ENDSs, and of those, 42.7% used 1 or more ENDSs products in the past 30 days. All respondents exhibited similar patterns of ENDSs use and did not favor the use of ENDSs over other tobacco products. Among all participants, peer influence was the primary reason for initial use. Those with asthma were no more likely to use ENDSs to quit smoking. Participants with asthma felt that ENDSs were more harmful than traditional cigarettes; however, secondhand effects were perceived as less harmful by those with asthma. Those with asthma were more likely to exhibit co-occurring smoking behaviors.

CONCLUSIONS. College students diagnosed with asthma were just as likely as their peers to use ENDSs despite having an underlying respiratory condition. All students were similar in their motivation, perceptions, and use of ENDSs. Those with asthma, however, may be more aware of the inhalation of products that negatively affect respiratory health.

REVIEWER COMMENTS. With the rapid rise in the use of ENDSs in youth nationwide, clinicians and policymakers are struggling to curb the growth of this tobacco alternative. Despite nationwide smoking decreases, a high prevalence of ENDSs use continues among college students. This is particularly important because college students perceive ENDSs to be less harmful than studies demonstrate them to be. This study was limited regarding the generalizability to other campuses and the diversity of participants. Nevertheless, the results from this study may be used to inform smoking and tobacco cessation campaigns.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2018–2420U

Sarah Zimmerman, BA
Harvey L. Leo, MD
Ann Arbor, MI

ANAPHYLAXIS

Anaphylaxis in the Pediatric Emergency Department: Analysis of 133 Cases After an Allergy Workup

Alvarez-Perea A, Ameiro B, Morales C, et al. *J Allergy Clin Immunol Pract*. 2017;5(5):1256–1263

PURPOSE OF THE STUDY. To analyze the incidence and management of anaphylaxis in the pediatric emergency department (PED) of a Spanish tertiary hospital as well as the concordance between the etiological diagnosis of the anaphylactic event made in the PED and the definitive cause of anaphylaxis obtained after an allergy workup.

STUDY POPULATION. The study involved all patients ≤15 years of age presenting to the PED with anaphylaxis between March 2012 and March 2014. There were 133 cases (59 boys and 74 girls with a median age of 4.3 years).

METHODS. This was an observational, descriptive study. Electronic medical records were reviewed by 2 independent allergists. Anaphylaxis was defined according to guidelines from the National Institute of Allergy and Infectious Disease and FAAN, which require any of the following criteria: acute onset with involvement of skin-mucosal tissue and symptoms of respiratory involvement or signs of cardiovascular dysfunction or hypotension, involvement of ≥2 systems after recent exposure to a likely allergen, or signs of cardiovascular dysfunction after exposure to a known allergen. After discharge, all patients were referred to the allergy department (AD), where they underwent diagnostic procedures, including skin testing (100%), serum total and specific immunoglobulin E levels (83%), and challenge testing (26%).

RESULTS. 133 cases of anaphylaxis were identified out of 111 870 patients for a cumulative incidence of 0.12%. The highest incidence was in children <12 months of age. Epinephrine was administered in 44% of episodes; however, an epinephrine autoinjector was prescribed at discharge in only 5% of cases. The most frequently suspected trigger of anaphylaxis by the PED physician was food allergy in 68% of cases, with cow's milk in 41% of those cases followed by eggs in 21%, peanuts in 13%, and tree nuts in 5%. There were 36 patients (31%) discharged without a diagnosis. There were 118 cases (89%) evaluated in the AD. Identification of the trigger was obtained in 109 patients (92%), with food allergy in 90% of patients. The final etiological diagnosis of anaphylaxis differed from the diagnosis reported by the PED physician in 39% of cases. The frequency of suspected food allergy increased from 68% to 90%. Of patients diagnosed with food allergy in the PED, 26% were confirmed to be allergic to a different food from that suspected in the PED, most frequently tree nuts. Interrater agreement between the PED and the AD was strongest in the infant group compared with the toddler age group.

CONCLUSIONS. This study underscores the discrepancy between the etiological diagnosis of anaphylaxis made in the PED and that made in the AD in 39% of cases. The difference was most marked in the toddler age group. Food allergy was the most common trigger of anaphylaxis, with tree nuts being most commonly underestimated by the PED.

REVIEWER COMMENTS. This study reveals the importance of referral for allergy evaluation after a diagnosis of anaphylaxis in the PED to obtain an accurate diagnosis of the trigger of anaphylaxis and appropriate counseling on avoidance to prevent recurrence of anaphylaxis. It is not surprising that the incorrect diagnosis occurred more frequently in the toddler age group compared with the infant group given a more varied diet with increasing age.

