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can be reevaluated. If these conditions cannot be met or if the child has a purulent wound near the involved eyelid, the child should be hospitalized. If these conditions can be met and a decision made for outpatient management, then a blood culture should be obtained and ceftriaxone (50 mg/kg not to exceed 1 g) given intramuscularly or intravenously. The child should be examined daily until blood cultures have remained negative for 48 hours and there is clinical improvement. If the blood culture remains negative, the child could be started on a broad-spectrum oral agent such as ampicillin-clavulanate or trimethoprim-sulfamethoxazole to complete a 7- to 10-day course of antimicrobial therapy. Because this treatment also will treat most cases of acute bacterial sinusitis effectively, we do not obtain plain radiographs of the sinuses routinely.

The number of _S pneumoniae_ isolates relatively or absolutely resistant to penicillin and cephalosporins is increasing rapidly. For relatively resistant isolates, the antimicrobial agents recommended previously should be adequate. If meningitis is suspected or the clinical response is not rapid, vancomycin (10 mg/kg per dose given every 6 h) should be administered.

The child who has a purulent wound near the involved eyelid is likely to have an _S aureus_ or an _S pyogenes_ infection and should be hospitalized to receive a parenteral beta-lactamase-resistant antimicrobial agent until culture results are known. Good antimicrobial agents in this setting include semisynthetic penicillins such as oxacillin or nafcillin, first-generation cephalosporins such as cefazolin or cephalothin, or a macrolide such as clindamycin.

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**PIR QUIZ**

1. Which one of the following commonly is associated with periorbital cellulitis?
   A. Insect bite and _Haemophilus influenzae_ type b infection.
   B. Local wound infection due to _H influenzae_ type b.
   C. Local wound infection due to _Streptococcus pyogenes_.
   D. Sinusitis due to _Staphylococcus aureus_.
   E. Upper respiratory tract infection and local _S aureus_ infection.

2. Which one of the following statements about orbital cellulitis in children is true?
   A. Bilateral infection is common.
   B. Chemosis is diagnostic of orbital cellulitis.
   C. Ehrlich sinusitis is a common antecedent event.
   D. Immunization with _Haemophilus influenzae_ type b conjugate vaccine will prevent this condition.
   E. The presence of proptosis is unusual.

3. In all cases, the management of a child who has acute onset of a swollen red eye should include which one of the following?
   A. Blood culture.
   B. Computed tomographic scans of the orbit.
   C. Conjunctival cultures.
   D. Eye examination.
   E. Lumbar puncture.

4. The most appropriate antibiotic for the management of a child who has a red, swollen periorbital area is:
   A. Intravenous clindamycin if meningitis is suspected.
   B. Outpatient dicloxacillin if sinusitis is present.
   C. Outpatient quinolone if a purulent wound is present near the eyelid.
   D. Penicillin if the blood culture is positive for penicillin-sensitive pneumococcus.
   E. Trimethoprim-sulfamethoxazole if the blood culture is positive for penicillin-resistant pneumococcus.
## PIR QUIZ

5. You are asked to examine a 2-year-old girl whose parents are concerned about her odd mannerisms, deteriorating speech, and increasingly dysfunctional social behavior. They state that she met expected motor, personal-social, and language milestones in the first year of life. However, during the past 6 months, her use of language has declined and she has become less interested in social interaction. Recently, they have noted she has begun to wring her hands repetitively. This history is most consistent with a diagnosis of:
   - A. Asperger disorder
   - B. Classic autism
   - C. Fragile X syndrome
   - D. Hearing loss
   - E. Rett syndrome

6. An 18-month-old boy, known for his temper tantrums, characteristically bangs his head repetitively against the wall before falling asleep. Motor development is normal. Although he has a vocabulary of only six words, he communicates his desires by pointing with his fingers and tugging at his mother’s clothing. He enjoys playing with other children. The physical examination is unrevealing. Of the following, the most likely diagnosis is:
   - A. Asperger disorder
   - B. Attention deficit disorder
   - C. Hearing impairment
   - D. Mental retardation
   - E. Semantic-pragmatic language disorder

7. Assuming development and behavior are otherwise normal, which one of the following children most deserves a thorough evaluation for autism or other pervasive developmental disorder?
   - A. A 15-month-old boy who intermittently displays immediate echolalia
   - B. An 18-month-old girl who rocks and bangs her head when falling asleep
   - C. A 3-year-old boy whose speech is confined to short, unintelligible sentences
   - D. A 4-year-old boy who prefers to play in parallel exclusively with a single toy truck
   - E. A 5-year-old boy who refuses to go to school

