Peanut Allergy Awareness

Kenneth Johnson, PA-C, Lisa Daitch, MPAS, PA-C

Peanut allergy affects young children, teenagers, and adults in increasing numbers, and allergic reactions to peanuts account for a significant number of anaphylaxis cases in US emergency departments. How can you keep your peanut-allergic patients safe?

Among all persons with food allergies, those who are allergic to peanuts are at greatest risk for anaphylactic symptoms. About 30,000 cases of food allergy–related anaphylaxis are seen in the nation’s emergency departments (EDs) each year, and the food most commonly responsible is peanuts. What can primary care providers do to reduce the number of peanut allergy–associated anaphylactic reactions and fatalities, both in the ED and in the larger community?

According to a guideline from the National Institute of Allergy and Infectious Diseases (NIAID), prevalence of peanut allergy is about 0.6% of the US population, although in an 11-year survey involving more than 13,000 respondents, Sicherer et al reported allergy to peanuts, tree nuts, or both in 1.4%, possibly translating to some three million Americans; British researchers have reported peanut allergy in 1.8% of an 1,100-member children’s cohort. The risk of exposure to peanuts and the associated risk for severe and possibly fatal anaphylaxis present a lifelong struggle for both patient and family.

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Etiology of Peanut Allergies

Food allergy prevalence has reportedly doubled in recent decades, with a significant increase also seen in allergy severity. Allergies involving eggs, nuts, fish, milk, and other foods represent the leading cause of hospital-treated anaphylaxis throughout the world. Unlike other allergenic foods that affect only one age-group, peanuts are among the foods that trigger the “vast majority” of allergic reactions in young children, teenagers, and adults alike.

Increases in reported episodes of peanut allergy reactions may be occurring for several reasons:

- Many people have adopted vegetarian diets, and nuts are considered a good protein source.
- Environmental exposures are increasingly common.
- More people are genetically vulnerable, as the role of family history becomes clearer.
- Food preparation methods (eg, shared processing equipment, contaminated raw materials, formulation errors) and inaccurate labeling lead to accidental exposures.
- Exposure to nuts in utero or during breastfeeding is more common.

Environment and Genetics

The body of knowledge regarding the specific causes of peanut allergy is increasing constantly. Several known peanut proteins (Ara h1, Ara h2, Ara h3, Ara h6, Ara h7, and Ara h9; Ara h8 is a homologous allergen that may account for peanut/birch cross-reactivity) are thought to be responsible for the initial sensitization to peanuts in vulnerable persons, triggering the associated immunoglobulin E (IgE)-mediated response. Approximately 75% of known peanut-allergic patients will react to these proteins on their first ingestion after being sensitized.

Since IgE antibodies do not cross the placenta, it is believed that sensitization to peanut proteins must occur in utero or through breast milk. This form of sensitization predisposes these continued on page 33 >>
patients to the initial life-threatening anaphylactic reaction. There is strong evidence that genetic factors may play a role in peanut allergies. In a study of 58 pairs of twins by Sicherer et al., heritability of peanut allergy was estimated at 82%, with 64% of monozygotic pairs, versus 7% of dizygotic pairs, showing concordance for peanut allergy. However, the genetic loci that may be responsible for specific food allergies have not yet been identified. It is believed that manifestations of food allergy are very similar to those of asthma and atop dermatitis. According to Green and colleagues, 82% of peanut-allergic children who visited a referral clinic also had atop dermatitis. These conditions appear to be triggered by similar mechanisms, mediated by both environmental and genetic factors. Hong et al. are optimistic about the advances being made in food allergy genetics. Increased awareness, they feel, may lead to new treatment options for potentially fatal food allergies.

PATIENT PRESENTATION AND HISTORY

As with any IgE-mediated immune response, the patient must have been exposed to the allergen in question. Most pa-
tients present with a history of having ingested raw or boiled peanuts and/or foods produced in a facility that also processes nuts. Clinical symptoms of peanut allergy may develop within seconds of ingestion. For some patients, consumption of as little as 5 to 50 mg of peanut protein can trigger symptoms. A single peanut from a jar of commercially processed peanuts contains approximately 300 mg of potentially allergenic protein.

