Immunotherapy for house dust allergy

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The results of treatment in 201 patients with rhinoconjunctivitis due to house dust mite-induced allergy are reported. Bronchial asthma was associated with this condition in 45 of the patients (22.3%). Of the 201, 143 patients in whom symptomatic therapy was not sufficiently efficacious, received immunotherapy (hyposensitization). In most of the 143 patients, hyposensitization with Alutard allergen extract resulted in marked improvement, rendering 107 patients (75%) free of symptoms and signs. The remaining 36 responded as follows: the patient’s condition improved considerably in 14 (10%), in seven (5%) it improved, in 10 (7%) it remained unchanged, and in five (3%) it worsened. During the hyposensitization, generalized urticaria was seen in three patients, oedema of the upper part of the body in one, and generalized pruritus and dyspnoea in one.

Keywords dust mites allergic rhinoconjunctivitis extrinsic bronchial asthma specific immunotherapy

Introduction

The proportion of patients suffering from allergic rhinitis in the populations of European countries is 5–15%.1–3 The number of such patients seen in our outpatient department is increasing.4 Within this group of patients the proportion of those whose allergy is caused by house dust mites is also on the increase.

The cause of the increasing incidence of allergy caused by house dust is the subject of a world-wide investigation, the findings of which suggest that the main co-factor in it is changes in lifestyle. For example, in New Guinea 7% of the population suffered from bronchial asthma at the end of the 1980s, although previously this was an unknown disease. The explanation for this is that the country was ‘flooded’ with cheap blankets which were not regularly cleaned by the users.5 Dutch and Scandinavian authors have described a rapid rise in the number of diseases caused by house dust allergy at the time of the oil crisis when dwellings were better insulated and their ventilation reduced. This was favourable for the multiplication of dust mites. According to German and Swedish authors, in 50–60% of homes pets are kept, which may lead to a rapid sensitization of atopic patients.5,6

The importance of this problem is clearly indicated by the fact that in 1987 the ‘Gesellschaft für Hausbiologische For-
In our outpatient department 3240 allergic patients are registered. Of these, 287 suffer from perennial complaints. In 201 of the 287, the sensitizing role of some members of the *Pyroglyphida* family was proven by the patient’s history, a percutaneous prick test and by allergen-specific IgE level determination (Figure 1).

The serum of all patients with perennial complaints was tested for allergen-specific IgE. There were 10 where the prick test was positive, but no allergen-specific IgE was found in the serum. The percutaneous prick test and its evaluation were done by the method of Mygind (1) using the ALK SQ allergen extracts from *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae* (10 HEP) produced by the firm Epipharm (Austria). The 3 HEP solution of histamine was used as positive control. Determination of the serum level of the allergen-specific IgE in the case of *Dermatophagoides pteronyssinus* was performed using the IgE Quick test (Epignost), and in that of *Dermatophagoides farinae* by the RAST method.

Out of the 201 patients who proved to be allergic to dust mites, 17 complained of rhinitis, 139 of rhino-conjunctivitis and 45 of rhinitis + extrinsic asthma. In the last-mentioned group mild, reversible airways obstruction was demonstrated by spirometry (Table 1). These 45 patients complained of rhinitis, conjunctivitis and, in some cases, of cough and dyspnoea persisting throughout the year. These complaints were experienced mainly in closed rooms. The severity of the complaints increased in spring, summer and early autumn in 86 of the 201 patients.

If it became evident that among the causative factors the dust mite also had a role, the patients were asked to bring a sample of dust from their homes. The samples were then tested for the presence of dust mites, using the Akarex test developed by Bischoff and Schirmacher (2,3) for determination of the guanine content of house dust.

As a first step, elimination of the allergen from the patient’s environment (at least reduced exposure to it) was attempted in all patients. The patients received a list of recommendations regarding the mode of cleaning, washing and buying carpets and bedding in order to reduce the number of dust mites in their homes. Lately Akarosan foam and powder have been available for this purpose. The firm producing these chemicals guarantees an area free of dust mites for 6–12 months. Symptomatic treatment was given in parallel with dust mite eradication since, in our experience, reduction of the number of dust mites even to a minimal level in the patient’s immediate environment failed to result in a completely symptomless state. The symptomatic treatment consisted of administration of Aldecin, Rhinocort, and Syntaris nasal sprays, anti-histamines, eyedrops and anti-asthmatic preparations. (The extrinsic bronchial asthma caused by mites was treated in close co-operation with chest physicians.)

When in spite of the anti-dust mite measures and symptomatic treatment the complaints persisted, specific immunotherapy was offered to the patients (10–13).

