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Prevalence of sensitization to *Cupressus sempervirens*: a 4-year retrospective study

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Abstract

In the last few years *Cupressus sempervirens* has been identified as the cause of an increasing number of cases of late winter-early spring pollinosis in Mediterranean countries. We conducted a 4-year retrospective study of a large group of subjects with documented allergic respiratory disease in order to determine the prevalence, clinical significance and annual rate of sensitization to *C. sempervirens* pollen. Anamnestic data and skin prick tests (SPT) with common aeroallergens and *C. sempervirens* extract were collected from 1397 subjects (712 male and 685 female) resident in Latium, a region in central Italy, with complaints related to upper- or lower-respiratory-tract disorders or conjunctival disease. Two hundred and forty-three subjects (17.4%) showed positive results to *C. sempervirens* extract; 47 (19.3%) of them were monosensitized. The annual sensitization rate of SPT positivity to *C. sempervirens* varied from 7.2% in 1995 to 22% in 1998. All the subjects monosensitized to cypress pollen had symptoms from January through April. Our study suggests that sensitivity to *C. sempervirens* is responsible for respiratory symptoms in an increasing percentage of subjects. Further studies are needed to determine its frequency at the national level. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Cypress; Pollinosis; Skin prick test

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1. Introduction

Pollinosis is the most common form of IgE-mediated hypersensitivity. There is evidence that allergic reactions induced by pollen are increasing (Wüthrich, 1989; Burney, 1993). Grass pollen is the major cause of pollinosis in many parts of the world (Friedhoff et al., 1986).

Palynological and epidemiologic studies have identified other pollen grains responsible for conjunctival and respiratory symptoms in sensitized subjects. These pollen grains vary from country to country and among different parts of countries.

In Italy *Parietaria* and olive-pollen sensitivity are responsible for 55% of the positive skin-prick tests (SPT) in pollinosis patients. In the last few years, several species of the Cupressaceae family, mainly *Cupressus sempervirens*, have been identified as the cause of an increasing number of cases of late winter-early spring pollinosis in Mediterranean countries such as Israel, Spain, France and Italy (Tas, 1965; Panzani et al., 1986; Caiaffa et al., 1993; Subiza et al., 1995).

Cypress pollinosis is characterized by symptoms such as conjunctivitis, rhinitis and asthma, which appear during the winter and often mimic those of recurrent viral infections of the upper airways typical of this period. As observed by Mari et al. (1997), this mimicking could lead to clinical underevaluation of the importance of pollen from the Cupressaceae family as a cause of allergic symptoms.

The prevalence of SPT positivity to Cupressaceae pollen antigens among pollinosis patients varies among European countries and their regions, ranging from a maximum of 35% in the Córdoba region of Spain to a minimum of 2% in southern Italy (D'Amato et al., 1989; Guerra et al., 1996).

We conducted a 4-year retrospective study of a large group of subjects with documented allergic respiratory disease in order to determine the prevalence, clinical significance and annual rate of sensitization to *C. sempervirens* pollen.

2. Materials and methods

Of the patients who came to our Department

between January 1995 and December 1998 with complaints related to upper- or lower-respiratory-tract disorders or conjunctival disease, we included in the study all those who resided in Latium (a region in central Italy) and had a positive SPT result to at least one of the common aeroallergens described below.

Anamnestic data regarding the characteristics, duration, onset and disappearance of the symptoms were collected.

SPTs were performed according to standard procedures (Malling, 1993) and with the following standard extracts: grass pollens, *Artemisia vulgaris*, *Parietaria*, olive-tree pollen, *Plantago lanceolata*, birch-, plane-, and beech-tree pollen, *Solidago*, cat and dog dander, *Dermatophagoides pteronyssinus* and *farinae*, *Alternaria tenuis*, *Aspergillus*, *Penicillium* and *Cladosporium* molds, and *C. sempervirens* (Dome/Hollister, Stier Diagnostics, Bayer, Milan, Italy).

