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Diet Recommendations for Patients with Irritable Bowel Syndrome

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TARGET JOURNAL & INSTRUCTIONS

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Diet Recommendations for Patients with Irritable Bowel Syndrome

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INTRODUCTION

Irritable bowel syndrome (IBS) is a very common chronic functional gastrointestinal (GI) disease that is characterized by abdominal pain in association with defecation and change in bowel habits.[1] The condition has a multifactorial and incompletely understood pathophysiology, including altered brain-gut interactions, microbiome changes, differed GI motility, psychological factors, and food hypersensitivity.[2] With the heterogenicity of the disorder, there is no standardized treatment for IBS, leading its therapy to rely on symptomatic treatments.[2] The influence of dietary triggers on the generation of IBS symptoms is well-known and includes different mechanisms including immune activation, mast cell inflammation, and luminal distention.[2] Studies show that 50% of patients with IBS have postprandial exacerbations of symptoms within 90 minutes of eating with the prevalence of food intolerance being as high as 70%.[3] More specifically, Fermentable Oligo-, Di-, and Mono-saccharides And Polyols (FODMAPs) have been recognized as triggers to IBS symptoms, as they ultimately lead to increased gas production as a consequence of food fermentation.[1] Therapeutic gains offered by medications are only 8-20% more than that of placebo use, thereby improving the conditions of less than half of patients.[3] Given the limitations of drug therapy, the long course of IBS, and the role of food in symptom development, diet and lifestyle play an essential role in managing IBS.[2,3] Unfortunately, there is currently little high-quality evidence regarding a dietary approach.[2] Nevertheless, many different approaches have been suggested including the low-FODMAP diet (LFD), gluten-free diet (GFD), wheat-free diet (WFD), and lactose-free diet, with the first two mentioned diets being the most suggested.[2] This article will focus on comparing the diets used for those with IBS and discuss how providers today can best implement these diets in current practice.

OBJECTIVES

1. Discuss different diet therapies that can be used in the treatment of those with IBS
2. Provide evidence-based data regarding which diet is most efficacious in controlling IBS symptoms
3. Discuss the proper ways that these diet therapies should be implemented in practice

NEEDS ASSESSMENT

As mentioned in the introduction, IBS is one of the most common GI disorders,[2] with a global prevalence of 11%.[4] The impact of IBS is substantial, including a reduction in the quality of life, increase use of healthcare services, and increased time off work.[4] With this condition being so common and the impact being as substantial as it is, it is important that effective therapies are available for the treatment of those with IBS. Given that diet plays a pivotal role in symptom generation and serves as a precipitating factor in the pathogenesis of IBS, first-line management includes diet therapies and lifestyle management.[4] It is essential that providers understand these different diet therapies and how to implement them properly in real practice.

REVIEW OF THE LITERATURE

Bellini et al[2] discussed the evidence regarding the LFD and the GFD to evaluate which diet is more suitable for IBS patients. Before discussing the results of the article, it would first be helpful to define the diets. FODMAPs are a large class of small, non-digestible carbohydrates that contain sugars that are poorly absorbed in the small bowel.[2] These sugars, found undigested in the intestinal lumen, act in several ways; by increasing the water content in the small bowel, by increasing the production of gas through bacterial fermentation, and by increasing the production of bacterial metabolites.[2] With that, FODMAPs then lead to IBS symptoms including abdominal pain, bloating, and bowel habit changes.[2] Low-FODMAP foods include foods like

rice, oats, lactose-free milk, plant-based milks and yogurts, carrots, celery, lettuce, spinach, berries, certain nuts, white and brown sugar, and maple syrup.[2] Foods that are high-FODMAP and are to be avoided are foods such as barley, rye, cow milk, butter, ice cream, asparagus, cauliflower, garlic, onion, beans, apples, mangoes, cashews, agave, honey, and fructose.[2] The LFD consists of a first phase that lasts from four to eight weeks of global elimination of all the FODMAP foods followed by a phase of reintegration of one category of the carbohydrates step by step.[2] This not only allows the patient to identify food sensitivities, but it also enables the provider to tailor the diet to a single patient.[2] It also allows for long-term implementation of the diet by minimizing the risks of possible nutritional defficiencies.[1] In regards to the GFD, gluten is a family of proteins that serves as storage proteins in the starchy endosperm of many cereal grains such as wheat, barley, and rye.[2] Therefore, these grains are not allowed in a GFD. This diet is the only recognized therapy for Celiac Disease, an autoimmune disease triggered by gluten ingestion.[2] However, in recent years, the GFD has been suggested as a possible treatment for those with IBS.[2]

