

Prevalence of food allergy diagnosis in pediatric patients with atopic dermatitis referred to allergy and/or dermatology subspecialty clinics

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Clinical Implications

Food allergy (FA) is common among pediatric patients with atopic dermatitis (AD): 55% had immunoglobulin E-mediated FA, but only 3% had food-triggered AD. A detailed FA history should be obtained in AD patients, with testing and oral food challenge if indicated.

Atopic dermatitis (AD) is a common chronic inflammatory pediatric skin disorder, affecting up to 25% of children.¹ Children with AD are at higher risk for food allergy (FA); approximately 30% to 50% of children with AD have a history of FA.²⁻⁵ Further, the prevalence of AD and FA has increased over time.⁶ Prior studies examining FA prevalence in children with AD often conflated multiple types of FA, including immediate immunoglobulin E (IgE)-mediated symptoms and food-triggered atopic dermatitis (FTAD), and did not clearly distinguish the two entities.²⁻⁴

Parents of children with AD are often concerned about food as a trigger and may alter the child's diet to control AD. Because these children have a high risk for FA, there is potential harm in unnecessary dietary restriction, which may lead to decreased oral tolerance, nutritional deficiencies, inattention to skin care regimen, and increased costs.^{7,8} We sought to investigate the prevalence of FA in children with AD, specifically distinguishing the prevalence of FTAD from IgE-mediated FA.

We performed an institutional review board-approved retrospective chart review study of 372 children with AD

referred to allergy and/or dermatology at a tertiary-care referral center with at least 1 follow-up visit. Atopic dermatitis and FA history and testing were reviewed. Allergic sensitization was defined as skin prick testing 3 mm greater in saline or specific serum IgE greater than 0.1 kU/L. Immunoglobulin E-mediated FA was defined by typical cutaneous (urticaria and angioedema), gastrointestinal (vomiting, diarrhea, or abdominal pain), and/or respiratory (lower airway symptoms such as wheezing) symptoms, together with evidence of sensitization, with oral food challenge (OFC) when available. An FTAD was defined by clinical history of improvement in AD with food removal (typically after 2–6-wk follow-up) and sensitization to the trigger food (without immediate symptoms), confirmed by OFC when available for presence of FTAD and absence of IgE-mediated FA. Statistical testing was performed using GraphPad Prism version 9.1.2 (GraphPad Software, San Diego, CA).

The AD severity was based on published national allergy and dermatology guidelines for AD management.^{1,9} Severe AD was designated by failing middle potency topical corticosteroid (TCS) twice-daily and requiring adjunctive therapies, including antibiotics, bleach baths, dupilumab, and/or systemic immunosuppressants. Moderate AD was designated by the inability to wean off maintenance twice-per-week low-to-middle potency TCS. Mild AD was defined as intermittent TCS use that did not meet the previously listed criteria.

Of the 372 patients, 29% had moderate AD and 18% had severe AD (Table 1). Most patients were male (63%), White (76%), and non-Hispanic (92%). At the first specialist visit, the median age was 1.1 years (range 0–16 y). Of these patients, 59% percent were seen by allergy only, 7% by dermatology only, and 34% saw both ($P < .001$).

An IgE-mediated FA was common (55%) among patients with AD and did not differ by severity (mild 60%; moderate 45%; and severe 57% AD) (Figure 1). A total of 67% of patients with FA were male (Table 1). Patients with IgE-mediated FA were more likely to be younger than 1 year of age at initial visit compared with those without FA (48% vs 26%; $P < .001$). Peanut (44%) and egg (43%) were the most common allergens

TABLE 1. Demographics of FA and AD patients. The demographics of the total cohort numbers are presented first, then the breakdown by patients with IgE-mediated FA or FTAD diagnosis, and then finally by AD severity.

Demographics		IgE-mediated			Moderate		
		Total n (%)	FA n (%)	FTAD n (%)	Mild AD n (%)	AD n (%)	Severe AD n (%)
Total		372 (100)	206 (55)	13 (3)	196 (53)	108 (29)	68 (18)
Sex	Female	139 (37)	68 (33)	6 (46)	66 (34)	44 (44)	25 (37)
Race	White	283 (76)	164 (80)	10 (77)	164 (84)	72 (67)	47 (69)
	Black/African American	42 (11)	14 (7)	1 (8)	17 (9)	17 (16)	8 (12)
	Asian/Pacific Islander	36 (10)	22 (11)	2 (15)	11 (6)	17 (16)	8 (12)
	Other/unknown	11 (3)	6 (3)	0 (0)	4 (2)	2 (2)	5 (7)
Hispanic ethnicity	Yes	29 (8)	12 (6)	2 (15)	13 (7)	8 (7)	8 (12)
Age at first specialist visit (y)	0 to <1	148 (40)	99 (48)	6 (46)	68 (35)	49 (45)	31 (46)
	1 to <2	87 (23)	51 (25)	5 (38)	41 (21)	31 (29)	15 (22)
	2 to <5	79 (21)	35 (17)	2 (15)	54 (28)	13 (12)	12 (18)
	≥5	58 (16)	21 (10)	0 (0)	33 (17)	15 (14)	10 (15)
Median age at first specialist visit (y)		1.1	1.0	1.0	1.5	1.0	1.0

