

FOOD ALLERGIES

COMPETENCY – The resident should be able to define food allergy, develop a differential diagnosis for food allergy, including differentiating between food allergy and food intolerance, and understand the tools used to diagnose food allergies in an allergist’s office. In addition, the resident should be able to devise a therapeutic plan, including prevention strategies, for a child with food allergy.

CASE - A mother brings her 3 ½ year old child into your office for a well-child check. She is worried that her child may have food allergies, but he is otherwise healthy. She reports that for the last several months, her child complains of “an itchy tongue” and abdominal pain, usually 30 minutes to an hour after eating melon. There is a strong family history of allergic rhinitis and asthma, but no food allergies. She does report that he has had a constant runny nose for the last six months. On physical exam, he is a healthy-appearing child with bilateral pale, boggy turbinates and clear nasal discharge.

QUESTIONS –

What is food allergy?

What are the most common foods triggering allergic reactions?

What are the differential diagnoses for food allergies?

How is the diagnosis of a food allergy (ies) made?

What are the therapeutic strategies used for a child with food allergies?

REFERENCES –

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FOOD ALLERGIES – Q&A

What is food allergy and what are its symptoms?

Food allergy, also known as food hypersensitivity, is an adverse immune-mediated pathological reaction to food. Food allergies can be broadly divided into two types of immune-mediated reactions: IgE and non-IgE mediated hypersensitivity to food. IgE mediated food allergies can affect a variety of target organs: the skin, manifested as urticaria and/or angioedema; the respiratory tract, as wheezing and/or allergic rhinitis; the gi tract, causing vomiting, abdominal pain, and/or diarrhea; and the cardiovascular system resulting in hypotension and/or cardiac arrhythmias. An immediate, systemic IgE-mediated reaction is anaphylaxis and can develop into a severe, potentially fatal allergic reaction on repeated exposure to the causative food. With non-IgE mediated (or T-cell mediated) food allergies, patients can have reactions to food, such as atopic dermatitis flare-ups or severe vomiting and diarrhea progressing to shock on ingestion/exposure to the offending food. These patients are skin test negative to the causative food despite their clinical symptoms.

Specific examples of IgE mediated food allergy are:

Oral Allergy Syndrome:

Oral allergy syndrome is a form of contact allergy with a specific food. In patients who have seasonal allergic rhinitis, ingesting certain fruits or vegetables cause symptoms of pruritis and angioedema of the lips, tongue, palate and throat that is rapid in onset and resolution. The causative fruit or vegetable is thought to have antigen-specific cross-reactivity with the pollen causing the allergic rhinitis. Patients with the diagnosis of Oral Allergy Syndrome do not exhibit immediate hypersensitivity in other organ systems.

Immediate GI Hypersensitivity Reactions:

Immediate gastrointestinal symptoms induced by ingesting a certain food can occur within minutes of ingestion up to 2 ½ hours later. Symptoms include nausea, vomiting, diarrhea, colic and abdominal pain. Vomiting may be explosive, or in the case of chronic, long-standing exposure, may be intermittent, or even absent, and accompanied by poor weight gain. These GI symptoms may accompany reactions, such as wheezing or pruritis.

Urticaria and Angioedema:

Ingestion of, or direct contact with, the offending food may cause a wheal and flare. Food allergies more commonly cause acute rather than chronic urticaria or angioedema. The reactions are mediated by antigen-specific IgE that are delivered to the skin through the circulation. Cutaneous reactions can occur as isolated symptoms or as part of a systemic reaction. Topical reactions from direct contact must be differentiated from true allergic reactions, especially in infants who may end up with most of the offending food on their face and body with only some, or even none of the food actually ingested.