Written informed consent was obtained from all patients before the beginning of hyposensitization and detailed information was given about the possible risks and the benefit which might be expected from treatment.

As is well-known, immunotherapy must be carried out with great caution. The patient should be thoroughly questioned and examined before every injection and at least 30 minutes of close observation is mandatory after each injection. An intensive care unit should be available. If those conditions are met, then a lethal outcome can be avoided. Deaths have been variously reported (14,15) and, therefore, immunotherapy was prohibited in the UK for several years.

For hyposensitization we used allergen extracts from *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*. Alutard SQ made by ALK Laboratory, Holsholm, Denmark and distributed by Epipharm in Hungary.

Increasing doses were given once a week, according to a scheme supplied by the firm, until the maintenance dose tolerated by the patient without any side-effects was reached.

At this stage the favourable effect of the treatment was usually felt, after which the maintenance dose was administered once a month. As an average this dose corresponded to 0.25 ml of the 10.000 SQU solution. If a larger dose was given, it resulted in too great a local reaction (erythema larger than 10 cm in diameter or generalized urticaria), which necessitated reduction of the dose.

If the patient had mixed allergy (pollen + mite) the treatment was interrupted in the season of the pollen concerned.

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**Figure 1.** Distribution of patients according to allergens, based on serum IgE levels. As can be seen *Dermatophagoides pteronyssinus* was the only antigen in most patients (in 83). In the others *Dermatophagoides pteronyssinus* and another allergen were also implicated. D1 = *Dermatophagoides pteronyssinus*; D2 = *Dermatophagoides farinae*. ■ = D. pteronyssinus; □ = D1 + D2; □ = D1 + animal hair; □ = D1 + pollen; □ = D1 + more pollen; □ = D1 + epithelium + pollen; □ = D1 + fungi.
Interestingly enough, we observed strong local reactions at the end of August and at the beginning of September also in the patients in whom the mite allergen was the only allergen. That is why we interrupted the immunotherapy for this period of time even if the allergen was a pure mite allergen. This phenomenon can only be explained by non-specific irritation of the nasal mucosa by the extremely high numbers of pollen and spores present in the air at that time.

Immunotherapy was administered to 79 patients from 1987 to 1990, and to 64 from 1988 to 1991. The patients were divided into these two groups because this enabled observations to be made on the basis of a longer follow-up in patients whose treatment had begun earlier.

Results

The effectiveness of the treatment was judged by the changes in symptoms and signs. The severity of the complaints was assessed according to a symptom score system of 0 to 4. For 1 week before the beginning of the immunotherapy the patients recorded the symptom scores. These served as pre-

![Figure 2](image-url) Changes in average symptom scores over a 4-yr period (1987–1990) in 79 patients (i.e. after 4 yr of treatment). $v = 16$, $n = 79$, $sp = 68.96$, $t = 3.8$, $P < 0.005$. □ = before treatment; ■ = after treatment. For symptoms see Table 2.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Symptom scores before treatment</th>
<th>Symptom scores after treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Conjunctivitis</td>
<td>316</td>
<td>96</td>
</tr>
<tr>
<td>II. Itching of the nose</td>
<td>158</td>
<td>78</td>
</tr>
<tr>
<td>III. Watery secretion</td>
<td>316</td>
<td>100</td>
</tr>
<tr>
<td>IV. Sneezing</td>
<td>300</td>
<td>102</td>
</tr>
<tr>
<td>V. Nasal obstruction</td>
<td>246</td>
<td>124</td>
</tr>
<tr>
<td>VI. Itching of the throat</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>VII. Itching of the ears</td>
<td>94</td>
<td>54</td>
</tr>
<tr>
<td>VIII. Coughing</td>
<td>108</td>
<td>44</td>
</tr>
<tr>
<td>IX. Dyspnoea</td>
<td>108</td>
<td>36</td>
</tr>
</tbody>
</table>

Table 2. Changes in average symptom scores over a 4-yr period (1987–1990) in 79 patients.
Dust mite allergy

Dust mite allergy

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treatment values. Then after each year of treatment, during the 1 month of temporary cessation of treatment, the patients
again recorded the symptom scores every day. The values
obtained in this way were summarized and regarded as post-
treatment scores (Figures 2 and 3). The effectiveness of immu-
notherapy can be clearly seen in both treated groups. The
treatment resulted in a marked improvement in all symptoms
and signs, the significance of which was, therefore, calculated.
A significant difference was found between the pre- and post-
treatment scores in both groups ($P < 0.005$).

