

In this issue of the *Proceedings*, we are pleased to introduce a new section of the journal, Clinical Pearls and Pitfalls. The format of this new feature of the *Proceedings* begins with a case vignette highlighting a common clinical problem. Evidence supporting clinical characteristics and pathophysiology is then presented, followed by a review of diagnostic and management guidelines, and ends with the author's clinical recommendations. Although this section will be of interest to the general readership, it will be particularly useful for fellows-in-training preparing for board examinations. The *Proceedings* wish to thank Dr. Warner W. Carr for his imaginative leadership in initiating this section, and, as Section Editor, we wish him well as he continues to provide the readership with innovative and provocative case material. Authors are invited to make submissions to this section at <http://aap.msubmit.net>.

Clinical Pearls and Pitfalls: Peanut Allergy

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ABSTRACT

A case of pediatric peanut allergy is presented. Pathophysiology, clinical characteristics, diagnostic test, case management, and natural history are reviewed. Clinical Pearls and Pitfalls include: (1) About 20% of young infants will outgrow peanut allergy, especially if IgE levels measured by ImmunoCAP RAST are less than 5 kU/L. (2) Cases of resensitization have been documented after negative peanut oral challenges. (3) Only a negative food challenge can provide convincing evidence that the patient has outgrown his or her peanut allergy. (Allergy and Asthma Proc 26:145–147, 2005)

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The opinions or assertions contained herein are the private views of the Author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense

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Question:

A 7-year-old male with a long history of peanut allergy presented with his parents to the clinic for advice about continued management of his peanut allergy. He had an initial severe anaphylactic reaction after ingesting peanut butter at age 17 months and has strictly avoided peanuts since. His initial peanut-specific IgE was 19 kU/L at age 17 months. A recent repeat ImmunoCAP RAST reveals a level of 2.3 kU/L. His parents want to know whether he has “outgrown” his peanut allergy. Which of the following statements is correct?

- A. Peanut allergy is a lifelong allergy and he has not outgrown it.
- B. About 20% of infants may outgrow peanut allergy, especially when specific IgE levels are below 5 kU/L.
- C. Peanut allergy rarely lasts into adulthood.
- D. Peanut-specific IgE levels of at least 2 kU/L or greater have a 95% likelihood of allergic reaction after peanut ingestion
- E. Once a child has outgrown his or her peanut allergy, resensitization does not occur.

INTRODUCTION

Food allergies affect between 4% and 8% of children and between 1% and 2% of adults.^{1,2} There are eight foods that are responsible for more than 90% of food allergies: cow's milk, eggs, soy, wheat, peanuts, tree nuts, fish, and shellfish.^{3,4} Peanut allergy deserves special attention because it occurs early in life, usually represents life-long allergy, and trace amounts can cause severe reactions in highly sensitized individuals. In addition, allergies to peanuts (and tree nuts) account for the majority of fatal and near-fatal anaphylactic reactions.^{5,6}

CLINICAL CHARACTERISTICS AND PATHOPHYSIOLOGY

The clinical presentation of peanut allergy is very similar to the presentation of other food allergies. However, reactions tend to be more severe, and biphasic reactions may occur in up to 1/3 of fatal reactions.⁷ Allergies to peanuts and tree nuts account for the majority of fatal and near-fatal anaphylactic reactions.^{5,6} In addition, very low quantities of peanut proteins are needed for both subjective and objective symptoms. Kanny and colleagues reported that subjective symptoms may manifest with doses as low as 100 µg and objective symptoms occur at doses of 2 mg.⁸ Keep in mind that one peanut contains approximately 200 mg of protein.⁹ Once exposure occurs, the pathophysiology of peanut allergy is typical for type I hypersensitivity reactions. Peanut allergens (Ara h 1, Ara h 2, and Ara h 3) bind to specific IgE bond to mast cells. This leads to degranulation, mediator release, and the expression of clinical allergy.

DIAGNOSIS

The diagnosis of peanut allergy begins with a careful history and physical exam. Focus should be given to the types and quantities of foods ingested and to time of onset and severity of symptoms. The clinician should also be aware of other potential dangers, because about 1/3 of peanut-allergic patients are also allergic to at least one tree nut.¹⁰ If supported by the history, then testing for specific peanut allergy should ensue. Either skin-prick or ImmunoCAP RAST testing is appropriate. The skin-prick test gives immediate results and is convenient. However, there is a risk of anaphylaxis, and it does not necessarily predict risk of future reactions with food exposure. On the other hand, the ImmunoCAP RAST does provide positive predictive values. For instance, patients with levels of 15 kUA/L should not undergo food challenge, because this is associated with a high risk of anaphylaxis.^{7,11,12} When there is doubt about the diagnosis, oral food challenges can be performed and are considered the "gold standard." Oral food challenges can also be considered when the history is consistent with an IgE-mediated reaction, but there is no evidence of peanut-specific IgE on skin testing or with ImmunoCAP RAST testing. Conversely, when laboratory or skin testing is positive but the history is not consistent

with an IgE-mediated reaction, a challenge may be considered. Finally, when patients are being evaluated for possible resolution of a known peanut allergy, food challenge is also indicated.

MANAGEMENT

The cornerstone in treating peanut allergy is to educate patients and families to avoid food products containing peanuts. Accidental exposure to peanuts leads to allergic reactions every 3–5 years in affected individuals. Therefore, it is also very important for patients and families to be very adept at recognizing the early signs of allergic reactions and be able to administer injectable epinephrine when indicated. Delay in administration of epinephrine is associated with a poor outcome, and prompt administration is recommended. Biphasic reactions can occur in about 1/3 of cases, so, after administering epinephrine, all patients should be observed and evaluated at a medical facility. Future management strategies may include novel therapies such as anti-IgE. A recent study involving 84 patients with peanut allergy demonstrated a significant increase in the threshold dose of peanut flour required to provoke allergic symptoms after anti-IgE therapy.¹³

NATURAL HISTORY

Historically, it was believed that peanut allergy was a lifelong allergy and loss of sensitization was rare. Recent data have suggested that up to 20% of young patients may outgrow their allergy.^{14,15} This is especially true when repeat ImmunoCAP RAST values for peanut-specific IgE are below 5kU/L.^{14,15} Although a certain ImmunoCAP RAST may be comforting, only a negative food challenge can provide convincing evidence that the patient has outgrown his or her peanut allergy. In the question above, this likely represents the most valid answer. However, care must be taken in these patients, because cases of re sensitization have been documented.¹⁶ These patients should continue to carry epinephrine and stay alert to the early signs of anaphylaxis.

Answer: B

Pearls

- Allergies to peanuts and tree nuts account for the majority of fatal and near-fatal anaphylactic reactions.
- Delay in initial therapy is associated with poorer prognosis.
- Biphasic reactions occur in up to 1/3 of fatal reactions.
- Peanut-specific IgE levels of at least 15 kU/L have 95% or greater likelihood of allergic reaction after peanut ingestion.
- About 20% of young infants will outgrow peanut allergy, especially if IgE levels are less than 5kU/L.
- Accidental exposure leads to allergic reaction every 3–5 years.

- About 1/3 of peanut-allergic patients are also allergic to at least one tree nut

Pitfalls

- Only a negative food challenge can provide convincing evidence that the patient has outgrown his or her peanut allergy.
- Cases of resensitization have been documented after negative peanut oral challenges.
- Given the risk of resensitization, patients who have outgrown their peanut allergy should be prescribed injectable epinephrine.

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