

Elimination Diets and Oral Food Challenges

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KEY CONCEPTS

- Diagnostic elimination diets are undertaken to provide presumptive evidence that a disorder or symptoms are food responsive.
- Prolonged diagnostic elimination diets may carry risks of nutritional deficiencies or loss of a state of desensitization.
- The oral food challenge (OFC), in particular when double-blind and placebo-controlled, is the most definitive modality available to diagnose a food-related illness.
- An OFC may induce anaphylaxis.
- Decisions about when and how to undertake an OFC require consideration of benefits (nutritional, social) and risks.
- Performance of an OFC requires preparation and consideration about dosing, understanding when to stop a challenge and treat a reaction, and how to instruct patients about introducing or avoiding a food following a challenge.

Introduction

The oral food challenge (OFC) is a definitive diagnostic test used to determine if a food is tolerated. The double-blind, placebo-controlled oral food challenge (DBPCFC) is considered the “gold standard” of diagnosis [1]. The test does not depend on the pathophysiology of an adverse reaction, and so it is valid for determination of food allergy, intolerance, and for pharmacologic reactions to foods. Steps taken to determine the need for an OFC, and deciding upon masking and placebo controls, are explained in Chapters 20 and 24. Here, the technique of performing an OFC will be described, including a review of risks and benefits, selection of challenge location, challenge procedures, dosing, monitoring, and challenge preparation and aftercare. OFCs typically follow a period of dietary elimination undertaken either as treatment of a known or likely allergy, or as a diagnostic trial to determine if a condition is food responsive. Procedural issues in undertaking a diagnostic elimination diets will be described here as well.

Food elimination diets

When food hypersensitivity is under consideration as a cause for a chronic disease such as atopic dermatitis or eosinophilic gastroenteropathy, a diagnostic elimination diet is often required prior to undertaking OFCs [2]. Another reason for dietary elimination prior to a food challenge may be to avoid a suspected or known trigger of reactions. There are three types of elimination diets (Table 23.1) and the type selected for a particular patient will depend on the clinical scenario being evaluated and the results of tests for IgE antibody. The first type involves the elimination of one or several foods from the diet. This may be the obvious course of action when an isolated food ingestion (i.e. peanut) causes a sudden acute reaction and there is a positive test for IgE to the food. This would represent a therapeutic intervention, rather than a diagnostic one. However, eliminating one or a few suspected foods from the diet when the diagnosis is not so clear (asthma, atopic dermatitis, chronic urticaria) can be a crucial step in determining if food is causal in the disease process. If symptoms persist, the eliminated food(s) is (are) excluded as a cause of symptoms. The length of trial depends on the type of symptoms, but 1–6 weeks is usually the time interval required. A brief dietary trial should suffice for disorders with frequent acute reactions while longer trials may be required to allow chronic inflammation to subside.

Table 23.1 Types of elimination diets used to evaluate the role of adverse food reactions in chronic disease

Diet	Description/target	Example
Specific Food(s)	Targeted diet to one or several suspected foods; may be therapeutically necessary as final treatment	Elimination of egg in toddler with atopic dermatitis; elimination of food dyes and preservatives in child with chronic urticaria
Oligoantigenic	Palatable, balanced diet devised according to patient preferences, but eliminating a large group of common or suspected allergens (e.g. egg, milk, peanut, seafood, etc.)	Allow lamb, broccoli, squash, sweet potato, rice, corn, beets, cooked apple and pear, sugar, salt, and vegetable oil for 6 weeks in patient with reflux and atopic dermatitis
Elemental	Amino-acid-based formula (or, less ideally, an extensive hydrolysate) as sole nutrition	Used for 8 weeks to evaluate severe eosinophilic gastroenteropathy in a 3-year old with failure to thrive