Typically, the most dramatically affected patients have a medical history of asthma or other IgE-mediated immune reactions. In one study, young adults with IgE-mediated peanut allergy were found at especially high risk for severe anaphylaxis. Seventy-five percent of patients who have a reaction to peanuts do so following their first ingestion (after the initial exposure).

The mean age for a diagnosis of peanut allergy is about 14 months; only 20% of the patients diagnosed with a peanut allergy (most likely those with a baseline peanut-specific serum IgE level < 5 kU/L)19 will outgrow it by the time they reach school age.20 Those who do should be encouraged to consume peanuts on a regular basis; according to Byrne et al., 21% of patients with allergy resolution experienced recurrence, a possible result of infrequent peanut consumption.

PHYSICAL EXAMINATION

Patients with peanut allergies can present with a range of symptoms, possibly involving cutaneous, cardiovascular, gastrointestinal, and/or respiratory systems (see Table 1).2,11 The more notable symptoms, possibly developing within 15 minutes of exposure, are progressive upper and lower respiratory difficulties, vomiting, diarrhea, hypotension, edema of the face and hands, arrhythmia, throat tightness (in serious cases, approaching anaphylaxis), and possibly loss of consciousness. Such severe reactions often occur in the child who has ingested raw peanuts or tree nuts.22

Milder physical exam findings include erythema, pruri tus, conjunctivitis, abdominal pain, nasal congestion, itchy throat, and sneezing. These reactions may have been triggered by foods produced in a facility that also processes nuts, household utensils used to prepare foods that contain nuts, or cross-contamination from another child.9,11,24

DIAGNOSTIC WORK-UP

The diagnosis of a patient with a peanut allergy is made through thorough history taking, careful physical examination, allergy testing with either a skin prick test (SPT) or serum-specific

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TABLE 2
Clinical Criteria for Diagnosing Anaphylaxis

When any of the following three criteria are present, anaphylaxis is considered highly likely:

- Acute onset with skin and mucosa affected; generalized hives, pruritus or flushing; swollen lips, tongue, and/or uvula AND
- Respiratory compromise with dyspnea, wheeze, stridor, and hypoxemia AND/OR
- Reduced BP or associated end-organ dysfunction

- Two or more of the following, occurring rapidly after exposure:
  - Hives, pruritus, flushing, and/or edema of the skin and/or mucosa
  - Respiratory compromise
  - Reduced BP, hypotonia, syncope, or incontinence
  - Persistent GI symptoms (eg, abdominal cramps, vomiting)

- BP abnormalities
  - In infants and children, >30% decrease in systolic BP
  - In adults, <90 mm Hg systolic BP or >30% decrease from baseline

Abbreviations: BP, blood pressure; GI, gastrointestinal.

IgE, and oral food challenges. The gold standard for diagnosing food allergy is the double-blind, placebo-controlled oral food challenge, as this test alone can determine the amount of peanut protein needed to trigger a reaction in the given patient. However, this is a difficult test to administer and must be performed under strict medical supervision.

It has been determined that a wheal size of 8.0 mm or greater on the SPT has a 95% to 100% positive predictive value for peanut allergy. Although conflicting results have been reported in some patients between SPT and the oral food challenge, a negative SPT result is considered useful for excluding IgE-mediated allergic responses.

Researchers examining the peanut-specific serum IgE have demonstrated a 95% to 99% positive predictive value when serum levels exceed 15 kU/L. This cutoff value in peanut allergy patients is considered suggestive of allergic reactivity, although negative results on an oral food challenge have been reported in more than 25% of children with serum levels exceeding the cut-off. Testing may have been to whole peanut extract rather than the molecular components (eg, Ara h8).

This past summer, the FDA approved a component test that detects allergen components that include Ara h1, h2, h3, h8, and h9. Another specific version of the serum IgE test has been in development, one that measures the patient's IgE reactions to the Ara h2 and Ara h8 components in peanut protein. Johnson and colleagues have found an increasing level of serum IgE anti-Ara h2 in children who were unable to pass the oral peanut challenge, whereas serum IgE anti-Ara h8 was higher in those who did pass the challenge.