8. A 4-year-old boy who avoids social interaction, has markedly delayed speech, and is preoccupied by brightly colored objects is diagnosed with classic autism. Of the therapeutic modalities listed, current evidence suggests that the one most likely to influence outcome positively as part of the management plan is:
   - A. Auditory integration training
   - B. Behavioral modification
   - C. Facilitated communication
   - D. Pharmacotherapy
   - E. Psychotherapy

9. A 4-year-old autistic boy has a non-verbal intelligence quotient of 80 and can convey his wishes to others through rudimentary speech. His parents ask you about his long-term prognosis. Which one of the following statements would be most appropriate?
   - A. He almost certainly will require institutionalization as an adult
   - B. His peak speech capacity already has been attained
   - C. No improvement in social skills should be anticipated
   - D. Some functional deterioration may occur at the time of puberty
   - E. Stereotyped behaviors generally intensify with age
epinephrine and oral liquid antihista-
mines. In addition, patients must be
prepared to go to the nearest emer-
gency facility for further treatment
when indicated.

The role of breastfeeding and food aller-
gen avoidance in the prevention of atopy
and food allergy remains controversial. However, it appears
that breastfeeding (especially when
the mother avoids major allergens—
milk, egg, peanut, fish—during lacta-
tion) and/or the use of hydrolyzed
infant formulas can prevent some
atopic dermatitis and food allergy
in high-risk infants, but whether it actu-
ally prevents respiratory allergy is
not yet clear.

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Genetic and environmental factors affecting
the development of atopy through age 4 in
children of atopic parents: a prospective
randomized study of food allergen avoidance.

PIR QUIZ

10. Approximately what percentage of
children in the United States is
affected by allergic diseases, includ-
ing asthma?
A. 1%
B. 5%
C. 10%
D. 20%
E. 50%

11. When compared with skin tests for
the diagnosis of allergies, which of the
following is an advantage of
serum IgE antibody immunoassay?
A. Greater sensitivity.
B. Immediately available results.
C. Less expensive.
D. Quantitative results.
E. Wide allergen selection.

12. Which of the following is the least
common manifestation of a food
allergy?
A. Acute urticaria
B. Anaphylactic reaction
C. Atopic dermatitis
D. Diarrhea
E. Respiratory symptoms.

13. In vivo skin testing would be of
least value in making the diagnosis
of allergy caused by which of the
following?
A. Food.
B. Fungi.
C. Grass pollen.
D. House dust mite cuticle.
E. Tree pollen.

14. Although skin testing may be performed
on any child at any age, a positive
reaction may not be seen in
children less than age 6.
A. 1 year.
B. 2 years.
C. 3 years.
D. 4 years.
E. 5 years.

15. To avoid false-negative skin tests in
the allergic child, long-acting
antihistamines such as astemizole
should be withheld prior to the test
for a period of:
A. 12 hours.
B. 26 to 48 hours.
C. 10 to 14 days.
D. 1 week.
E. 4 to 6 weeks.
Adverse Food Reactions


Adverse food reaction is the broad descriptive term given to clinically abnormal responses that occur after the ingestion of food or food additives. These responses can be divided into those that do not involve the immune system (food intolerance) and those that are mediated by the immune system (food allergy or hypersensitivity). There are many causes of food intolerance, including the presence of toxic contaminants such as histamine in scombroid fish; the pharmacologic properties of the food, as with tyramine in cheese; a metabolic dysfunction in the patient, such as lactase deficiency; and idiosyncratic responses. The term food allergy is used to describe responses mediated by the host immune system, independent of any physiologic effect of the food or food additive. Although the best characterized food allergic reactions are mediated by immunoglobulin E (IgE), some hypersensitivity responses may be mediated by non-IgE-mediated immune mechanisms.

The “gold standard” for the diagnosis of food allergies is the double-blind, placebo-controlled oral food challenge. Several studies have indicated that there is a significant discordance between the high incidence of adverse food reactions reported by the public (up to 25%) and the much lower prevalence of true food allergy diagnosed by physicians (as low as 1%). The most common foods associated with allergic responses in children are cow milk, chicken egg, peanuts, fish, and tree nuts. Although seafood is a common cause of food allergies in the adult population, it is a far less common cause in children.

The most extreme adverse reaction to food is anaphylaxis, which can lead to death. The initial symptoms of food-induced anaphylaxis include the sensation of itching or tingling in the mouth, throat tightness, nausea and vomiting, abdominal cramping, and urticaria. In addition, patients may complain of shortness of breath, stridor, and wheezing.

Sampson et al examined the characteristics of anaphylactic reactions in children and adolescents (age range 2 to 17 years) that were fatal in six cases and near-fatal in seven. Although all of the patients had a history of food allergies, they were unaware that the responsible allergen (peanuts, four cases; nuts, six cases; milk, two cases; or eggs, one case) was contained in the candy, cookies, or pastries eaten. This suggested that strict avoidance alone is not sufficient to prevent allergic responses to foods.

