

Can inhalation of garlic dust cause asthma?

WE REPORT the case of a 16-year-old boy, resident in a rural environment, with no atopic history. For 5 years, he had helped his father load a van with strings of garlic, a task which raised a large amount of dust from the stored garlic. On the last two occasions, this activity was followed by rhinitis and asthma that required admission to hospital. The patient tolerated the ingestion of garlic. He was free of symptoms when not working. An allergologic study was carried out.

The prick technique with 32 airborne allergens, foodstuffs, and seven storage mites, using extracts from Aristegui (Bilbao, Spain), and Abelló (Madrid, Spain), was performed. Histamine (1/1000) was used as positive control and glycerosaline as negative control. Prick tests were also performed with a commercial garlic extract (Aristegui, Bilbao), garlic powder, powder from other members of the Liliaceae family including onion and spring onion (UCB-Stallergens), and a garlic dust extract prepared in our laboratory in the following manner. After shaking a portion of a garlic string into a sterile vessel, the released dust was recovered and diluted in 0.9% saline solution (concentration: 1/10 w/v). In addition, a garlic clove was peeled, and, after mashing and maceration in of only the flesh, saline, an extract was obtained at 1/10 w/v, and later put through a Millipore filter. The noncommercial extracts were tested on five nonatopic and five atopic subjects acting as controls.

Measurement of airway responsiveness to metha-

choline was performed by Chatman et al. method (2). We performed bronchial challenge tests with extract of garlic dust and *Tyrophagus putrescentiae*. Decreasing dilutions of garlic dust extract and *Tyrophagus* (1/10, 1/100, 1/1000) were used in skin titration until the final dilution was equivalent to the concentration that produced a wheal of 3 mm in diameter. This dilution was the initial dose in bronchial challenge tests, which we performed with a Devilbiss 646 inhaler, as in to previous studies (1). A positive response was defined as a drop of 20% in FEV₁ within the first hour. A late positive response was defined as a fall of 25% or more in the PEFR within the next 24 h.

■ Specific IgE was measured by fluorescent enzymeimmunoassay (FAST) (Ingelheim Diagnostics, Germany). Class 2 or above was considered positive. Specific IgE to garlic flesh was measured by the CAP system (Pharmacia Diagnostics, Sweden). The dust from the garlic supplied by the patient and from garlic harvested in other rural areas was studied by light microscopy.

■ The prick tests were positive to *Dermatophagoides pteronyssinus* (9 × 9), *D. farinae* (5 × 5), and *T. putrescentiae* (20 × 20). A positive result (5 × 5) was seen with garlic dust extract at a dilution of 1/10. Skin tests with the rest of the allergens were negative. No positive results were obtained with the extract of garlic dust and flesh in any of the controls.

The patient exhibited a methacholine PC₂₀ of 5 mg/ml. Challenging with the extract of garlic string dust (dilution 1/10) was negative. A fall of 15% from baseline FEV₁ was seen at 20 min, which began to recover at 30 min. With *Tyrophagus* (1/100), an immediate response (20% fall in FEV₁)

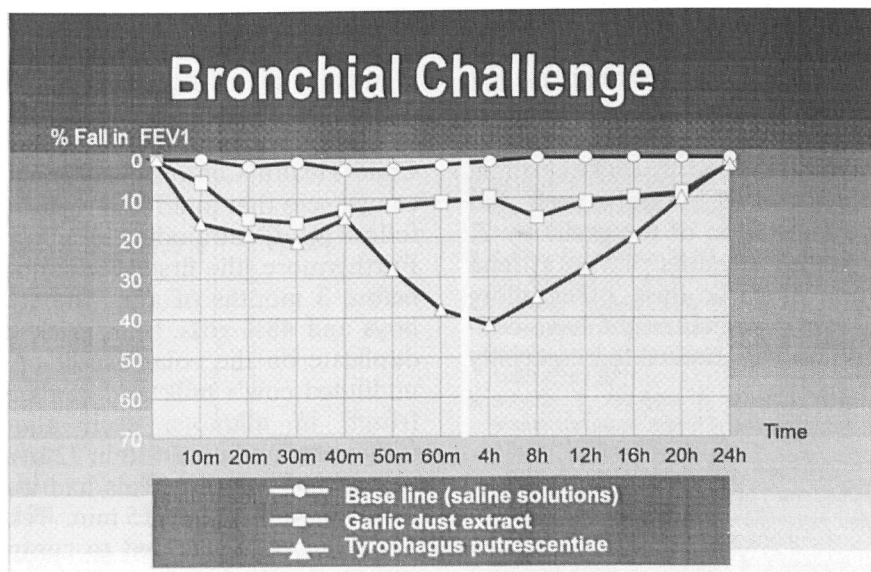


FIGURE 1 Bronchial challenge test with garlic dust extract and *Tyrophagus putrescentiae*.

was seen at 30 min, with a late response at 4 h, and the patient was sent to the hospital emergency ward. A fall of 40.8% in PEF was observed, and this was reversed by specific treatment (Fig. 1).

