

The Lung

Jean Bousquet

- A positive food challenge doesn't imply that there is an IgE mediated allergy but implies the patient is intolerant to certain foods.
- If specific IgE and/or prick test to a specific food-stuff is positive, an IgE-mediated mechanism is likely to be involved but a proportion of patients with IgE to foods do not present any symptom when ingesting the food.

Key words: Food allergy-induced asthma, epidemiology

Food allergy in asthma

Food allergy has always been a difficult problem to assess, especially in asthma, where some investigators deny its existence whilst others tend to overestimate its importance. Moreover, the diagnosis of food allergy is always difficult and double-blind food challenges should often be performed to confirm the diagnosis of food-induced asthma (1).

Clinical presentation

Respiratory symptoms due to an IgE-mediated food allergic reaction can suddenly occur if the food is not routinely ingested and may be associated with other symptoms of generalized anaphylaxis. These acute outbreaks of asthma may be extremely severe and fatalities have been reported (2,3). However, if the food is normally eaten, the patient may present with chronic asthma which is often associated with atopic dermatitis. Often, such patients present with severe asthma which is difficult to control. The severity of chronic asthma varies widely and may in mild cases only present as a persistent cough or as exercise-induced asthma (4).

In infants, symptoms may take the form of classical asthma but there may also be intermittent attacks of dyspnea, tachypnea and occasionally fever. Other symptoms of food allergy are often present concomitantly (5).

Diagnosis of food allergy-induced asthma

The diagnosis of food allergy in asthma is difficult because of the quality of the tests available but also because it should be demonstrated that the suspected food causes asthma. Such diagnoses are based on a suggestive clinical history, the demonstration of an IgE-mediated allergic reaction to food allergens and, at best, a food challenge.

Skin tests and measurement of food-specific IgE

The value of skin tests and serum specific IgE is dependent upon a number of variables amongst which the quality of the allergen extract used is of major importance. Allergen extracts currently available are not standardized, and their stability often remains poorly established. For allergen extracts which are rapidly degraded like those from fruits and vegetables, skin tests may be falsely negative in food allergic individuals. For fruits and vegetables, skin prick tests with raw fresh foods are required (prick+prick test) (6). Allergen extracts from egg, milk, fish, shellfish, nuts, peanuts, cereals are usually of better quality. Intradermal skin tests are more sensitive than prick tests but they are less specific. They may be used when prick tests are negative. The titration of serum food-specific IgE is available for many foods and is often more valuable than skin tests since the allergens used for these *in vitro* tests may be of better quality than

those used for skin tests. However, even more than in inhalant allergy, the presence of food-IgE in serum or positive skin tests to foods do not necessarily correlate with food allergy since only about 50% of patients with food-specific IgE have a clinical sensitivity.

Food challenge

Patients who develop acute urticaria or anaphylaxis often make the diagnosis of "food intolerance" by themselves, and the presence of positive skin tests and/or serum specific IgE correlating with the claims of the patient makes possible a diagnosis without performing a food challenge. This test may cause severe untoward reactions in patients with anaphylaxis and should be performed with extreme care. However, in asthma, patients rarely identify a food as a cause of wheezing so it is necessary to confirm the diagnosis by food challenge (7).

Food challenges should be performed in a manner similar to that reported by Bock and May (8) or Sampson et al. (9). The food suspected as causing symptoms should be eliminated from the diet for a minimum of 2 weeks before testing. Challenges should ideally be conducted in a double-blind manner, but if several foods are implicated, a screening with single blind challenges may be done first. In case of food-induced asthma, serial pulmonary function tests should be carried out for up to 8 hours since late reactions can occur (10). During all challenges, a physician should follow-up the patient since some untoward systemic reaction might occur. The challenge is only considered to be positive if $PD_{20}FEV_1$ is reached on a test day without any such drop in FEV_1 during a placebo day. If the challenge is inconclusive, it has been proposed to ask the patient to eat the amount of food ingested during a usual meal and to measure the pulmonary function serially. Food challenge data may be augmented by measuring non-specific bronchial responsiveness before and after oral challenge (11). A positive food challenge does not necessarily imply that the patient presents an IgE-mediated allergy but suggests that he is intolerant to certain foods. If specific IgE and/or prick test to a specific food-stuff is positive, an IgE-mediated mechanism is likely to be involved.

Elimination diets

Elimination diets are used primarily for the diagnosis of diseases such as eczema and rhinitis.

In the case of asthma, it is often difficult to make the diagnosis of food allergy by elimination diets for many reasons (10). Food allergy is almost constantly associated with inhalant allergy and possibly with other triggers, and variations in the airways obstruction may be due to factors unrelated to foods. Food allergens as well as inhalant allergens aggravate the non-specific bronchial hyper-reactivity and it may take days or even weeks to observe an improvement of asthma. The great variability of the airways obstruction in chronic asthmatics may shadow the benefits of dietary manipulations. However, when a patient is highly allergic to a given food, significant improvement or even complete remission of asthma can be observed.

Prevalence of food allergy in asthma

Asthma due to foods may be caused by immunologic and non-immunologic mechanisms. IgE-mediated allergy appears to be less common than food intolerance as a trigger of asthma.

