

Short communication

High incidence of sensitization to ornamental plants in allergic rhinitis

Background: A few indoor plants have been described as potential allergens, in single case reports of allergic rhinitis. There is no data evaluating the prevalence of allergic sensitization to these plants.

Aim: The relationship between owning indoor ornamental plants with the risk to be sensitized has been evaluated in atopic rhinitis.

Methods: A group of 59 patients with allergic rhinitis were submitted to skin prick tests (SPT) using both the leaf of their own plant and commercial extracts of the most frequent airborne allergens. A control group of 15 healthy subjects was tested with the same allergens.

Results: While none subject from the control group developed a significant SPT to any of the tested plants, 78% of allergic rhinitis had positive SPT to at least one plant, the most frequent sensitization being *Ficus benjamina*, yucca, ivy and palm tree.

Conclusion: In allergic rhinitis, indoor plants should be considered as potential allergens.

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Sensitization to ornamental plants have been described in occupational settings, such as plant keepers (1, 2). In 1985, Axelsson et al. described for the first time *Ficus benjamina* (weeping fig), as a potential inhaled allergen (3). In the last 20 years, there was an increased use of ornamental plants in public places, houses and work places. Most people are exposed to indoor plants. Nowadays, about 10–40% of the western population is suffering from allergic rhinitis (4, 5).

In this study, we evaluated the risk to be sensitized to ornamental plants in patients with allergic rhinitis exposed to plants at home.

Material and methods

Patients

A population of 59 persistent rhinitis [31 female and 28 male, mean age 35 years (range 13–66)], was evaluated. Each subject was exposed to indoor decorative plants in their own home.

Skin testing

A skin prick test (SPT) was performed for the most common pneumallergens: *Dermatophagoides pteronyssinus* (DPT), cat, dog, *Aspergillus*, *Cladosporium*, *Penicillium*, *Alternaria*, cockroach, trees and grass pollens (using extracts from Stallergenes Laboratory, France). At the same time, an SPT was obtained with their own plants, through a freshly gathered leaf. The wheal responses were measured after 15 min. Negative and positive controls were done

with glycerol solution and histamine (10 mg/ml), respectively. A wheal diameter larger than 4 mm was defined positive (6).

A control group of 15 patients with no symptoms of allergy went through the same standard panel of SPT to airborne allergen as well as to the five most involved plants: *Ficus benjamina*, yucca, ivy, palm tree and geranium.

Specific IgE and evaluation of allergens avoidance

Sera from six patients were tested for *Ficus benjamina*-specific IgE antibodies by the radioallergosorbent test (RAST) (Pharmacia R, Uppsala, Sweden) (level of significance = 0.35 PRU/ml). In four patients specifically sensitized to indoor plants, the clinical benefit of allergen avoidance was evaluated both by their symptoms and their need in antiallergic treatment.

Statistics

Independent groups of numerical data were compared by the Fisher test (two groups). All the statistical analysis were performed using Statistica (Statsoft, Tulsa, OK, USA).

Results

In addition to rhinitis, most of the patients had other allergic symptoms: intermittent asthma (22/59, 37%), conjunctivitis (19/59, 32%) and dermatitis (7/59, 12%). Among the 59 patients, 46 (78%) were allergic to at least one ornamental plant. None of the 15 control subjects presented a reaction to these plants. So, the 'rhinitis

Table 1. Results of SPT to common pneumallergens (PA) and to indoor plants (IP) in 59 patients with allergic rhinitis

+ to PA and + to IP, $n = 38$ (64%)
+ to PA and – to IP, $n = 13$ (22%)
– to PA and + to IP, $n = 8$ (14%)

group' was significantly more allergic to ornamental plants than the 'control group' ($P < 10^{-6}$). Most patients (38/59, 64%) with a positive SPT to at least one common pneumallergen, reacted positively to one or more, of their indoor plant (Table 1). There were 13 patients (22%) sensitized to the common allergens but not to the plants, while eight (13%) were positive for plants only. Subjects sensitized to common pneumallergen were significantly more often allergic to indoor plants ($P < 10^{-6}$). *Ficus benjamina* and yucca were the most frequent plants involved in allergy (13 cases each), followed by ivy and palm trees (six cases each). Less frequently, a significant reaction to geranium ($n = 2$) and orchid, fern or laurel ($n = 1$) were observed. The frequency of a positive SPT to common pneumallergens was similar in plants sensitized patients, compared with the others. Among the six patients specifically allergic to ornamental plants, two subjects had a blood-specific IgE positive to *Ficus benjamina* (100 and 8.88 PRU/ml). In those patients, the avoidance of the plant(s) was associated with the disappearing of their symptoms and complete stopping of their treatment.

In the control group, only one patient had a positive SPT to DPT, which was significantly different from the 'rhinitis group' ($P < 10^{-6}$).

Discussion

Repeated exposure to common airborne allergen is a decisive factor in allergic sensitization and the development of clinical symptoms of allergy. Axelsson et al. (1) first described in 1985 an allergic reaction to an ornamental plant (*Ficus benjamina*) as an occupational disease. Later they demonstrated that low-grade exposure

to *Ficus benjamina* can induce allergy symptoms not only in persons with preexistent atopic disease but also in nonatopic subjects (2, 3, 7). So far, except to Goldberg et al.'s study (8), description of allergic reaction to ornamental plants were limited to case reports or to a single plant species (9–11). Golberg et al. performed SPT to 11 species of autochthonous pollen extracts in Israel and to common airborne allergens in occupational setting. The incidence of positive SPT to the plants was 52% in flower growers in general and 83% in flower growers also sensitive to the common allergens.

In our study, we have estimated the sensitization to ornamental plants in allergic rhinitis exposed to plants in the domestic environment. Among those patients, 78% had positive SPT to one or more of the plant to which they were exposed. Moreover, two patients presented positive RAST for *Ficus benjamina*. This high frequency of sensitization could be explained by fact that the patients were exposed continuously and chronically to a potential allergenic trigger which had probably led to a sensitization.

The control group presented no reaction to the tested plants suggesting that a nonspecific skin reaction of those plants can be excluded. In the five plants most commonly involved in a positive reaction to SPT, only *Ficus benjamina* has been really studied as an allergen. It seems that allergen originates from the milky sap of the plant and diffuses through the leaf by water. By osmosis, the allergen appears on the surface. As it mixes with house dust, it becomes airborne (12, 13).

Our study suggested also that the allergen avoidance of the concerned plant was useful. In fact, patients realizing removal of their plants presented a complete disappearing of symptoms confirming the etiologic role of the plant. This finding was yet pointed out by Pradalier et al. in a case report (14). This clinical benefit induced by plants avoidance in sensitized patients, reinforces the hypothesis that allergens from ornamental plants could be a important allergen. In conclusion, indoor plants could be considered as potential allergens causing perennial rhinitis. We suggest that indoor plants should be included into the standard SPT panel in exposed patients.

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