Positive and negative controls were performed with histamine solution (10 mg/ml) and normal saline solution, respectively.

Mean wheal diameters were measured 20 min after performance of the test and were considered positive when larger than 3 mm in diameter.

On the basis of SPT results, patients positive to *C. sempervirens* were classified as either monosensitized (with SPT positivity for cypress pollen extract only) or polysensitized (with positivity also for other allergen species). Then we matched the anamnestic data of the patients with SPT results in order to investigate the clinical significance of sensitization to cypress allergen.

3. Results

One thousand three hundred and ninety-seven consecutive subjects (712 male and 685 female) ranging in age from 3 to 80 years (mean age: 28 years) were diagnosed by our staff between 1995 and 1998 as having allergic respiratory disease. Table 1 shows the SPT results and prevalence of sensitization to the airborne allergens tested.

Two hundred and forty-three subjects (17.4%) showed positive results to *C. sempervirens* extract.

Table 1
Prevalence of SPT positivity in the subjects studied

Allergen	SPT-positive subjects	Prevalence
Grass pollens	875	62.6%
<i>Dermatophagoides pt. e fa.</i>	654	46.8%
<i>Parietaria</i>	582	41.6%
Olive-tree pollen	368	26.3%
<i>C. sempervirens</i>	243	17.4%
Cat dander	169	12.0%
<i>Artemisia</i>	115	8.2%
<i>Alternaria tenuis</i>	93	6.6%
Birch-tree pollen	85	6.0%
<i>Plantago</i>	83	5.9%
Plane-tree pollen	46	3.3%
Beech-tree pollen	41	2.9%
Dog dander	38	2.7%
<i>Solidago</i>	21	1.5%
<i>Aspergillus</i>	8	0.5%
<i>Cladosporium</i>	8	0.5%
<i>Penicillium</i>	6	0.4%

Table 2 shows the number of monosensitized subjects for each allergen.

Monosensitization to *C. sempervirens* characterized 47 (19.3%) of the 243 subjects SPT-positive to this pollen. Fig. 1 displays the sensitization rates of SPT positivity to *C. sempervirens* from 1995 to 1998.

In the first year considered in the study, we analyzed 180 patients, of whom 7.2% were SPT positive to *C. sempervirens* allergen extract. The corresponding value was 18.1% of 357 patients, 17.8% of 480 patients and 22% of 380 patients in 1996, 1997 and 1998, respectively.

Anamnestic data reported by the 243 subjects SPT-positive to *C. sempervirens* revealed that ocu-

lorhinitis was the only symptom in 157, and asthma the only one in 66, with both asthma and oculorhinitis occurring in 20. All the 47 subjects monosensitized to cypress pollen had symptoms from January through April in the form of oculorhinitis in 36, asthma in four, and both asthma and oculorhinitis in seven. The remaining 110 polysensitized cypress-pollen-sensitive patients also had symptoms during other periods; 8.16% of them reported asthma, 61% oculorhinitis and 30.1% both asthma and oculorhinitis.

4. Discussion

In countries with a Mediterranean climate, Cupressaceae pollen is the major aerospore component in winter and early spring. Within the Cupressaceae family the genus of greatest allergologic interest is *Cupressus*, which includes 12 species; *C. sempervirens* and *C. arizonica* are the most common. During the last 30 years, *C. arizonica* has been widely used for reforestation, for wind and noise barriers and in gardens and parks.

The present study was conducted retrospectively in order to evaluate the prevalence of sensitization to *C. sempervirens* in a large group of allergic subjects resident in Latium.

Of the 1397 patients studied, 17.4% presented SPT positivity to *C. sempervirens*.

This prevalence appears to be of interest, because only grass pollen, *Parietaria*, and olive-tree pollen account for higher values.

