

Food Allergies in Children: Review Questions

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QUESTIONS

Choose the single best answer for each question.

- 1. An 8-year-old boy presents to the emergency department in respiratory distress. His symptoms began within 15 minutes after he ate a chocolate chip cookie, and he has had similar reactions after eating foods containing peanuts and other ingredients. Physical examination reveals diffuse urticaria, angioedema, and bilateral wheezing. The patient is treated with epinephrine, antihistamines, and oral corticosteroids, and he recovers. What type of hypersensitivity reaction has this patient experienced?**

 - Type I
 - Type II
 - Type III
 - Type IVa
 - Type IVb
- 2. A 4-year-old boy presents to his primary care physician for a well-child examination and routine immunization. In the time between his first measles-mumps-rubella (MMR) vaccine and now, he has developed severe atopic dermatitis. Evaluation by an allergist/immunologist revealed IgE-mediated allergy to egg, soy, and peanut. He has had anaphylaxis after eating peanut, and eating eggs results in urticaria and worsening of his atopic dermatitis. His mother read that MMR vaccine is produced from eggs and is concerned about a possible reaction. What is the next course of action for this patient?**

 - Proceed with the vaccination
 - Refer the patient for desensitization to egg protein and then proceed with immunization
 - Delay vaccination because of the history of documented egg allergy
 - Repeat skin prick testing and, if negative, proceed with immunization
 - Use gradually increasing doses of the vaccine to decrease the risk of a reaction
- 3. A 10-year-old girl has a history of perennial allergic rhinitis with seasonal exacerbations in April and May. In vitro testing revealed IgE-mediated allergy to several inhalant allergens, including birch tree pollen, *Aspergillus fumigatus*, and dust mite. She also complains that ingestion of certain foods causes her mouth and lips to itch. Which of the following foods is most likely to cause this patient's oral symptoms?**

 - Wheat
 - Apple
 - Soy
 - Milk
 - Tomatoes
- 4. Which of the following is a current recommendation of the American Academy of Pediatrics (AAP) for decreasing the incidence of food allergy in at-risk children?**

 - Breast feed exclusively for 12 months
 - Include peanut in the lactation diet to induce oral tolerance
 - If unable to breast feed, use soy-based formulas rather than cow's milk formula
 - Delay introduction of solid foods
 - Begin feeding whole cow's milk at age 4 months, before allergies develop

(turn page for answers)

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ANSWERS AND EXPLANATIONS

- (A) Type I.** This patient had a type I, or immediate, hypersensitivity reaction. This IgE-mediated reaction affects between 3.5% and 4% of Americans; however, not all reactions are as severe as the reaction described in the case patient. Sensitized individuals produce allergen-specific IgE molecules that attach to circulating mast cells. Reexposure to the same allergen causes cross-linking of the IgE molecules and subsequent degranulation of the primed mast cells. Histamine, leukotrienes, and other inflammatory mediators are then released, causing a spectrum of clinical features. Patients with a history of anaphylaxis after ingestion of a food should always be evaluated by an allergist/immunologist to identify the causative allergen. Testing for immediate hypersensitivity can be performed in vivo (skin prick testing) or by measuring total IgE levels and specific IgE antibody levels in vitro. Clinical history, in vivo testing, and measurement of specific IgE antibody levels allow the allergist/immunologist to predict the likelihood that a reaction will occur upon re-exposure to that food and also to predict the need for carrying an epinephrine auto-injector.¹ Types II, III, and IV hypersensitivities do not manifest as described in the case. Rather, type II hypersensitivity involves complement, type III involves immune complex formation, and type IV is cell-mediated, or delayed type hypersensitivity.
- (A) Proceed with the vaccination.** Contrary to popular belief, egg allergy is not a contraindication to use of the MMR vaccine.² Contraindications include anaphylaxis to a prior MMR vaccination, anaphylaxis to neomycin, or a history of gelatin allergy. In cases of prior anaphylaxis to eggs (not observed in the case patient), the patient should be observed for 90 minutes after receiving the vaccine. Skin prick testing prior to vaccination is not recommended because it is not predictive of development of a hypersensitivity reaction to the vaccine.³ Neither desensitization to egg nor using incremental doses of vaccine has a role in management in this case.
- (B) Apple.** This patient has a condition known as the “oral allergy syndrome.” While most allergies are considered to be allergen-specific, cross-reactivity between inhaled allergens and some food allergens (eg, oral allergy syndrome) has been well documented. Symptoms include oral pruritus and tingling

as well as mild lip swelling. Oral allergy syndrome is an IgE-mediated reaction that occurs when epitopes shared between inhalant allergens and food allergens cross-react. Patients with birch tree pollen allergy may have oral symptoms when eating apples, celery, potatoes, or plums. Patients with ragweed allergy may react to fresh melon or bananas, and individuals with grass pollen allergy may react to raw tomatoes.¹ Because digestion and enzymatic degradation occur after ingestion, symptoms are localized to the oropharyngeal mucosa and systemic symptoms are rare. Evaluation by an allergist/immunologist and avoidance of the causative foods is usually recommended.

- (D) Delay introduction of solid foods.** Infants at high risk for developing food allergies can be identified based on a strong family history of atopy. Once a high-risk infant is identified, the AAP recommends exclusive breast feeding for 6 months, eliminating peanuts and nuts from the lactation diet, calcium and vitamin supplementation during restricted lactation diets, and avoiding soy formulas.⁴ Hypoallergenic infant formulas (extensively hydrolyzed case in formulas) should be used when not breast feeding. A delay in introducing solid foods is also recommended, with the least allergenic foods being introduced at age 6 months.⁵ Cow’s milk can be introduced at 12 months, eggs at 24 months, and peanuts, nuts, and shellfish at 36 months. Exclusive breast feeding for 12 months is not a recommendation of the AAP.

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