

ADVANCES IN NUTRITION

Current Developments in Nutrition Support, Dietary Issues, and Weight Management

The Low FODMAP Diet for Treatment of Irritable Bowel Syndrome and Other Gastrointestinal Disorders



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G&H What is at the crux of gut symptoms such as bloating, flatulence, abdominal pain, and other symptoms of irritable bowel syndrome?

JM/PG Distension of the gut lumen and the subsequent stimulation of mechanoreceptors are likely to be major factors for symptoms in the majority of patients with irritable bowel syndrome (IBS). Because patients with IBS commonly have visceral hypersensitivity, the distension does not have to be more than what physiologically occurs in us all; it is the response to that distension that is abnormal. Poor motility responses to distension of the small intestine and visceral hypersensitivity to food chemicals that stimulate specific receptors in the gut may also contribute to IBS symptoms. The relative importance of any of these potential mechanisms varies from one patient to another, but the common benefit experienced when distension is reduced suggests that luminal distension is the major causative factor in the majority of patients with IBS.

G&H How do food components contribute to IBS symptoms?

JM/PG Distension of the gut commonly results from the bacterial production of gases as a result of fermentation of undigested carbohydrates. In some patients with IBS, there may be dysbiosis of gut microbiota, including the location of bacteria and also the type of bacteria. A second reason for gut distension is water retention, especially in the small intestinal lumen, that can result from the osmotic effect of slowly

absorbed small molecules. There is a group of “indigestible” carbohydrates that are both readily fermented and of small molecular size. We termed these carbohydrates FODMAPs, which stands for fermentable oligo-di-monosaccharides and polyols, because there was no collective term for such short-chain, poorly absorbed carbohydrates. FODMAPs include fructose in excess of glucose (found in pears, apples, and honey); fructans, including fructo-oligosaccharides (found in artichokes, garlic, onions, wheat, and rye); galacto-oligosaccharides (GOS; found in pulses); sugar polyols (found in stone fruits, some vegetables, and artificial sweeteners); and lactose in persons who have lactose malabsorption. Restricting the intake of foods high in FODMAPs reduces the amount of colonic fermentation, gas production, and small intestinal fluid volume. Dietary therapy can, therefore, be directed toward reducing such gut distension by limiting both gas production and the osmotic effect. Marked improvement of gastrointestinal symptoms results in the majority of patients.

G&H Does gluten play a role in IBS, or is there more to the picture?

JM/PG The role of gluten in this patient group is complex. It has been observed that wheat induces symptoms such as abdominal bloating in many patients. Gluten in wheat has been assumed to be the culprit. Patients often report an improvement in gastrointestinal symptoms while on a gluten-free diet. This, in part, may explain the current popularity of the gluten-free diet.

Our analysis of grain and cereal products has recently revealed some interesting facts about gluten-containing foods. Gluten-free grain products tend also to be low in FODMAPs (mostly fructans and GOS). Consequently, patients may experience symptom improvement due to the lower FODMAP content of the gluten-free products. We have attempted to examine the specific role of gluten by studying patients who self-reported gluten intolerance but did not have celiac disease. In 2 studies that we conducted, these patients underwent blinded challenges with FODMAP-deplete gluten or placebo. Findings from the first study, which was a small parallel-group study, suggested that gluten might worsen symptoms, but findings from a recently completed, double-blind, randomized, controlled, crossover study showed evidence of specific induction of symptoms by gluten when the background diet was also low in FODMAPs. Definitions of nonceliac gluten sensitivity do not currently accurately identify patients who truly have gluten sensitivity. The issue will require considerable further study before a role can be attributed to gluten for functional gut symptoms beyond celiac disease.

G&H Is there a link between food intolerance and IBS, or is another paradigm at play?

JM/PG There is a link between food intolerance and IBS because high FODMAP foods play a major role in symptom induction. FODMAPs, however, are probably not the underlying cause of IBS, which involves a complex interaction between luminal events, the enteric nervous system, and the gut-brain axis. It is important to note that healthy persons do not need to restrict FODMAP intake. In fact, at least theoretically, oligosaccharide FODMAPs may promote good health via their prebiotic actions.

G&H Why are some persons more susceptible to IBS symptoms than others?

JM/PG This may relate to a combination of variables that relate to one or another person's visceral sensitivity, the type and location of the microbiota within the gut, and the processing of ascending data by higher centers. The dietary habits (such as food choice, style of eating, and volume of food ingestion) might also be important.

G&H Do FODMAPs aggravate other chronic gastrointestinal disorders? If so, are data available about the low FODMAP diet for these disorders?

