

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “Management of Food Allergies” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedscases.com/podcasts.

Management of Food Allergies

Developed by Cary Ma and Dr. Yarden Yanishevsky for PedsCases.com.
June 30, 2017

Introduction:

Hello everyone. My name is Cary Ma and I am a medical student at the University of Alberta. This PedsCases podcast was developed in collaboration with Dr. Yarden Yanishevsky, a pediatric allergist, assistant professor and section head of pediatric allergy at the University of Alberta and Stollery Children’s Hospital in Edmonton, Alberta, Canada. This podcast will review the management of IgE-mediated food allergies in children.

Case

Let’s begin with a clinical scenario to put everything into context. You are on call as a student clerk in the emergency department of your local hospital, and you are paged at 10:01pm by the nurse to immediately see Anna, a 3-year-old girl who has presented to the emergency department with her dad. When you enter the room, you see Anna lying uncomfortably on the bed with her dad trying to comfort her. Anna has shortness of breath, and she is coughing and wheezing. Anna’s face, chest and upper extremities are covered with an urticarial rash. Her lips and tongue are also swollen. While you were examining Anna, her dad tells you that she ate a peanut butter cookie about an hour ago and that this was the first time a reaction like this occurred. Within a minute of seeing her, you quickly realize that this is a medical emergency. What is happening to Anna? How are you going to manage this situation?

Learning Objectives

At the end of this podcast, the learner will be able to:

1. Define food allergy,
2. Develop an approach to the history and physical examination of a child with an allergic reaction to food,
3. Describe how a food allergy is diagnosed,
4. Discuss treatment of allergic reaction to food, and
5. Outline long term risk reduction strategies for a food allergy.

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Definition

A food allergy is an adverse immune mediated response with reproducible signs and symptoms that generally occur within two hours after the ingestion of a specific food and fully resolve in less than twenty-four hours in a sensitized individual. An individual is sensitized to an allergen after initial exposure and the subsequent formation of allergen-specific IgE antibodies. It is important to note that a food allergy is not the same as a food intolerance. A food intolerance, which is also a type of adverse food reaction, is an abnormal, non-immune mediated response to specific foods or food additives. Food intolerances are primarily characterized by gastrointestinal symptoms, such as discomfort, pain, and diarrhea. Food allergies, depending on the severity of the reaction, may be characterized by symptoms affecting the skin, as well as the gastrointestinal, respiratory and cardiovascular systems. Patients may present with urticaria, swelling of the lips and tongue, vomiting, diarrhea, shortness of breath, wheezing, stridor and hypotension. Unlike food intolerances, food allergies may progress to anaphylaxis, which is a life-threatening hypersensitivity reaction that requires immediate treatment.

Recognizing the signs and symptoms of anaphylaxis is essential for the initiation of life-saving treatment, which will be discussed later. The following are three criteria that will help you identify anaphylaxis, regardless of whether it is induced by a food allergen or some other agent.

1. A sudden onset of symptoms, occurring within minutes to several hours, that involves the skin and/or mucosal tissue, such as urticaria, angioedema, itching of the skin and swelling of the lips and tongue, with at least one of the following:
 - a. Sudden respiratory signs and symptoms, such as shortness of breath, wheeze, cough, stridor and/or hypoxemia.
 - b. Sudden drop in blood pressure or symptoms of end-organ dysfunction such as hypotonia (collapse).
2. At least two of the following occurring within minutes to several hours after exposure to a likely allergen for the presenting patient:
 - a. Sudden skin and/or mucosal signs and symptoms.
 - b. Sudden respiratory signs and symptoms.
 - c. Sudden drop in blood pressure or symptoms of end-organ dysfunction such as hypotonia (collapse).
 - d. Sudden gastrointestinal symptoms, such as crampy abdominal pain and/or vomiting.
3. A drop in blood pressure occurring within minutes to several hours after exposure to a known allergen for the presenting patient.
 - a. Infants and children will present with a decrease in systolic blood pressure greater than 30% from baseline or a low systolic blood pressure, which is dependent on the patient's age.
 - b. As an aside, adults, who are defined as individuals 18 years old or older, will present with a systolic blood pressure of less than 90 mm Hg or greater than 30% drop in baseline blood pressure.

For more details on the diagnosis and management please listen to the podcast on the emergency management of anaphylaxis in children.

