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ORIGINAL ARTICLE

Prevalence of oral allergy syndrome in children with allergic diseases

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Abstract
Introduction: The oral allergy syndrome (OAS) is a particular type of food allergy rarely explored in the paediatric population that is already considered an adult problem.
Objective: Identify the prevalence of OAS, symptoms and pollen species associated with its presence in children affected by allergic diseases.
Methods: A cross-sectional study was conducted. Consecutive sampling included children from 6 to 14 years who needed allergy treatment for the first time. A structured questionnaire was carried out to collect demographic and clinical data and history of OAS. Besides sensitisation to various allergens, the skin prick-by-prick test was performed to corroborate sensitisation to food related to OAS. Prevalence of OAS and its association with pollens was established following the covariate adjusted logistic regression.
Results: 267 subjects were included. Overall prevalence of OAS was 8.9% (95%CI 6.1–13.1%). Prevalence of OAS for allergic rhinitis and asthma were 8.8% and 9.1%, respectively. In patients sensitised to pollen, the prevalence ranged from 9.6% to 12.2% depending on the type of pollen. 62.5% of children with OAS were sensitive to pineapple. After adjusting for gender and family history of atopic disease, trees from the *Quercus* species showed an association with OAS (OR = 2.7, 95%CI 1.2–6.2).
Conclusions: OAS is not uncommon in our environment. Pineapple, a typical fruit from the region, was the main food related. *Quercus* sp., but not birch nor olive, was the pollen associated with this syndrome.

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Introduction

Food allergy is the result of an immune response directed against certain antigens found in food.[1] Its prevalence in children has been estimated to range from 4.8% to 6.0%.[2,3]

Recently, a group of patients who exhibit symptoms after consumption of food and whose skin prick tests are positive has gained notoriety.[4] The oral allergy syndrome (OAS) or pollen-food syndrome (PFS) refers to a hypersensitivity reaction mediated by immunoglobulin IgE that is directed against food. Such reaction is triggered by prior sensitisation to inhaled allergens coming from plants.[5] This syndrome is characterised by symptoms that are usually limited to the mouth (palate or lips itching, throbbing pain and swelling of lips, tongue, palate and throat, as well as a sensation of tightness in the throat),[6] and sometimes is accompanied by extra-oral manifestations (rash, nasal or otic itching, runny nose and itchy eyes).[7]

OAS has rarely been explored in the paediatric population, since it is considered primarily an adult problem.[8] In the USA, the prevalence in children has been estimated to be 5.0%.[9] More recently, in Australia it was almost 17%,[10] while in some European countries it was higher than 20%.[11,12] In Latin America there are no data related to OAS in children.

Our study aimed to determine the prevalence of oral allergy syndrome within a sample of children with allergic diseases and, identify foods that are frequently associated with its symptoms and pollen species related to its occurrence.

Methods and patients

Ethics

The parents signed a written informed consent for their children to participate in the study; another one for the skin prick test; and, if necessary, one more for the skin prick-by-prick tests. The Research and Ethics Committee of the hospital approved this study.

Design and population

A cross-sectional study was conducted to analyse a sample that included 267 children older than six years old and under 15 years old who needed allergy treatment for the first time. Children with asthma, allergic rhinitis or atopic dermatitis were considered, as well as those with allergies to foods or drugs or hives. Children were recruited consecutively from July to December 2014.

Skin testing

Parents of the children were instructed to stop providing their children with drugs that could interfere with the interpretation of results, especially antihistamines, at least one week before performing the allergy skin tests to their children.

Allergen sensitisation was established by testing a battery of multiple glycerinated allergens common in our geographical area (house dust mites, cockroach mix, dog and cat epithelia, feathers, grass pollen, weeds and trees and fungal spores). Histamine and glycerinated solution were used as positive and negative controls respectively. The allergens were applied on the back of each child using a multiple applicator (Multitest®) and after 15 min the test results were interpreted following international recommendations.[13]

The skin prick-by-prick test[14] was performed to corroborate sensitisation to food related to OAS. The interpretation of the results also followed international recommendations.

Definitions

For purposes of this study, OAS was the occurrence of clinical manifestations in the oral cavity (oral pruritus, hoarseness, swelling of lips, tongue, pharynx or larynx) associated with the consumption of certain fruits, vegetables or spices[15] within 30 min after eating the offending food, as well as the positive skin prick test to that food. PFS was the association between OAS and sensitisation to pollens.

Statistical analysis

To determine the OAS prevalence, its frequency and respective 95% confidence intervals (95%CI) were calculated. The qualitative variables were represented as percentages, while both the mean and standard deviation were calculated for the quantitative variables. The Chi square test was used to compare qualitative variables, whereas the Fisher's exact test was used when necessary. To identify the associated pollens (independent variables) with OAS (dependent variable), *odds ratios (OR) and their respective 95%CI were calculated* using the multivariate logistic regression model adjusted for gender and family history of atopy. Any value of $p < 0.05$ was considered statistically significant. The IBM SPSS software version 20.0 for Windows (Armonk, NY, USA) was used to process data.

Results

Regarding the population analysed, 55.8% were men (149/267), while the mean age was 9.2 ± 2.5 years (see Table 1). Over 90% of children had allergic rhinitis with or without asthma. Atopic dermatitis and food or drug allergy were less than 5%. According to the family history of atopic disease, allergic rhinitis and asthma, in that order, were the most frequent alterations in the father, mother and siblings of the children.

The clinical manifestations most frequently associated with OAS were as follows, oral tingling, oral pruritus and swelling of lips fewer than 15%, dysphonia was the main extra-oral symptom followed by nasal itching. One child exhibited systemic symptoms (rash) (see Table 2).

In children with OAS, two years was the median age for the onset of oral symptoms and, the median evolution time for asthma and allergic rhinitis were three years and four years, respectively.

The prevalence of OAS was 24/267 children (8.9%; 95%CI 6.1–13.1%), while for children with allergic rhinitis was 8.8% and 9.1% for asthma. In children sensitised to any type of pollen the frequency of OAS was 9.6%, while 3.7% ($p = 0.485$) for those sensitised to other allergens. When

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