The second type of diet consists of eliminating a large number of foods suspected to cause a chronic problem (usually including those that are common epidemiologically as causes of food-allergic reactions as described above) and giving a list of “allowed foods.” This “oligoantigenic” diet is useful for evaluation of chronic disorders when a larger number of foods are suspected. In most cases, this is the situation with atopic dermatitis, eosinophilic gastroenteropathies, or chronic urticaria. An example of such a diet is given in Table 23.2, but individualization is almost always needed. The advantage of this diet is that a nutritionally balanced, palatable diet is maintained while most possible causal foods are removed. The primary disadvantage is that, if symptoms persist, the cause could still be attributed to foods left in the diet. For finicky eaters, it may be helpful to assess exactly what foods are favorites and try to allow foods of low risk that are enjoyed by the patient and can be used for meals and snacks.

The most limited type of diet is an elemental diet in which calories are obtained from an extensively hydrolyzed formula or from an amino-acid-based formula. A subset of milk-allergic children react to extensively hydrolyzed casein-based infant formulas but tolerate amino-acid-based ones [3]. A variation is to include a few foods likely to be tolerated (however, this adds the possibility that persistent symptoms are caused by these foods). Unfortunately, except for the most severe disorders that warrant its use, this is a severe diet to impose and is extremely difficult to maintain in patients beyond infancy. In extreme cases, nasogastric feeding of the amino-acid-based formula can be achieved, although most patients can tolerate the taste of these

Table 23.2 Example of elimination diet (*see text*)

Pick one meat	Chicken or lamb
Pick one grain substitute*	Corn or rice
Pick three vegetables (cooked)	Broccoli, sweet potato*, carrot, squash, string bean
Pick three fruits	Apple, pear, peach, plum, banana
Consider supplement	“Complete” hypoallergenic formula

*Allows for variety of textures (breads, pastas, sweet potato chips/ mashed, pancakes).

formulas with gradual introduction or the use of flavoring agents provided by the manufacturers. This diet may be required when the diets mentioned above fail to resolve symptoms, but suspicion for food-related illness remains high. It is also often required in disorders associated with multiple food allergies such as the allergic gastroenteropathies [4–6].

Information concerning strict adherence to the diet must be carefully reviewed. Errors are common [7]. Patients and families must be educated about label reading, cross-contamination, and the fact that the food protein, as opposed to sugar or fat, is the ingredient being eliminated (e.g. lactose-free milk contains cow’s milk protein). If there is no improvement with elimination, then the foods eliminated are not likely to be a cause of the complaints. However, it is crucial to ensure that the diet was followed as prescribed before concluding that the result was negative. If resolution of symptoms is achieved, OFCs may be warranted as a next step in identifying which foods from among those eliminated are or are not tolerated.

There are potential risks when undertaking elimination diets. Elimination diets are usually required for just a few weeks and so nutritional deficiencies are not likely but must be considered if elimination is prolonged [8]. If multiple foods were eliminated and symptoms resolved, a patient or family may wish to maintain the prescribed diet. In this case, the nutritional adequacy of the diet, now being followed long term for treatment rather than diagnosis, should be assessed (see Chapter 38). An additional risk is that elimination of foods to which IgE antibodies were identified and which were associated with chronic inflammatory disease may result in loss of a desensitized state, leading to an acute reaction such as anaphylaxis or urticaria when the food is reintroduced [9,10]. The frequency of this occurrence and the length of time of elimination associated with loss of the desensitized state is unknown. However, the risk should be considered when undertaking prolonged elimination trials.

Oral food challenges

Chapter 20 defines the parameters under which an OFC is typically undertaken, and the factors that may be

