One Child's Food Fight: A Case Study of Oral Immunotherapy Treatment for Food Allergies

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ABSTRACT

The prevalence of food allergy has risen dramatically in the last two decades. Primary care providers encounter food-allergic children on a daily basis. Although the standard of care has traditionally been strict avoidance of the allergen and advisement to carry an epinephrine autoinjector in case of an accidental exposure resulting in a severe reaction, food allergy research has progressed in the past decade concerning various immunotherapies that may provide an alternate treatment strategy. Oral immunotherapy (OIT), performed under the supervision of an allergist, is the most widely studied of these therapies. In the past, OIT has been available in the realm of clinical trials, but it is now being offered by a small but increasing number of allergists in private practice throughout the United States. Pediatric primary care clinicians should be aware of both the risks and possible benefits of this treatment, because they are likely to encounter patients who may inquire about OIT in their practices. In this case report, use of OIT will be reviewed in the treatment of a food-allergic child. J Pediatr Health Care. (2018) ■■, ■■-■■.

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Anaphylaxis, desensitization, epinephrine autoinjector, food allergy, oral immunotherapy

CASE PRESENTATION

A 10-year-old boy with a known history of food allergies presented to the primary care clinic with his parents. His past medical history was significant for a first reported allergic reaction, which occurred at 7 months of age after ingestion of pasta, in which he exhibited facial flushing and edema followed by one episode of emesis an hour after ingestion. After subsequent reactions to different foods, percutaneous prick testing at 9 months showed sensitization to wheat, eggs, peanuts, and tree nuts. Strict avoidance was recommended and initiated.

Continued additional food reactions with similar allergic symptoms led to broader categories of food avoidance, a second opinion with a different allergist, and a new recommendation to carry an epinephrine autoinjector. At age 3 years, the child experienced facial edema, generalized severe urticaria, and repetitive emesis after eating a peppermint patty candy with inadvertent egg ingestion. His mother administered an epinephrine autoinjector at home, followed by emergent medical care and overnight hospitalization. During the next 7 years, various food challenges were tried in conjunction with allergist recommendations, often met with mixed results, with the child passing a wheat challenge but failing a baked egg challenge.

DISCUSSION

Between 1997 and 2011, food allergies among children were estimated to have increased by 50% (Jackson, Howie, & Akinbami, 2013). Between 2010 and 2016,

peanut allergies alone rose 21% (American College of Allergy and Immunology, 2017). Insurance claims in the United States with the diagnosis of anaphylactic food reactions rose a staggering 377% between the years 2007 and 2016 (Gelburd, 2017). Current estimates in the United States identify approximately 8% of children, or 6 million, who suffer from some form of food allergy, with younger children disproportionately affected (Centers for Disease Control and Prevention, 2011; Gupta et al., 2011). Most food-induced allergic reactions in children occur from exposure to milk, eggs, and peanuts. Symptoms of food allergy may present with symptoms ranging from mild to severe in the skin, gastrointestinal and respiratory tracts, and/or cardiovascular system (Food Allergy Research and Education, 2017). The clinical diagnosis of food allergy is based on a combination of medical history, physical examination, and food allergy testing. Clinicians should consider referral to an allergist/immunologist for diagnosis and management of suspected food allergy (American Academy of Pediatrics, 2011).

The current standard of care for food allergies is to practice strict avoidance of the allergen and carry self-injectable epinephrine for emergency use in case of an accidental exposure and subsequent anaphylaxis (Kulis, Wright, Jones, & Burks, 2015). This practice contributes to a diminished quality of life for these children and their families. One in three children report being bullied or teased because of their food allergy, with increased frequency of bullying corresponding to lower quality of life measures (Shemesh et al., 2013). Greater numbers of allergens also correlate to decreased quality of life measures (Warren, Otto, Walkner, & Gupta, 2016). Feelings of dissatisfaction with diminished quality of life can lead some patients and their caregivers to explore other treatment options (Lanser, Wright, Orgel, Vickery, & Fleischer, 2015). After 7 years of traditionally recommended allergen avoidance, the reported social health impacts of a food allergy diagnosis for this child's family included mild generalized anxiety; perceived stigma from requiring an "allergy safe spot" at school; feelings of social isolation when excluded from parties or other social events, which often revolved around food; restriction of airline travel because of exposure concerns; limitations to a small group of restaurants for social eating; and maternal anxiety over potential exposures, which did inadvertently happen in the school setting. Because of the continued allergy and significant social and emotional impact, the boy's family began seeking treatment options and learned about oral immunotherapy (OIT).

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EMERGING TREATMENTS

Several forms of immunotherapy are currently being explored as a treatment for food allergies. Epicutaneous immunotherapy (EPIT) is a treatment in which a patch containing the offending allergen is placed on the skin each day for a year or longer, thereby aiming to induce desensitization to the allergen (DBV Technologies, 2017; Jones et al., 2017). EPIT recently failed to meet its primary endpoint for a Phase 3 trial, with only 35.3% of patients responding to treatment, but it is still proceeding with the U.S. Food and Drug Administration (FDA) approval process (DBV technologies, 2017). A second option available to the general pediatric population and currently being studied in clinical trials is sublingual immunotherapy (SLIT), in which drops of allergen extract are placed under the tongue daily for a period of months to sometimes years, with the goal of inducing desensitization (Lanser et al., 2015). A third treatment option is OIT, available to children in private practice and undergoing continuing clinical trials. The offending food allergen is fed orally to the patient, first in minute amounts and then slowly increased over the course of months until the patient is able to tolerate a prespecified target dose of the food (Kulis et al., 2015). Although all three forms of immunotherapy have shown promise, OIT is the most widely studied food allergy treatment (Warren et al., 2016). The safety profile of both EPIT and SLIT are more favorable than OIT, producing few, if any systemic reactions. OIT, however, to date supersedes both EPIT and SLIT in efficacy (Kulis et al., 2015). In a randomized, double-blind, placebo-controlled study comparing peanut SLIT versus OIT in 21 children ages 7 to 13 years, after 12 months of treatment the median tolerated dose of peanut protein among those receiving SLIT therapy was 496 mg, or about two peanuts, whereas the median tolerated dose of those receiving OIT for 12 months was 7,246 mg of peanut protein, or about 29 peanuts (Narisety et al., 2015).

OIT protocols vary among providers but share some commonalities (Wasserman et al., 2014). OIT treatment is commonly divided into three stages: a rapid desensitization day at the onset of treatment, a gradual dose increase phase lasting for a period of several months, and a final maintenance phase continued indefinitely (Kulis et al., 2015). Although protocols vary by allergen and treatment provider, the rapid desensitization day usually begins with the patient ingesting micrograms of the allergenic proteins in question and ends with the consumption of several milligrams of the allergen. The second phase of treatment begins when the dosing amount achieved during the rapid desensitization day is consumed at home either daily or twice