Rhinitis and its Association With Asthma in Patients Under 14 Years of Age Treated in Allergy Departments in Spain

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Abstract

Background: Allergic rhinitis is the most frequent chronic allergic disease in children, and may be an important risk factor for the subsequent development of asthma.

Objective: To describe the characteristics of patients younger than 14 years of age presenting with rhinitis and the possible association with asthma.

Methods: We carried out a prospective, observational, descriptive, cross-sectional epidemiologic study (Alergológica 2005) of 917 patients under the age of 14 consulting for the first time in allergy departments in Spain.

Results: Rhinitis was diagnosed in 42.5% of the children. The association between asthma and rhinitis was significantly higher in children than in adults (44.9% vs 35.5%; P<.05). Time from onset of rhinitis was significantly associated with the development of asthma (2.97 vs 2.06 years; P<.0001). Allergy was the most frequent cause of rhinitis in children with and without asthma. Allergy to epithelia and fungi was more frequent in children with rhinitis and asthma than in children with rhinitis alone. We found no differences in the frequency of treatment with immunotherapy between children with and without asthma.

Conclusion: Rhinitis was frequently associated with asthma in children consulting for the first time at allergy departments. Time since onset of rhinitis and sensitivity to epithelia and fungi were associated with the development of asthma.

Key words: Allergic rhinitis in children. Rhinitis and asthma in pediatric patients.
Introduction

The ARIA (Allergic Rhinitis and its Impact on Asthma) document [1] indicates that allergic rhinitis is the commonest chronic allergic disease in children and that it is frequently associated with other allergic disorders.

According to recently published data from phase III of the International Study of Asthma and Allergies in Childhood (ISAAC) [2] (data collected from adolescents and parents using a self-administered questionnaire), the prevalence of allergic rhinitis in Spain—15.5% in adolescents aged 13-14 years and 8.2% in children aged 6-7 years—is similar to that of the other countries included in the study. The different analyses performed in ISAAC revealed a trend toward increasing prevalence of allergic rhinitis in Spain and other countries [3-6].

With the aim of collecting data on the characteristics of patients consulting in allergy departments, the Spanish Society of Allergy and Clinical Immunology (SEIAC) designed an epidemiologic study (Alergológica 92) that was carried out in Spain in 1992 [7]. This study showed rhinitis to be the most frequently diagnosed disease in allergy departments. However, no specific analysis was made of data on the pediatric population included. In 2005, a second study, Alergológica 2005, was carried out using the same methodology. The study population included 4991 subjects, of whom 917 (18.37%) were under the age of 14. Each researcher included 15 patients of any age of patients consulting in allergy departments, the Spanish Society of Allergy and Clinical Immunology (SEIAC) designed an epidemiologic study (Alergológica 92) that was carried out in Spain in 1992 [7]. This study showed rhinitis to be the most frequently diagnosed disease in allergy departments. However, no specific analysis was made of data on the pediatric population included. In 2005, a second study, Alergológica 2005, was carried out using the same methodology. The study population included 4991 subjects, of whom 917 (18.37%) were under the age of 14. The present article analyzes the data obtained from patients aged under 14 years who were diagnosed with rhinitis and the association with subsequent development of asthma.

Methods

Alergológica 2005 was a descriptive, observational, cross-sectional study. The methodology has been described elsewhere [8]. Data were collected prospectively throughout Spain by 332 allergists of whom only 30 worked in pediatric allergy units. Both researchers in general allergy units and those in pediatric units included patients under the age of 14. Each researcher included 15 patients of any age consulting for the first time for allergy-related conditions. Consecutive cases were selected from patients occupying the first place on each researcher’s list of daily consultations over a randomly assigned time period. Informed consent was obtained for all patients. Cases were included in 2 waves: March-June 2005 and September-December 2005.

Statistical Analysis

Prevalence and the remaining qualitative variables were analyzed by calculating the relative frequencies (%) and 95% confidence intervals (CI). Quantitative variables were described using the mean (SD), median, and other statistical measures. To compare differences between percentages of qualitative variables, 95% CIs of the difference in percentages were calculated or the Fisher exact test was used. Average values were compared using the t test or analysis of variance (Kruskal-Wallis test) [8].

The results for specific variables were compared with those obtained in the sample from patients with rhinitis over the age of 14 included in the Alergológica 2005 study.

Results

Of the 917 patients under the age of 14 included in the study, rhinitis was diagnosed in 390 (42.5%). The characteristics of the study population and patients with rhinitis are shown in Table 1.

