



Letter

Sensitization patterns among patients with atopic dermatitis evaluated in a large tertiary care pediatric center

The prevalence of food and aeroallergen sensitization has increased during the past 20 years and is commonly seen in pediatric patients with atopic dermatitis (AD).^{1,2} Overall, studies of patients with AD have reported similar patterns of aeroallergen sensitization in different countries, but the prevalence of sensitization to food allergens has varied (egg 35%–54%, peanut 22%–44%, cow's milk 19%–27%).^{2,3} Given the increase in peanut allergy in the past decade and the knowledge gained from the Learning Early About Peanut (LEAP) Study on the benefits of early introduction of peanut, the relation between peanut sensitization and AD is especially relevant.³ To our knowledge, allergic sensitization patterns among patients with AD in the United States have not been reported in the past 10 years. The objective of this study was to investigate sensitization to food and aeroallergens in pediatric patients referred to the allergy clinic by dermatology.

We conducted a retrospective chart review on patients referred from dermatology to allergy and immunology (January 2012 through December 2014). The study was reviewed and approved by the institutional review board at the Nationwide Children's Hospital (Columbus, Ohio). Of the 114 patients evaluated, 99 were referred secondary to AD. Charts were reviewed for demographics and results of allergy skin prick and serum peanut specific immunoglobulin E (IgE) testing. Because we anticipated differences in allergic sensitization based on age and the median age was 2 years, patients were stratified as younger than and at least 2 years of age for a priori analysis.

Selected skin prick testing (SPT) to food and/or environmental allergens was performed in 85 patients with AD. Of those who were tested for the 2 allergen types ($n = 58$), 79% were sensitized to at least 1 food or aeroallergen, 45% were sensitized to a food allergen and an aeroallergen, 22% were sensitized only to food allergens, and 12% were sensitized only to aeroallergens. The prevalence of sensitization to most aeroallergens was lower in patients younger than 2 years (Table 1). Of note, there were no patients younger than 2 years who were tested and found to be sensitized to dust mite; however, sensitization to cat and dog was common in this age group. Of older children, sensitization to dust mite was most frequent (53%) followed by pollens (23%–30%), and animal dander (21%–25%). In contrast to aeroallergens, sensitization to egg (60%) and milk (38%) was significantly more common in the younger group ($P < .05$ for the 2 comparisons). There was a high prevalence of peanut sensitization in the 2 age groups, with positive SPT reactions in 17 of 28 patients (61%) younger than 2 years and 25 of 42 (60%) at least 2 years old. The median age of patients with peanut sensitization was 2 years (range 0.4–9) and most were boys (69%; $n = 29$ of 42). A history of reaction to peanut was reported by

10 of 42 patients (24%). A large SPT response (ie, ≥ 8 mm) was observed in 22 of 31 patients (71%) and the median level of peanut specific IgE was 10.3 kU/L (interquartile range 2.3–79.3).

Although peanut is a common allergenic food, it is not typically reported as the most frequent cause of sensitization in children.² Interestingly, peanut sensitization was higher than egg and milk sensitization in our patients with AD. Furthermore, the overall prevalence of sensitization that we observed was striking at 60% (42 of 70 patients tested). De Benedictis et al² noted a “wide variation in the sensitization rate to foods between countries,” but they found that sensitization to egg was higher than that to peanut in all locations they studied. In their study, sensitization to peanut ranged from 7% in Belgium to 45% in Australia, with a high prevalence in the Netherlands and the United Kingdom at 38% and 36%, respectively. A study of patients with AD in the United States performed in 1998 found that 33% were sensitized to peanut.²

Although it is generally agreed that the prevalence of peanut sensitization and allergy is increasing, the reason for this change is not clear. Because patients with AD show increased odds of sensitization with greater environmental exposure to peanut protein and this effect is greater in children with severe AD, peanut sensitization could occur through the skin.⁴ Some evidence has suggested that filaggrin mutation, which is associated with impaired skin barrier function, seems to increase the risk of sensitization to peanut, but the results have been conflicting in different groups of patients.^{4,5} In the HealthNuts Study, children with AD had an increased odds of sensitization to peanut (odds ratio 8.3) and peanut allergy (odds ratio 11.0).⁶ Interestingly, 50% of those patients had a positive food challenge reaction by 12 months of age.⁶ All together, these findings are consistent with clinical evidence that food sensitization and food allergy are markedly increased in patients with AD.

Although our study suggests interesting trends in the prevalence of peanut sensitization in patients with AD, it is limited by its small patient population and retrospective nature. In addition, although patients were not classified using a standardized atopic dermatitis scoring system, our patients were referred from dermatology, which suggests they had significant AD. This parallels previous studies that showed a higher incidence of peanut allergy in patients with more severe AD. Food challenges were not performed in most of our study patients. However, an SPT wheal larger than 8 mm to peanut has been associated with 95% to 100% of positive food reactions.^{7,8} In the LEAP screening study, the median level of specific IgE to peanut was 8.0 (interquartile range 2.11–20.2) in the group with an SPT wheal of at least 4 mm to peanut. This group was excluded from the LEAP Study based on the suspicion that they had pre-existing peanut allergy.³ Thus, our patient group appeared to have a high probability of clinical allergy,

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Table 1
Prevalence of Positive Skin Prick Test Reactions to Environmental and Food Allergens in 85 Pediatric Patients^a With Atopic Dermatitis

Allergen	<2 y of age (n = 32)			≥2 y of age (n = 53)		
	Tested, n	Positive, n	Prevalence, %	Tested, n	Positive, n	Prevalence, %
Tree pollen	24	1	4.2	47	14	29.8 ^b
Grass pollen	24	1	4.2	47	11	23.4 ^b
Molds	24	1	4.2	46	4	8.7
Weed pollen	24	0	0	47	13	27.5
Dust mite	25	0	0	47	25	53.2
Cat	15	4	26.7	47	11	25.0
Dog	16	3	18.8	44	9	20.5
Cockroach	14	2	14.3	44	7	16.3
Egg white	28	17	60.7 ^b	43	12	30.8
Cow's milk	29	11	37.9 ^b	39	4	12.1
Wheat	26	2	7.7	33	2	6.1
Soy	27	0	0	34	4	11.8
Peanut	28	17	60.7	42	25	59.5
Tree nut(s)	26	8	39.8	40	16	40.0
Fish and shellfish	27	2	7.4	37	9	24.3

^aThe median age was 2 years (range 0.25–14) and there were 47 boys and 38 girls.^bUsing χ^2 test, a significantly higher prevalence of sensitization was observed in the age group indicated.

because most had an SPT response wheal of at least 8 mm and the median level of peanut specific IgE was high. In fact, 8 of 9 of our patients younger than 11 months with a positive SPT reaction to peanut would have been excluded from the LEAP Study based on having an SPT wheal larger than 4 mm.

In conclusion, our study shows that a large proportion of patients with AD are sensitized to peanut. Taken with existing evidence of clinically meaningful SPT size and the prevalence of positive food challenge reactions in other groups of patients with AD, it seems likely that this is indicative of clinically relevant food allergy in a significant proportion of our patients. Overall, it seems clear that patients with AD benefit from early referral to an allergy practitioner for SPT, possible food challenges, and potential dietary modification.

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