Diagnosis

Diagnosing a food allergy requires taking a proper history and, if indicated, allergy testing, which should be done by pediatric allergist. Before taking the history, you must ensure that the child is stable. In an emergency situation, such as anaphylaxis, you might not have enough time to take a complete history as immediate treatment of the allergic reaction is necessary. If a child is unable to answer questions regarding his/her medical history, direct your questions to the child's parents.

For the history of presenting illness, begin by inquiring about the onset and provocation of the allergic reaction. Typically, allergic reactions to food occur within 2 hours of ingesting the food and fully resolve within 24 hours. How long did it take for the allergic reaction to occur after the ingestion of the suspected food? Where did the reaction occur? Can the child or family identify suspected foods? What did the child last eat?

Next, assess the quantity and form of the suspected foods. How much of the food does the child have to eat to cause a reaction? Was the food cooked or raw? Is there a possibility of cross contamination of food products?

Next, review any associated signs and symptoms, as well as their frequency and reproducibility. As mentioned previously, patients may present with urticaria, swelling of the lips and tongue, vomiting, diarrhea, shortness of breath, wheezing, stridor, hypotension, and anaphylaxis. What symptoms does the child experience when the suspected food is ingested? Do these symptoms occur every time the child ingests the suspected food?

Next, inquire about medications. Were any medications, such as antihistamines or intramuscular epinephrine, given to the child? If so, how did the child respond to the medication?

Next, determine whether or not the child was recently sick as viral infections are the most common cause of urticaria in children. Has your child been sick recently? Did he/she have a cold?

Tests and procedures that can be utilized to confirm your diagnosis include skin prick testing, quantifying food-specific IgE antibodies, and the oral food challenge. Skin prick testing involves pricking the surface of the skin with the suspected allergen extracts assessing wheal and flare diameters around the point of penetration. Quantifying food-specific IgE antibodies, which determines the presence and exact level of specific IgE antibodies in the blood, is preferred when patients are on antihistamines, if they have dermatographism or widespread dermatitis. These tests are predictive of the presence or absence of IgE mediated food allergy and are also used to monitor disease progression over time. The gold standard procedure for diagnosing or ruling out a food allergy with absolute certainty is the oral food challenge where patients are exposed to suspected foods in a safe, controlled environment.

Treatment

As previously mentioned, when a child present to the emergency room with a suspected allergic reaction to food, there may not be enough time to take a complete history as immediate treatment is required. Begin by assessing the child's airway, breathing and circulation, or ABCs. The treatment for a child presenting with isolated skin symptoms, such as angioedema or urticaria, is oral non-sedating antihistamines. Since the presence of angioedema or urticaria may progress to anaphylaxis, observe the child for the next four hours before sending him/her home.

The treatment for a child presenting with anaphylaxis is intramuscular epinephrine injection into the mid-anterolateral region of the patient's thigh. The dose of epinephrine is 0.01mL/kg of a 1mg/1mL solution. The maximum dose of epinephrine is 0.5 mL per injection. Record the dose and time of administration, and if the child does not respond to the initial dose, give subsequent doses in 5 to 10 minute intervals as needed. If the child presents with hypotension, stridor or wheeze, additional treatments may be required:

1. If the child is hypotensive, place him/her in a supine position with their extremities elevated and give high flow oxygen, as well as 20mL/kg bolus of intravenous normal saline. Contact PICU and inform them of the emergency situation. Hypotensive patients require 12-24 hours of close observation.
2. If the child has stridor or wheezes, place him/her in a sitting position and administer high flow oxygen. Administer nebulized epinephrine to patients with stridor and inhaled beta-2-agonist to patients with wheezes. Patients with respiratory signs and symptoms should be observed for at least 6-8 hours before they are allowed to go home.

For more details on the diagnosis and management please listen to the podcast on the emergency management of anaphylaxis in children.