considered in deciding to utilize open, single, or double-blind, placebo-controlled challenges. Briefly, this process requires consideration of the likelihood that a food will be tolerated, which typically derives from the past history and test results. Additional consideration includes assessment of nutritional, social, and emotional factors that may indicate the need for, or deferral of an oral challenge. The DBPCFC is considered the “gold standard” for diagnosing food allergy [11,12]. Any test, however, can have limitations. The false positive and false negative rate for the DBPCFC based primarily on studies in children with atopic dermatitis is 0.7% and 3.2%, respectively [13,14]. To help exclude false negatives, it has long been suggested to include an open feeding under supervision of a meal size portion of the tested food prepared in its usual manner as a follow-up to any negative DBPCFC [15–17]. When one is evaluating subjective symptoms, there is a greater likelihood that false positive or negative determinations would occur. Increasing the number of challenges (additional placebo and true foods) helps to diminish the possibility of a random association, but this can be a very labor intensive approach [18,19]. While the DBPCFC can elucidate the relationship of symptoms to foods, it is not specific for food hypersensitivity. Any adverse reaction to food (intolerance, pharmacologic effect) can potentially be evaluated, so demonstration of an immunological explanation is still needed to label a reaction as a food allergy [1]. Oral challenges are almost the only methodology to adequately evaluate reactions to food additives (coloring and flavoring agents and preservatives) [20,21]. The same can be said for symptoms not likely to be associated with food allergy (behavior, etc.). This chapter focuses upon factors pertinent to undertaking the OFC including presenting the concept to a patient/family and considering risks/benefits, making a risk assessment for choosing an appropriate location for a challenge and selecting a dosing schedule, preparing challenge materials, preparing to treat a reaction, how to monitor for symptoms and to decide when to discontinue a challenge and treat symptoms, and how to instruct families following a successful or failed procedure.

Discussing the procedure with a patient

The challenge procedure, its risks, and benefits must be discussed with the family/patient. As described in Chapter 20, numerous factors are considered including the assessment of the odds for passing, the nutritional/social need for the food, and ability of the patient to cooperate with the challenge. Patients should understand that the test is being done to determine if the food is safe for them to ingest, but also that should they tolerate the food, it should be added to the diet following a successful challenge. Persons who passed a food challenge to peanut, for example, but do not incorporate the food into the diet may be at risk to redevelop reactions [22,23]. Although OFCs may be used to determine thresholds of reactivity, challenges are not routinely

performed for clinical purposes in persons who are expected to react simply for the purpose of defining a safe threshold. In addition, since challenges are stopped when symptoms develop, they may not reflect severity of reactions from exposures due to accidental ingestion. Risks include anaphylaxis, though no deaths have been reported from physician-supervised OFCs. Risks may also include emotional ones from failed challenges. Following review of risks and benefits, informed consent should be documented.

Deciding upon a challenge location

If a challenge is undertaken, a risk assessment is needed to determine a safe location/setting in which to undertake the challenge. In rare circumstances, the food may be administered without physician supervision at home. For example, if vague complaints or ones not usually associated with food allergy (headache, behavioral issues) are being evaluated and there is no risk of an acute anaphylactic reaction, and especially when symptom onset is perceived to be delayed, foods (even in a double-blind, placebo-controlled structure) could be added at home. Similarly, if many foods were eliminated for a chronic, non-IgE-mediated disease and acute reactions are not a concern, adding the previously tolerated foods back into the diet at home for observation of recurrence of chronic symptoms is reasonable because doing so would not likely cause a severe reaction. On the other hand, whenever there is an even remote potential for an acute and/or severe reaction, physician supervision is mandatory.

Except in the uncommon circumstances described previously, OFCs are undertaken under direct medical supervision. A physician or trained health care worker evaluates symptoms during a challenge. The decision to undertake a supervised challenge includes, but is not limited to, the evaluation of disorders that include a potential for severe reactions. The next issue at hand is whether the challenge is considered of “low risk” and can be done in an office setting or should be conducted in a location with heightened capabilities for the management of severe anaphylaxis (e.g. hospital, intensive care unit). Whether intravenous access should be established prior to commencing the challenge must also be considered. The decisions about challenge location and whether to secure intravenous access prior to commencing a challenge are based on the same types of data evaluated for the consideration of food allergy in the early diagnostic process: the history (severity of prior reactions, history of reactions to the test food, etc.), prick skin test (PST) results, serum food-specific IgE tests. The higher the probability of a reaction the more likely a physician may wish to undertake the procedure in a more highly monitored (e.g. hospital) setting. Additional consideration is given to the potential severity of a reaction, should one occur. For consideration in this regard are co-morbid conditions (such as asthma), the type of food (e.g. risk of causing a severe reaction), severity of prior reactions, a history of reacting to small doses, etc. In

