Are Food Allergies on the Rise, or Is It Misdiagnosis?

Given the prevalence of news regarding food allergy in today's media—from parenting blogs that debate whether schools should ban nuts and peanut butter, to the school bus that was evacuated and decontaminated after someone saw a peanut on the floor (1), to the 2007 report of a child in the United Kingdom barred from school because administrators deemed his nut allergy a health and safety hazard (2)—it might be assumed that a large number of individuals suffer from food allergy. In fact, although the Centers for Disease Control and Prevention have reported that in the United States, from 1997 to 2007, food allergies in children rose 18% (3,4), only a small percentage of the population—approximately 4% to 8% of children and roughly 2% of adults (5)—have diagnosed food allergies.

Researchers are confounded by this increase in food allergy diagnosis and by another puzzling proliferation: a recent uptick in misdiagnosis. Being unnecessarily subjected to social burdens of allergy aside, there may be serious medical consequences to adhering to a needlessly restrictive diet—that is, if a child has needlessly avoided a given food because of the parents' allergy fears—it has been suggested that a sensitivity to that food could develop if it is ultimately consumed later. Similarly, an adult experiencing gastrointestinal problems may self-diagnose the onset of food allergy or receive faulty medical advice based on unreliable tests. Furthermore, because the terms *food allergy*, *food intolerance*, and *food sensitivity* are frequently and often incorrectly used interchangeably, misunderstanding of the actual problem is possible.

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Because registered dietitians (RDs) will likely encounter patients seeking dietary counseling for suspected or diagnosed food allergies, they must be aware of current considerations when advising patients and clients regarding food allergies, both real and misdiagnosed, while also taking into account individual needs.

THE PROBLEM WITH TESTING

In the early 1980s, conflict regarding how to define a true allergy existed, with "some physicians (who usually care for children) ascrib[ing] a staggering array of symptoms to foodstuffs" whereas "others (who usually care for adults) seem[ed] unwilling to consider any food reaction 'allergic' except for acute anaphylactic reactions" (6), leading to a "dubious reputation" for the subject of food allergy altogether. An emphasis on testing was encouraged, though questions of reliability persisted.

Despite improvements, unease about the dependability of food allergy test results are still an issue, as false-positives and even false-negatives are entirely possible. Intradermal testing for food allergy, for instance, is not advised because it has a high rate of false-positives, and skin prick test results can be affected if the patient has recently taken antihistamine (7). It has been noted that a combination of skin prick testing plus allergy patch testing could help with identification of food allergens, but false-positive results are still a concern (8). Complicating matters is that when a test reveals higher serum levels of allergen-specific immunoglobulin-E (s-IgE) antibodies, it only reveals probability of a reaction to food and not clinical relevance (7); accordingly, a patient may test positive for s-IgE to a food, but this does not necessarily mean that there is clinical allergy and that that patient will suffer adverse effects from consuming that food (9). Furthermore, when an allergy test reveals sensitization, it does not indicate whether the s-IgE is the actual cause of the symptoms (9,10). In fact, s-IgE has "suboptimal predictive values" (8). Thus, the selection of which allergens to test should actually be based on patient history—"symptoms, environmental and occupational exposures, age, and other relevant factors"—and not random; any food that a patient has tolerated should not be tested. A false-negative is possible if inflammatory response to a food does not occur in an IgE-mediated immune mechanism (9).

For these reasons, diagnostic tests should not be considered the means for determining presence of allergy but "should be used to support or exclude a diagnosis of specific allergies based on the history" (9). It should be noted that the most common allergens are cow's milk, egg, soy, wheat, peanut and tree nuts, fish, and shellfish; children are most frequently allergic to cow's milk, egg, peanut, soy, wheat, and fish, whereas adults respond most often to peanut, tree nut, fish, and shell fish (7). However, allergic response can be set off by any food (though allergy to chocolate, citrus, berries, and corn are unusual) (9).

