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Mites as trophoallergens

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INTRODUCTION

Allergic food reactions may be causatively due to the foodstuffs themselves, or to contaminants including additives or other foodstuffs not mentioned in the labelling¹. The clinical features may range from mild manifestations, such as the oral syndrome, up to anaphylactic shock. On the other hand, house dust mites are a well-recognised cause of respiratory allergy, and storage mites also appear to play an important role in this context². Curiously, a number of recent studies suggest that mites may behave as trophoallergens, as the ingestion of foods and foodstuffs contaminated by them may cause anaphylactic reactions³⁻⁶.

The clinical observation of several patients with allergic reactions after the ingestion of foods prepared with flour and in whom no food allergy could be demonstrated led us to design a prospective study with the aim of testing the hypothesis that those reactions might be due to contamination of the flour by mites. Our results demonstrate that the ingestion of flour contaminated by various species of mites constitutes the aetiologic agent responsible for the reported allergic reactions.

METHODS

Patients reporting systemic reactions after the ingestion of foods prepared with flour that were suggestive of being IgE-mediated but in whom no food allergy could be demonstrated were included into the study protocol. Samples of the flours presumably implicated in the reactions were microscopically studied, together with control samples

of flours of the same brands and compositions. The major allergens of mites were quantified in the various flours using the DEA-test. The studies and analyses performed were skin prick tests with mite extracts and with extracts prepared from the flours, culture of the mites in flours similar to those involved in the reactions, and single-blind oral challenge tests vs placebo with the flours and with acetyl-salicylic acid (ASA)⁷.

RESULTS

Twenty patients, 16 females and 4 males with a mean age of 22 ± 8 years, were included in the study (Table I). The clinical manifestations of the reactions presumably induced by flours ranged from isolated angioedema to anaphylactic shock occurring from five minutes to one hour after the ingestion of the food involved. The most common symptoms were periorbital angioedema and wheezy dyspnoea. Ninety per cent of the patients also reported a history of angioedema reactions, with or without dyspnoea, in relation with the ingestion of ASA or derivatives thereof.

The microscopic examination of samples of six flours involved in the reactions disclosed very high

levels of mite contamination: *Dermatophagoides farinae* in one sample, the storage mite *Thyreophagus entomophagus* in four, and another storage mite, *Suidasia medanensis*, in the remaining sample (Table II). Our patients evidenced positive skin tests and specific IgE to the flours involved in the reactions, and negative ones to the control flours. The RAST inhibition studies revealed partial cross reactivity between *Thyreophagus entomophagus* and *Suidasia medanensis* and the storage mite *Tyrophagus putrescentiae* and absence of cross reactivity between the two storage mites first named and *Dermatophagoides farinae*.

The DEA-test disclosed high levels of the Der f 2 allergen in the flour infested by *D. farinae*. The spectrophotometric analysis of the samples of the flours involved in the reaction showed that there was no contamination by ASA. The oral challenge tests with the flours involved in their reactions were positive in four patients, with systemic reactions characterised by angioedema and bronchial asthma with or without associated urticaria or digestive symptoms. The cultures of mites in flour samples showed that confectioner's flours favour the growth of mites, that this growth may be inhibited by low temperatures, and that the growth pattern depends on the mite involved.

Table I. Clinical characteristics of the patients

Patient No.	Age/Sex	Atopy	ASA intolerance	Food ingested	Clinical features
1	19/F	R/BA mites	AO	Vegetables*	Shock
2	26/F	R/BA mites	AO/BA	Pancakes	AO/BA
3	17/V	R/BA mites	AO/BA	Cake	U/AO/BA
4	38/F	R/BA mites	AO	Bread	AO/BA
5	26/F	RC mites	AO/BA	Pizza	AO/BA
6	33/F	R mites	AO/BA	Pancakes	AO
7	24/F	R mites	AO	Squid*	U/AO/BA
8	17/F	RC mites	AO	Cake	AO/BA
9	17/V	R/BA mites	AO/BA	Pizza	AO/BA
10	13/V	R/BA mites	—	Fish*	AO/BA
11	14/V	R/BA mites	—	Cake	AO/BA
12	13/F	RC mites	AO	Cake	AO/BA
13	33/F	R mites	AO	Pancakes	AO/BA
14	21/F	R mites	AO	Cakes	RC/AB
15	29/F	R/BA mites	AO/BA	Fish*	AO/BA
16	13/F	R/BA mites	AO	Cake	AO/BA
17	19/F	R/BA mites	AO	Pizza	AO
18	30/F	R/BA mites	AO/BA	Cake	RC/BA
19	19/F	R/BA mites	AO/BA	Meat*	U/AO
20	31/F	R/BA mites	AO/BA	Fish*	U/AO/BA

F = female, M = male, R = rhinitis, BA = bronchial asthma, RC = rhinoconjunctivitis, AO = angioedema, U = urticaria.

* Foodstuffs fried in flour batters.