DIAGNOSING ANAPHYLAXIS

The manifestation of anaphylaxis in patients allergic to peanuts or tree nuts can be life-threatening. Symptoms include intense pruritus with flushing of the skin, urticaria, and angioedema, upper-respiratory obstruction resulting from laryngeal edema, and hypotension. The clinical criteria for diagnosing anaphylaxis can be found in Table 2.

It is important to recognize the signs and symptoms of anaphylaxis in patients with a peanut allergy; many patients who present to the ED represent first-time reactions. Among patients with life-threatening symptoms on initial reaction, 71% will have similarly severe reactions in subsequent episodes (compared with 44% of patients whose first reaction was not life-threatening).

TREATMENT, INCLUDING PATIENT EDUCATION

Currently there is no cure for peanut allergy, and no appropriate therapies yet exist to reduce allergy severity. Modest gains have been reported in raising tolerance threshold levels through peanut oral immunotherapy—a long, painstaking process. For now, treatment for peanut allergy is directed at controlling symptoms, once a reaction has occurred. Therefore, the clinician's goal is to educate peanut-allergic patients and their families on avoiding accidental peanut ingestion, recognizing signs and symptoms of an allergic reaction, and preparing an emergency plan.

Because four in five patients can expect peanut allergy to last for a lifetime, strict avoidance of peanuts and peanut products is essential—though difficult because of accidental exposure to food allergens (for example, when dining in res-

TABLE 3
Hidden Peanut Sources to Avoid

In addition to raw, roasted, or ground nuts, any food product with a label listing “nuts” as an ingredient, the following potential hidden sources of peanuts should be avoided:

<table>
<thead>
<tr>
<th>Source</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial nuts</td>
<td>Peanut-based flavoring added; mandelonas are peanuts soaked in almond flavor</td>
</tr>
<tr>
<td>Other oils and butters</td>
<td>Walnut, arachis, or other nut oils; cashew butter, almond butter</td>
</tr>
<tr>
<td>Chocolates</td>
<td>Often processed using equipment used to process peanuts and peanut-containing foods</td>
</tr>
<tr>
<td>Ethnic foods</td>
<td>African, Chinese, Indian, Indonesian, Mexican, Thai, and Vietnamese dishes may contain peanuts</td>
</tr>
<tr>
<td>Specialty baked foods</td>
<td>Ingredients often exposed to peanuts, peanut oil, and peanut flour during baking process</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>Often processed using equipment used to process peanuts and peanut-containing foods</td>
</tr>
</tbody>
</table>

Management of Anaphylaxis in the ED\textsuperscript{1,6}

The emergency department staff should concentrate on airway management and administration of epinephrine, dosed as following:

- 0.01 mg/kg body weight (1:1,000 solution) IM every 10 to 20 minutes, as needed, for as long as 4 hours OR
- 0.1 mg (1:100,000 solution) IV over 5 to 10 minutes x 1, followed by 0.1 to 1.5 μg/kg/min in patients with severe anaphylactic shock

Once stable, the patient should be given:

- Oral prednisone, 1 mg to 2 mg/kg, up to 75 mg OR
- IV methylprednisolone, 2 mg/kg body weight, up to 250 mg
- Nebulized albuterol, 1.25 to 2.5 mg every 20 min
- Possibly, an H\textsubscript{2}-receptor antagonist:
  - Adults, 4 mg to 5 mg/kg oral ranitidine, up to 300 mg OR 50 mg IM OR IV every 6 to 8 hours
  - Children, 1.5 mg/kg IM, OR IV up to 50 mg

Sources: Burks. Lancet. 2008\textsuperscript{6}; Lee and Sheffer. Allergy Asthma Proc. 2003\textsuperscript{6}