any setting, it must be appreciated that oral challenges can elicit severe, anaphylactic reactions, so the physician must be comfortable with this potential and be prepared with emergency medications and equipment to promptly treat such a reaction no matter where the test is undertaken. In the office setting, such preparations are similar to those recommended in the context of offices that administer allergens by injection for immunotherapy [11,24].

If the challenge is considered “high risk” (e.g. positive test for IgE, previous severe reaction, asthmatic patient), then it is best to perform it in a very controlled setting (e.g. hospital). In high-risk challenges, it may also be prudent to have intravenous access prior to commencing challenges. One research group reviewed their record with 349 food challenges in children with atopic dermatitis and recommended intravenous access for challenges when the history indicated a prior need for medical intervention or when particular tests for IgE antibody indicated a fairly high risk for reactions [25]. A study by Perry *et al.* [26] reviewed risks of OFCs in children typically assessed to have a 50% risk or less of a reaction prior to challenge. Of the 584 challenges completed, 253 (43%) were positive to: milk (90), egg (56), peanut (71), soy (21), and wheat (15). Of patients who failed, there were 197 (78%) cutaneous, 108 (43%) gastrointestinal, 66 (26%) oral, 67 (26%) lower respiratory, and 62 (25%) upper respiratory reactions. Despite presumptions about certain foods causing more severe (e.g. peanut) reactions than others (e.g. egg, milk) there was no difference between foods in the severity of failed challenges or the type of treatment required to reverse symptoms. These observations underscore the need for preparation to treat severe reactions whenever undertaking an OFC.

Food protein-induced enterocolitis syndrome can result in hypotension and should be performed with intravenous access in a hospital setting [27]. This cell-mediated disorder results in a symptom complex of poor growth and profuse vomiting and diarrhea with or without microscopic blood in the stool while the causal food(s) are part of the diet [27]. When severe, particularly with re-feeding after a period of elimination as is the case during the OFC, reactions may include lethargy, dehydration, and hypotension, and may be complicated by acidosis and methemoglobinemia.

Preparing the patient for the challenge and baseline assessments

Patients must be given specific preparatory instruction prior to undertaking the challenge. Patients avoid the suspected food(s) for at least 2 weeks, antihistamines are discontinued according to their elimination half-life, and chronic asthma medications are reduced as much as possible prior to undertaking the challenge. β -agonists are eliminated for a relevant time period before challenges are undertaken. Medications such as β -blockers that may interfere with treatment should be substituted as possible. The patient should be examined

carefully prior to challenge to confirm that they are not already having chronic symptoms, and to determine their “baseline.” It would not be prudent to undertake a challenge in an individual with, for example, mild wheezing for both the ability to judge a reaction and for safety concerns. Patients should be queried about any symptoms they have been experiencing that could confuse the interpretation of a food challenge, such as urticaria or rhinitis. It is prudent to avoid performing challenges if a patient recently had an exacerbation of asthma, particularly one requiring oral steroids. For some diseases (i.e. severe atopic dermatitis) hospitalization may be necessary to treat acute disease and establish a stable baseline prior to challenges. The patient should avoid food or drink for about 4 hours prior to challenge, although for young children or infants, clear fluids may be allowed.