In the 4 years considered in our study we also observed a linear increase in sensitization to *C.*

Table 2
Number of monosensitized subjects

Allergen	SPT-positive subjects	Monosensitized subjects	Prevalence
Grass pollens	875	105	12%
<i>Dermatophagoides pt. e fa.</i>	654	173	26.4%
<i>Parietaria</i>	582	67	11.5%
Olive-tree pollen	368	11	3%
<i>C. sempervirens</i>	243	47	19.3%
Cat dander	169	3	1.7%
<i>Artemisia</i>	115	2	1.7%
<i>Alternaria tenuis</i>	93	3	3.2%

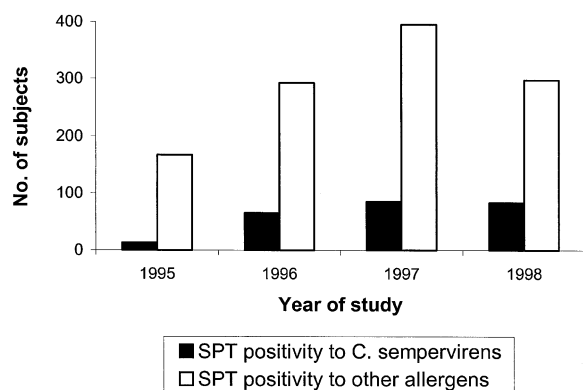


Fig. 1. Rates of sensitization to *C. sempervirens* and other allergens in the period 1995–1998.

sempervirens ranging from 7.2% in 1995 to 22.0% in 1998. No increase in sensitization to other airborne allergens tested was observed (unpublished data).

Some authors have suggested that the increasing prevalence of cypress sensitization could be related to: (1) the increasing use of Cupressaceae plants for gardening and reforestation (Panzani et al., 1991), and (2) the interaction of cypress pollen with air pollution (Ishizaki et al., 1987).

An atypical trend has been noted in the cypress-pollen counts in Latium for the period studied. A large amount of pollen grains (about 600/m³ of air) was recorded in 1995 and 1998, in spite of a smaller amount (approx. 450/m³) in 1996 and 1997 (data furnished by Italian Association of Aerobiology, A.I.A.). Therefore, the increase in cypress sensitization seems not to be related to the amount of pollen grains in the atmosphere.

Monosensitivity to *C. sempervirens* was present in 19.3% of the subjects SPT-positive to this pollen. Grass pollen, *Parietaria* and olive-tree pollen, the major causes of pollinosis in Italy, were responsible for monosensitization in a lower percentage of cases (12, 11.5 and 3%, respectively). Only *Dermatophagoides* showed a higher percentage of monosensitization (26.4%). In 16 cases there were positive SPTs only to cypress pollen and *Dermatophagoides*.

We analyzed the allergenic significance of sen-

sitivity to this pollen by matching the SPT results with the clinical histories.

Oculorhinitis was the most common symptom in monosensitized subjects, while asthma, as reported by Panzani et al. (1986), appears more frequently in subjects who are also sensitive to other airborne allergens (*Dermatophagoides*, *Parietaria*, grass pollen).

All the monosensitized subjects presented symptoms from January through April. Latium is characterized by a subcontinental climate that allows Cupressaceae to pollinate in winter. According to pollen count data, the main cypress pollen season in Latium starts in January and ends in May.

Moreover, *C. arizonica*, which pollinates in January and February and partially overlaps with the cross-reacting *C. sempervirens* (pollinating from February to the end of March), is so widespread that it could lead to an earlier onset of the Cupressaceae pollen season (Pham et al., 1994; Mari et al., 1996; Barletta et al., 1996; Caballero et al., 1996).

As expected, in polysensitized patients symptoms were also present in other periods relating to different pollen seasons and/or to sensitivity to *Dermatophagoides*.

In conclusion, our study suggests that sensitivity to *C. sempervirens* is responsible for respiratory symptoms in an increasing percentage of subjects. Further studies are needed to determine its frequency at the national level.

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