomy and orthodontic surgery.

Skin tests

The results of prick tests to inhalant allergens are shown in Fig. 1. A large proportion of allergic patients (97.1%) responded to one or more mite extracts. About half of them showed responses to dog dander extract, followed by cat