After analyzing data from different studies, it was concluded that the LFD is more effective in IBS patients than the GFD.[2] The LFD was found to be more effective in decreasing abdominal bloating and normalizing bowel function.[2] It was also suggested that the nature of the LFD ensures better nutritional safety and a lower negative influence on gut microbiota compared to the GFD that consists of eliminating a whole category of food.[2] It was concluded that IBS patients with symptoms mainly linked to gluten/wheat could benefit from a GFD as first-line therapy, and those who have symptoms linked to food (not only due to gluten/wheat) are best treated with the LFD[2]; suggesting that therapy should be individualized. From a cost standpoint, gluten-free products are more expensive.[2] Although the first elimination phase of the LFD may

cause an increase in food costs, the second reintroduction phase tends to involve reduced costs.[2] Finally, it is important to note that the authors[2] stressed that both the GFD and LFD are elimination diets that should be monitored by a gastroenterologist and nutritionist.[2]

Rej et al[4] performed a review of first-line dietary therapies based on analyzing existing literature as well as a roundtable discussion that occurred amongst gastroenterologists and dietitians with a special interest in dietary therapies in IBS. The diet therapies included in the discussion were the LFD, WFD, and GFD.[4] A meta-analysis demonstrated a statistically significant decrease in IBS symptom severity scores, IBS-quality of life score, and symptom severity for abdominal pain, boating, and overall symptoms, with the implementation of the LFD.[4] However, a systematic review that focused on the quality of the LFD in IBS suggested a high risk of bias in trials with concerns regarding blinding and the small numbers of patients being used.[4] Long-term adherence to the LFD was good, with a prospective observational study demonstrating 75% adherence to an adapted LFD after a follow up of 16 months, with 70% of patients satisfied with their symptoms.[4] In addition to that, a prospective questionnaire study following dietitian-led low-FODMAP education showed that 57% of patients reported relief of symptoms at long-term follow up, with 82% continuing on an adapted LFD, with no compromise in nutritional adequacy.[4] Although there are RCTs that demonstrate a reduction in calcium intake and energy intake with the LFD, there is emerging data that utilization of an adapted FODMAP diet may be nutritionally adequate.[4] For instance, a long-term follow-up questionnaire study demonstrated that there was no significant difference in carbohydrate and calcium intake between an adapted LFD and habitual diet at long-term follow up.[4] In regards to the effects on gut microbiota, a placebo-controlled study found that patients had a lower abundance of *Bifidobacterium* species in fecal samples on a LFD, but higher levels when given a multi-species

probiotic, which suggests that probiotic supplementation can potentially limit this change in microbiota.[4]

In terms of a WFD, most data suggest that a proportion of individuals with IBS may have a sensitivity to wheat,[4] but there is a lack of evidence regarding the impact of a WFD on IBS symptoms. A large double-blind placebo-controlled trial demonstrated that 30% of the IBS patients included had wheat sensitivities or multiple food hypersensitivities.[4] When the patients were put on an elimination diet and subsequently re-challenged with wheat, there were significant increases in bloating, abdominal pain, and stool inconsistency,[4] supporting possible wheat sensitivities in those with IBS. Potential risks with a WFD include lower intakes of magnesium, iron, zinc, manganese, and folate.[4] Pertaining to the GFD, an RCT of a GFD versus a gluten-containing diet was done in patients with IBS-D (diarrhea prominent) and showed that patients had increased bowel movements on a gluten-containing diet.[4] Another study that focused on patients with IBS who had been symptomatically controlled on a GFD, received gluten or placebo over a six-week time period.[4] Following the introduction of gluten, there was worsening of overall symptoms, pain, bloating, stool satisfaction, and fatigue, demonstrating the deleterious effect of gluten.[4] Just as the WFD, the risks of the GFD include lower intakes of magnesium, iron, zinc, manganese, and folate.[4] Studies have also demonstrated an alteration in the composition of the gut microbiota with the GFD.[4] Cost of implementation is also a concern, as a study done on the financial cost of gluten-free food in the UK showed that they were at least four times more expensive than gluten-containing foods.[4]

