Airpalynology Research Implications in Allergic Diseases

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ABSTRACT (online version)
There is a constant increase of the number of mediate Ig E diseases worldwide, known as reagin or atopic diseases. The inflammable substratum, which stands as their basis, is decoded at the cellular and the molecular level, guiding the pharmaceutical research towards finding the most efficient treatments. In recent years, there is also a remarkable evolution of the diagnosis methods. Modern methods of knowing the impact of environment factors, including allergens, hasten to the allergenicity and the sick people’s assistance. One of these methods, extremely valuable in the medical practice, is the volumetric method of sampling, identifying and quantifying the airborne pollen, which belongs to the category of inhaling allergens and which brings about the pollinosis. Airborne pollen dynamics, as yearly pollination calendars, brings precious information in choosing the diagnosis and treatment methods of polinosis, diminishing their costs and being able to impose a new prophylactic conduct. The pollination calendar can draw allergologists’ attention to some plants producing allergen pollen, less known plants, adventives or expanding, as Ambrosia artemisiifolia species, common to the South - West area of Romania. The pollination calendar can also be useful to extracts and allergenic vaccines producers, directing their production according to the local presence of some species of plants with allergen pollen.

KEY WORDS: allergens, rhinallergosis, airborne pollen, airpalynology, pollination calendar, Ambrosia artemisiifolia

INTRODUCTION
Airpalynologists and allergologists cooperation can bring great benefits to the medical practice. The correlation of the modern strategies of preventing and treating pollen allergy. Pollen allergy has a precocious start and it lasts for the rest of the person’s life, that is why its prophylaxis is more useful than the treatment of its complications and aggravation. The allergens are antigens that produce and express an Ig E mediate immunoreactivity.

There are four types of allergens to be noticed: inhalant (pneumoallergens), food (food allergens, trophallergens), allergodermia and injected ones. They initiate the sensibilisation processes and the dual allergic reaction (Radu, 1998; Popescu, 1998).

In vivo diagnosis in Ig E mediate allergy requires:
- prick tests, intradermic and skin biopsy (the window test);
- tests of provoking the hyperactivity of the organ: nasal, ocular, bronchi, of food origin and with a living insect;

In vitro diagnosis in Ig E mediate allergy uses techniques and methods that prove the presence of specific antibodies, mediate and cytokins, released as a result of the specific cell activation:
- total serum Ig E, by radio immunologic methods (RIST, PRIST) and radio enzymatic (ELISA);
- specific Ig E, based on the immunoabsorbtion principle (RAST, FAST, CAP system, Magic lite);
- the dosage of the Ig G specific precipitator antibodies (the Ouchterlony method).

An important aspect in the therapeutic approach of the inflammation and of the allergic diseases also includes the reestablishment of desensibilisation (also called specific hiposensibilisation, specific immunotherapy with allergens or specific immunotherapy with allergic vaccines ITS) in the therapeutic scheme.

All these investigations are extremely expensive. Since the rhinallergosis is more and more frequent, the diagnosis and the treatment can be more precisely directed by means of the information given by the pollination calendar drawn by airpalynologists.

MATERIALS AND METHODES
We have drawn the pollination calendar taking into account the results of the monitorisation which took place in 1999, and for the graphics we present here we also took into consideration data from the year 2000. The pollen aspiration was made by means of a volumetric collector type VPPS 2000 Lanzoni, situated on the buildings of the University of the West of Timişoara, at a height of approximately 20 m. In order to diagnose rhinallergosis, prick tests mere used (in 270 patients), with pollen mixtures from early trees, grasses and weeds (the tests of Halcis Terapie SRL - Timişoara).

RESULTS AND DISCUSSION
Skin tests revealed (table 1) the fact that the number of cases of rhinallergosis (complicated with asthma or not) is bigger than that of no allergic rhinitis (most of them vasomotor):
### TABLE 1. The cases of rhinallergosis and no allergic rhinitis in 2000

<table>
<thead>
<tr>
<th></th>
<th>No allergic rhinitis</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhinallergosis</td>
<td>Perennial (sensitivity at acarins, moldiness, feathers and animals’ fur)</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Perennial and perennial allergic asthma</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Seasonal (pollinosis)</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Seasonal allergic asthma</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Perennial with seasonal aggravation</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Perennial with seasonal aggravation and allergic asthma</td>
<td>8</td>
</tr>
</tbody>
</table>

In order to diagnose pollen allergy, and at the same time for the initiation of INS, an evaluation of the exposure at pollination agents is necessary. ITS is indicated according to the severity and the duration of the disease evolution, as well as in patients with extended seasonal table or exposed to several pollen types, with sequential time spreading.

Out of a total of 36 cases of pollinosis, prick tests reveal a higher sensitivity at grasses and weeds pollen:

![Graph showing sensitivity to different types of pollen](image)

**FIG. 1.** The results of prick tests at pollinosis in 2000

In ITS, therapeutic allergen vaccine are used, administrated subcutaneous and unconventional (oral, sublingual, nasal, bronchi). The dosage in pollen treatment is extremely important in order to obtain high results:
- during pollination season the dosage is severely decreased;
- the patient should be warned to avoid pollen exposure during treatment;
- the proceeding of treatment during pollination season is contra-
  indicated;
- perennial treatment could be interrupted if the symptomatology is strong
  in pollination season.

Thus, in order to make some tests in vivo or ITS, the dynamics of the
airborne pollen in the area in which the patient lives should be known: the
beginning of the blossom, all these being easily found in annual pollination
calendars. The tolerance limit is low during the pollination season, and due
to this fact airpalynologists will elaborate forecasts in future. Through mass-
media, they will warn upon the possible pollen dynamics.

Airpalynologic values recorded during the years 1999 and 2000 show
huge differences for our geographic area concerning the incidence of the
pollen of some plants with airborne allergen pollen. For instance, we notice
the abundance of the pollen coming from a species which is adventives in
our country’s flora: the *Ambrosia artemisiifolia*. September is the month
with the highest incidence of this pollen. The comparative study for 1999
and 2000 reveals the increasing of this type of pollen from 51.57% to
77.04% of the total pollen identified during September. This leads to the
necessity of individual testing with *Ambrosia* pollen and the complete study
of this plant, in expansion in our country (Faur et al, 2001b; Ianovici &
Faur, 2001; Faur & Ianovici, 2001).

**CONCLUSIONS**

Allergens identifying and quantifying can contribute to:
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- the orientation of specific prophylaxis measures;
- the evaluation of the role of the allergens in sensibilisation, in the
  hyperactivity of an organ;
- the directing of immediate and long term therapeutic plans, including
  specific immunotherapy with allergens vaccine.
**FIG. 2.** Pollination calendar for 1999
FIG. 3. Pollen quantify in September - 1999

FIG. 4. Pollen quantify in September 2000

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