Long-term management of food allergies involves strict avoidance of the allergen. The child's co-morbid diseases, such as asthma, should also be assessed and treated. Poorly-controlled asthma significantly increases the risk of fatal anaphylaxis. In addition, a written emergency action plan, which includes a list of foods that the child is allergic to, any additional health problems, concurrent medications, whether or not the child had previous episodes of anaphylaxis, warning signs and symptoms of anaphylaxis, treatment plan that clearly indicates the type of epinephrine auto-injector to use during an emergency, and emergency contact information, should be developed to prevent and manage future reactions. A prescription for an epinephrine auto-injector and education of its use are also necessary for the long-term management of the child's food allergy. Patients under 25kg should be prescribed a 0.15mg-dose epinephrine auto-injector (eg. EpiPen Jr), while patients over 25kg should be prescribed a 0.30mg-dose epinephrine auto-injector (eg. EpiPen). In addition, a medical identification bracelet should be recommended as it serves to alert other people of the child's medical condition. Furthermore, if the child has multiple or complex food allergies, consider referring them to a dietician in order to ensure that they have a safe diet and to prevent nutritional deficiencies. Another long term management strategy that the child and family can explore is immunotherapy, which alters the immune system's response to an allergen. However, immunotherapy, for the most part, is currently limited to research settings.

Regarding the natural course of the condition, a number of children may outgrow their allergies. Approximately 80% of children with allergies to milk, egg, soy or wheat outgrow their allergies during childhood. On the contrary, only about 20% of children with allergies to peanut, tree nuts, fish and shellfish become tolerant to those foods.

The prevalence of food allergy is on the rise, presently reaching around 8% in young children. Fortunately, we now know that early introduction of peanuts significantly decreases the frequency of the development of peanut allergy among high risk children, such as those with severe atopic dermatitis and/or egg allergy. Therefore, it is no longer recommended that infants avoid consuming allergenic foods such as peanut to prevent the development of such allergies. Instead, early and safe, rather than delayed introduction should be recommended.

Case

Let's return to the case. Anna is clearly having an anaphylactic reaction to the peanut butter cookie that she ate less than an hour ago. You assess Anna's ABCs without delaying the administration of IM epinephrine. Since Anna weighs approximately 15kg, you determine that she requires 0.15mL of epinephrine. You draw 0.15 mL of a 1mg/1mL solution of epinephrine and inject it intramuscularly into the mid-anterolateral region of the thigh.

Next, you make a note on Anna's chart that 0.15mL of epinephrine was administered at 10:05pm. Within 5 minutes, Anna's respiratory function returns to normal. You have successfully treated Anna's allergic reaction within minutes of her arriving in the emergency department. Anna remains in the emergency department for the next 8 hours so the hospital staff can monitor her general status and vital signs prior to discharge.

Your preceptor writes a prescription for two auto-injectors for Anna's dad to fill, educates him on recognizing signs and symptoms of an allergic reaction, and teaches him how to administer the auto-injector in the event that an anaphylactic reaction occurs. Your preceptor advises Anna to avoid peanuts for the timing being and refers her to a pediatric allergist for a further assessment. Anna's dad fills the prescription before taking his daughter home. On their way out, Anna gives you a high five and thanks you for saving her life.

Conclusion

This brings us to the end of the podcast. Here are a few take-home points:

1. A food allergy is an adverse immune mediated response with reproducible signs and symptoms that generally occur within two hours after the ingestion of a specific food and fully resolve in less than twenty-four hours in a sensitized individual.
2. Severe allergic reactions, characterized by anaphylaxis, are medical emergencies and need to be treated immediately. Signs and symptoms of anaphylaxis include urticaria, angioedema (such as lip swelling), difficulty breathing, cough, wheeze, severe abdominal cramping, vomiting, drop in blood pressure, and or collapse.
3. The treatment of anaphylaxis is epinephrine. The dose of epinephrine is 0.01 mL/kg of a 1mg/1mL solution for a maximum dose of 0.5 mL per injection. Record the dose and time of administration, and give subsequent doses in 5 to 10 minute intervals, if needed. Before

carrying out any medical procedure, assess ABCs without delaying the administration of IM epinephrine.

4. Strict avoidance of the food allergen is essential to long term management.
5. A written emergency action plan, which includes a list of foods that the child is allergic to, any additional health problems, concurrent medications, whether or not the child had previous episodes of anaphylaxis, warning signs and symptoms of anaphylaxis, treatment plan that clearly indicates the type of epinephrine auto-injector to use during an emergency, and emergency contact information, should be developed to prevent and manage future reactions.
6. Majority of children with allergies to milk, egg, soy or wheat outgrow their allergies during childhood. However, the opposite is true for children with allergies to peanut, tree nuts, fish and shellfish.
7. Early introduction of peanut in infants at high risk for developing peanut allergy is associated with the prevention of the development of such an allergy in this population.

Thank you for listening to this PedsCases podcast!

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