After analyzing many different studies, it was concluded that there was variable evidence for the use of all three diets mentioned.[4] The response rate to the LFD was 50-76%, compared to a 34-71% response rate for the GFD. [4] In those who were wheat sensitive, response to a wheat or

GFD was reported to be as high as 98%.[4] Therefore, the data suggested that one diet alone was not effective for all patients with IBS, demonstrating the underlying heterogeneity of the condition and the overlap between the dietary therapies.[4] It was again reiterated that the choice of diet should be individualized, and that dietary advice should be delivered by a dietitian.[4] It was further mentioned that concerns for all three diets exists, including concerns of nutritional adequacy and the effects on gut microbiota, with further long-term efficacy data required.[4]

Cozma-Petrut et al[5] reviews the main dietary approaches in IBS and summarizes the main diet and lifestyle recommendations provided by dietary guidelines and scientific literature. The authors[5] emphasize that diet and lifestyle advice should be the first-line approach in the management of IBS. This approach includes eating regular meals, avoiding large meals, increasing total dietary fiber, drinking 1.5-3 liters of fluids daily, and participating in moderate physical activity thirty minutes per day for at least five days per week.[5] It also includes restricting certain triggers including alcohol, caffeine, spicy foods, and lactose.[5] If symptoms still persist after first-line therapy, the second-line intervention should then be implemented, which includes advanced dietary approaches, such as the LFD.[5] Evidence from observational studies and RCTs indicated that the low-FODMAP approach leads to symptom improvement in up to two-thirds of IBS patients.[5] Further recommendations were made stating that the LFD should be provided by a healthcare professional with training in nutrition therapy.[5] It was recommended that the diet not be strictly followed over the long term, and that a restriction phase of four weeks is sufficient and should be followed by a reintegration of FODMAP foods to find the level of food restriction needed for symptom control.[5] The authors[5] also discussed the GFD, admitting that the role of gluten in IBS is still unclear. However, there were several interventions that found that gluten restriction for four to eight weeks improved IBS symptoms and reduced bowel movements per

day and intestinal permeability.[5] It was concluded that the mechanisms underlying the benefit of the GFD in IBS requires further research and that if IBS patients choose to follow a GFD, they should be informed that the evidence is conflicting.[5] A further recommendation was made to warn patients of the detrimental effects of an inappropriate GFD, including nutritional deficiencies.[5] The overall conclusion of the article was that dietary management is key in the treatment of IBS, although there needs to be more well-designed studies to validate the efficacy and long-term effects of the dietary approach.[5]

Paduano et al[6] analyzed the effect of three diets on IBS symptoms and quality of life. Forty-two patients with IBS were enrolled in the study and followed either a low-FODMAP, gluten-free, or balanced Mediterranean diet for four weeks.[6] It was found that all three diets reduced symptom severity, bloating, and abdominal pain, and improved quality of life, with the highest patient preference for the balanced diet and the lowest preference for the LFD.[6] The LFD was the only diet to regularize the bowel functions by reaching the fourth grade of the Bristol Stool Scale, which is considered normal.[6] The LFD also showed superiority in decreasing abdominal bloating in comparison to the GFD.[6] In regards to quality of life, the LFD and GFD showed improvement both physically and mentally, while the balanced diet showed improvement only mentally.[6] The balanced diet that satisfied the Mediterranean diet criteria and provided an adequate quantity of FODMAPs was found to be the most appreciated by patients.[6] The balanced diet focused on increased fiber intake, eating smaller, more regular meals, and redistributing meals, calories, and FODMAPs over a 24 hour period, preventing patients from an excessive FODMAP intake.[6] The overall conclusion was that a diet that contains FODMAPs that is adequately distributed in different meals throughout the day should be recommended to prevent excessive consumption of FODMAPs in one sitting.[6]

