Relationship of clinical and aerobiological pollen data in the north-west of Spain

A. Dopazo, M.* J. Aira, M. Armisén*, and C. Vidal*

Department of Plant Biology, School of Pharmacy, and *Allergy Unit, Hospital de Conxo (Complejo Hospitalario Universitario de Santiago), Santiago de Compostela, Spain.

SUMMARY

Background: few studies report clinical and aerobiological pollen data in the north-west of Spain, a region similar to northern and central Europe. Moreover, it is difficult to obtain patients’ collaboration in filling out symptom cards. The aim of this study was to establish a relationship between pollen types and clinical data obtained through questionnaire and telephone calls.

Patients and methods: from January to December 2000, 24 patients aged 28 ± 10.6 years and allergic to pollens were studied. The seasonal and hourly rhythm of symptoms and their intensity were obtained monthly by telephone calls. Atmospheric pollen was collected over the same period using a Hirst-type volumetric pollen sampler.

Results: the most important pollen types recorded were Poaceae, Betula, Parietaria and Plantago. Most patients (83 %) showed symptoms during March and in the period between May and July (99 %), which coincided with the greatest quantity of atmospheric pollen. Fifty-six percent of the patients complained of symptoms during the first hours of the morning, 63 % during the central hours of the day and 22 % at nightfall. In specific sensitizations, symptoms were more evident during the hours of maximum atmospheric levels of their taxa.

Conclusions: the method employed in the present study to obtain information on patients’ symptomatology (telephoning their homes once a month) proved useful and revealed a clear relationship between the presence of certain pollens in the atmosphere and the development of symptoms.

Key words: North-west of Spain. Pollen. Aerobiology. Asthma. Rhinoconjuntivitis.

Allergol et Immunopathol 2002; 30(2):74-78.

INTRODUCTION

Although Spain belongs, from a geographical point of view, to Southern Europe and the so-called Mediterranean area, this is not the case, aerobiologically speaking, of all of its territory. Thus, NW Spain, a wet region with mild temperatures, is more similar, as far as pollination is concerned, to Northern and Central Europe (1-3). It is well known that the presence of pollen in the atmosphere is capable of triggering respiratory problems in allergic patients. However, the minimum levels of atmosphere pollen required to produce symptoms is only known for some pollen types (4, 5). It has thus been verified that 80 % of patients allergic to Betula pollen show symptoms when its atmospheric level is greater than 30 grains/m³ (4), and the same is true of Poaceae pollen and the corresponding allergic patients when it surpasses 50 grains/m³ (5). There are few studies relating clinical and aerobiological data in NW Spain (6-8).

The aim of this study was to establish a relationship between pollen types detected in the atmosphere and clinical data obtained by questionnaire, ad telephone calls in an area of NW Spain.

PATIENTS, MATERIAL AND METHODS

Patients

In this prospective study, a total of 24 patients (12 men and 12 women) aged 28 ± 10.6 (range,
7-51 years) were studied in the Allergy Unit from January to December 2000. All of the patients were found to be allergic to pollens on the basis of case history (rhinoconjunctivitis in 23, and/or bronchial asthma in 10), and having positive skin prick tests with pollens: *Alnus glutinosa* (n = 2 patients), *Artemisia vulgaris* (n = 3), *Betula alba* (n = 5), *Chenopodium album* (n = 6), *Corylus avellana* (n = 4), *Fraxinus excelsior* (n = 3), *Olea europeae* (n = 1), *Parietaria judaica* (n = 1), *Plantago lanceolata* (n = 10), *Platanus acerifolia* (n = 2), *Quercus robur* (n = 3), and several *Poaceae*: *Anthoxantum odoratum* (n = 14), *Cynodon dactylon* (n = 10), *Lolium perenne* (n = 22), and *Phragmites communis* (n = 15). Twenty-one patients had more than one sensitisation. No patient presented sensitisation against *Cupressus sempervirens*, *Ligustrum vulgare*, *Pinus radiata*, *Rumex*, *Salix*, *Urtica dioica*, house dust mites, moulds and cat and dog dander.

All patients came from the health-care area of Santiago. The city is located in the NW of Spain (42 degrees 53’N, 8 degrees 32’W) with nearly 100,000 inhabitants. Meteorological data during 2000 (supplied by the Observatorio Astronómico Ramón Maria Aller) showed a total annual precipitation of 2,472 mm, April being one of the wettest month (average daily value of 16 mm) and June the driest. The average monthly temperature in winter months oscillated between 7.4 °C and 13.6 °C. Temperatures significantly increased from May onwards with maximum daily values of 24.8 °C in August.

**Study methods**

Seasonal and hourly rhythm of symptoms and their intensity during previous years were assessed by questionnaire at the first visit. The same data for the year 2000 was obtained monthly, in which case a researcher telephoned each patient once a month in order to obtain information about his health during the previous month. Symptoms were classified as slight, moderate or intense (table I).

