

ADVANCES IN NUTRITION

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

Dietary Modification as a Treatment for Irritable Bowel Syndrome



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G&H Which foods most commonly cause symptoms in patients with irritable bowel syndrome?

NJT Based on the available data, several different types of food substances seem to contribute to symptoms in patients with irritable bowel syndrome (IBS). These foods include lactose, fructans, galactans, fructose, sorbitol, mannitol, and xylitol. (This group of foods is collectively referred to by the acronym FODMAP, which is short for Fermentable Oligosaccharides, Disaccharides, Monosaccharides, And Polyols.) In addition, data suggest that gluten intolerance is relevant in some patients with IBS symptoms, even if they do not have any evidence of celiac disease. Finally, fiber can play either a positive or negative role in IBS; high-fiber foods can help some patients with IBS, but they can cause a worsening of symptoms in other patients.

G&H How do these foods contribute to the pathogenesis of IBS?

NJT There may be multiple mechanisms that cause IBS, but emerging data suggest that bacterial fermentation of food in the gut is a key factor in symptom generation. This hypothesis suggests that excess carbohydrates—such as fructose, lactose, and fructans—are poorly handled in patients with IBS. Loading the intestine with excess amounts of high-FODMAP foods results in increased food fermentation by the gut flora, which induces excess gas production and intestinal distension. In healthy people, this gas production and intestinal distension do not lead to any noticeable problems. On the other hand, in those individuals who have a background of either genetically or

environmentally acquired gut hypersensitivity, probably a key component of IBS, gaseous distention leads to pain or discomfort and bloating. In other words, high-FODMAP foods can precipitate symptoms of IBS but are not the underlying cause of IBS; a low-FODMAP diet removes the precipitating factor in many patients, and symptoms resolve unless FODMAP foods are reintroduced.

To avoid IBS symptoms, patients can try to eliminate the culpable foods from their diet—or at least ingest a diet that is low in these foods; the key to this diet is a global reduction in FODMAP foods, not just reduction of an individual component like lactose. By reducing these excess carbohydrates, the potential for fermentation will be significantly reduced, and patients' symptoms should be significantly improved. Indeed, such an improvement has been observed in clinical practice, and limited trial data support the view that reduction of these foods is efficacious.

We need large randomized trials to confirm this observation, but the currently available data and my own experience indicate that the benefit of dietary modification can be quite remarkable. Not every patient responds to dietary intervention, but a significant proportion of patients do respond—perhaps up to two thirds of IBS patients, according to trial data—and they can benefit substantially from this therapy.

G&H How often is dietary modification used as a treatment for IBS?

NJT In general, there has been very little use of dietary intervention in the United States until recently—the 2 exceptions are that introduction of fiber may be recommended in some patients with constipation, and lactose

withdrawal may be considered if patients are suspected of being lactose intolerant. However, more comprehensive dietary intervention is now starting to be widely adopted, and patients are certainly becoming more aware of this option. Still, most physicians are largely unfamiliar with the use of a low-FODMAP diet as a treatment for IBS.

G&H What is the FODMAP diet?

NJT The FODMAP diet is a way of limiting the amounts of poorly absorbed carbohydrates that are fermented. Specifically, it involves reducing fructose, lactose, fructans, galactooligosaccharides, and polyols. Excess fructose is found in many types of foods; it occurs naturally in foods such as watermelon, pears, mangos, apples, and honey, and high-fructose corn syrup is added to a wide range of processed foods. Lactose is found in milk and milk products, such as ice cream. Fructans are found in a range of foods, including wheat, onions, and artichokes. Galactooligosaccharides are found in legumes such as beans and chickpeas. Finally, polyols are found in foods such as apples, apricots, avocados, pears, and plums.

In order to implement the FODMAP diet, gastroenterologists need to collaborate with an expert dietitian or nutritionist who can work with patients to identify and reduce their intake of these foods. In addition, clinicians need to decide the best approach to take when implementing this diet. One approach involves performing breath testing to determine whether fructose or lactose is handled well or poorly, in order to decide how restrictive the diet needs to be (although this approach is based on insufficient evidence, as of yet). The preferred alternative is a more limited diet in which all of the FODMAP foods are restricted, at least initially; if patients respond to this diet, then certain foods may be reintroduced over time under supervision.

G&H Have other diets been considered for the treatment of IBS?

NJT A gluten-free diet is an alternative approach for treatment of IBS, and there is some evidence to support its use. In practice, many of the foods that would be withdrawn as part of the FODMAP diet are foods that contain gluten, so there could be considerable overlap between the FODMAP diet and a gluten-free diet. Both the FODMAP diet and a gluten-free diet are restrictive, however, which can be a problem for patient compliance.

G&H Should gastroenterologists consult with a dietitian when implementing one of these diets?

NJT Yes, consultation with a dietitian can be very beneficial, as long as the dietitian knows about the current

literature regarding the low-FODMAP diet and the use of gluten withdrawal for the treatment of IBS. I advise all of my patients that dietary modification is 1 treatment option for IBS; if they are interested in pursuing this option, I have them meet with a gastrointestinal dietitian who provides them with appropriate dietary advice. Of course, some patients do not wish to change their diet, in which case other treatment options will need to be considered. However, if patients are willing to change their diet and they see an expert dietitian, then a significant proportion of these patients can achieve good results with dietary modification, if they are compliant with the diet.

G&H Have any studies evaluated the efficacy of these diets for the treatment of IBS?