Skin tests were performed in 95% of the children with rhinitis and serum determination of specific immunoglobulin (Ig) E in 47%. Simple spirometry was performed in 31% of patients and a bronchodilator test in 9%. In 44.9% of cases (175 patients), rhinitis was associated with asthma. This association was significantly higher (P<0.05) than the 35.5% found in patients aged over 14 years. A significant difference
in time since onset of rhinitis was found between children with and without asthma (2.97 vs 2.06 y, respectively) \((P=0.0001)\) irrespective of the age group analyzed (<6, 6-10, and 11-14 y). No significant association was found between presence of asthma in children with rhinitis and other variables such as gender (56.3% of males vs 57.6%, with and without asthma), mean age (9.27 vs 9.36 y, with and without asthma), or age group (<6 y, 13.7% vs 15.3%, with and without asthma; 6-10 y, 43.4% vs 38.6%, with and without asthma; 11-14 y, 42.9% vs 46%, with and without asthma).

Allergy was the most common cause of rhinitis (82%) both in children with and without asthma (85.7% and 79.1%, respectively). Sensitization to animal epithelia and fungi was more frequent in patients who presented with rhinitis and asthma than in those presenting with rhinitis only (Table 2). All children (100%) sensitized to fungi were sensitized to Alternaria.

Immunotherapy was always prescribed subcutaneously and no differences were observed in frequency of treatment with immunotherapy between children with and children without asthma (23% vs 22%).

### Discussion

In *Alergológica 2005*, rhinitis was the most frequently diagnosed condition in patients under the age of 14 (42.5%) and, in most cases (82%), it was caused by allergy. In a high percentage of cases, rhinitis was associated with asthma (44.9%). Time since onset and sensitization to epithelia and fungi were greater in patients with asthma.

The percentage of rhinitis among children is slightly lower than that detected in the total study population (52%) [9]. Most patients diagnosed with rhinitis were over the age of 6, and the prevalence of rhinitis by age group increased progressively with age: 18% (<6 years), 47% (6-10 years), and 66% (11-14 years). These findings are consistent with those of other studies [2,10].

Asthma can affect 21%-40% of patients with allergic rhinitis [11-13]. Rhinitis has been reported to be a risk factor for the development of asthma both in atopic and in nonatopic subjects [14-16]. Of note, almost half of the children with rhinitis in Alergológica 2005 had asthma (44.9%). Phase III of the ISAAC study [2] showed that 30% of 13 to 14-year-olds with rhinoconjunctivitis had asthma, as did 35% of 6 to 7-year-olds. This difference in the association between rhinitis and asthma in Alergológica 2005 and the ISAAC study may be because the diagnosis was made by specialists in allergology and using specific tests, whereas in the ISAAC study, a survey was performed in the general population.

The association between asthma and rhinitis was significantly higher in children than in adults (44.9% vs 35.5%; \(P<0.05\)), with no differences between age groups among the children. Children were more likely to develop asthma the longer the time since onset of rhinitis. The Spanish ONEAIR study [17], which analyzed the coexistence of rhinitis in adult asthmatic patients, found that most patients with asthma (89.5%) also had rhinitis and that they had been suffering from rhinitis significantly longer than from asthma. The 2008 ARIA guidelines [1] and those previously issued in 2001 [18] recommend performing spirometry in patients with allergic rhinitis, as asthma can be diagnosed in over 30% of patients with allergic rhinitis and no previous history of obstructive bronchial disease [19]. In Alergológica 2005, spirometry was performed in 31% and a bronchodilator test in 9% of patients under the age of 14 with rhinitis; therefore, in most cases, the diagnosis of asthma was based exclusively on symptoms suggestive of asthma with no use of respiratory function tests. We must remember that some children, because of their age, were not capable of performing spirometry adequately (14.6% of those with rhinitis were below 6 y).

If lung function tests—and even bronchial hyperreactivity tests—were routinely performed in children with allergic rhinitis, then patients with asthma and those at greatest risk of developing asthma could be detected early [20].

Sensitization to animal epithelia and fungi was significantly more frequent in patients who presented with rhinitis and asthma than in those presenting with rhinitis only. All children sensitized to fungi were sensitized to Alternaria.
In a previous study, sensitization to Alternaria was associated with coexistence of rhinitis and asthma [21]. According to the ARIA guidelines [1], subcutaneous and sublingual immunotherapy receives the highest recommendation (grade A), based on evidence or tests in the treatment of allergic rhinitis in children and adults. This category is shared with other treatments such as topical corticosteroids and antihistamines. As a result, it is surprising that subcutaneous specific immunotherapy was prescribed by allergists in so few children with allergic rhinitis and in the same proportion in those with and without associated asthma.

In conclusion, allergic rhinitis is the most frequently diagnosed allergic disease in patients under the age of 14 consulting for the first time at Spanish allergology departments. Almost half of the children with rhinitis (44.9%) suffer from asthma. The likelihood of developing asthma is related to the longer time since onset of rhinitis. Consequently, an asthma workup should be included in the periodic follow-up of patients with allergic rhinitis.

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