Positive RAST was found to *D. pteronyssinus* (class 2, 1.17 IU/ml) and to *Tyrophagus* (class 4, >44 IU/ml). Specific IgE to the remaining mites, pollens, fungi, and garlic extracts was negative. The three samples studied by microscopy presented infestation by *T. putrescentiae*. The degree of infestation was estimated at 1800 mites/g of dust.

Garlic is considered to be one of the most common causes of dermatitis of the fingertips in suppliers of foodstuffs. However, its association with asthma or rhinitis rarely has been reported in the literature. In 1940, Henson reported a case of occupational asthma, with immediate and late asthmatic reactions, induced by garlic dust in a sausage maker. Since then, we have found six cases that, as in our patient, suggest an etiopathogenic mechanism of IgE-mediate immediate hypersensitivity, determined by skin tests, *in vitro* tests, and immediate response in the bronchial challenge test (3–5).

We think that the asthma suffered by our patient could be considered occupational because, after a symptom-free sensitization period, symptoms and spirometric changes occurred during each exposure to garlic dust but improved rapidly after the patient ceased this activity. The true problem was this: which allergen of garlic dust causes this asthma? Our *in vivo* and immunologic tests showed a relevant association with sensitization to *T. putrescentiae* and a superinfestation by this mite in different samples of garlic dust. Arlian (J Allergy Clin Immunol 1984;74:166) described the allergenic properties of this storage mite, which can infest various dusts. Moreover, Ownby et al. (J Allergy Clin Immunol 1993;92:846) have described a case of anaphylaxis due to ingestion of another member of the Liliaceae family, the onion, showing that the cause was the superinfestation of the onions by *D. farinae*, and not the ingestion of pure onion.

In conclusion, we think that occupational asthma in our patient was not caused by garlic itself, but was due to the superinfestation of the garlic by *T. putrescentiae*. This finding suggests that in asthma induced by inhalation of garlic dust, other, more common causes of allergy which might have contaminated this dust should be checked for, especially storage mites.

A. ARMENTIA, MD
Sección de Alergia
Hospital Río Hortega
Cardenal Torquemada, s/n
47010 Valladolid
Spain

Accepted for publication 8 February 1996

REFERENCES

1. Armentia A, Tapias J, Barber D, Martín J, et al. Sensitization to the storage mite *Lepidoglyphus destructor* in wheat flour respiratory allergy. *Ann Allergy* 1991;68:398-403.
2. Chatman M, Bleecker ER, Norman P, Smith PL, Mason PA. Screening tests for airways reactivity. An abbreviated methacholine inhalation challenge. *Chest* 1982;83:15-18.
3. Fallarone E, Zeiss CR, Levitz D. Occupational asthma secondary to inhalation of garlic dust. *J Allergy Clin Immunol* 1981;68:156-60.
4. Lybarger JA, Gallager JS, Pulver DW, Litwin A, Brooks S, Bernstein L. Occupational asthma induced by inhalation and ingestion of garlic. *J Allergy Clin Immunol* 1982;69:448-54.
5. Seuri M, Taivanen A, Ruoppi P, Tukiainen H. Three cases of occupational asthma and rhinitis caused by garlic. *Clin Exp Allergy* 1993;23:1011-14.

Atopy and season of birth

EXPOSURE during the first months of life is important for atopic disease several years later (2, 3, 7). Especially children at high genetic risk of atopic disease, born during or immediately before the peak pollen season, seem to become sensitized and develop symptoms of allergy more readily than those without such risk factors (3). One large study has failed to demonstrate a seasonal effect (5). The cause of the discrepancy is unclear but can hardly be a selection bias in earlier studies, as at least some of them used objective assessments in unselected groups of subjects (3, 7). In a large study of serum samples, Aalberse et al. (1) showed that the risk of food sensitization peaked among subjects born during the winter and the lowest frequency was found among those born in May.

■ To determine whether the findings by Aalberse et al. (1) were reproducible, we performed skin prick tests in a nonselected series of 710 children, 7 months of age, taking part in a vaccination study. All the families of the children born in Linköping, Sweden, during 1992 were invited to participate at Child Health Centres. Exclusion criteria were circumstances that interfered with communication and follow-up. Contraindications were chronic illness. Furthermore, the first vaccination had to be given before 3 months of age. The study included 52% boys and 48% girls. Skin prick tests were done in duplicate on the volar aspect of the forearm with undiluted cow's milk and hen's egg (large batches frozen in aliquots; each aliquot thawed, refrigerated and used within 72 h) and were regarded as positive only if wheals had a mean diameter of 3 mm or more after 15 min. Tests with histamine 10 mg/ml were included to control for unresponsiveness due to treatment with, e.g., antihistamines (not found), and blank lancets were used to control

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.