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A Practical Approach to Integration of Diet and Nutrition in the Management of Patients with IBD



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Inflammatory bowel diseases (IBD; Crohn's disease (CD), ulcerative colitis (UC)) are global diseases with a rising prevalence across several regions of this world.^{1,2} While changes in several external environmental factors likely contribute to this increase in incidence over the past decade, one such factor that likely plays a central role is the change in diet. Most patients with IBD believe that diet plays an important role in either their disease onset or relapse.³ While previously evidence in support for this

was anecdotal, there is a growing burden of rigorous epidemiologic studies supported by mechanistic experiments that highlight various mechanisms through which diet contributes to intestinal inflammation.⁴⁻⁶ Patients also seek to actively incorporate dietary changes in the management of their IBD. It is important for physicians and treating providers to recognize the role diet plays in IBD, familiarize themselves with the various dietary therapies, and develop a practical algorithm to guide patients through

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this decision process. In this review article, we will summarize the evidence for the role of diet in IBD and present practical tips for integration of dietary therapy in the management of IBD.

Epidemiologic Studies of Diet and Incidence of IBD

Several levels of evidence support a role for dietary changes as being important in the global emergence of IBD. Worldwide, diets have seen a decline in consumption of fiber along with an increase in fatty and sugar-rich diets that derive a significant fraction of their energy from ultraprocessed foods.⁷ This temporal evolution in dietary practices parallels the rising incidence of IBD, particularly in regions of the world such as Asia and South America that have been more recent venues of such westernization in diet.⁸ Over the past decade, several rigorously conducted prospective cohort studies from North America, Europe, and low/middle income countries have provided important signals about the association between diet and the development of IBD.⁹ In a prospective analysis of 170,776 women enrolled in the Nurses' Health Study cohorts, women in the highest quartile of intake of dietary fiber had a lower risk of incident Crohn's disease (hazard ratio (HR) 0.59, 95% confidence interval (CI) 0.39 – 0.90).¹⁰ Strikingly, this association was strongest for fiber derived from fruits and vegetables and weaker for insoluble fiber from whole grains and cereals. Dietary fat intake has also been demonstrated to be associated with development of IBD. In both European and North American cohorts, a diet high in n-6 polyunsaturated fatty acids (PUFA) was associated with an elevated risk of ulcerative colitis (odds ratio (OR) 6.09, 95% CI 1.05 – 35.23) while a high n-3/n-6 PUFA ratio was inversely associated

with UC risk (HR 0.69, 95% CI 0.49 – 0.98).^{11,12} There is less consistent data on the impact of a protein rich diet with mixed evidence suggesting an association between animal protein intake or a red-meat rich diet and risk of ulcerative colitis.¹³ In addition to dietary macronutrients, intake of micronutrients such as vitamin D and zinc, or other food components such as polyphenols, have been hypothesized to modify risk of IBD.^{14,15}

Cohort studies examined the association between dietary patterns and risk of IBD. In the Swedish cohorts, adherence to a Mediterranean diet was associated with a lower risk of older onset Crohn's disease but not ulcerative colitis (OR 0.42, 95% CI 0.22 – 0.80).¹⁶ Western-style diets rich in sugar-rich foods have been associated with increased risk of IBD.¹⁷ Hypothesis-driven identification of dietary factors associated with elevated levels of circulation serum inflammatory markers contributing to an Empiric Dietary Inflammatory Potential (EDIP) score was associated with risk of IBD.¹⁸ Importantly, the latter study showed diet as a modifiable risk factor in adulthood, demonstrating that a change from a low inflammatory potential to a high inflammatory potential diet was associated with an increase in risk of Crohn's disease (HR 2.05, 95% CI 1.10 – 3.79). In addition to food constituents themselves, processing of food modified nutritional consult removes certain beneficial components and incorporates additives, emulsifiers, and preservatives to boost taste and preserve shelf-life. A diet rich in ultraprocessed foods was associated with risk of Crohn's disease both in North America¹⁹ as well as in emerging low/middle income countries. In the Nurses' Health Study cohorts, participants in the highest quartile of energy intake from ultraprocessed foods²⁰ had a two-fold increase in risk of incident CD (HR 1.70, 95% CI 1.23 – 2.35).¹⁹

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Evidence for Dietary Therapies for the Management of IBD

In contrast to the robust epidemiologic evidence regarding dietary risk factors for IBD, until recently, high-quality evidence for modulation of IBD activity through dietary changes has been sparser.²¹ The dietary therapy with the strongest evidence behind its efficacy is exclusive enteral nutrition