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taurants or purchasing bakery products\textsuperscript{2,15}, cross-contamination (as can occur when a food preparation area is not properly cleaned), and allergen cross-reactivity (such as consumption of other legumes).\textsuperscript{1} Patients must be taught to read food labels carefully for possible hidden sources of peanuts (see Table 3,\textsuperscript{7,8} page 35); in some cases, product labels bear helpful advisory wording, such as “may contain peanuts.”\textsuperscript{14,15} US legislation mandates that listed ingredients on food packaging include the eight foods that account for 90% of allergic reactions:
- Peanuts
- Tree nuts
- Egg
- Milk
- Wheat
- Soybeans
- Fish
- Crustacean shellfish.\textsuperscript{14} 

**Treatment for Anaphylaxis**

In pediatric patients, administration of epinephrine is the definitive treatment for anaphylaxis; both the child and parents should carry an epinephrine self-injection device at all times in the event of accidental peanut ingestion. These devices are available in two strengths, based on the child’s weight, and expiration dates should be noted with care. Correct use of the epinephrine self-injection device should be reviewed at each office visit.\textsuperscript{6}

Early-stage allergic reactions can be managed by oral antihistamines, such as diphenhydramine (1 mg/kg body weight...
same consideration is advised if a child has already been diagnosed with another allergy. According to the American Academy of Pediatrics children at high risk for food allergy (eg, atopic disease in both parents or one parent and one sibling) should be breastfed or be given hypoallergenic formula until age 1 year, with no solid foods before age 6 months; peanut-containing foods should not be given before age 3 or 4 years.

**CONCLUSION**

Peanut allergy can present a lifelong battle for affected patients. Eating one peanut or being exposed even to minute amounts of peanut protein could mean life or death without appropriate management. Reading food labels carefully, preparing peanut-free foods, recognizing the signs and symptoms of anaphylaxis, and obtaining the necessary treatment when allergic reactions occur are essential for peanut-allergic patients and their families.

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**REFERENCES**

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Clostridium difficile Infection

Brian K. Yorkgis, PA-C, DO, Victoria Frain, MSN, RN, CRNP

Since the late 1970s, when the pathogenic effects of Clostridium difficile were first recognized, infection with this agent has been problematic to patients and a challenge to health care providers for accurate diagnosis, treatment, and containment of illness. Additionally, C difficile-associated infection appears to be increasing in incidence and severity. Which diagnostic techniques and therapeutic options are currently considered most effective? And how can antibiotic stewardship and proper isolation help prevent the onset and spread of this potentially deadly illness?

CE/CME INFORMATION

TARGET AUDIENCE: This activity has been designed to meet the educational needs of physician assistants and nurse practitioners in primary care with patients at risk for infection with Clostridium difficile.

• Original Release Date: December 2011
• Expiration Date: December 31, 2012
• Estimated Time to Complete This Activity: 1 hour
• Medium: Printed journal and online CE/CME

PROGRAM OVERVIEW: The primary objective of this educational initiative is to provide clinicians in primary care with the most up-to-date information regarding the identification, management, and prevention of Clostridium difficile infection.

EDUCATIONAL OBJECTIVES: After completing this activity, the participant should be better able to:

• List significant risk factors for Clostridium difficile infection (CDI).
• Describe a two-step diagnostic strategy, recently recommended to overcome the disadvantages of conventional laboratory tests.
• Explain current pharmacologic and surgical treatment strategies for mild-to-moderate, severe, severe/complicated, and recurrent CDI.
• Discuss investigative efforts to identify effective new therapeutic strategies for patients with CDI.

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ACCREDITATION STATEMENT: PHYSICIAN ASSISTANTS

This program has been reviewed and is approved for a maximum of 1.0 hour of American Academy of Physician Assistants (AAPA) Category I CME credit by the Physician Assistant Review Panel. Approval is valid for one year from the issue date of December 2011. Participants may submit the self-assessment at any time during that period.

This program was planned in accordance with AAPA's CME Standards for Enduring Material Programs and for Commercial Support of Enduring Material Programs.

Successful completion of the self-assessment is required to earn Category I CME credit. Successful completion is defined as a cumulative score of at least 70% correct.

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