

Dietary Management of Epilepsy

DAVID T. HSIEH, MD; HEIDI H. PFEIFER, RD, LDN; and ELIZABETH A. THIELE, MD, PhD, *Massachusetts General Hospital, Boston, Massachusetts*

The safety and effectiveness of the ketogenic diet for the treatment of epilepsy have been known for decades. However, successful implementation of the diet requires an essential commitment by the patient and his or her family. Compliance with the ketogenic diet involves adjustments and often reversals of habitually established eating routines, as opposed to the task of consistently taking one's prescribed antiepileptic drugs.

As we reflect on the past several decades of epilepsy treatment, however, we are realizing that despite the almost yearly expansion of new antiepileptic drugs, they are ineffective in about one-third of patients.¹ For many patients, dietary therapies offer hope for an improved quality of life through seizure reduction, and accordingly we have seen an expansion of their use worldwide.² Successful implementation of these dietary therapies is dependent on support from family, social and educational networks, and the entire health care team.³

The classic ketogenic diet is high in fat and low in carbohydrates, and has enough protein for growth, usually at a 3:1 or 4:1 fat to protein plus carbohydrate ratio. Precise portions in the prescribed ratios are allocated using a digital gram scale. Additionally, within the past decade, less restrictive and more palatable, but equally effective, diets have been introduced: the modified Atkins diet⁴ and the low glycemic index treatment (LGIT) diet.⁵ The modified Atkins diet restricts carbohydrates to 10 to 30 g per day, without restrictions of fluids, calories, or protein. The LGIT diet allows patients to eat more "normal" foods, restricting carbohydrates to 40 to 60 g per day; however, patients can eat only carbohydrates with a low glycemic index (less than 50). All of these diets require vitamin supplementation.

The ketogenic diet has been shown to be effective in observational studies and a recently published randomized controlled trial; 15 percent of patients became seizure-free and at least one-third achieved at least a 50 percent reduction in seizures.⁶⁻⁸ Smaller, shorter-term observational studies of the modified Atkins diet and the LGIT diet have reported that approximately 50 percent of patients have at least a 50 percent reduction in seizures, and approximately 30 percent of patients

have at least a 90 percent reduction in seizures.^{9,10} The anticonvulsant mechanisms of these diets are still being investigated.

Dietary therapy should be considered in patients who have not responded to an adequate trial of two antiepileptic drugs.¹¹ Initiation of the ketogenic diet can be considered earlier in infants and patients with a gastrostomy tube, because the diet can easily be started using a commercially prepared liquid formula. Use of dietary therapy, specifically the modified Atkins diet and LGIT diet, has been increasing in adolescents and adults.¹¹ The ketogenic diet is considered a first-line treatment option for persons with specific conditions that involve defective glucose utilization and usually present with seizures, such as glucose transporter type 1 deficiency syndrome. Fatty acid oxidation disorders are one of the few absolute contraindications. If a decrease in seizure frequency is achieved, a trial of antiepileptic drug reduction can be considered after three to six months. Patients usually stay on the diet one to two years before discontinuation is considered.

The family physician's role is to support the family through a lifestyle change that affects the entire family's normal routine. Because dietary therapy should be administered only under medical supervision, the family should contact the dietary treatment center administering the patient's therapy with any questions. The Charlie Foundation Web site (<http://www.charliefoundation.org>) provides information and supportive resources, including a list of available dietary treatment centers.¹² The family physician should be aware of certain aspects of medical care distinctive to dietary therapies, such as surveillance for adverse effects and the management of common non-diet-related illness.

Adverse effects of dietary therapies can include acidosis (particularly during intercurrent illness), constipation, gastroesophageal reflux disease, poor linear growth, renal calculi, and metabolic abnormalities. When medications are prescribed, they should be in formulations that are low in carbohydrates, because seizure control is dependent on maintaining the metabolic state induced by the dietary therapy. Liquids and chewable tablets often use sugar-based fillers and should typically be avoided. When illness occurs and poor oral intake brings about dehydration, dextrose-free hydration fluids (oral or intravenous) should be used if possible; however, if symptomatic hypoglycemia is a concern, oral hydration with fluids containing glucose can be considered.

Editorials

All health care professionals play an important role in the successful use of dietary therapies in the treatment of epilepsy. With the increasing use and emergence of alternative diets, such as the modified Atkins diet and LGIT diet, a working knowledge of dietary therapies—with the support of the administering dietary treatment center—will improve the care of our patients.

The views expressed are those of the authors and do not reflect the official policy or position of the U.S. Air Force, Department of Defense, or the U.S. government.

Address correspondence to David T. Hsieh, MD, at david.hsieh@us.af.mil. Reprints are not available from the authors.

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Dr. Maynard Shapiro (AAFP President, 1968-1969) with medical trainees (part of a special program to acquaint college-bound students with medicine) at Chicago's Jackson Park Hospital, 1963, from CHFM photograph collections.

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