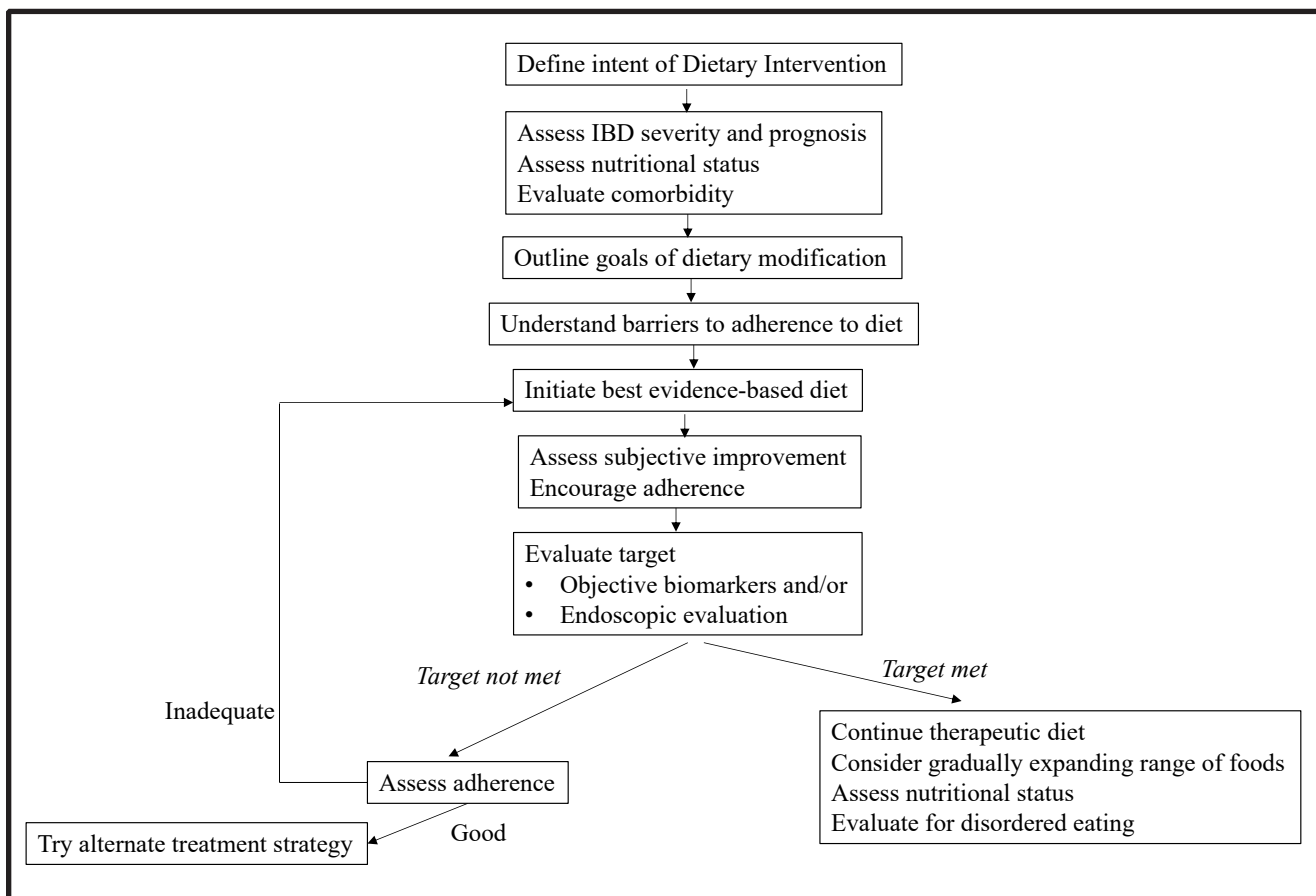


Figure 1. Practical Approach to Incorporation of Diet in the Management of IBD

(EEN).²²⁻²⁴ This dietary strategy incorporates exclusion of all table foods while meeting caloric requirements through consumption of either elemental or polymeric formulas. Both types of enteral preparations are similarly effective with the latter being more palatable. In randomized controlled trials, EEN induces clinical remission, normalization of fecal calprotectin and endoscopic healing in Crohn’s disease without evidence supporting its efficacy in UC.²⁵⁻²⁷ Its efficacy is comparable or only modestly inferior to oral systemic corticosteroids or anti-TNF therapy.^{25,28} A challenge precluding wider use of this strategy is the difficulty to maintain compliance over the long-term.

Partial enteral nutrition (PEN) along with consumption of an unrestricted diet is less effective in achieving resolution of inflammation in CD. However, a strategy of combining PEN with modified exclusion diets that encourage

incorporation of dietary fiber and n-3 PUFA while reducing sugar-rich and ultraprocessed foods in the Crohn’s disease exclusion diet (CDED) demonstrated the ability to achieve clinical remission (75% vs. 59%) that was comparable to EEN at 6 weeks and superior to expanding to an unrestricted diet for the subsequent 6 weeks of treatment (75.6% vs. 45.1%, $p=0.01$).²⁹ A modified version of the CDED that eliminated the use of PEN, relying just on dietary changes was also effective in improving symptoms and resolving inflammation in adult patients with Crohn’s disease.³⁰ Analysis of the initial clinical trial of CDED data showed that response by 3 weeks was a strong predictor of both compliance and clinical improvement. Lack of improvement by 3 weeks in patients who were compliant with the diet was predictive of poor efficacy at the end of treatment.