Dionne et al[7] conducted a meta-analysis of RCTs that focused on the efficacy of a GFD and LFD in the symptomatic treatment of IBS. A total of nine studies were eligible for review; two RCTs of a GFD, three RCTs that compared low-FODMAP diet with control diets, and seven RCTs that compared the LFD with other control interventions.[7] In regards to the GFD trials, the diet was associated with a reduction in symptoms compared with a control diet, although the results were not statistically significant.[7] The RCTs showed that a greater proportion of participants had an exacerbation of their IBS symptoms when their diet was "spiked" with gluten,[7] demonstrating that gluten-containing foods can be triggering for those with IBS. The LFD studies showed that the diet led to a reduction in global IBS symptoms compared to alternative diets.[7] The overall conclusion of the systematic review was that there is insufficient evidence to recommend a GFD to reduce IBS symptoms and there is very low-quality evidence that a LFD is effective in reducing symptoms in IBS patients.[7] It was further concluded that more data is needed, but that of the available dietary interventions, the LFD currently has the greatest evidence in reducing symptoms globally in IBS patients.[7]

Summary of Diet Recommendations for IBS patients						
	Low-FODMAP Diet		**Gluten-free Diet**		**Traditional Dietary Advice/Balanced Diet + Lifestyle**	
What to Eat and What to Avoid	**Eat** • Rice, oats, quinoa, tapioca, gluten-free bread and cereals • Lactose-free milk, rice milk, oat milk, soy milk, soy yogurt, Greek yogurt, hard cheeses • Carrot, celery, lettuce, spinach, potato, tomato, zucchini, eggplant, green bean, beet, herbs, olives • Peas, soy products • Banana, blueberry, strawberry, raspberry, grape, kiwi, orange, passionfruit • Almonds, hazelnuts, walnuts • White sugar, brown sugar, maple syrup	**Avoid** • Bread and bakery products, biscuits, croissants, pasta, wheat flour, barley, rye, couscous, muesli • Cow milk, goat milk, yogurt with lactose, fresh cheeses, butter, ice cream, heavy cream • Asparagus, cauliflower, broccoli, garlic, onion, shallot, mushroom, leek, fennel, artichoke, radish, turnip • Beans, chickpeas, lentils, soybeans • Apple, pear, watermelon, mango, apricot, avocado, cherry, peach, plum, lychee • pistachios, cashews • Agave, honey, fructose, xylitol, maltitol, mannitol, sorbitol	**Eat** • Corn • Potatoes • Rice • Millet • Buckwheat • Quinoa • Amaranth • Teff • Oats, if free of contamination	**Avoid** • Wheat • Barley • Rye • Malt • Kamut • Spelt • Triticale • Bulgur • Beer	**Do** • Eat regular meals • Avoid large meals • Increase total dietary fiber • Drink 1.5-3 liters of fluids/day • Moderate physical activity (30 minutes/day x 5 days/week)	**Restrict** • Alcohol • Caffeine • Spicy foods • Lactose
Phases	1) Elimination (4-8 weeks)- swap high-FODMAP foods for low-FODMAP foods 2) Reintroduction (6-8 weeks)- reintroduce one FODMAP at a time (6-8 weeks) 3) Personalization- modified low-FODMAP diet based on specific triggers		1) Elimination of gluten-containing products		1) None	
Pros	• Provides symptom improvement in up to two-thirds of IBS patients[5,6] • Decreases symptom severity scores[4] • Normalizes bowel function[2] • Improves quality of life[6] • Ensures better nutritional safety and a lower negative influence on gut microbiota compared to the GFD[2] • Currently has the greatest evidence in reducing symptoms globally in IBS patients[7]		• Reduces symptom severity, bloating, and abdominal pain[6] • Improves quality of life[6] • Reduces bowel movements per day[5]		• Reduces symptom severity, bloating, and abdominal pain[6] • Improves quality of life[6] • Distributes FODMAPs throughout the day and prevents excessive FODMAP intake in one sitting[6] • Most preferred by patients[6]	
Cons	• Most complex and should be followed by a gastroenterologist and/or dietician[2,4,5,7] • Possible reduction in calcium intake and energy intake[4] • Least preferred by patients[6] • Alteration of gut microbiota (although found to be improved with probiotic supplementation)[4]		• Requires the elimination of a whole category of food[2] • More expensive[2] • Less nutritionally adequate with lower intakes of magnesium, iron, zinc, manganese, and folate[2,4] • Alteration of gut microbiota[4]		• May not be feasible with certain patient schedules (i.e., not being able to eat regular meals due to work schedule)	
*****Important components in the diet/lifestyle management of IBS: 1) Individualize the diet 2) Identify trigger foods 3) Incorporate a dietician and/or gastroenterologist 4) Discuss different diet options including, but not limited to the LFD, GFD, and traditional/balanced diet**						

Table 1. Summary of treatment modalities through diet/lifestyle for IBS patients.

