

Dietary Triggers for Atopic Dermatitis in Children

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PRACTICE POINTS

- The perception of dietary triggers is so entrenched and widespread that it should be addressed even when thought to be irrelevant.
- It is important not to dismiss food as a factor in atopic dermatitis (AD), as it can play a number of roles in the condition.
- On the other hand, education about the wide range of food reactions and the relative rarity of true food-driven AD along with the potential risks of dietary modification may enhance both rapport and understanding between the clinician and patient.

It is unsurprising that food frequently is thought to be the culprit behind an eczema flare, especially in infants. Indeed, it often is said that infants do only 3 things: eat, sleep, and poop.¹ For those unfortunate enough to develop the signs and symptoms of atopic dermatitis (AD), food quickly emerges as a potential culprit from the tiny pool of suspects, which is against a cultural backdrop of unprecedented focus on foods and food reactions.² The prevalence of food allergies in children, though admittedly fraught with methodological difficulties, is estimated to have more than doubled from 3.4% in 1999 to 7.6% in 2018.³ As expected, prevalence rates were higher among children with other atopic comorbidities including AD, with up to 50% of children with AD demonstrating convincing food allergy.⁴ It is easy to imagine a patient conflating these 2 entities and mistaking their correlation for causation. Thus, it follows that more than 90% of parents/guardians have reported that their children have had food-induced

AD, and understandably—at least according to one study—75% of parents/guardians were found to have manipulated the diet in an attempt to manage the disease.^{5,6}

Patients and parents/guardians are not the only ones who have suspected food as a driving force in AD. An article in the *British Medical Journal* from the 1800s beautifully encapsulated the depth and duration of this quandary: “There is probably no subject in which more deeply rooted convictions have been held, not only in the profession but by the laity, than the connection between diet and disease, both as regards the causation and treatment of the latter.”⁷ Herein, a wide range of food reactions is examined to highlight evidence for the role of diet in AD, which may contradict what patients—and even some clinicians—believe.

No Easy Answers

A definitive statement that food allergy is not the root cause of AD would put this issue to rest, but such simplicity does not reflect the complex reality. First, we must agree on definitions for certain terms. What do we mean by *food allergy*? A broader category—adverse food reactions—covers a wide range of entities, some immune mediated and some not, including lactose intolerance, irritant contact dermatitis around the mouth, and even dermatitis herpetiformis (the cutaneous manifestation of celiac disease).⁸ Although the term *food allergy* often is used synonymously with *adverse food reactions*, the exact definition of a food allergy is specific: “adverse immune responses to food proteins that result in typical clinical symptoms.”⁸ The fact that many patients and even health care practitioners seem to frequently misapply this term makes it even more confusing.

The current focus is on foods that could trigger a flare of AD, which clearly is a broader question than food allergy

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sensu stricto. It seems self-evident, for example, that if an infant with AD were to (messily) eat an acidic food such as an orange, a flare-up of AD around the mouth and on the cheeks and hands would be a forgone conclusion. Similar nonimmunologic scenarios unambiguously can occur with many foods, including citrus; corn; radish; mustard; garlic; onion; pineapple; and many spices, food additives, and preservatives.⁹ Clearly there are some scenarios whereby food could *trigger* an AD flare, and yet this more limited vignette generally is not what patients are referring to when suggesting that food is the root cause of their AD.

The Labyrinth of Testing for Food Allergies

Although there is no reliable method for testing for irritant dermatitis, understanding the other types of tests may help guide our thinking. Testing for IgE-mediated food allergies generally is done via an immunoenzymatic serum assay that can document sensitization to a food protein; however, this testing by itself is not sufficient to diagnose a clinical food allergy.¹⁰ Similarly, skin prick testing allows for intradermal administration of a food extract to evaluate for an urticarial reaction within 10 to 15 minutes. Although the sensitivity and specificity vary by age, population, and the specific allergen being tested, these are limited to immediate-type reactions and do not reflect the potential to drive an eczematous flare.

The gold standard, if there is one, is likely the double-blind, placebo-controlled food challenge (DBPCFC), ideally with a long enough observation period to capture later-occurring reactions such as an AD flare. However, given the nature of the test—having patients eat the foods of concern and then carefully following them for reactions—it remains time consuming, expensive, and labor intensive.¹¹

To further complicate matters, several unvalidated tests exist such as IgG testing, atopy patch testing, kinesiography, and hair and gastric juice analysis, which remain investigational but continue to be used and may further confuse patients and clinicians.¹²

Classification of Food Allergies

It is useful to first separate out the classic IgE-mediated food allergy reactions that are common. In these immediate-type reactions, a person sensitized to a food protein will develop characteristic cutaneous and/or extracutaneous reactions such as urticaria, angioedema, and even anaphylaxis, usually within minutes of exposure. Although it is possible that an IgE-mediated reaction could trigger an AD flare—perhaps simply by causing pruritus, which could initiate the itch-scratch cycle—because of the near simultaneity with ingestion of the offending food and the often dramatic clinical presentations, such foods clearly do not represent “hidden” triggers for AD flares.³ The concept of food-triggered AD (FTAD) is crucial for thinking about foods that could result in true eczematous flares, which historically have been classified as early-type (<2 hours after food challenge) and late-type (≥2 hours after food challenge) reactions.^{13,14}