Anaphylaxis:

While anaphylaxis refers to any immediate IgE-mediated systemic reaction, it is anaphylactic shock, the most severe and potentially fatal form, which is often thought of and described. Severe/fatal anaphylaxis is an IgE dependent mechanism causing massive release of mediators. Patients at highest risk are those with previously identified food allergy. Additionally, adolescents with underlying asthma seem to be at highest risk of death. Symptoms range from *mild*: mouth tingling, itching, odd taste, flushing, urticaria, abdominal pain, nausea, vomiting, diarrhea, uterine contractions, to *severe*: throat tightness, hoarse voice, stridor, wheezing, hypotension, cyanosis, feeling of impending doom. The time course is usually fairly quick: minutes to 1 hour after ingestion. It can also follow a biphasic pattern, where the “immediate” reaction is followed hours later by a “late-phase” reaction caused by a second wave of inflammation. In

an unusual form, anaphylaxis can occur after exercise, usually after ingesting the specific food 2-4 hours before exercising. In the unusual form, the specific food does not induce symptoms during rest, but these patients often have positive skin-prick tests to the causative agent. In all anaphylaxis, typical triggers are nuts, peanut and seafood. Aspirin, exercise or alcohol can increase the risk.

Respiratory: wheezing and rhinitis:

Symptoms of wheezing and/or nasal reactions to food are usually uncommon as isolated symptoms and usually occur as part of multiple-organ system allergic pathological reaction. The highest incidence occurs among children with a previous diagnosis of asthma or atopic dermatitis.

Other IgE associated/cell –mediated food allergy are:

Atopic dermatitis:

Atopic dermatitis is a chronic inflammatory skin disorder whose major features include pruritis and typical morphology of scaly and lichenified lesions and distribution of lesions on the extensor surfaces of extremities and face in infancy and on the flexor surfaces of extremities and neck in older children. Approximately 35% of children with mod-severe AD have food allergy with positive skin-test to certain foods, causing a flare-up of their eczema. Common causes are : cow's milk, egg, soy and wheat. Often times, elimination of these foods can improve their eczema.

Eosinophilic gastroenteropathies:

Eosinophilic gastroenteritis (EG) or eosinophilic esophagitis (EE). Although occurring predominantly in early to midadulthood, eosinophilic gastroenteropathies can be found in any age group. With EG, symptoms can include abdominal pain, diarrhea, melena, weight loss. Patients with EE present with symptoms of dysphagia, abdominal pain, vomiting, weight loss, occult blood loss/anemia and failure to thrive.

In either EG or EE, there is often peripheral eosinophilia as well as eosinophils found on biopsy of the stomach or esophagus. Symptoms may mimic GERD, but patients with EG/EE are unresponsive to reflux meds and have negative pH probes. Generalized symptoms can also be present and include: ascites, weight loss, edema and obstruction. Patients are often responsive to oral corticosteroids, and symptoms resolve after the causative agent is eliminated from their diet.

Not all food allergies are IgE dependent. Cell-mediated food allergies cause allergic reactions often chronic or delayed in nature. Non-IgE mediated food allergies include:

Food Protein-Induced Enterocolitis Syndrome:

Symptoms of FPIES include vomiting and diarrhea and can progress into a severe shocklike state. These patients usually present in the first few months of life and the disorder typically resolves by 2 years of age. The onset of symptoms are delayed, compared with IgE mediated reactions, and can occur from 1 to 10 hours after exposure. Usually emesis is the initial symptom followed by diarrhea. The most common offending foods are: cow's milk and soy. Other reported triggers are egg, wheat, rice, oat and peas. Laboratory findings include increased blood neutrophil count during a positive food challenge. There is no skin-test positivity to the offending food.

Food Protein-Induced Proctitis:

This type of food allergy occurs in early infancy and presents with blood-streaked stools in well-looking infants. Lesions (neutrophil/eosinophil infiltration) are limited to distal large bowel. Blood loss is usually minimal. Common triggers are milk and soy, but can also occur in breast fed babies.

Food Protein-Induced Enteropathy:

Also occurs in infancy but presents with diarrhea, poor weight gain and vomiting. Intestinal biopsy reveals villous atrophy and cellular infiltration, leading to malabsorption of proteins and nutrients. Patients can sometimes present with edema and FTT. Anemia is less common. Most common trigger is milk, but also soy, egg, wheat and other foods.

Celiac disease:

Celiac disease is a specific food protein induced enteropathy caused by a reaction to gliadin, the alcohol-soluble portion of gluten found in wheat, oat, rye and barley. Villous atrophy and cellular infiltration found on biopsy are reversed by eliminating gluten from the diet. GI symptoms include weight loss, chronic diarrhea, steatorrhea and abdominal distention. Extra-intestinal features include oral ulcers.

