Integrative Nutrition for Pediatrics

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Food is essential for life. Yet, poor food choices may cause poor health. Dietary manipulation is frequently integrated into the management of common chronic pediatric conditions. Parents seek dietary information to have more control over child's condition and to avoid side effects of medicine. This article reviews selected diets for a few common pediatric disorders including eczema, attention deficit hyperactivity disorder, headache and migraine, non-celiac gluten sensitivity, and irritable bowel syndrome.

Curr Probl Pediatr Adolesc Health Care 2016;46:165-171

Dietary Considerations in ADHD

In the United States, Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders of childhood. Surveys of complementary and alternative medicine (CAM) use in pediatric ADHD suggest that nearly 25% use these therapies, with biologically based treatments such as dietary modification and supplementation the most frequently used.[1] The four primary diet modification approaches that have been most commonly studied: (1) Feingold and additive-free diets, (2) the few foods elimination diet, (3) the sugar restriction diet, and (4) use of dietary supplements such as poly-unsaturated fatty acids, zinc, iron, or mega-dose vitamin supplementation. Here we summarize data about the Feingold diet and the few-food, restricted elimination diet because at least 12 studies have shown that sugar does not cause ADHD and the focus of this article is on diets rather than supplements.

Feingold and Additive-Free Diets

In 1973, pediatrician Ben Feingold hypothesized that the elimination of foods from the diet that contain artificial or synthetic food additives and naturally occurring salicylates would reduce hyperactivity. A 1983 meta-analysis of 23 studies investigating the Feingold hypothesis concluded that the Feingold diet produced a modest yet statistically insignificant effect.[2] Although strict adherence to the original Feingold diet is no longer widely used, aspects of the diet related to artificial additives continue to be recommended, and their efficacy studied. In a randomized, double-blinded, placebo-controlled trial of 297 children, McCann et al.[3] found that artificial food additives increased hyperactivity. In the United Kingdom and the European Union, synthetically derived food coloring has been eliminated from most products, or products containing those ingredients have been required to carry a warning label since 2008. Consumer demand in the United States and calls from the Center for Science in the Public Interest have led more manufacturers to reduce reliance on artificial colors, flavors, sweeteners, and preservatives, but this is far from universal.

Few Foods, Restricted, or Elimination Diets

Few foods, restricted or elimination diets, also referred to as oligo-antigenic or oligo-allergenic, are also used to manage ADHD symptoms. In this type of diet, common sensitizing food antigens and allergens are eliminated from the diet. Typically, the elimination is followed by a challenge phase whereby individual foods are reintroduced to identify foods causing untoward health effects via non-IgE-mediated reactions difficult to detect through standard allergy skin tests. Common allergenic foods include dairy (cow milk and cheese), wheat, egg, soy, nuts, and citrus fruits. Hypoallergenic permissible foods included during the elimination phase include: lamb, potato, tapioca, carrots, peas, and pears.

From the The Children's Hospital of Philadelphia, Philadelphia, PA.

Curr Probl Pediatr Adolesc Health Care 2016;46:165-171
1538-5442/$ - see front matter

http://dx.doi.org/10.1016/j.cppeds.2015.12.007

Several studies have evaluated this approach. For example, Carter et al.[4] conducted a three-phase trial of a few foods elimination diet in children diagnosed with ADHD; during the open trial phase, 59/78 subjects who adhered to a restrictive diet had improved symptoms symptom improvement. When commonly implicated foods were reintroduced in the second phase, 47/59 subjects relapsed; among these, there was a significant behavioral difference between placebo and provocative food in the third stage. In 2009, Pelsser et al.[5] conducted a randomized controlled trial of an elimination diet compared with a routine diet; 70% of the patients on the restricted diet had dramatic and statistically significant improvement in behavior ratings, as scored by parents and teacher, and no longer met DSM-IV criteria for ADHD. Similarly, in another study, there were statistically significant improvements in sleep and other physical symptoms among children with ADHD randomized to the elimination diet.[6]

More recent research has also demonstrated profound benefits of the restricted diet on ADHD in over 70% of children, and that blood levels of IgG are not helpful in predicting which children will respond to the restrictive diet.[7]

Conclusions

Because restrictive diets are difficult to implement and sustain, pediatricians should consider referring families interested in this approach to a registered dietitian for in-depth assessment, counseling, and support.

Nutritional Considerations for Pediatric Headache Management

Common dietary modifications recommended to headache patients include the avoidance of fasting, dehydration, obvious food triggers, and caffeine. In addition, some clinicians recommend elimination diets; histamine-free diet; ketogenic or modified Atkins diet; Mediterranean diet; and dietary supplements such as vitamin B2, magnesium and coenzyme Q10. Here we focus on the most common diets rather than dietary supplements.

Trigger Elimination

Up to 60% of patients report food triggers for migraine.[8] Frequently reported dietary triggers include: chocolate, cheeses, nuts, processed meats, citrus fruits, monosodium glutamate (MSG), aspartame, fatty foods, coffee, ice cream, and alcohol. The specific mechanisms by which these foods may elicit an attack are not well understood, and diagnosis depends on clinical symptoms rather than laboratory tests. Encourage patients and families to carefully track the relationship between specific foods and headache symptoms. Again, referral to a registered dietitian may be helpful.

Elimination or Oligo-antigenic Diets

In one study children with frequent migraines placed on an oligo-antigenic diet, followed by serial reintroduction of foods[9]; the elimination diet phase induced remission for most subjects, even though many subjects had no IgE antibodies to foods that were identified as triggers. Another study found increased IgG antibodies among migraine sufferers compared with controls, and reported that elimination of these foods results in remission of migraine without medication.[10] A 2010 study, using IgG testing to determine which foods to eliminate showed reduced headaches and medication use during elimination versus provocation phases.[11] Similarly, a 2011 trial using IgG to compare a sham diet versus avoidance of IgG positive foods showed a significant reduction in number of migraine headaches at 4 weeks.[12] Overall, preliminary evidence from adult studies supports an IgG-based elimination diet to treat migraine, but large well-controlled studies in pediatric populations are desirable.

Histamine-Free Diet

A study in adults with chronic headaches compared the effects of 1 month of a histamine-free diet (eliminating tuna, sardine, anchovy, and mackerel; emmenthal, gouda, roquefort, camembert, and cheddar; salami and dried ham; pickled cabbage, spinach, and tomatoes (ketchup); and red wine, white wine, sparkling wine, and beer) found a 50% reduction in headaches for 33/45 participants.[13] To date, no studies have evaluated this diet in children with frequent headaches.

The Ketogenic Diet and Modified Atkins Diet

The ketogenic diet (KD) is high in fat, restrictive in protein, and very low in carbohydrates, promoting ketosis. The modified Atkins diet (MAD) is similar to KD in severely restricting carbohydrates and promoting the intake of fats, but it is somewhat less restrictive;