Decisions on dosing

Despite attempts and discussions to make a uniform international protocol for performing OFCs, no consensus has been reached and many published studies use variations on a general theme [11,17,28]. In all challenges, the food is given in gradually increasing amounts. This is for safety reasons. For most IgE-mediated reactions, the author and colleagues [29] give a total of 8–10g of the dry food or 100ml of wet food (double amount for meat/fish) in gradually increasing doses at 10–15 minute intervals over about 90 minutes followed by a larger, meal size portion of food a few hours later. The doses may be distributed, for example, in portions such as (0.1%, 0.5%), 1%, 4%, 10%, 20%, 20%, 20%, 25%. However, researchers and clinicians have used a variety of other challenge regimens (lower starting doses, variations in the degree of dosing increases, different time intervals, etc.) with good success [28,30–32]. The dosing interval may be increased or doses repeated either because the observer is unsure of symptoms or to more closely mimic the history of reactions. In the latter situation, doses may be administered over days if the history indicates that several days of ingestion were required to trigger symptoms.

The starting dose to select varies among studies, but clinical correlation may be helpful. To place this in perspective, it is reported that highly sensitive cow’s milk-allergic patients may react to trace milk contamination (e.g. 8.8–14ppm) in commercial products, but these are generally not patients with a profile conducive to oral challenges [33,34]. In a study of adult peanut-allergic patients undergoing DBPCFCs, 50mg of peanut was generally the lowest dose that elicited objective reactions (one patient experienced subjective symptoms at only 100 μ g of peanut) [35]. We reviewed challenge data for 513 positive challenges to six common allergenic foods in children with atopic dermatitis [29]. Starting doses were usually 500mg, but at the physician’s discretion, starting doses were sometimes 100 or 250mg. The percentage of children reacting at the first dose (500mg or less) were as follows: egg 49%, milk 55%, soy 28%, wheat 25%,

peanut 26%, and fish 17%. Twenty-six milk challenges and 22 egg challenges were positive at a first dose of 250mg; 3 milk challenges and 7 egg challenges were positive at a first dose of 100mg. Eleven percent of the reactions that occurred on first dose were judged severe. The dose to elicit a reaction was not predictable with PST size or IgE antibody concentration, as was also observed in the study by Perry [26]. Based on these results, starting doses of 100mg or less were recommended. To be particularly cautious, one could argue for starting doses that begin under the thresholds reported to induce reactions. Unfortunately, the published thresholds vary by logarithmic differences among studies and data are not available for most foods. However, reactions are usually not reported under 0.25mg of protein for peanut, 0.13 for egg, and 0.6 for milk (milligram of protein varies according to the form of the food) [36]. Some workers begin challenges by placing the food extract on the lower lip for 2 minutes (labial food challenge) and observing for local or systemic reactions in the ensuing 30 minutes [30]. The development of a contiguous rash of the cheek and chin, edema of the lip with conjunctivitis or rhinitis, or a systemic reaction is considered a positive test. Negative labial challenges are generally followed by an OFC. However, the validity of labial challenges has not been thoroughly investigated.

Dosing regimens for food protein-induced enterocolitis syndrome are slightly different [27,37]. Food challenges for this non-IgE-mediated syndrome are typically performed with 0.15–0.6g/kg of the causal protein (usually cow’s milk or soy), and reactions of profuse vomiting and diarrhea typically begin 2–4 hours after the ingestion and are accompanied by a rise in the absolute neutrophil count of over 3500 cells/mm³.

Making and administering the challenge food

The successful administration of OFCs to young children requires a great deal of preparation, ingenuity, and patience. Young children may become stubborn and refuse to ingest the challenge food. Prior planning with the family to select palatable or familiar forms of challenge foods or vehicles to hide foods in, if the challenge is masked, can be helpful in improving the experience [38]. For example, milk protein may be mixed and hidden in soy frozen dessert products. Having additional challenge vehicles, for example liquid and solid forms of the challenge substance, readily at hand may prevent delays. Allowing the use of well-cleansed utensils and dinnerware that are familiar to the child (e.g. a favorite cup or plate) makes the challenge more natural appearing. Diversions such as toys, games, or videotapes are helpful. Since splattered or drooled food can elicit a local skin reaction from direct skin contact (but not necessarily from ingestion), it is helpful to have wet napkins on hand and straws for liquid challenges. Similarly, when performing OFCs with children, it is better to feed them rather than to let them feed themselves and risk splattering.

