

Adult-Onset Food Allergy

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ABSTRACT: The prevalence of food allergy is increasing in both the pediatric and adult populations. While symptom onset occurs mostly during childhood, there are a considerable number of patients whose symptoms first begin to appear after the age of 18 years. The majority of patients with adult-onset food allergy suffer from the pollen-plant allergy syndromes. Many of them manifest their allergy after exercise and consuming food to which they are allergic. Eosinophilic esophagitis, an eosinophilic inflammation of the esophagus affecting individuals of all ages, recently emerged as another allergic manifestation, with both immediate and late response to the ingested food. This review provides a condensed update of the current data in the literature on adult-onset allergy.

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Prevalence rates of allergic diseases have been increasing worldwide over the last few decades, especially in industrialized countries [1,2]. Allergic diseases are often regarded as pediatric problems since some of them start in early childhood. The subject of allergic reactions in the elderly has not been investigated in depth thus far, yet one-fifth of the population in developed countries was aged 60 years or more in 2000, and this is expected to rise to one-third by 2050 [3]. Allergic reactions present with a variety of symptoms involving cutaneous (e.g., urticaria, angioedema, eczema), respiratory (rhinitis, asthma), gastrointestinal (diarrhea), or generalized anaphylactic reactions [4,5]. Up to 25% of adults believe that they or their children suffer from food allergy, although the actual prevalence seems to be lower, i.e., ~5%–8% of children and 2%–3% of adults suffer from objectively confirmed food hypersensitivity [1,2].

A 2004 German study determined a point prevalence of food hypersensitivity by conducting a double-blind, placebo-controlled food challenge in 2.6% of the general population aged 18–79 years [6]. The most frequent foods that elicited allergens in childhood were egg, milk, peanut, soy and wheat, whereas the most prevalent pollen-associated food allergies

in adults were elicited by fruits, vegetables, nuts, fish and shellfish [7–10].

Sensitization to food allergens may occur directly or indirectly through cross-reactivity with aeroallergens. Birch pollen is one of the most common causes of rhinoconjunctivitis and allergic asthma in Northern and Central Europe and North America. It has long been known that patients with birch pollen allergy may develop immediate reactions to fruits and vegetables in addition to seasonal respiratory symptoms. This birch-fruit-vegetable syndrome is characterized by local symptoms at the site of food contact, such as itching of the lips, tongue and throat, sometimes accompanied by swelling of the lips and tongue, and it is referred to as oral allergy syndrome [11–14]. Systemic and more severe immunoglobulin E-mediated reactions, such as urticaria, asthma, or anaphylactic shock, may sometimes occur. Birch pollen-related food allergy is considered a consequence of immunological cross-reactivity between ubiquitous birch pollen allergens and structurally related food proteins. IgE antibodies specific for the major birch pollen allergen, Bet v 1, have been shown to cross-react with homologous proteins identified in different stone fruits, such as apple (Mal d 1), cherry (Pru av 1) and pear (Pyr c 1), as well as hazelnut (Cor a 1), celery (Api g 1), carrot (Dau c 1), soybean (Gly m 4), peanut (Ara h 8), jackfruit, and kiwi (Act d 8). Bet v 2, the birch pollen profilin, is another allergen capable of inducing cross-reactive IgE antibodies. Bet

Food allergy is becoming a common health problem in adults

v 2-specific IgE antibodies have been shown to recognize profilins in apple, banana, carrot, celery, cherry, hazelnut, pear, pineapple, potato and tomato. Patients with birch pollen allergy who display IgE reactivity to birch pollen-related allergens in foods often do not develop clinical symptoms when consuming those foods.

Patients sensitized to ragweed pollen may react to the Cucurbitaceae family (melon, cantaloupe, honeydew, watermelon, zucchini, cucumber) and to the Musaceae family (bananas). Patients sensitized to mugwort pollen may also react to the Apiaceae family of food (carrot, celery, parsley, caraway, fennel, coriander, aniseed). Patients allergic to mugwort may develop allergic symptoms to mustard and experience severe reactions (mugwort-mustard syndrome) [15].

Also well known is the latex-fruit syndrome: approximately 30% to 50% of patients who have an allergy to natural rubber

IgE = immunoglobulin E

latex demonstrate allergy to plant-derived food, especially to fruits such as avocado, banana, chestnut, kiwi, peach, tomato and others [16].