Whether these findings can be applied to the PED in the United States will need to be further evaluated.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2018–2420V

Anne-Marie Irani, MD
Richmond, VA

Food-Induced Anaphylaxis in Infants and Children

Samady W, Trainor J, Smith B, Gupta R. *Ann Allergy Asthma Immunol*. 2018;121(3):360–365

PURPOSE OF THE STUDY. To describe food-induced anaphylaxis in infants and to compare the clinical presentations with those in older children.

STUDY POPULATION. There were 357 cases of food anaphylaxis diagnosed and treated in the emergency department over a 2-year period (from June 2015 to June 2017). These cases included 47 infants, 43 toddlers, 96 young children, and 171 school-aged children.

METHODS. This was a retrospective chart review in which a standardized collection form was used. Anaphylaxis was defined by using the 3 criteria outlined in the second symposium on the definition and management of anaphylaxis. The primary group of interest was infants (<12 months of age); comparison groups were toddlers (12–24 months of age), young children (2–6 years of age), and school-aged children (>6 years of age).

RESULTS. Infants and toddlers presented with skin involvement more frequently than school-aged children (94% and 91% vs 62%; $P < .001$). Hives was the most common skin manifestation, found in 70% of infants compared with 54% of school-aged children ($P = .001$). Infants presented with gastrointestinal involvement more frequently than any other age group (89% of infants versus 63% of toddlers [$P = .003$], 60% of young children [$P = .006$], and 58% of school-aged children [$P < .001$]). Vomiting was present in 83% of infants. Respiratory symptoms were more common in older cohorts (17% of infants versus 54% of young children [$P < .001$] and 49% of school-aged children [$P < .001$]). Wheezing was present in 2% of infants compared with 31% of young children ($P < .001$) and 22% of school-aged children ($P = .001$). Eggs and cow's milk were the most common foods to cause anaphylaxis in infants, significantly more so than in school-aged children. Infants had lower rates of anaphylaxis caused by peanuts and tree nuts compared with older cohorts. Eczema was not significantly more common in infants than in older cohorts. Children who were allergic to eggs and cow's milk had a history of eczema 25% and 28% of the time, respectively. Half of the children with peanut allergies had a history of eczema. Infants were least likely to be discharged from the hospital.

CONCLUSIONS. This was the largest study to date in which the symptomatology of food-induced anaphylaxis in infants was described. The main manifestations were hives and vomiting. Most infants did not have eczema or a history of food allergies.

REVIEWER COMMENTS. The biggest weakness of this study was the lack of confirmation of allergy by skin or in vitro allergy tests. The take-home message is that there are differences in the presentation of food anaphylaxis and in the types of foods associated with food anaphylaxis in infants compared with older children. If hives are not present, the diagnosis of anaphylaxis can be overlooked. On the other hand, hives and vomiting are common symptoms in infants; therefore, a diagnosis of food allergy should be confirmed before advising prolonged food avoidance.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2018–2420W

Paul V. Williams, MD
Mount Vernon, WA

Improving Anaphylaxis Care: The Impact of a Clinical Pathway

Lee J, Rodio B, Lavelle J, et al. *Pediatrics*. 2018;141(5):e20171616

PURPOSE OF THE STUDY. To evaluate the clinical impact of a revised anaphylaxis clinical pathway with reductions in emergency department (ED) observation time, increased provider education on anaphylaxis, and patient accessibility to epinephrine auto-injectors.

STUDY POPULATION. The study population included pediatric ED patients at an urban, tertiary university-affiliated children's hospital, before and after changes to a clinical anaphylaxis pathway.

METHODS. This was a multidisciplinary quality improvement initiative, performed at an urban, tertiary university-affiliated children's hospital ED to update the anaphylaxis clinical pathway. ED observation time was reduced from 8 to 4 hours, with the goal to reduce anaphylaxis-related admissions. Provider education on anaphylaxis and prompt epinephrine use was improved, and all patients were discharged from the ED with an epinephrine auto-injector. Data were analyzed 18 months before and after the pathway update. Patients with anaphylaxis were identified by using *International Classification of Diseases, Ninth Revision* and *International Classification of Diseases, 10th Revision* codes. Their medical records were reviewed to evaluate ED management and follow-up care. The study authors set a target epinephrine administration time of ≤20 minutes after ED arrival and a goal of ≥80% of patients being discharged from the hospital with epinephrine. Statistical analysis was performed by using Fisher's exact test for the primary end point and

Anaphylaxis in the Pediatric Emergency Department: Analysis of 133 Cases After an Allergy Workup

Anne-Marie Irani

Pediatrics 2018;142;S220
DOI: 10.1542/peds.2018-2420V

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Anaphylaxis in the Pediatric Emergency Department: Analysis of 133 Cases After an Allergy Workup

Anne-Marie Irani

Pediatrics 2018;142;S220
DOI: 10.1542/peds.2018-2420V