JM/PG There is strong evidence that functional gut symptoms occur more commonly in patients with quiescent inflammatory bowel disease (IBD) than those with-

out. Our studies have shown that fructose malabsorption is more common in patients with Crohn's disease and that this is most marked in those patients in whom the small bowel is most affected. Furthermore, we have shown that lactose malabsorption is more common in patients with ulcerative colitis than healthy controls or patients with IBS. Both Crohn's disease and ulcerative colitis are associated with enhanced delivery of fructose and/or lactose to the intestinal microbiota. Our retrospective studies have suggested that patients with IBD can get relief similar to that achieved in patients with IBS from a low FODMAP diet. The low FODMAP diet also may benefit patients who have an ileostomy by helping to reduce excessive effluent output. The diet also may help patients with an ileal pouch by reducing the frequency of emptying. In celiac disease, some patients continue to have gastrointestinal symptoms despite strict adherence to a gluten-free diet. In our clinical practice, restriction of FODMAPs can also help resolve such symptoms. In fact, patients with celiac disease with difficult-to-treat symptoms were the group that led nutritionist Sue Shepherd to study the role of fructose and fructans in gut symptoms.

G&H How did you come to collaborate with Dr. Shepherd, who developed the low FODMAP diet?

JM/PG Dr. Shepherd, who is currently Senior Lecturer in the Department of Dietetics and Human Nutrition at La Trobe University in Melbourne, took a temporary contract to work in our hospital and claimed to achieve considerable benefit with a diet she had developed. She called the diet the fructose malabsorption diet. It involved restricting both fructose in excess of glucose and fructans—in addition to lactose in patients with lactose malabsorption—in patients who had positive breath hydrogen testing for fructose malabsorption. When we observed very good apparent responses in our patients, we invited Dr. Shepherd to work with us to provide high-quality evidence for the diet's efficacy and to determine mechanisms of action. Through subsequent research, the diet became more restricted after looking at the role of other poorly absorbed, short-chain carbohydrates but became less restrictive for patients who demonstrated fructose malabsorption on breath testing. We constructed detailed food composition tables by measuring the levels of relevant short-chain carbohydrates in a wide variety of foods to formulate accurate tables of safe and unsafe foods. The concept of FODMAPs was then born.

G&H How are patients selected for the diet?

JM/PG Patients with IBS or functional bloating in whom celiac disease has been excluded are candidates for

the low FODMAP diet. Because the diet requires active patient participation, the patient must have some interest in dietary change and be able to both understand the rationale for the diet and follow instruction. Not surprisingly, retrospective analyses have consistently shown that adherence is the major predictor of response to the diet. Beyond these criteria, prospective predictors of response to the low FODMAP diet have not been defined.

G&H Does the diet present nutritional challenges for some patients?

JM/PG Properly administered by a qualified dietician, the low FODMAP diet is nutritionally adequate. The major challenge is adequate dietary fiber intake. Often, low FODMAP grains and cereal products are also low in dietary fiber, and so the dietician needs to educate the patient on how to ensure adequate fiber intake. Also, restricting the dietary intake of the oligosaccharides, fructans, and GOS, which are natural prebiotics, can result in changes in the luminal bacterial populations. Although the health consequences are not known, we do not recommend that the low FODMAP diet be strictly followed over the long term. Rather, a reintroduction of FODMAP foods should be instituted after good symptomatic response is achieved to find the level of food restriction that the person requires to adequately control symptoms. We also do not recommend the low FODMAP diet to healthy people because of concerns regarding fiber intake and changes in luminal microflora.

G&H What has been the rate of compliance with the diet?

JM/PG Adherence to the diet has been excellent, with about 3 out of 4 patients being judged to have good or excellent adherence after many months of following the diet. We have interpreted this observation as further evidence that the diet is effective.

G&H What areas of research are needed to further refine the association between food components and gastrointestinal hypersensitivity in select patients?

JM/PG The topic of food intolerance is a challenging area of research, and more quality research is required. The success of the low FODMAP diet for control of gastrointestinal symptoms associated with IBS and the controversy surrounding gluten sensitivity have stimulated greater interest in dietary research. Besides carbohydrates, there are many other food components worthy of study. For example, dietary fat has been shown in acute studies to change visceral hypersensitivity. Naturally occurring chemicals are widespread in foods and can interact with receptors in the gut or have direct, possibly pharmacologic actions on the enteric nervous system and mast cells. Although dietary approaches that restrict natural salicylates, glutamates, and amines are currently in practice, few well-designed studies investigating the potential role of food chemicals in patients with functional gut disorders have been performed. Clearly, more work is required in this area.

Suggested Reading

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