Methods. A 21-item questionnaire, which assessed food allergy awareness, avoidance measures, and treatment strategies, was mailed to the 273 schools. Multiple-choice questions were derived from suggested school guidelines for anaphylaxis.

Results. A total of 104 responses were received representing 109 schools (40% response rate). A total of 39% characterized their school district as urban, 37% as rural, and 28% as suburban. Based on a school-reported estimate of 66 598 children, there was a 1.7% self-reported prevalence rate of food allergies. A total of 95 schools reported having at least 1 food-allergic student and 55% of those reported 10 or more food-allergic children. The most common food allergies were milk (81%), peanut (62%), tree nuts (32%), shellfish (28%), egg (23%), wheat (22%), and soy (7%). A total of 31 schools reported “other” food allergens including fruit, chocolate, red dye, tomato, fish, orange juice, spices, and cheese. Food-allergic children were identified primarily through official school records, and only 16% of school had written individual emergency plans. For education on food allergies, schools relied mainly on parents (52%) and in-services (47%) conducted most commonly by school nurses or principals. Avoidance measures to aid in preventing accidental ingestions included food substitution and special meal requests, non-sharing food policies, and instruction for food handlers on techniques to prevent cross-contamination. However, only 21% of schools reported instructions on reading food labels for hidden allergens. In the event of a serious allergic reaction or on administration of epinephrine, 94% of the schools reported that they would transport the student to medical facilities. The most common site for storage of epinephrine was the main office or the nurse’s office. Principals, nurses, and teachers were most often trained to administer epinephrine. No training of staff was reported by 10% of the schools.

Conclusions. Schools need to formally educate their personnel on a school-wide basis. Important prevention measures such as reading labels, written treatment plans, immediate accessibility to epinephrine, and staff training on administration of epinephrine are areas that need to be emphasized.

Reviewer’s Comments. This study demonstrates that most schools have at least 1, if not several, food-allergic children. It also revealed a large number of deficiencies in school policies regarding food-allergic children, such as lack of school-wide staff education, lack of avoidance measures (instructions on food labeling for cafeteria workers as well as knowledge on who has food allergies), lack of written emergency plans, lack of accessibility to epinephrine, and lack of personnel who can administer epinephrine. Previous studies have shown that even those who are responsible for administering self-injectable epinephrine often are not familiar with the correct technique for administration. Schools need help from physicians on proper policies and programs to keep food-allergic children safe from harm.

Helen Skolnick, MD
Princeton, NJ

AN ETIOLOGICAL ROLE FOR AEROALLERGENS AND EOSINOPHILS IN EXPERIMENTAL ESOPHAGITIS

Purpose of Study. An experimental model was established to test the hypothesis that eosinophilic esophagitis is mechanically linked to eosinophilic allergic responses in the lung.

Study Population. Eight- to 10-week-old BALB/c mice, interleukin (IL)-5 gene-targeted mice, and eotaxin-deficient inbred mice were maintained with age- and sex-matched controls.

Methods. Using previously published protocols, mice were exposed to repeated inoculations of Aspergillus fumigatus antigens by oral, intragastric, and intranasal routes. Eosinophils levels in the esophagus were analyzed by anti-major basic protein immunostaining. The tissue distribution of eosinophils after intranasal allergen was examined in the blood, bronchoalveolar lavage fluid, stomach, and small intestine. Pathologic changes were defined using histologic examination of the esophagi and electron microscope analysis of tissue eosinophil morphology. Experimental eosinophilic esophagitis was induced in eotaxin gene-targeted mice and in IL-5 gene-targeted mice.

Results. Allergen-challenged mice developed marked levels of esophageal eosinophils, free eosinophil granules, and epithelial cell hyperplasia, which mimic pathophysiologic changes observed in humans with eosinophilic inflammation of the esophagus. Of note, eosinophil levels in the stomach and small intestine did not significantly increase after allergen challenge. As opposed to the intranasal route, exposure of mice to oral or intragastric allergen does not promote eosinophilic esophagitis, indicating that hypersensitivity in the esophagus occurs with simultaneous development of pulmonary inflammation. In the absence of eotaxin, eosinophil recruitment is attenuated, and furthermore, in the absence of IL-5, eosinophil accumulation and epithelial hyperplasia were ablated.