The specific carbohydrate diet (SCD) has

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gained popularity among patients but supporting evidence of this diet is primarily through case series demonstrating symptom resolution or improvement of calprotectin in some patients.³¹ The DINE-CD study compared the SCD to a Mediterranean diet in 191 patients with mild to moderately symptomatic Crohn's disease.³² At 6 weeks, 46.5% of patients in the SCD group and 43.5% in the Mediterranean diet group achieved symptomatic remission ($p=0.77$). However, only a small fraction of patients in both groups achieved normalization of fecal calprotectin (34.8% vs. 30.8%), highlighting the discrepancy between symptom improvement and objective resolution of inflammation.

Other dietary strategies that have been examined including the autoimmune protocol diet, IBD-anti-inflammatory diet, the IBD-treat diet, an allergy-based diet, a low emulsifier diet, all of which have mixed evidence supporting efficacy primarily from case series without rigorous data on improvement in inflammation.²¹ In an intriguing strategy incorporating dietary changes along with microbiome-directed therapy, Kedia et al. conducted an RCT of 66 patients with mild-to-moderate ulcerative colitis who received either standard medical therapy or seven weekly colonoscopic infusions of fresh multi-donor FMT and subsequently initiated an anti-inflammatory diet.³³ At the end of the clinical trial, the combination of FMT-AID was superior to standard medical therapy in achieving clinical remission (60% vs. 32%) at 8 weeks. The AID was superior to standard medical therapy in maintaining deep remission until 48 weeks (25% vs. 0%).

Practical Tips for Incorporation of Dietary Modification in Management of Patients with IBD

Most gastroenterologists and other treating providers will be asked the question "what can I eat?" by their patient with IBD at some point in the clinical course. The first step in answering that question is to understand the intent of dietary changes (Figure 1). The intent could be to use dietary modification to treat underlying inflammation in IBD, changes to address residual functional symptoms after resolution of inflammation, or to

incorporate healthy lifestyle behavior for overall good health. These three aims of the dietary changes merit different answers. For the patient who has residual functional symptoms of diarrhea, abdominal pain, or bloating, despite achieving endoscopic remission of their underlying IBD, dietary strategies can focus on identifying specific dietary triggers of these symptoms and eliminating them from diet. A low FODMAP diet is effective in improving symptoms of abdominal pain and bloating in randomized controlled trials. Trials of lactose-free or gluten-free diets may help identify patients who have lactose intolerance or gluten sensitivity. It is important to ensure that non-culprit food items are re-introduced back in the diet.

For patients who are seeing general good health and reduction in risk of subsequent IBD relapses, a Mediterranean style diet may confer overall health benefits and reduce risk of cardiovascular disease and improve longevity. In addition, mechanistically such diets may be beneficial in preventing IBD relapses though high-quality data on this is lacking. In the absence of stricturing disease, incorporation of sufficient amount of dietary fiber, particularly soluble fiber from fruits and vegetables is important and may be associated with reduced risk of IBD relapses. In addition, minimizing consumption of emulsifier and processed foods is also likely to be beneficial in reducing risk of inflammatory activity.

If dietary strategies are being used to achieve remission in symptomatic patients with objective inflammation, it is important to first ensure the patient is appropriate for dietary treatment. Most studies of dietary treatment have focused on those with mild disease activity with paucity of data demonstrating the efficacy of diet for moderate-to-severe disease or those with high-risk phenotypes. Consequently, patients with milder disease can be prioritized for a strategy of dietary modulation. While most studies have focused on diet as the sole treatment, it is reasonable and indeed more acceptable to consider using dietary treatment along with pharmacologic therapy, particularly in those with disease at the more moderate end of the spectrum. The second step is to identify the best dietary intervention based on quality of evidence at that time. Since this is a rapidly evolving field, it is best to identify strategies most supported by

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high quality data at the time such interventions are being suggested. As for pharmacologic therapy, dietary therapies are effective only if one is able to be adherent to them. Thus, it is important to assess patient motivation, lifestyle, and ability to adhere to diet in deciding the right therapeutic diet for the patient. The third step is to define the right duration of intervention before assessment of outcome. For most dietary studies, the initial phase has been 6-8 weeks long. This is an appropriate duration for a dietary trial with close monitoring for disease worsening. Finally, as for other medical therapies, it is important to ensure objective remission through either biomarkers and/or endoscopic evaluation to ensure that symptom improvement parallels resolution of inflammation.

In parallel with incorporation of diet, it is important to monitor patient for development of

nutritional deficiency either as a consequence of their disease or exclusion diets. It is also important to monitor for the development of avoidant eating disorders in patients relying on diet for treatment of their underlying disease or owing to their symptoms. Multidisciplinary care with a trained dietician is a critically important component for ensuring success of dietary treatment strategies in patients with IBD. ■

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