Most cases of food-induced asthma are observed in early infancy and are then often related to cow's milk hypersensitivity (5). But there appears to be increasing numbers of infants allergic to egg, flour and peanuts. The prevalence of food allergy decreases with age. In areas where mugwort and birch pollens are rare, food allergy represents only a minor cause of perennial asthma, being present in 4-6% of asthmatic children (12) and in 1-4% of asthmatic adults (10, 13). However, when these pollen species are prevalent, allergy due to crossreactive food epitopes, such as celery, nuts or fruits, may be more important but anaphylactic, or gastrointestinal and dermatologic symptoms are likely to be more frequent than asthma. According to the regular diet of a given country, differences may be observed, such as dye-allergy that was reported to be relatively frequent in Great Britain.

Treatment of asthma induced by food allergy

The presence of a positive skin prick test or serum IgE test to a given food should not lead to an elimination diet because only 30 to 40% of patients have asthma when they are challenged orally with the offending food (8,10). A positive food challenge favors dietary avoidance (14) but nutritional balance must always be maintained especially in infants and young children since many infants are

now being placed on dangerously inadequate diets. Also, the reintroduction of a food, accidental or intentional, may be associated with anaphylaxis or severe respiratory obstruction since individual patients tend to continue to react with the same symptoms as they had before.

The efficacy of oral sodium cromoglycate is not completely established but this drug was found in some studies to prevent asthma due to food allergy (10, 15). It is clear that only a fraction of patients benefits from this treatment.

There is at present no evidence to support specific immunotherapy by either the oral or the parenteral route. If such a treatment is administered it must be done for research purposes, in an intensive care setting by specialized doctors since deaths have been reported.

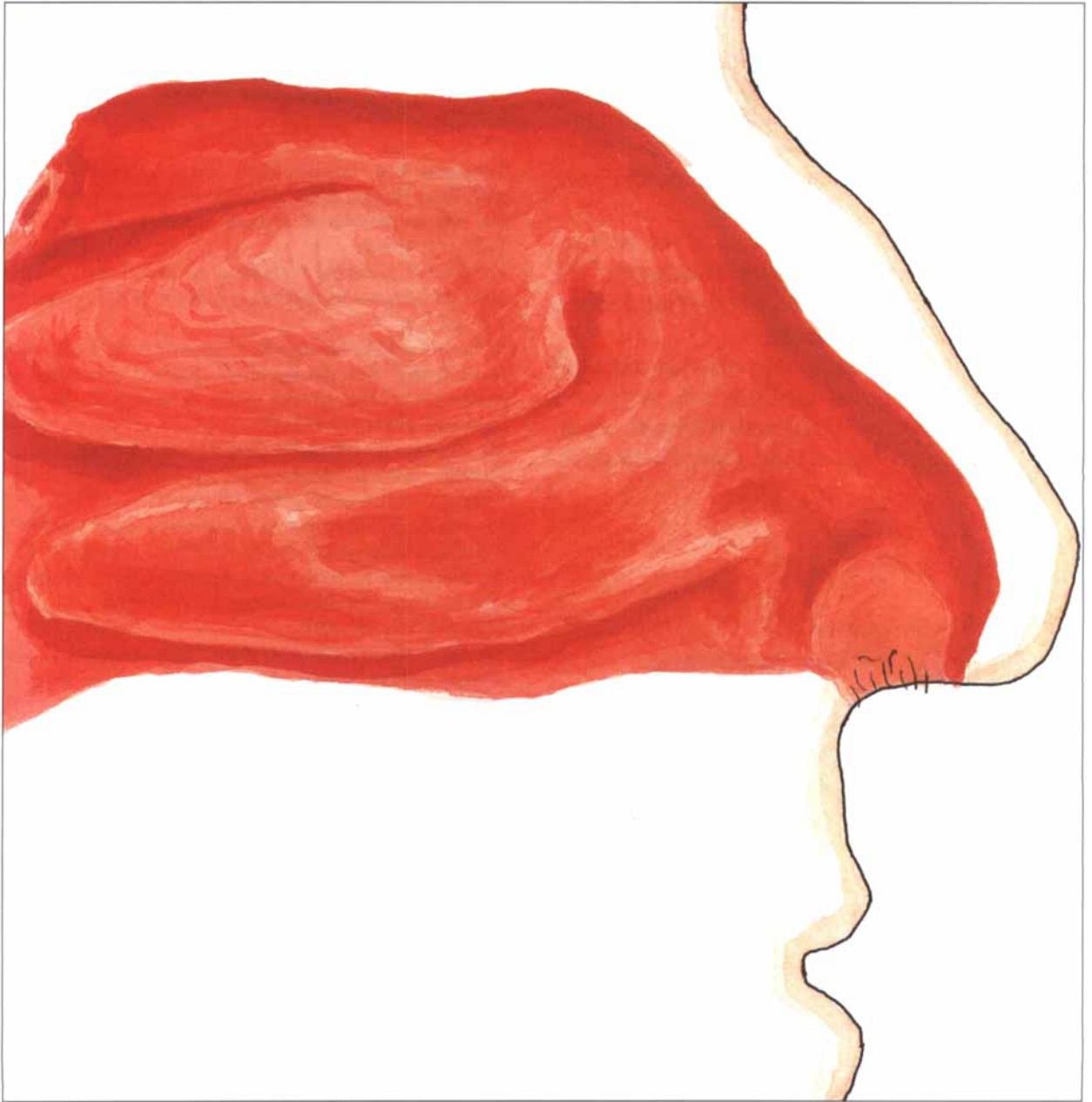
In any case, asthma is a disease of the airways and patients should always have a treatment of the bronchial inflammation and obstruction besides the treatment of food allergy.

The prevention of food allergy may be attempted in the high-allergic risk newborn, but, at present there is no clear demonstration that breastfeeding, even over a long period of time, prevents the onset of allergy.

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