Conclusions. These results establish a pathophysiologic connection between allergic hypersensitivity responses in the lung and esophagus and demonstrate an etiologic role for inhaled allergens and eosinophils in gastrointestinal inflammation. Moreover, these investigations dissect the cellular and molecular mechanisms involved in eosinophil homing into the esophagus. Aeroallergens may be contributing to the pathogenesis of eosinophilic inflammation in a subset of patients with primary eosinophilic esophagitis and gastroesophageal reflux disorders.

Reviewer’s Comments. Just when you thought you had heard of the last potential trigger for gastroesophageal reflux disorders, this very provocative investigative model of experimental eosinophilic esophagitis was published. These data suggest that eosinophilic esophagitis can be mediated by extrinsic allergens and establish a causal link between the development of allergic hypersensitivity in the respiratory tract and in the esophagus. This model not only implicates a role for aeroallergens in the pathogenesis of esophagitis, but also provides a novel system to evaluate the treatment of eosinophilic esophageal disorders, which include gastroesophageal reflux, allergic eosinophilic esophagitis, eosinophilic gastroenteritis, primary eosinophilic esophagitis, and drug reactions.

John M. James, MD
Fort Collins, CO

ANAPHYLAXIS

CAN EPINEPHRINE INHALATIONS BE SUBSTITUTED FOR EPINEPHRINE INJECTION IN CHILDREN AT RISK FOR SYSTEMIC ANAPHYLAXIS?

436 ALLERGY AND IMMUNOLOGY
Purpose. For outpatient treatment of anaphylaxis, inhaled epinephrine from a metered-dose inhaler is sometimes recommended as a simple and easily administered alternative to injectable epinephrine. This study evaluated the practicality of inhaled epinephrine in pediatric patients at risk for anaphylaxis by evaluating the rate and extent of epinephrine absorption after inhalation.

Study Population. A total of 19 children ages 6 to 14 years with a history of allergy and anaphylaxis.

Methods. This was a prospective, randomized, placebo-controlled parallel group study with observer blinding. Based on the child’s weight, 10, 15, or 20 inhalations of epinephrine or placebo were administered. Plasma levels of epinephrine were monitored before and at intervals from 5 to 180 minutes postdosing, along with blood glucose, heart rate, blood pressure, and adverse effects.

Results. The 11 children in the epinephrine group were able to inhale 11 ± 2 inhalations (range: 3–30 puffs), which represented 74% ± 7% of the precalculated dose. The 8 children in the placebo group were able to inhal e 12 ± 2 (range: 8–20) puffs, or 89% ± 3% of the precalculated dose. Peak plasma epinephrine concentrations were 1822 ± 413 for the epinephrine group and 1316 ± 247 for the placebo group. There were no differences between the groups in epinephrine levels, heart rate, or blood pressure.

Conclusion. Even with expert coaching, children were unable to achieve adequate plasma epinephrine concentrations with inhaled epinephrine.

Reviewer’s Comments. This is a well-conducted study with an important message that inhaled epinephrine should not be used as an alternative to injectable epinephrine.

Christopher Randolph, MD
Waterbury, CT

ANAPHYLAXIS IN THE UNITED STATES: AN INVESTIGATION INTO ITS EPIDEMIOLOGY

Neugut AI, Ghatak AT, Miller RL. Arch Intern Med. 2001;161:15–21

Purpose. Anaphylaxis is a severe, life-threatening allergic reaction that affects both children and adults in the United States. However, data regarding the incidence and prevalence of anaphylaxis and the number of deaths caused by it are limited. The purpose of this study was to provide a better understanding of the magnitude of the problem of anaphylaxis in the United States.