DISCUSSION

Through this research, it is clear that IBS is a heterogeneous entity and that the increasing knowledge of its pathophysiology supports the potential of dietary therapies.[6] From this review of literature, it seems that one thing that can be agreed upon is that more research is needed when it comes to diet therapies in IBS, specifically the long-term effects of the diets on alterations of gut microbiota and nutritional inadequacies.[4,5,7] Although more research is needed, unfortunately, there are limitations of clinical trials regarding diet therapies for IBS.[2] These limitations include the difficulty establishing an effective blinding, unclear adherence rates, unclear evidence about the right length of a wash-out period in crossover studies in order to avoid carry over effects on symptoms and gut microbiota, and the fact that IBS dietary trials are seldomly supported by pharmaceutical companies or investors.[2] To elaborate on the issue around lack of blinding, many IBS patients are aware of the concept of the LFD and can deduce which diet they have been allocated to in the study.[7] A better approach, suggested by Dionne et al,[7] would be a double-blinded challenge study in which the participants are placed on a LFD and then randomized to continue that diet or have their diet "spiked" with a high-FODMAP product. However, this would still be difficult to interpret given that any diet alteration can cause GI symptoms as the GI tract is exposed to new foods.[7] A further suggestion would be to have the challenge studies be long-term (at least eight weeks) to account for any short-term non-specific effects of foods that the GI tract had not experienced recently.[7]

Another consensus of this review is that the choice of diet should be individualized, and that dietary advice should be delivered by a dietician, justified by the complexity of these diet therapies, potential for nutritional deficiencies, and the time and resources needed to provide proper counseling.[2,4,5,7] If a dietician is not available or the patient is unable to afford one, the

clinician has a duty to provide high-quality teaching materials so that the patient can responsibly implement the diet therapy.[7] As of now, there is evidence that supports the recommendation of a LFD in the treatment of IBS.[2,4,5,7] Under the careful guidance of a nutritionist, the LFD has been found to be nutritionally adequate and can be followed in the long-term.[2] With its phase of reintroduction of the single FODMAP categories, it enables the provider and the patient to have more precise information of individual sensitivity, which then allows the patient to learn more about their own disease and trigger foods.[2] Clinicians should keep in mind the exclusion of FODMAPs is only the first phase of the diet and should be viewed as a diagnostic test to identify IBS patients who are sensitive to FODMAPs.[7] Those who fail to improve should not continue the diet, and those that do improve should reintroduce foods to identify their sensitivities.[7] Paduano et al[6] had a novel recommendation to have IBS patients try a diet that adequately distributes the FODMAPS in different meals throughout the day. This would essentially not be an LFD, but would be a redistribution diet that will allow patients to avoid overload while also maintaining a correct distribution of calories.[6]

CONCLUSION

IBS is the most common functional disorder and most extensively evaluated functional bowel disorder.[8] It is very common, with a reported global prevalence of 11%.[8] The impact of IBS is substantial, with a reduction in the quality of life, increased use of healthcare, and increased time off work.[4] IBS is also associated with several other conditions including depression, fibromyalgia, chronic fatigue disorder, and temporomandibular joint disorder.[8] With that being said, it is important that effective therapies are available to manage patients with IBS. Given that diet plays a pivotal role in symptom generation in IBS, many suggested treatments focus on lifestyle and dietary management, including diets such as the LFD and GFD.[2,4]

Unfortunately, there is low-quality evidence regarding the efficacy of diet therapies in IBS due to the difficulty in establishing non-bias RCTs as well as adequate evaluation of adherence rates for the different diets.[1] A consensus of the literature suggests that diet therapy should be individualized to each patient, focusing on the patient's triggers and symptoms.[2,4,5,7] There also needs to be more sufficient evidence of the efficacy of diet therapies in IBS patients and the relevant long-term effects of each therapy.[2,4,5,6]

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