Elemental Diets for Eosinophilic Esophagitis: Theories and Practice
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The therapeutic goals of treating patients with eosinophilic esophagitis (EoE) are two-fold: the alleviation of symptoms and the reduction/elimination of eosinophils in the esophagus. At the present time, there is no universally accepted approach to obtain these goals, so each case has to be evaluated and treated on an individual basis. Dietary therapy is one approach that can be effective, if accepted by the patient and/or family. But that is a big if, since compliance is difficult and expense can be a limiting factor. There are three standard dietary approaches utilized: elemental, directed and non-directed food elimination diets. In general, the use of elemental diets for EoE is more common in infants and toddlers, since they already get most of their nutrition in a liquid form. This review will focus on the elemental discussing some of the pros and cons, but will not discuss specific products on the market.

Let's start with the basics. We need food to live, or said another way, we need calories to sustain ourselves, and for kids to grow. Our caloric needs are met by three major components of the food we eat: carbohydrate, protein, and fat. A food allergy, or in this case EoE, is a reaction of our immune system to certain proteins in our diet.

Proteins consist of essential building blocks known as amino acids that are linked together in long chains. A hypoallergenic formula is one that is treated in a way to render the proteins less reactive to the immune system (for a detailed definition, see ref. 1 and 2). The most common procedure to do this is called hydrolyzation, which breaks the proteins up into individual or short amino acid chains. Most of these extensively hydrolyzed formulas are made from components of cow's milk (either casein and/or whey), but have between 3,000 and 100,000 times less of these proteins that found in whole cow's milk (3). But there are still very small amounts of protein that can produce an immune reaction in as many as 5% of patients. This has

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lead to the development of elemental formulas, where synthetic, individual amino acids (free amino acids) are the protein source in the formula. Cellular components of the immune system can not recognize proteins of less than 6-8 amino acids, so in theory, the free amino acids in elemental formulas should not produce an immune response. Elemental formulas have been shown to be effective in treating EoE. In a large series of 160 patients, 158 had normalization of their esophageal biopsies after being placed on an elemental diet (4). The same group reported a non-response to elemental diet in only 5/500 patients (5).
The reason for these failures is not clear, but there are several possibilities including unidentified non-compliance, reactivity to other constituents of the formula, or that this in fact may represent a portion of patients with EoE that do not have food allergy as the basis for their disease. Nonetheless, the data that an elemental diet improves symptoms and esophageal histology are compelling.

Elemental diets have to be just that. It requires the removal of all solid foods and the use of a nutritionally balanced, complete formula. Elemental formulas appear to be safe. It is recommended that an elemental diet be initiated with the input of a registered dietician. They are particularly helpful in establishing the initial nutritional goals, and in the ongoing processes of assessing growth and nutritional status, and re-setting caloric goals as the patient grows. Documentation of improvement in both symptoms and esophageal histology is necessary, not only to prove the efficacy of the therapy, but as a basis for therapeutic planning in the future. But at this time, the precise course to take from here is not known and there are many unanswered questions about management. Do we keep the patient on an elemental diet indefinitely? If and when should food be (re)introduced? What should be (re)introduced first? How often should we perform endoscopy to monitor esophageal eosinophil counts? The list of

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questions goes on and on. Suffice it to say, when there is no clear cut answer as to how to proceed, it is essential that there is a working partnership between physician and patient/family to develop a reasonable plan of action based on the best available data, the experience of the physician, common sense, and the emotional and physical needs of the patient.

So why isn't the elemental diet the first line treatment for all patients with EoE? The answer is more complex than we sometimes appreciate. The obvious answer is that an elemental diet is not very tasty (what doctors or most chefs would call unpalatable). Adding flavors or now the availability of flavored formulas has somewhat improved this limitation. But in many instances, the only way to maintain adequate intake is by using a nasogastric tube to administer the formula. This is an effective way to provide the volumes necessary to reach caloric goals. It is safe, and once the family and patient get used to it, generally well-tolerated.

But a more subtle reason, which is rarely articulated by patients, is the fact that eating is more than just meeting nutritional goals. It's an important part of our lives. In some instances, it seems that people live to eat, rather than eat to live. This has a cultural influence, but regardless of culture, most people enjoy food. It's the combination of senses that gives us enjoyment: the smell, the sight, and the taste are all important. We plan our lives around it, and we socialize as families and with peers, within the context of mealtime. These aspects of diet and food are particularly important to older kids and adults and are a major reason for refusing the initiation or continuation of an elemental diet.

In an ideal world, I would say that all patients with EoE should be on an elemental diet. But we do not live in an ideal world, and we, as physicians, need to appreciate and understand the

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complexities and individual nature of the decisions our patients/families make regarding elemental diets. An important aspect of our job is to provide you with information, so that you can see the greater context of all the therapies available for EoE, and particularly their risks/benefits. This hopefully will permit you can make the best informed decision for you, the patient, and/or your family.

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