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Blocked</th>
<th>Sneezing</th>
<th>Itchy eyes</th>
<th>Daily activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight</td>
<td>Short time</td>
<td>Limited</td>
<td>Esporadic</td>
<td>Unaffected</td>
</tr>
<tr>
<td>Moderate</td>
<td>Several hours</td>
<td>Abundant</td>
<td>Habitual</td>
<td>Difficult</td>
</tr>
<tr>
<td>Intense</td>
<td>All day</td>
<td>Continuous</td>
<td>Constant</td>
<td>Impeded</td>
</tr>
</tbody>
</table>

**Airborne pollen concentration**

Atmospheric pollen was collected between January to December 2000 using a Hirst-type volumetric pollen sampler, set up on the top of a building in the centre of Santiago de Compostela, at 26 metres above ground level. Samples were processed following the methodology proposed by the Aerobiological European Network. Mean daily pollen concentration (grains/m³) was measured. The model of Galán et al. was employed to evaluate the hourly diurnal variation of principal pollen types (9). Data was expressed as the proportion of pollen trapped during each hour of the day.

**RESULTS**

**Airborne pollen counts**

The total atmospheric pollen recorded in Santiago during the study period was 12,698 pollen grains. The most important types of pollen detected were *Poaceae* (3,181 grains –25 % of the total), *Betula* (2,888 grains –23 %), *Parietaria* (1,001 grains –8 %), *Plantago* (581 grains –5 %), and, to a lesser extent, *Quercus*, *Platanus*, and *Alnus*. *Artemisia*, *Chenopodium*, *Corylus*, *Fraxinus*, and *Olea* pollens were barely presented (< 0.1 %).

In relation to mean daily concentration, more than 30 grains/m³ of *Betula* were detected during 21 days, and more than 80 grains/m³ during 12 days. Levels greater than 10 grains/m³ of *Quercus*, *Alnus*, and *Platanus* were recorded during 14, 7 and 9 days, respectively. On June and July, *Poaceae* pollen reached 50 grains/m³ during 20 days.

**Relationship between allergic symptoms and pollen counts**

From a clinical point of view, most patients showed symptoms during March (20/24, 83 %) and in the period between May and July (23/24), coinciding with the greatest quantity of atmospheric pollen. The sharp decrease in allergy symptoms in April may be related to the scarcity of pollen due to the effect of rainfall, since this month was the rainiest in the year apart from winter (439 mm) (fig. 1).

The intensity of symptoms according to the monthly questionnaire was slight (scale 0–1) during the first months of the year (from January to March) and affected 50 % (12/24 patients) of the studied po-
population, although 21% of the patients (5/24) reported the same kind of symptoms throughout the rest of the year. Starting from May the intensity of symptoms increased to moderate (scale 1-2), affecting 33% (8/24) of the patients. Symptomatology became intense in the following months, affecting 67% (16/24) of the individuals in June. From September onwards between 4-14% of the patients showed moderate symptoms, which may be related mainly to pollen of Plantago, late-flowering gramineae and Urticaceae. Parietaria pollen (which caused skin sensitisation in 8% of the sample) reached average daily concentrations of more than 10 grains/m³ during 34 days.

In relation to diurnal variations (fig. 2), 56% of the cases showed symptoms during the first hours of the morning, generally on waking or going outside; 63% of the patients experienced allergic reactions during the central hours of the day and 22% at nightfall. With respect to each sensitization, 80% of the patients allergic to Betula showed symptoms during this taxon's hours of maximum atmospheric levels, i.e. in the afternoon. In the same way, all the patients that skin-tested positively for Quercus showed allergic symptoms at night, coinciding with this pollen type's maximum atmospheric presence in the year 2000. In the case of Plantago, 70% of the patients coincided with a greater allergic incidence around 2 pm and in that of gramineae, 59% of the patients experienced symptoms in the evening, coinciding with this pollen type's hours greatest pollen concentration.

**DISCUSSION**

Coinciding with studies carried out in other towns in the NW Iberian Peninsula (6), pollinosis sufferers in
Lastly, the high

ter studies with a greater number of patients.

However, they were sufficiently high in order to trig-

2000 were lower than those of previous years (11).

sensitisation, it seems that the symptomatology de-

Quercus

dominantly sensitised to the pollen of

Betula

is the genus that most frequently produces

Betula

levels are on the increase

Parietaria

y

Platanus

Posteriores mostraron síntomas en el mes de marzo

más elevados de pólenes. Respecto a las variaciones horarias, el 56 % de los

Poraceae

las pacientes mostraron síntomas en el mes de marzo (83 %) mientras que en el período de mayo a julio el

99 % de los sujetos se encontraron afectados, coincidiendo con los niveles más elevados de pólenes.

Allergol et Immunopathol 2002; 30(2): 74-78
tan sólo un 22 %, al anochecer, todo ello en directa relación con la presencia de los distintos tipos polínicos.

Conclusiones: el método empleado en el presente estudio –llamadas telefónicas con periodicidad mensual– parece útil en el seguimiento de los síntomas, pudiendo detectarse una relación con la presencia de los distintos tipos polínicos en la atmósfera.

Correspondencia:
C. Vidal, M.D.
Unidad de Alergia
Hospital de Conxo
(Complejo Hospitalario Universitario de Santiago)
Rúa Ramón Baltar, s/n.
15706 Santiago de Compostela.
Spain.


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