



Letter

Food allergy exposures among hospitalized pediatric patients

Current studies have found that approximately 4 to 8% of children are affected by food allergy (FA).^{1,2} Patients with FA are instructed to strictly avoid exposure to offending foods. Despite best efforts, accidental reactions occur in up to 50% of food-allergic children.³ Previous reports show that 13 to 18% of children have had adverse food reactions associated with restaurants and schools.^{3–5}

Another facility where children may be at risk for accidental FA exposure is the hospital. Although FA histories are typically documented in patient charts, this information may be unknown by nutrition staff and food servers. To our knowledge, FA exposure among hospitalized pediatric patients has not been previously described.

Data were collected from patients/parents admitted to Kosair Children's Hospital in Louisville, Kentucky, during 6-week periods in the winter of 2010 and spring of 2012. Surveys were distributed to eligible patients approximately 12 hours before discharge from the hospital and collected at the time of discharge. Patients aged 1 to 18 years who were admitted to the hospital, had inpatient orders for a regular diet, and were receiving meals provided by the hospital were eligible to participate. The surveys contained questions pertaining to demographics, history of FA, reasons for current hospitalization, length of stay (LOS), and details about exposures to food allergens while hospitalized. The survey allowed patients/parents to define inpatient FA exposures as “full exposure” or “near exposure.” “Full exposure” required oral, cutaneous, or inhalational contact; “near exposure” was defined as an encounter in which food was brought to the patient to be eaten, but the history of FA was realized by parent/patient/staff and food was removed before full exposure could take place.

Of 292 distributed surveys, 112 were returned (38%). The LOS for the patients was 2.70 days. Over 40% were admitted because of asthma exacerbation. Among the 112 patients surveyed, 21 reported a history of FA (19%). Ninety-five percent indicated that their FA was diagnosed by an allergist. There was no difference in the LOS between the food-allergic and non-food allergic patients (2.68 days vs 2.71 days). The characteristics of the 21 food-allergic patients are provided in Table 1.

Despite documentation of patient history of FA during admission, 8 of the 21 food-allergic patients (38%) had exposure to 1 of their FA triggers during the present hospitalization. The offending food was identified in each episode, with egg implicated in 37.5% of cases. Other trigger foods encountered during hospitalization included milk, peanut, soy, fish, and red dye (carmines). Of the 8 exposed patients, 4 self-reported “full exposure” (3 oral and 1 inhalational exposure), and 2 patients had systemic symptoms requiring intervention.

One patient developed diffuse swelling, pruritus, and respiratory distress after inhalational exposure to fish. She was treated with intramuscular epinephrine, antihistamines, albuterol, and oral corticosteroids. Her hospitalization was prolonged as a result of her reaction. The other patient reported wheezing and respiratory distress caused by soy consumption. He required treatment with albuterol and oral steroids.

The rate of FA in our sample (19%) is higher than the nationally reported prevalence in children (4–8%).^{1,2} Inaccuracies caused by self-reporting and a lack of a trained interviewer, or an over-estimation resulting from small sample size, may be responsible. The prevalence in our population normalizes to 7% when one controls for participation bias by assuming that the 180 patients that failed to complete the survey would have reported no history of FA. Review of survey participant admission diagnoses gives another explanation for the elevated prevalence. Over 40% of the patients were admitted for treatment of an asthma exacerbation. Children with FA are more likely to experience asthma

Table 1
Food allergy patient characteristics

Patient	Admission diagnosis	Age (years)	LOS (days)	Exposure	Food	Reaction
1	Asthma	6	5	Full (oral)	Soy	Yes
2	Anaphylaxis ^a	15	2	Full (inhalational)	Fish	Yes
3	Asthma	14	5	Near	Egg	
4	Asthma	9	2	None		
5	Asthma	4	2	None		
6	Pain	9	2	None		
7	Asthma	10	2	None		
8	Asthma	4	2	None		
9	Asthma; pneumonia	10	3	None		
10	Asthma	3	3	Near	Egg	
11	Diabetes	12	2	Full (oral)	Red dye	No
12	Asthma	12	2	None		
13	Asthma	1	3	Full (oral)	Egg	No
14	Acute otitis media	5	NR	None		
15	Abnormal laboratory test results	15	4	Near	Milk	
16	Asthma	7	3	None		
17	Seizures	10	1	None		
18	Seizures	16	1	None		
19	Asthma	1	2	None		
20	Knee swelling	8	8	Near	Peanut	
21	Asthma	3	3	None		

Abbreviations: LOS, length of stay; NR, not reported.

^aPatient 2 was initially admitted for observation after anaphylaxis episode secondary to inadvertent fish consumption. Fish sandwich was brought to a neighboring room, and inhalation by patient 2 resulted in swelling, itching, wheezing, and respiratory distress.

Disclosures: Authors have nothing to disclose.

than their non–food-allergic peers. The 2007 National Health Interview Survey reported that 29% of children with FA also had asthma.⁶ Guilbert et al⁷ showed that more than 33% of children with asthmatic features had evidence of sensitivity to at least 1 food.⁷

These limitations (small sample size, low participation rate, and patient self-reporting) may have artificially inflated the observed FA prevalence rate. However, the high prevalence is not the most striking observation from this study. Rather, the most alarming outcome is the evidence that patients who identified themselves as food allergic had exposures while hospitalized. Regardless of the accuracy of the diagnosis, such exposures should not occur in the hospital.

Children with self-reported FA constitute a significant number of inpatients, and inadvertent FA exposures are occurring during hospitalization. The rates of exposure are unacceptably high and should be avoidable. Hospitals must promote quality improvement mechanisms to prevent FA-associated adverse events.

Timothy J. Franxman, MD^{*,†}
Kasey R. Strothman, MD^{*}
James L. Sublett, MD^{*,‡}
Vicki L. Montgomery, MD^{*,§}
Alan P. Baptist, MD, MPH[†]
^{*}Department of Pediatrics
University of Louisville
Louisville, Kentucky

[†]Division of Allergy and Clinical Immunology
University of Michigan
Ann Arbor, Michigan

[‡]Division of Pediatric Allergy/Immunology

[§]Division of Pediatric Critical Care
University of Louisville
Louisville, Kentucky

tfranxma@med.umich.edu

References

- [1] Sampson HA. Update on food allergy. *J Allergy Clin Immunol*. 2004;113:805–819; quiz 820
- [2] Gupta RS, Springston EE, Warrier MR, et al. The prevalence, severity, and distribution of childhood food allergy in the united states. *Pediatrics*. 2011;128:e9–17.
- [3] Nowak-Wegrzyn A, Conover-Walker MK, Wood RA. Food-allergic reactions in schools and preschools. *Arch Pediatr Adolesc Med*. 2001;155:790–795.
- [4] Furlong TJ, DeSimone J, Sicherer SH. Peanut and tree nut allergic reactions in restaurants and other food establishments. *J Allergy Clin Immunol*. 2001;108:867–870.
- [5] Young MC, Munoz-Furlong A, Sicherer SH. Management of food allergies in schools: A perspective for allergists. *J Allergy Clin Immunol*. 2009;124:175–182, 182.e1–4; quiz 183–184.
- [6] Branum AM, Lukacs SL. Food allergy among U.S. children: trends in prevalence and hospitalizations. *NCHS Data Brief*. 2008;10:1–8.
- [7] Guilbert TW, Morgan WJ, Zeiger RS, et al. Atopic characteristics of children with recurrent wheezing at high risk for the development of childhood asthma. *J Allergy Clin Immunol*. 2004;114:1282–1287.