The set-up for a DBPCFC is more complicated than what is needed for open or single-blind challenges. Although the procedure is more labor intensive, it can be carried out in an office setting if the challenge is not high risk [12]. The procedure still introduces graded doses but in this case either a challenge food or a “placebo” food is administered. The aid of a “third party” is needed to prepare the challenges so that the observer and patient are kept unaware whether a true or placebo challenge is being undertaken. A “coin flip” can be used by the third party to randomize the order of administration. The food is hidden either in another food or in opaque capsules. Suggestions for materials to have on hand for creating masked challenges are shown in Table 23.3. It is beneficial to stretch the imagination in trying to best mask foods, especially foods with strong odors. Creating meals that definitively mask taste is often difficult and to do it well requires studies of successful test foods, by tasting panels [38,39]. This procedure may be warranted for challenges performed for research purposes. To prevent false associations, it has been calculated that multiple challenges may be needed, with several placebo and verum feedings, but this procedure has practical limitations [19].

It is easiest to use opaque capsules because bias, possible if masking of foods is done poorly, is eliminated. However, oral symptoms are then bypassed and some patients are unable to ingest enough capsules. Bypassing oral symptoms by using capsules could theoretically result in stronger reactions, should multiple capsules begin to discharge their contents more closely in time than expected. It is often easier to mask liquid into liquid and to use powder or dehydrated forms of foods that can be folded into solid vehicles. Certain flavoring agents such as mint can also help to mask odors. It is important to select vehicles that are clearly tolerated by the patient. If a gritty food is being hidden in a vehicle, then a similarly gritty food should be added as placebo to the carrier vehicle. For example, oat as an allergen mixed in apple sauce may be matched to corn meal in apple sauce. It is also important to appreciate that certain preparation methods (canning, dehydration) may alter the allergens, hence an open challenge with a meal size portion of the food prepared

Table 23.3 Equipment and common foods to stock for use in creating masked food challenges

Equipment	Common allergens	Useful carrier agents
Paper plates, cups utensils	Peanut flour, peanut butter	Proprietary formulas (hydrolyzed casein, amino acid)
Mixing bowls	Powdered egg white	Baby foods (squash, carrot, potato)
Scale	Powdered/fresh milk	Apple sauce
Mortar/pestle	Soy milk, soy flour	Juices
Blender	Wheat breads, flour	
Microwave	Baby foods	

in its natural state for consumption following a negative DBPCFC is essential. It is preferable not to use fatty foods as vehicles since they can delay gastric absorption [40,41].

Depending on the particular food hypersensitivity disorder under consideration, timing of dose administration can be adjusted. For example, when evaluating potentially IgE antibody-mediated reactions, two challenges may be performed on a single day with 2–4 hours between challenges (one is placebo, one is active – so one food is tested each day). The practice of interspersing placebo and active food proteins during a single challenge (i.e. random ordering of sequential doses that may or may not contain the causal protein) should be discouraged since it can be difficult to determine if a reaction shortly after a particular dose, possibly a placebo dose, was actually a delayed response from an active dose administered previously.

Open or single-blind food challenges are typically used clinically instead of DBPCFC to screen for reactions, unless bias is suspected or subjective symptoms are the expected outcome. These open challenges are less labor and time intensive than DBPCFC and objective reactions are usually reliable. Ambiguous results of open or single-blind challenges can be confirmed using a DBPCFC. A negative DBPCFC is followed, usually a few hours later, with a meal sized portion of the food prepared in its natural form to ensure it is tolerated.