What are the most common foods triggering allergic reactions?

In the U.S. the most common food allergies are milk, egg, peanut, soy, wheat, tree nuts, fish and shellfish. Milk is the most common food allergy with approximately 2% of infants having food intolerance or allergy to milk. Egg follows with 1.3% and 0.5% for peanut and lesser rates for other foods. Within the first 3 to 5 years of life the majority, about 85%, of children lose their sensitivity to milk, eggs, wheat and soy, hence, the continued allergies into adulthood of peanuts, tree nuts, fish and shellfish. In addition, food additives, such as artificial flavors and colors, have also been implicated in causing angioedema and urticaria. Allergy to fruits and vegetables are common, but usually not severe.

What are the differential diagnoses for food allergies?

Foods can cause adverse reactions that are not immune-based, leading to an incorrect assumption of a food allergy. These food *intolerances* should be differentiated from true immune-mediated allergic reactions. The differential diagnosis for food allergy includes:

- 1) Lactose intolerance (milk, ice cream)
- 2) G-6PD deficiency (fava beans)
- 3) Toxic ingestions (botulism, seafood toxins, contaminants with heavy metals, pesticides)
- 4) Caffeine (sensitivity, including tachycardia, GI upset)
- 5) Infectious: parasitic (causing eosinophilic infiltration/eosinophilia)
bacterial (Salmonella causing acute vomiting, abd pain)
viral
- 6) Digestive: gallbladder disease, pancreatic insufficiency
- 7) Neurological: gustatory rhinitis from spicy foods, facial flushing from tart foods
- 8) Psychological: panic disorder
- 9) Anatomical: pyloric stenosis

How is the diagnosis of a food allergy (ies) made?

An assessment begins with a thorough history and physical examination. The history is especially important in evaluating acute systemic, or anaphylactic, reactions. A diet diary can be helpful in identifying a specific food as the causative agent. Important questions included in the history are: is the reaction reproducible each time the suspected food is ingested? What is the time frame for the reaction? Do the symptoms fit the pathophysiology of allergic reaction vs. food intolerance? Often times, IgE mediated disorders are easier to diagnose with a history because of the more acute onset of symptoms. If a specific food cannot be identified, allergy testing can be performed in an allergist's office. Skin-prick testing probes for food protein induced IgE. Although skin-prick testing has a high negative predictive value (>95%), its positive predictive value is only approximately 50-60%. Also, it does not include the possibility of non-IgE mediated allergic reactions. In vitro diagnostic studies such as radioallergosorbent test, or RAST, can identify food specific IgE antibodies in serum and can be helpful in patients with limited skin surface due to extensive eczema or those patients unwilling to discontinue antihistamine use.

For non-IgE mediated food allergy, little to no diagnostic tools are available. Food patch testing is now being explored as a possible tool.

The gold standard of food allergy testing is the double-blind, placebo controlled challenge. This should only be performed in a monitored setting where a severe reaction can be immediately treated. Before a food challenge, the intended food is eliminated for 7 days and H1 blockers are discontinued for 3 days. The patient is given increasing doses of the suspected food at intervals during constant observation. Once the top dose is reached the patient is observed for period of time, anywhere from 2.5 to 4 hours for allergic symptoms.

What are the therapeutic strategies used for a child with food allergies?

The only proven therapy for food allergy is strict elimination of the offending food. This requires extensive education and work on the part of the parents and any other caregiver, including babysitters, grandparents, etc, and includes reading all food labels as well as taking special care when ordering food in restaurants, notifying schools regarding snacks/cafeteria meals, etc. For patients at risk for anaphylaxis autoinjectable epinephrine, i.e. Epi-Pen, is essential. [Patients should also be reminded to discard old epipens, not to store them in hot cars, etc.] Parents of younger children with food allergies should be trained to identify early allergic symptoms and should have antihistamines and epinephrine available at all times. In all cases of food allergy, elimination of the offending agent is the most important treatment modality.

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