Food additives—most frequently annatto, carmine, and saffron—may also be suspect for causing an adverse reaction in patients, though they shouldn't be considered until all potential food allergens have been ruled out. Food additives are usually identified as a potential trigger if a patient's history of adverse reaction seems to be caused by unrelated foods or if a specific food is normally tolerated only if prepared at home (11). However, prevalence of food additive allergy is low, and there is little agreement in the literature regarding the signs and approximate pervasiveness, as reliable studies in this area are scant (11). For instance, monosodium glutamate, or MSG, has long been associated with allergic response in restaurant settings, partic-

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ularly in establishments that serve Asian dishes. But despite descriptions of moderate to severe reaction to the alleged offending food, double-blind challenges failed to establish a link and reactions were "inconsistent and not reproducible" (11). Furthermore, in the case of tartrazine—FD&C yellow no. 5—which is commonly used in sweets and has been linked to a few cases of asthma and urticaria, challenge testing has demonstrated that the claims of allergic response have far outnumbered the confirmed cases (11).

Oral food challenges, whereby "small doses of food are administered in gradually increasing amounts until a full serving of the allergen has been ingested" as vital signs and target organs are monitored (7), are a recommended tool for confirmation of diagnosis.

Diagnosis must be confirmed not only because of the terrifying possibility of anaphylactic shock—which may involve a combination of the gastrointestinal tract, the skin, respiratory tract, and cardiovascular system—but because of the possibility of misunderstanding the body's response to a food, whether by the individual who consumed the food, a family member, or even a health care professional.

DIAGNOSIS AND MISDIAGNOSIS

The burden of food allergy can be great. Among 87 families with children with food allergy, 60% indicated that family social activities were affected and one third noted that school attendance had been negatively affected (12). One might assume, then, that a number of families are needlessly put through such challenges: Although the incidence of clinical food allergy in the population is quite low, some studies have found that parents believe that, among children younger than age 3, 28% to 43% have a food allergy (12), whereas another study found that 10% to 20% of the public thinks that a family member or they themselves have a food allergy (13); and, one fourth of US households reported dietary habit modification to respect a family member's food allergy (12). Furthermore, children with peanut allergy have been found to be anxious about being away from home, more fearful of adverse health effects beyond the allergy, and restrictive of their physical activity (12).

What accounts for the discrepancy in actual numbers versus the overreaction in the public? One contributing factor is that the characterization of clinical allergy is largely misunderstood by the public—who may be quick to ascribe nasal congestion, stomach pain, and headaches as a reaction to food (14)—and professionals who misread serum test results, which can overestimate or underestimate the body's response or "fail to distinguish between similar proteins in different foods" (4).

A reaction to food is deemed allergy only if it occurs as an immune response, but some foods—including spoiled fish, most notably tuna, mackerel, mahi-mahi, and bluefish, and cheeses—can release bacteria that cause histamine conversion that mimics the effects of food allergens (13).

If a negative response is not associated with the immune system, then it is likely a food intolerance or sensitivity—though, as noted previously, these designations are frequently used as inaccurate synonyms for food allergy in the medical literature and lay press. *Intolerance* is frequently the term used, because—as "food allergy has no pathognomonic or unique symptoms . . . food may not be involved at all . . . [and] the mechanism may not be immunologic"—using the catchall helps to "avoid the task of sorting out the underlying mechanism" (10).

Food intolerance may be caused by metabolic defect, as in the case of lactose intolerance, or food idiosyncrasy, or "adverse reactions to foods or food components that occur through unknown mechanisms and which can even include psychosomatic illness" (13). Or, the body's reaction could even be the result of food poisoning. A 2008 salmonella outbreak tied to a peanut processing plant demonstrated that diarrhea or vomiting after consuming peanuts is not always an immunologic response.

Self-Diagnosis

A major difficulty in the proliferation of self-diagnosis or diagnosis of children by parents is that "they are often erroneous, leading to the identification of the wrong foods, and implicate

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