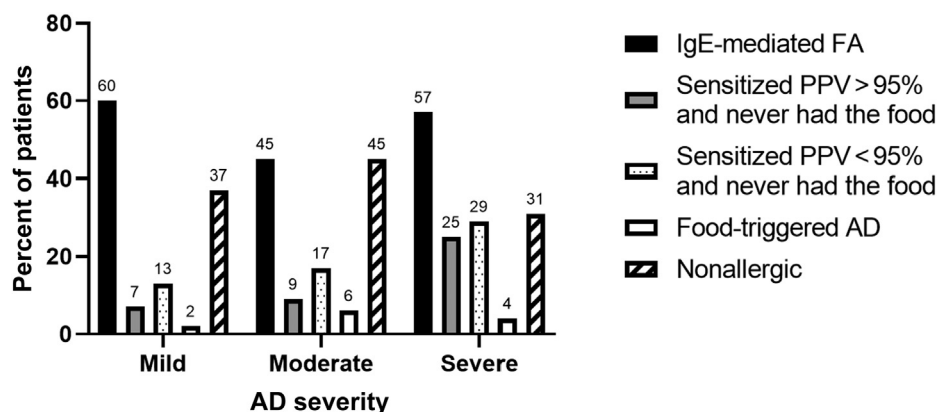


FIGURE 1. Prevalence of FA diagnosis for mild, moderate, and severe AD patients. Percent of patients in each category equals more than 100% because some patients had multiple diagnoses (IgE-mediated FA to one food and/or FTAD to another food). *PPV*, Positive predictive value.

TABLE II. Food triggers of IgE-mediated FA and FTAD patients*

Food trigger	IgE-mediated FA (n = 206) n (%)	FTAD (n = 13)
Egg	89 (43)	8 (62)
Peanut	93 (45)	4 (31)
Milk	56 (27)	2 (15)
Tree nut	49 (24)	2 (15)
Soy	2 (1)	2 (15)
Wheat	8 (4)	1 (8)
Sesame	14 (7)	0 (0)
Fish/shellfish	8 (4)	1 (8)

*The percentage of patients sums to greater than 100% because some patients had multiple triggers for their IgE-mediated FA and FTAD.

associated with immediate-type FA (Table II). Among patients with IgE-mediated FA, 65% had skin prick testing or IgE levels with positive predictive value greater than 95%.

An FTAD was defined by physician-noted sustained improvement in AD upon removal of a food (typically after 2–6-wk follow-up), to which the child was sensitized without any other changes in skin care. An FTAD was uncommon (3%) throughout the cohort (Table I). It was diagnosed in 2% with mild AD, 6% with moderate AD, and 4% with severe AD (Figure 1). Of patients with IgE-mediated FA to at least one food, 4% also had FTAD to another food(s) (Figure 2). Egg (62%) and peanut (31%) were the most common allergens for FTAD (Table II). Approximately 30% of patients diagnosed with FTAD had the diagnosis confirmed by OFC.

In patients referred only for AD (excluding FA referrals, n = 97), 29% had IgE-mediated FA, 13% had mild AD, 28% had moderate AD, and 41% had severe AD. A total of 5% of these 97 patients developed FTAD.

The prevalence of IgE-mediated FA for severe AD in our study (57%) was consistent with what was described in the Sampson and McCaskill study (1985)² for severe AD. However, overall prevalence was higher than described in other studies^{3–5}; FA was common among mild AD patients. This may be influenced by referral bias in this cohort. When this cohort was narrowed to patients only referred for AD (excluding FA

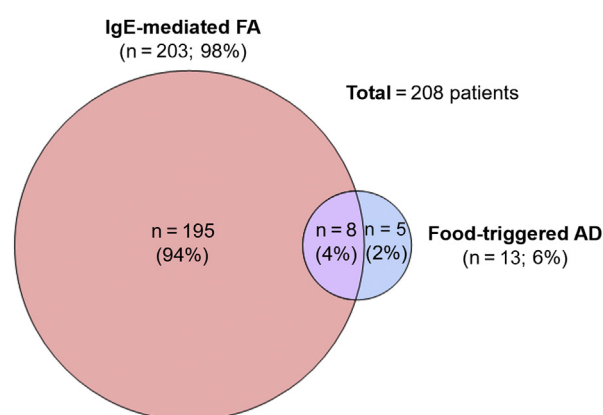


FIGURE 2. Venn diagram of IgE-mediated FA and FTAD. The numbers of patients with IgE-mediated FA or FTAD or both diagnoses are shown. Patients with both diagnoses have IgE-mediated FA to one food(s) and FTAD to a different food(s).

referrals, n = 97), 29% had IgE-mediated FA, and FA was less common among patients with mild AD, which is more consistent with previous studies.

This study differentiates prevalence of FTAD from IgE-mediated FA. Previous studies may have combined them when describing the prevalence of FA. An FTAD prevalence in our study was 4% (n = 3) for severe AD, lower than described by Sampson and McCaskill (1985),² where FTAD was not specifically delineated from other isolated cutaneous reactions.

Limitations included that the study was retrospective and conducted in a tertiary-care center, so it may not be generalizable. To be certain of AD and FA diagnoses, we selected for those referred to either allergy and/or dermatology, which may select for more severe AD or allergy. To address this, we presented rates of FA for both the entire cohort and those who were referred for AD only. Not all patients had an OFC; for FTAD, we attempted to take a strict definition with clear improvement AD in 2 to 6 weeks without other alterations in skin care. Prospective studies are needed to further characterize the link between FA and AD.

Overall, FA was common, even among patients only referred for AD, although FTAD was rare. Food elimination diets may lead to improvement of AD in a very small number of patients; however, they are not without significant risks, including nutritional deficiencies and loss of tolerance. In a retrospective study, 40% of children with FTAD who removed a food subsequently developed an immediate reaction to it.⁷ Careful consideration is necessary before prescribing food elimination diets for AD in the absence of immediate FA symptoms. Clinical decision making should focus on symptoms of IgE-mediated FA in most cases.

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