A state free of complaints and symptoms was achieved in
about 75% of patients. In the case of the first group this
improvement has lasted for 4 years now. It should be added
that a considerable proportion of this group consists of pa-

tients with mixed (pollen-mite) allergy. The complaints
appear only in the pollen season, which seems to be a very
satisfactory result to the patients.

Considerable improvement has been achieved in 10% of
patients, who are not handicapped in their everyday activities.
They are doing well and need to take only one drug and even

that only occasionally.

Five per cent of the patients have improved, which means
that they have to use local steroid treatment, i.e. nasal sprays,

only about twice a day, in addition to half the usual dose of

antihistamine. On this therapy they do not feel handicapped
in their daily routine.

The condition of 7% of patients living under unfavourable
conditions remained unchanged. For financial reasons, they
are unable to change their dwellings, or their work place does
not make a reduction of allergen exposure possible if, for
example, they have to work with feathers.

The 3% of patients whose condition did not improve and
even deteriorated, live under the same conditions as described
above (Table 4).

Severe complications attributable to the immunotherapy
have occurred in no more than five patients during the last
7 years. Generalized urticaria developed within the first 20
minutes of the injection in three patients. Oedema involving
the whole upper part of the body appeared in one patient 25
minutes after the injection. In one patient generalized pruritus,

Table 4. Results of hyposensitization in 143 patients

<table>
<thead>
<tr>
<th>Symptom scores before treatment</th>
<th>Symptom scores after treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Free of symptoms and signs</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>~75%</td>
</tr>
<tr>
<td>Itching of the nose</td>
<td></td>
</tr>
<tr>
<td>Watery secretion</td>
<td></td>
</tr>
<tr>
<td>Sneezing</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Coughing</td>
<td></td>
</tr>
<tr>
<td>Dyspnoea</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Changes in symptom scores over a 3-yr period (1988–1991) in 64 patients

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Figure 3. Changes in symptom scores during 3 yr in 64 patients treated between 1988 and 1991. $v = 16, n = 64, sp = 61.26,
t = 3.088, P < 0.005. □ = before treatment; ■ = after treatment. For symptoms see Table 3.
oedema of the skin of the neck and increasing dyspnoea were observed 25 minutes after the injection and, therefore, he was admitted to our clinic for 24-h observation. Prompt medical treatment prevented full development of the anaphylactic reaction in each patient.

Discussion

In all patients with chronic rhinitis it is advisable to decide whether it is an IgE-mediated allergic disease or not, and if it is, whether dust mites play a sensitizing role. If symptomatic treatment does not result in acceptable improvement, specific immunotherapy may be valuable.

Opinions in the literature about the duration of immunotherapy are divided. Earlier a 3-yr period of treatment used to be recommended; later a 4-yr period was suggested, and lately the results of even 1 or 2 yr of treatment have been reported.

There was improvement in all treated patients but only as long as the hyposensitization lasted. In the case of unsuccessful treatment the symptoms recurred with unchanged intensity after a 1-month break in treatment. In spite of this, we continued the treatment for 3 yr, which, in a few patients, resulted in some improvement.

It was interesting to see that patients with rhinitis and asthma regarded cessation of nocturnal dyspnoea as a complete success of treatment and did not pay much attention to rhinitis. The size of the maintenance dose is absolutely individual. In our patients the tolerance dose was never larger than 10 000 SQ-U (0.25–0.30 ml). Larger doses did not result in considerable improvement in the patient’s condition; instead the severity of the side-effects and immediate local reactions increased. This observation is in accordance with that of Haugaard.

The question of whether there was a correlation between the improvement in complaints and the changes in laboratory data has intrigued us before and, therefore, we studied it in patients with ragweed pollinosis but we found no correlation.

We investigated this problem also in 20 patients with dust mite allergy, determining the serum levels of total IgE and specific IgE. However, neither of these parameters showed any correlation with the changes in symptoms.

Immunotherapy reduced the early-type allergic skin reaction in the majority of patients. The initial 128 mm² urticarial wheals decreased to 64 mm² after the first year, to 32 mm² (in some cases to 16 mm²) after the third year.

At the end of the 1970s mite allergen extracts became commercially available. Treatment using these types of extract offers encouraging results and raises our hopes that it will be possible to improve the quality of life for patients with mite allergy.

Acknowledgement

I would like to express my sincere thanks to the Central Laboratory of the Medical University of Pécs for the radiolallergosorbent tests and the valuable aid rendered by colleagues working in the Central Institute of Pulmonary Diseases of Pécs, for the respimetric examinations and their help in treating our asthmatic patients.

References


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