Monitoring and stopping a challenge/treatment

Challenges should be performed with appropriate monitoring equipment and emergency treatment medications, equipment, and oxygen immediately available. Medication doses (e.g. epinephrine, steroids, antihistamines, H-2 blockers, glucagons, vasopressors, etc.) should be pre-calculated by patient weight. The physician or health care worker records the dose given, the time of administration, and any symptoms that arise during the challenge [11]. Forms for recording vital signs, skin, respiratory, gastrointestinal, and cardiovascular examinations have been published [11,12]. Frequent assessments are made for symptoms affecting the skin, gastrointestinal tract, and/or respiratory tract, for example prior to each dose. With children, early indications of a reaction can include subtle signs such as moving the tongue in the mouth to rub an itchy palate, or ear pulling due to referred pruritus. While some families believe increased physical activities (hyperactivity) are a sign of food allergy, a common early response for children as they begin to experience a reaction is that they become suddenly quiet or assume a fetal position as a prodrome to more objective symptoms. Children with atopic dermatitis may develop a maculopapular rash in predilection areas of eczema. Objective monitoring can be done with peak flow or spirometry. Challenges are terminated when a reaction becomes apparent and medications are given, as needed. Judgment is required to decide upon discontinuing a challenge, continuing or modifying the dose, or timing for

subjective symptoms. Generally, antihistamines are given at the earliest sign of a reaction with epinephrine and other treatments given if there is progression of symptoms or any potentially life-threatening symptoms, but this is open to the judgment of the supervising staff, who must take the patient's history into consideration. In some cases, families or individuals may question whether it is necessary to treat the symptoms at all, or may even ask to proceed with more doses to see "how bad" the reaction could be. This is not advisable for obvious safety reasons and also because the reactions are not likely to reflect what a subsequent exposure may cause in an uncontrolled setting.

Patients may be observed for 2 hours or longer as clinically indicated after a negative OFC. Though most reactions occur promptly, it is possible to have late onset symptoms. Observation may be longer if the history indicates prior delayed reactions or if prior reactions were severe. If a reaction was treated, the patient should be observed 2–4 hours or longer past resolution of symptoms depending on the features/severity of the symptoms. During that period, repeated assessments are made and additional therapies used as indicated.

Post-challenge care

There are several issues that need to be addressed when an OFC results in a reaction. The disappointment engendered should be openly discussed. Sometimes patients or families can be partly consoled to know that their hard work at avoidance was necessary and successful. Patients often wish to know if future reactions could be severe, a question whose answer may not be related to the result of the challenge because dosing is gradual rather than sudden and possibly high during accidental exposures. In some cases, it may be apparent that patients were not symptomatic with small exposures during the challenge and may have a margin for error in terms of potential accidental exposures. Patients and families may also inquire as to the possibility that the challenge could "boost" or prime their allergy. While there are no published data to clearly support or refute this concern, the OFC is ultimately the only way to know whether the food is tolerated and is performed clinically when risk assessments are favorable for passing, thus making this concern essentially moot. A plan for re-evaluation with laboratory tests and OFCs should be discussed depending on the usual natural course for the food in question and patient-specific determinants such as age and other food allergies. Review of food avoidance measures is also helpful, and a re-evaluation of any nutritional impact that avoidance may have engendered should be undertaken.

Patients who have passed a challenge often need additional counseling about how to introduce or reintroduce the food. In some cases, a remaining fear could result in continued avoidance. There may also be concerns about re-developing the food allergy, a situation that is quite rare. Patients with

remaining food allergies must be cautioned specifically about any increased risk of exposure to an allergen that is commonly associated with the food that they are now able to ingest. For example, a patient with milk and egg allergy who passes an OFC to wheat must be warned to carefully check wheat products, now new to the patient, that may often also contain milk and egg. When there are no remaining food allergies, patients may be loathe to discontinue carrying epinephrine, and this should be discussed as well with consideration for a period of continued availability to reduce stress.

Summary

Elimination diets are used as treatment of a known food allergy or for diagnosis to provide presumptive evidence of causality. OFCs provide a definitive means to determine whether a food is causal of symptoms. The safety of the procedure is ensured by careful gradual dosing, close monitoring, promptly discontinuing administration and providing treatment in the event of symptoms, and providing continued monitoring and therapy as indicated until symptoms resolve. The DBPCFC is considered the “gold standard” for diagnosing a food allergy.

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