Study Population and Methods. A thorough review of the current medical literature was conducted to obtain prevalence estimates on each of the 4 major subtypes of anaphylaxis (food, drugs, latex, and insect stings). They calculated an overall estimate of the risk of anaphylaxis by using only estimates that are specifically derived from epidemiologic studies measuring anaphylaxis in the general population.

Results. Known rates or cases of anaphylaxis were 0.0004% for food, 0.7% to 10% for penicillin, 0.22% to 1% for radiocontrast media, and 0.5% to 5% after insect stings. There were 220 cases after latex exposure. Considering the 1999 US population of 272 million, the population at risk for anaphylaxis from food is 1099, from penicillin is 1.9 million to 27.2 million, from radiocontrast media is 22 000 to 100 000, from latex is 220, and from insect stings is 1.36 million to 13.6 million. These calculations yield a total of 3.29 million to 40.9 million individuals at risk of anaphylaxis.

Conclusions. The occurrence of anaphylaxis in the United States is not as rare as is generally believed. On the basis of our figures, the problem of anaphylaxis may, in fact, affect 1.21% to 15.04% of the US population.

Reviewer’s Comments. It’s a little hard to know what to make of studies like this. Most of us don’t have much problem identifying anaphylaxis attributable to antibiotics, radiocontrast media, insect stings, and latex. The idiosyncratic cases are the ones that make us all crazy.

Allen Adinoff, MD
Aurora, CO

INSECT STING ALLERGY WITH NEGATIVE VENOM SKIN TEST RESPONSES


Purpose of the Study. To increase awareness about the patient with a negative skin test response and insect sting allergy and to determine the frequency and significance of negative skin test responses in patients with a history of systemic reactions to insect stings.

Study Population. Subjects were recruited for insect sting challenge study using advertisements. Subjects with a history consistent with a systemic immunoglobulin E (IgE)-mediated allergy to insects were evaluated.

Methods. Venom skin testing, serologic IgE venom testing, and insect sting challenges were conducted. Intradermal skin testing to venom extracts (ALK-Abello Labs, Copenhagen, Denmark) was conducted in a range from 0.001 μg/mL to 10.0 μg/mL. Venom-specific serum IgE was detected using radioallergosorbent testing (RAST) (on-site assay using precommercial venom preparations). Sting challenge was performed using standards reported by this group with stings classified as mild, moderate, or severe based on defined criteria.

Results. After 4 years of recruitment, 307 subjects were enrolled. Skin testing was positive in 208 (68%) of patients. Skin testing was negative in 99 (32%) of whom 56 (57%) also had a negative RAST and 43 (43%) had a positive RAST. Of those with negative skin testing and positive RAST, 36 had a low-level RAST (1–3 ng/mL) and 7 had a high-level RAST (4–243 ng/mL). Sting challenge was conducted in 51 of the 99 patients with negative skin tests. Systemic reactions occurred in 11 of these 51 patients: 9 had low-level RAST and 2 had no specific IgE. Positive sting challenge was mild in 7 patients and moderate in 4, with no patient demonstrating a severe reaction. All systemic reactions occurred with yellow jacket stings, the focus of this group’s research. The systemic reaction rate to sting challenge in skin test negative patients (22%) was not different from the systemic reaction rate (21%) in skin test positive patients. The reaction rate was higher in patients with negative skin tests and positive RAST results (24%) than in those with negative RAST results (14%). Additionally, there was no significant difference in the severity of the reported past systemic reactions by patients with positive or negative skin tests, with both groups reporting 25% mild, 55% moderate, and 20% severe reactions.

Conclusions. The authors conclude that negative venom test results do not exclude the possibility of a systemic reaction. Authors also note their low recruitment of patients with negative skin tests and RAST for sting challenge make it possible that the overall frequency of reaction is as low as 11%; however, this does not diminish the potential risk of reaction in patients with a convincing history and negative testing. These results likely reflect limited diagnostic sensitivity of current testing methods. Authors recommend that patients with a convincing his-
Can Epinephrine Inhalations be Substituted for Epinephrine Injection in Children at Risk for Systemic Anaphylaxis?
Christopher Randolph
*Pediatrics* 2002;110:436

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