

Correlation between Phadiatop and skin tests for pneumoallergens

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INTRODUCTION

Specific diagnosis in rhinitis and in bronchial asthma constitutes an irrenounceable aim that should be universally pursued in all patients. The current concept of those two diseases and the therapeutic and prognostic implications of that diagnosis leave little room for doubt. There is no hesitation in the Allergy clinics regarding the implementation of this concept, and the methodology applied is perfectly established and operative and offers a very high standard of quality.

However, other medical collectives, both generalists and specialists, who care for patients with rhinitis and/or bronchial asthma are far removed from being able to offer this standard and level of quality. This is because the use and interpretation of these techniques requires knowledge, updating and ability, and the three are difficult to achieve without the adequate specialisation and dedication.

Furthermore, the access of the patients to the Allergology clinics within our Health Care System has limitations. The possibility of having a system that might provide information regarding allergen sensitization available to other medical collectives might improve the referral of the patients, particularly in those cases in which the clinical manifestations are open to doubt or the severity of the symptoms is not worrying.

Unarguably, the skin tests represent the main diagnostic tool in the hands of the Allergologist. The quantitation of the specific serum IgE has become rather usual, although it has the limitation of its high cost. The handling and processing of serum samples, however, has more advantages in Primary Health Care or specialist outpatient clinics and particularly so if a number of allergens

can be tested at the same time, thus rendering the incurred cost more supportable.

The use of Phadiatop as a screening method for pneumoallergen hypersensitivity has become well established¹⁻³ since its introduction in the early '90s. One of its main limitations is the need to adequate the panel of tested allergens to the characteristics of the patients' environments, with the need to include all those that are relevant in their actual area of residence. In countries such as ours, with its great bioclimatic diversity, this may represent a serious hindrance.

The aim of our study was to compare the efficacy in detecting pneumoallergen hypersensitivity of a commercially available Phadiatop kit (Pharmacia & Upjohn, Uppsala, Sweden) and of a panel of skin tests being habitually used in our Outpatient Clinic.

MATERIAL AND METHODS

One hundred and ninety patients referred for the first time to our Allergology Service for investigation of seasonal or perennial bronchial asthma and rhinitis were included in the study. The sources of referral had been Primary Health Care (53%), ENT (13%), Pneumology (20%) and other Services (14%). No patient had been studied in an Allergology clinic or had received immunotherapy previously.

Sixty-two per cent of the patients were females. Their ages ranged between 1 and 78 years, and the mean age was 27 ± 15 years. Almost one-half of the patients (98) had only rhinitis, while the remainder (92) had associated bronchial asthma.

Table I. Panel of pneumoallergens used in the skin tests

Skin test allergen panel	
Phleum	Alternaria
Olea	Cladosporium
Artemisia	Aspergillus
Salsola	Cockroach
Chenopodium	Tyrophgus
Parietaria	Lepidoglyphus
Plantago	D peteronyssinus
Acer pseudoplatanus	Dog
Cupressus	Cat

Table II. Contingency between skin tests and Phadiatop results

	Prick (+)	Prick (–)
Phadiatop (+)	122	7
Phadiatop (–)	12	48

Skin tests were performed to all patients with a panel of pneumoallergens commonly encountered in our environment (Table I). The prick technique was used, with Morrow-Brown lancets. The skin tests were considered positive if the elicited wheals or equal or greater size than that of the 10 mg/ml histamine control. Further tests performed were a total IgE determination, and specific IgE to *Phleum* and *Olea* pollens, *Dermatophagoides pteronyssinus*, *Alternaria* and cat dander. Finally, the Phadiatop test was carried out using the Pharmacia CAP system. All the tests were carried out in the autumn or winter.

RESULTS

Seventy per cent of the patient had at least one positive skin test to some allergen. Pollen sensitization was the most frequent one (48% of the total group, 69% of those with positive tests), followed by animal dander (20% of the total group), mites (14%) and moulds (8%).

Most patients (91%) with at least one positive skin test also had a positive Phadiatop result, as shown in the contingency table (Table II).

The sensitivity of the Phadiatop technique, considering as true positive the presence of positive skin tests, was 93%. The specificity was 88%, and the diagnostic efficiency 91%. The positive predictive value was 94.5%, and the negative predictive value 85%. The k test had a value of 0.75, indicative of a very acceptable level of coincidence between the two techniques.