A study of more than 1000 DBPCFCs performed in patients with AD was illustrative.¹⁵ Immediate reactions other than AD were fairly common and were observed in 40% of the food challenges compared to only 9% in the placebo group. These reactions included urticaria, angioedema, and gastrointestinal and respiratory tract symptoms. Immediate reactions of AD alone were exceedingly rare at only 0.7% and not significantly elevated compared to placebo. Just over 4% experienced both an immediate AD exacerbation along with other non-AD findings, which was significantly greater than placebo ($P < .01$). Although intermediate and late reactions manifesting as AD exacerbations did occur after food ingestion, they were rare (2.2% or less) and not significantly different from placebo. The authors concluded that an exacerbation of AD in the absence of other allergic symptoms in children was unlikely to be due to food,¹⁵ which is an important finding.

A recent retrospective review of 372 children with AD reported similar results.⁴ The authors defined FTAD in a different way; instead of showing a flare after a DBPCFC, they looked for “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.” Despite this fundamentally different approach, they similarly concluded that while food allergies were common, FTAD was relatively uncommon—found in 2% of those with mild AD, 6% of those with moderate AD, and 4% of those with severe AD.⁴

There are other ways that foods could contribute to disease flares, however, and one of the most compelling is that there may be broader concepts at play; perhaps some diets are not specifically driving the AD but rather are affecting inflammation in the body at large. Although somewhat speculative, there is evidence that some foods may simply be proinflammatory, working to exacerbate the disease outside of a specific mechanism, which has been seen in a variety of other conditions such as acne or rheumatoid arthritis.^{16,17} To speculate further, it is possible that there may be a threshold effect such that when the AD is poorly controlled, certain factors such as inflammatory foods could lead to a flare, while when under better control, these same factors may not cause an effect.

Finally, it is important to also consider the emotional and/or psychological aspects related to food and diet. The power of the placebo in dietary change has been documented in several diseases, though this certainly is not to be dismissive of the patient’s symptoms; it seems reasonable that the very act of changing such a fundamental aspect of daily life could result in a placebo effect.^{18,19} In the context of relapsing and remitting conditions such as AD, this effect may be magnified. A landmark study by Thompson and Hanifin²⁰ illustrates this possibility. The authors found that in 80% of cases in which patients were convinced that food was a major contributing factor to their AD, such concerns diminished markedly once better control of the eczema was achieved.²⁰

Navigating the Complexity of Dietary Restrictions

This brings us to what to do with an individual patient in the examination room. Because there is such widespread concern and discussion around this topic, it is important to at least briefly address it. If there are known food allergens that are being avoided, it is important to underscore the importance of continuing to avoid those foods, especially when there is actual evidence of true food allergy rather than sensitization alone. Historically, elimination diets often were recommended empirically, though more recent studies, meta-analyses, and guidance documents increasingly have recommended against them.³ In particular, there are major concerns for iatrogenic harm.

First, heavily restricted diets may result in nutritional and/or caloric deficiencies that can be dangerous and lead to poor growth.²¹ Practices such as drinking unpasteurized milk can expose children to dangerous infections, while feeding them exclusively rice milk can lead to severe malnutrition.²²

Second, there is a dawning realization that children with AD placed on elimination diets may actually develop true IgE-mediated allergies, including fatal anaphylaxis, to the excluded foods. In fact, one retrospective review of 298 patients with a history of AD and no prior immediate reactions found that 19% of patients developed new immediate-type hypersensitivity reactions after starting an elimination diet, presumably due to the loss of tolerance to these foods. A striking one-third of these reactions were classified as anaphylaxis, with cow's milk and egg being the most common offenders.²³

It also is crucial to acknowledge that recommending sweeping lifestyle changes is not easy for patients, especially pediatric patients. Onerous dietary restrictions may add considerable stress, ironically a known trigger for AD itself.

Finally, dietary modifications can be a distraction from conventional therapy and may result in treatment delays while the patient continues to experience uncontrolled symptoms of AD.

Final Thoughts

Diet is intimately related to AD. Although the narrative continues to unfold in fascinating domains, such as the skin barrier and the microbiome, it is increasingly clear that these are intertwined and always have been. Despite the rarity of true food-triggered AD, the perception of dietary triggers is so widespread and addressing the topic is important and may help avoid unnecessary harm from unfounded extreme dietary changes. A recent multispecialty workgroup report on AD and food allergy succinctly summarized this as: "AD has many triggers and comorbidities, and food allergy is only one of the potential triggers and comorbid conditions. With regard to AD management, education and skin care are most important."³ With proper testing, guidance, and both topical and systemic therapies, most AD can be brought under control, and for at least some patients, this may allay concerns about foods triggering their AD.

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