Table II. Results of the microscopic examination of the flour samples

Flour	Mites/g.	<i>D. farinae</i>	<i>D. pteronyssinus</i>	<i>Th. entomophagus</i>	<i>S. medanensis</i>
P1	4.900	100%	—	—	—
P8	52.200	—	—	100%	—
P9	9.047	—	—	100%	—
P12	37.615	—	—	100%	—
P19	30.600	—	—	—	100%
P20	83.000	—	—	100%	—
Control	0-53	+	+	—	—

DISCUSSION

Mites are well known to play an important role in respiratory allergy. However, little attention has been paid up to now to the possibility that the ingestion of mite-contaminated foods might cause allergic reactions. Erben *et al.* were the first to report a case of anaphylaxis related to the ingestion of fritters contaminated by *D. farinae*³. Later on, a group of investigators from Venezuela described a series of patients with reactions induced by the ingestion of mite-infested flours, 66% of which also reported a history of intolerance to ASA^{5,8}. A group of Japanese authors have also reported two patients with anaphylactic reactions caused by the ingestion of foods contaminated by *Tyrophagus putrescentiae*⁶. We have ourselves had the opportunity to study several cases of allergic reactions after the ingestion of mite-contaminated flours in patients without food allergy^{9,10}. Our patients had as common denominator a history of respiratory allergy to house dust mites and ASA intolerance.

The possibility that the flours involved might have been contaminated with ASA was ruled out by spectrophotometric analysis, while their contamination by mites was confirmed by the microscopic examination of samples of the flours involved in the reactions. We have furthermore demonstrated, by means of oral challenge tests, that the reactions had been actually caused by the ingestion of the mites, and we have also confirmed that most of our patients were intolerant to ASA^{9,10}. This clinical association between reactions induced by ingestion of mites and ASA intolerance is highly significant. A possible explanation for it, however, is as yet unknown, although a number of hypotheses may be formulated^{11,12}.

We would also like to stress the implication in these reactions of two uncommon storage mites, *Thyrophagus entomophagus* and *Suidasia meda-*

nensis. As they had never previously been related to allergic reactions, their possible clinical transcendence should be investigated. Finally, with the help of mite cultures in flours we have demonstrated that confectioner's flours favour the growth of mites; for this reason, such flours should be stored in hermetic containers in a refrigerator so as to prevent their infestation, at least in climates that favour the proliferation of mites.

In conclusion, the ingestion of foods contaminated by mites may give rise to allergic reactions. Patients with respiratory allergy to mites should therefore be counselled to prevent the contamination of flours by mites, and even to avoid the ingestion of foods prepared with confectioner's flours, particularly if they also have a history of ASA intolerance.

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SECOND MAIN SUBJECT: DEBATE ON THE USE OF SPECIFIC *IN VITRO* DIAGNOSTIC METHODS IN PRIMARY HEALTH CARE

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Debate on the use of specific *in vitro* diagnostic methods in Primary Health Care

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INTRODUCTION AND USEFULNESS IN PAEDIATRICS

The observation of a clear increase in the incidence of allergic disorders is an evident fact in our professional routine practice. This fact implies, for those physicians who care exclusively for patients from the public health system, that we must carry out a number of measures aimed at chronological reshuffling of the population in the waiting list. In

other words, we have to try to give priority to those clinical disorders that will most rapidly benefit from our studies in terms of prevention, elimination of the causative allergen or specific therapy.

Which are the measures a hospital paediatric allergologist can put in motion for an optimal management of his waiting list?

In the first place, and this should be considered his obligation, he should request more resources from the adequate instances, in the form of more specialised health care personnel that will be able to attend, with the least permissible delay, those patients sent to us with a "preferent" label from the basic health care areas.

The allergologist will then have to hear a volume of mostly negative explanations from the local authorities. These explanations will be based in economicist terms and will usually ignore a fundamental general principle of our Constitution, that of equity, which should mean that every Spaniard has the right to be treated under equal conditions. Having heard all this, the allergologist will have to put his imagination seriously at work in order to devise ways and means to benefit those disorders, those patients who most need it, within that hypothetical equality.

The first step in this endeavour will be, after the obvious and oftentimes useless personal efforts to find imaginative ways to get more human resources through research grants, collaboration scholarships, clinical studies, etc., to try to assess and classify the interconsultation request slips from the primary health care centres in a completely subjective way. And this must be subjective and based in the experience garnered over long years of work. This experience will detect those "preferent" interconsultations requested because of extraclinical reasons, those mistaken requests due to lack of knowledge, those unforgivable delays in submitting the patient for specialised care, and finally those slips that should not have been completed. Let me now consider one by one those incidences, in the light of our own clinical practice.

– An interconsultation request slip (or "CH", for *consulta hospitalaria*, as they are called in Catalonia) with a "preferent" annotation does not always necessarily mean that that consultation should be moved forward in time. We all know that the pressure from the parents, caused by a problem the severity of which is inversely proportional to their stress, may sometimes cause the paediatrician to request "preferent" attention.