The analysis of the cases in which the two techniques were discrepant is reflected in Tables III and IV. The 12 patients with positive skin tests and negative Phadiatop were monosensitized to some allergen, the most frequent one being *Salso-la* (3 cases), followed by *Alternaria* (2 cases) and hamster (2 cases); the patients with negative skin tests and positive Phadiatop evidenced positive specific IgE to mites, cat and *Phleum* in three cases, with negative results in the remainder.

DISCUSSION

Summarising, in our patients we observed a good correlation between positivity to our standard skin test panel and positivity in the Phadiatop. The sensitivity and specificity of the investigated technique are high. Recent studies in groups of patients with rhinitis and asthma, carried out in Primary Health Care or Allergology services, offer similar results^{5,6}.

Multiple reports have been published confirming the usefulness of Phadiatop as an atopy screening method in the general population, particularly when studies of very large populations are carried out³. In this setting, Phadiatop has demonstrated itself to be superior to the skin tests because of the simplicity of the technique, which does not require specialised personnel.

There are also studies comparing Phadiatop with the skin tests and the detection of specific IgE for the diagnosis of rhinitis and bronchial asthma. One of the more recent ones is a very large Swiss study, SAPALDIA⁴, which encompasses over 8000 patients. In this study, Phadiatop was more sensitive than the skin tests for the diagnosis of rhinitis and bronchial asthma, although it was less specific. The positive predictive value and the diagnostic yield were lower than those of the skin tests. The lesser sensitivity of the skin tests might be related to the small number of allergens used.

Table III. Characteristics of the cases with positive skin tests and negative Phadiatop

Patient	Total IgE (kU/L)	Specific IgE (kU/L)	Clinical history of allergy	Positive allergen in Prick
YMH	18	Negative	Positive	<i>Alternaria</i>
MFP	260	Negative	Positive	E. de Hamster
JHM	31	Negative	Negative	<i>D pt</i>
PBG	38	Negative	Positive	<i>D pt</i>
LCR	147	Negative	Positive	E6
RFS	20	Negative	Positive	<i>Artemisia</i>
IAS	21	Negative	Negative	Cat
JDG	42	<i>Alternaria</i> (15 kU/L)	Positive	<i>Alternaria</i>
PBG	10	Negative	Positive	<i>Salso-la</i>
PCA	42	Negative	Negative	E6
RSO	106	Negative	Positive	<i>Salso-la</i>
TVC	22	Negative	Negative	<i>Salso-la</i>

Table IV. Characteristics of the cases with negative skin tests and positive Phadiatop

Patient	Total IgE (kU/L)	Specific IgE (kU/L)	Clinical history of allergy	Positive allergen in <i>Prick</i>
FCF	79	Grasses (5)	Negative	–
IPD	18	Negative	Negative	–
DGS	274	Cat (1, 2)	Positive	–
PGG	81	<i>D pt</i> (0,7)	Positive	–
PGT	10	Negative	Positive	–
CIP	152	<i>D pt</i> (18)	Positive	–
DME	27	Negative	Negative	–

At the end of the past decade, Businco *et al.*² compared Phadiatop and a number of diagnostic tools including the anamnesis, total and specific IgE and skin tests in a paediatric population. They used a panel of five allergens in intradermal tests, and achieved 87% sensitivity with 100% specificity.

The analysis of the discordances between the two tests reveals that most of the cases correspond to the use of allergen panels that were not adequate to the local aerobiological characteristics. This is particularly important in the case of monosensitized patients such as the ones with *Salsola* hypersensitivity in our own study. One patient with sensitization to hamster epithelium and two with sensitization to guinea pig epithelium were not detected by the habitual skin test panel, even though the data derived from the anamnesis caused us to extend the investigation. Sensitization to *Alternaria* also appears to be problematic, particularly in monosensitized patients. Other investigators have also pointed out that the loss of sensitivity might be more perceptible in these patients, possibly because the amount of specific IgE that might bind to a single allergen which is not quantitatively well represented in the panel might be insufficient for later detection. All these disadvantages might possibly be solved if and when the panel of tested allergens is enlarged, and also through qualitative improvement of those already included in the panel, for instance *Alternaria*.

We conclude that Phadiatop is an effective method for the detection of patient sensitization to a number of common pneumoallergens. Nevertheless, the allergen panel included in the kit requires the most rigorous possible adequation to the local

aerobiological characteristics, diversifying as required the actual allergen contents of the kits.

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Practical usefulness of Phadiatop

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UNICAP-PHADIATOP is an *in vitro* test based on the IMMUNOCAP technology (fluoro-enzyme-