Differences were observed in the clinical presentation of the fatal cases compared with that of nonfatal cases. All of the patients who had nonfatal reactions but only one who had a fatal reaction had cutaneous allergic manifestations. In addition, deceptively mild symptoms were seen for 1 hour or more in four of six patients who had fatal reactions but in only one of those who had a nonfatal reaction. The value of early intervention was suggested by the fact that all of the patients who had nonfatal anaphylaxis received epinephrine injections before or within 5 minutes of the development of severe symptoms and no patients who died received epinephrine prior to the development of severe respiratory symptoms. This confirms the importance of prescribing injectable epinephrine for all children who have IgE-mediated food allergies and ensuring its availability in emergencies. Because several patients in this study appeared to be improving prior to the occurrence of cardiorespiratory arrest, all children and adolescents exhibiting an acute allergic reaction to food should be observed for at least 3 to 4 hours after the onset of symptoms at a center capable of treating anaphylaxis.

Several mechanisms underlie the development of cow milk allergy. The increased permeability of the infant’s intestine allows cow milk proteins to pass through the intestinal epithelium, thereby stimulating an immune response. Although all in-
fants ingesting cow milk develop an immune response to cow milk proteins, the type of immune response mounted may determine whether the infant will exhibit the clinical symptoms associated with cow milk allergy. Preferential stimulation of a T helper 1 response, characterized by secretion of cytokines inducing IgG and IgA secretion by B cells, may mediate a protective anti-inflammatory effect. In contrast, preferential induction of a T helper 2 response, characterized by the secretion of interleukin-4, stimulates B cell production of IgE, which can bind to the surface of various types of mast cells. Cross-linking of cow milk protein-specific IgE on the surface of these cells stimulates the release of mediators that cause an allergic response to the cow milk. In addition, a cell-mediated response to cow milk proteins may cause a delayed reaction that induces intestinal pathology such as crypt hyperplasia, villous atrophy, increased density of lymphocytes in the epithelium, and mononuclear cell infiltration of the lamina propria. Because of cross-reactivity between cow milk and goat milk proteins, the majority of patients allergic to cow milk also will not tolerate goat milk. In addition, as many as 25% to 40% of these patients may develop clinical hypersensitivity to proteins present in soy-based formulas.

To avoid the ingestion of foods containing milk proteins, patients who are allergic to cow milk frequently rely on labels describing foods as nondairy or parve (containing neither milk nor meat products) to guide them. However, these labels do not guarantee that milk proteins are absent. Gern et al describe reactions by patients allergic to cow milk after the ingestion of foods labeled as nondairy or parve. The authors demonstrated that these foods were contaminated with traces of milk protein. Thus, patients allergic to cow milk should be told of the possibility of a reaction even to food labeled as nondairy or parve.

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Comment: Perhaps no area in pediatric health care is more suffused with myth and mysticism than food allergy. The public's propensity to describe almost any reaction associated with food as "allergic" should not be surprising. For one thing, the distinction between a temporal association (the baby eats an egg and later in the day has a rash) and true cause-and-effect (the baby's response to eggs is consistent and replicable, even when tested blindly) is not conceptually simple. Neither is the distinction between food allergy (a reaction mediated by the immune system) and food intolerance (a nonimmunologic reaction) altogether clear. Pediatricians, as well as families, frequently confuse lactose intolerance with milk allergy. The first involves the loss of an enzyme, lactase, with a resulting inability to metabolize a sugar; the second represents an immunologic response to a protein antigen. We need to educate ourselves to help demystify our patients.

Henry M. Adam, MD
Associate Editor
In Brief
avoiding UTI. Obviously, significant obstruction or anomalies of the urinary tract require evaluation by a surgeon specially trained in dealing with pediatric urologic problems. Reflux should be treated conservatively and prevention of recurrent UTI emphasized. Such a regimen includes long-term prophylaxis as well as thorough attention to the control measures mentioned previously and noted in the Figure. Long-term (6 months to 2 years) prophylaxis for infection can be achieved by using a number of different drugs (Table 5), usually given once a day at bedtime so that the antibiotic is concentrated in the bladder overnight.

Prognosis
Overall, most patients who have UTI can be treated effectively in a primary care setting. Children who have urologic anomalies, severe reflux, or initial renal scarring and those who have recurrent infection are more likely to progress to renal insufficiency. Issues related to infection are complex, but strategies for dealing with this problem in children are well-defined. First and foremost is the importance of accurate diagnosis. Also, adult standards of care should not be applied to children because, in the area of UTI, children clearly are different.

SUGGESTED READING