NJT Yes, there have been Australian studies that have examined the efficacy of these diets. One study was a randomized trial of 25 patients with IBS who responded to a low-FODMAP diet and were then randomly re-exposed to either fructose and/or fructans or glucose. Glucose was used as the control in this study because it is well absorbed in all individuals and therefore does not lead to an excess carbohydrate load that could cause fermentation. This study found a significant difference in symptom control between patients who were given fructose and/or fructans versus those given glucose. Over 70% of patients had inadequate symptom control when they were exposed to fructose and/or fructans, while only 14% of the patients in the glucose group had inadequate symptom control.

Another important study of dietary intervention for IBS was a small, single-blind, crossover trial of healthy volunteers and IBS patients who were given either a low-FODMAP diet or a high-FODMAP diet. Among IBS patients, those assigned to the high-FODMAP diet had more symptoms and also more lethargy; in contrast, the high-FODMAP diet had no effect on healthy volunteers.

Finally, a US study by Austin and colleagues evaluated a very-low-carbohydrate diet as a treatment for IBS; this diet was similar to the low-FODMAP diet but was even more rigorous in its reduction of carbohydrates. This study found that a very-low-carbohydrate diet showed clinical benefit for IBS patients with diarrhea.

G&H How much overlap exists among IBS, food intolerance, and celiac disease? How can clinicians identify which condition is causing symptoms in a particular patient?

NJT Celiac disease is easy to diagnose by applying screening serology (tissue transglutaminase) testing and performing a confirmatory duodenal biopsy. However, IBS with diarrhea and celiac disease do overlap in terms

of symptomatology so screening suspected IBS cases for celiac disease is recommended by a number of guidelines. Interestingly, IBS without celiac disease can also respond to gluten withdrawal, suggesting these entities may share pathophysiologic mechanisms.

Other evidence suggests that some patients with IBS have an element of true food intolerance. In 1 study, immunoglobulin (Ig) G antibody testing to foods was performed in patients with IBS, and then patients were randomized to a diet that eliminated either the foods to which they had tested positive or the foods to which they had tested negative. This study showed that elimination of the foods that caused a positive IgG response yielded better clinical outcomes than elimination of foods that did not trigger an IgG response. This finding suggests that foods might induce IBS in some cases; however, further research is needed in this area.

The bottom line is that carbohydrate load does seem to be a problem for a significant proportion of IBS patients, and gluten intolerance and/or other food intolerance may also be relevant. In a significant proportion of patients, there may also be some overlap between those 2 mechanisms.

G&H Is testing for food intolerance helpful in patients with IBS?

NJT There are very little data on the application of food intolerance testing in patients with IBS, so I do not currently recommend such testing. We may have better testing methods in the future, but I suspect that skin prick testing will never be very helpful in the setting of IBS, nor am I yet convinced that serum antibody testing provides useful information in patients with IBS, as it is typically not accurate enough. Until more information becomes available, I believe we should continue to take an empiric approach to dietary therapy.

G&H Can adding certain foods to a patient's diet improve his or her IBS symptoms?

NJT I am not aware of any good data showing that the addition of specific foods improves symptoms in patients with IBS. The only exception might be soluble fiber, which does seem to help some patients, particularly those

with constipation. However, there is some controversy around the benefit of fiber for patients with IBS: Some randomized trials definitely support the introduction of soluble fiber to treat IBS, but data also suggest that adding insoluble fiber, like bran, may actually worsen symptoms. This suggests that the effect of fiber is related not just to its bulk but also, in part, to the food product itself.

G&H What further research is needed in this area?

NJT First, we need large randomized trials of the low-FODMAP diet in the United States; these studies should be well-conducted, multicenter, randomized trials with rigorous endpoints. I also believe researchers now need to pay more attention to studies of the mechanisms through which certain foods may produce symptoms in IBS: Are symptoms due to carbohydrate fermentation alone, or does IBS also include an element of food intolerance? Or is a combination of mechanisms responsible for patients' symptoms? Of course, other factors must also be involved in the pathogenesis of IBS—including the bacterial composition of the gut, hypersensitivity, abnormalities in intestinal permeability, and inflammatory changes—and all of these factors need to be studied and understood in combination. By considering an overarching model of how IBS occurs, clinicians might be able to more effectively interfere with these mechanisms and eventually cure IBS, rather than just treat patients' symptoms.

Suggested Reading

Gibson PR, Shepherd SJ. Food choice as a key management strategy for functional gastrointestinal symptoms. *Am J Gastroenterol*. 2012;107:657-666; quiz 667.

Gibson PR, Shepherd SJ. Evidence-based dietary management of functional gastrointestinal symptoms: the FODMAP approach. *J Gastroenterol Hepatol*. 2010;25:252-258.

Ong DK, Mitchell SB, Barrett JS, et al. Manipulation of dietary short chain carbohydrates alters the pattern of gas production and genesis of symptoms in irritable bowel syndrome. *J Gastroenterol Hepatol*. 2010;25:1366-1373.

Austin GL, Dalton CB, Hu Y, et al. A very low-carbohydrate diet improves symptoms and quality of life in diarrhea-predominant irritable bowel syndrome. *Clin Gastroenterol Hepatol*. 2009;7:706-708.e1.

Atkinson W, Sheldon TA, Shaath N, Whorwell PJ. Food elimination based on IgG antibodies in irritable bowel syndrome: a randomised controlled trial. *Gut*. 2004;53:1459-1464.