Profilins are ubiquitous proteins, present in all eukaryotic cells and identified as allergens in pollen, latex, and plant foods [17]. The highly conserved structure confers the cross-reactive nature of IgE antibodies against plant profilins and their designation as pan-allergens. Primary sensitization to profilin seems to arise from pollen sensitization, with later development of cross-reactive IgE antibodies against plant food (and possibly latex) profilins. The role of profilin in inducing allergic symptoms needs to be evaluated and raises important issues for the diagnosis of allergy due to cross-reactivity. IgE cross-reactivity among profilins is associated with multiple pollen sensitizations and with various pollen-food syndromes. In respiratory allergy, sensitization to pollen to which the patient has virtually no environmental exposure has been identified as a manifestation of profilin sensitization. As a food allergen, profilin usually elicits mild reactions, such as oral allergy syndrome; it is not modified by processing, and it is especially important in allergy to some fruits such as melon, watermelon, banana, tomato, citrus and persimmon. Purified natural and recombinant profilins for in vitro and in vivo allergy tests are helpful in the diagnostic workup. As a pan-allergen, profilin is associated with multiple pollen sensitization and pollen-food-latex syndromes that the allergist needs to be aware of in order to reach an accurate diagnosis and choose optimal treatment. In reviewing the current state of knowledge about profilin and its implications in the diagnosis and treatment of allergic diseases, we conclude that although its role in triggering allergic symptoms is still controversial, this is undoubtedly an allergen of considerable impact.

Lipid transfer proteins are by far the most frequent cause of type 1 food allergy in adults living in Mediterranean countries [18-21], but they are very rare in Northern Europe. Offending fruits also differ between geographic areas, peach being the most frequent sensitizer in Italy and Spain and wine or hazelnut causing the rare cases observed in the north. The reasons for this strange distribution are still unclear, but some published data provide clues that point to a possible transdermal or respiratory sensitization to this protein. Lipid transfer proteins are particularly abundant in peach fuzz [22] which, in turn, is particularly abundant in freshly picked peaches. Many workers employed in picking and handling peaches in the area of Ferrara (a commune in northern Italy) must wear gloves to avoid the occurrence of contact urticaria induced by these fruits, but, interestingly, the same workers have never reported similar problems handling nectarines, apples, pears, plums or cherries.

Previously considered a rare condition, eosinophilic esophagitis has become increasingly recognized as an important

cause of dysphagia and food impactions in adults [23,24]. This is likely attributable to a combination of an increasing incidence of eosinophilic esophagitis and a growing awareness of the condition among gastroenterologists and pathologists. This is illustrated by a PubMed search conducted in February 2009 using the term *_eosinophilic esophagitis_* which identified 403 publications since 2000 compared to only 38 publications prior to that time. There has been a substantial increase in reports of eosinophilic esophagitis both in adults and children from Europe, Asia, Australia and North and South America. Noel and Rothenberg [25] reported the incidence of eosinophilic

The presentation of adult-onset food allergy can be different than pediatric-onset food allergy

esophagitis in children residing in Hamilton County in Ohio, USA: in 2000 the estimated incidence was 0.91 case/10,000 with a prevalence of 1 case/10,000 compared with 1.7 cases/10,000 and a prevalence of 10.4 cases/10,000 in 2007. Straumann and Simon [26] reported a similar trend among adults in Olten County, Switzerland, with an incidence of 0.15 cases/10,000 and a prevalence of 3 cases/10,000 in that catchment area. A population-based study in Sweden randomly surveyed 2860 healthy adults, 1000 of whom underwent endoscopy with esophageal biopsy, and reported histological eosinophilia meeting criteria for definite or probable eosinophilic esophagitis in 1% of that population [27]. The pathophysiology of eosinophilic esophagitis remains largely unknown, although the entity has been increasingly linked to food allergies and aeroallergens [28]. The vast majority of patients (90%) are sensitized to both food and aeroallergens, yet only 10–30% have a history of anaphylaxis. Beef, chicken and cows have been implicated as causing esophageal inflammation in patients with eosinophilic esophagitis.

Fortunately, the rate of fatal food allergic reactions is very low [29]. As demonstrated by pooled data from the American Academy of Allergy, Asthma and Immunology Registry of Anaphylactic Deaths in the USA, 89% of the 63 reported cases occurred in adolescents and adults, with approximately 50% occurring in teenagers.

In conclusion, food allergy is generally considered the domain of the pediatric population since symptom onset is, indeed, mostly during childhood. The aim of this review is to increase the awareness of the primary care physician to the newly emerging evidence on the magnitude of adult-onset food allergy in order to expedite the appropriate management for those patients.

Special precaution should be taken when asthma coexists with food allergy

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