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Review Article

Nutritional Protocol for Ulcerative Colitis/Crohn's Disease

Emmett J Hughes D.C., M.S*

Associate Professor at University of Bridgeport, USA

***Corresponding Author**: Emmett J Hughes D.C., M.S, Associate Professor at University of Bridgeport, USA.

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Abstract

Inflammatory bowel disease is a prevalent condition affecting millions of Americans. While traditional medical treatment offers relief from symptoms in some cases, the root cause of the disease is usually not addressed. Food sensitivities and allergies, gut dysbiosis, and a low fiber diet are all implicated in the development of the disease. Addressing these issues can result in remission of the disease and lead to repair and proper functioning of the gut.

Keywords: *Ulcerative Colitis; Crohn's Disease; Inflammatory Bowel Disease*

Chronic inflammation in the gut can occur in both ulcerative colitis (UC) and Crohn's disease (CD). They are the two main forms of inflammatory bowel syndrome (IBS). However, there are some differences in the two diseases.

Ulcerative colitis is a condition limited to the large intestine (colon and rectum). The inflammation is limited to the innermost lining of the intestine. It is a continuous inflammation rather than parts of the large intestine.

Crohn's disease can occur in any portion of the GI tract from the mouth to the anus. It is usually characterized by patches of inflammation, affecting some areas while other areas of the gut remain healthy. It can occur in all three layers of the bowel walls.

Both of these conditions result in chronic inflammation of the gut. Usually there are periods of exacerbation and remission. They can result in impaired function of the gut, leading to such symptoms as persistent diarrhea, along with painful cramping in the abdomen. Although they can occur at any age, both usually develop in teens and young adults. Men and women are affected equally. The causes of both UC and CD continues to elude researchers, but both have similar types of contributing factors, including stress, smoking, liberal use of antibiotics, low fiber diets, genetics, environmental toxins and immune dysfunction.

Indeterminate Colitis

Nearly 10% of cases of inflammatory bowel diseases exhibit the features of both CD disease and UC. These cases are called indeterminate colitis. Either way, both conditions are treated with the same basic protocol.

Diagnosis

Symptomatology and diagnostic imaging are usually all that is needed to make the diagnosis of inflammatory bowel disease. Disability resulting from the disease can be assessed using the Inflammatory Bowel Disease Disability Index [1]. Another factor that may predict severity of the disease is circulating anti-microbial antibodies. Their presence, even years before the diagnosis of Crohn's diagnosis, is associated with a more aggressive form of the disease [2].

There is a strong relationship between inflammatory bowel disease and colorectal cancer. Known risk factors include severity, extent and duration of colitis, presence of primary sclerosing cholangitis, and family history of colorectal cancer [3].

Aggressive steps to treat the symptoms and an attempt at remission are critical for preventing the development of cancer.

Diet

Most of the literature has focused on the low FODMAPs (fermentable oligo, di, monosaccharides, and polyols) diet [4]. A diet low in fiber is associated with the development and symptoms of IBS. In fact, soluble fiber supplements have been shown to help reduce the symptoms of both CD and UC [5].

A food elimination diet is the foundation for a natural approach to treating inflammatory bowel disease. The foods to be eliminated are gluten, dairy, alcohol, refined sugars, corn, peanuts, eggs, soy, citrus fruits, nightshades (white potatoes, tomatoes, eggplant and bell peppers), conventionally-raised beef, pork, chicken, and turkey, shellfish, farm-raised fish, chocolate, non-dairy creamer, and caffeine.

Of course, this severely limits the typical American's diet. Therefore, it is important to give the patient a list of foods that they can eat. These include rice, tree nuts, seeds, beans, gluten-free oats, millet, teff, buckwheat, amaranth, quinoa, tapioca, all other fruits and vegetables not listed above, olives, grapeseed oil, sesame oil, canola oil, olive oil, raw honey, agave syrup/nectar, brown rice syrup, stevia, pure maple syrup, free-range lamb, chicken, turkey, wild game, and wild caught seafood (fin fish, not shell fish). This diet must be maintained for at least six weeks. After the initial six weeks, foods can be reintroduced one at a time for three days, carefully noting any exacerbation of symptoms. If there are no symptoms related to the food, it can be included back in the diet in small amounts.

Carrageenan

Extracted from red seaweeds, carrageenan has been used to induce an experimental inflammatory bowel disease in animals. It is used widely in the food industry, even though it is a known carcinogen for the colon. It appears that it does not directly cause UC or CD in humans, but it may be dependent on the species of bacteria in the individual's gut. In any event, it should be completely eliminated from the diet of everyone, especially those with IBS. Elimination of carrageenan in conjunction with a food elimination diet had been shown to be helpful in achieving remission for several years [6].

Prebiotics

Prebiotics are non-digestible food ingredients that promote the growth of beneficial bacteria in the gut. These include bran, starch, lactulose, psyllium seed husk, xanthan gum, germinated barley foodstuff (GBF) and fructooligosaccharides (FOS) including inulin [7,8]. These are known to increase fecal water content, which helps relieve constipation. Bacterial fermentation of prebiotics produces SFAs as well. Dosages range from 20-40 grams per day.

Probiotics

The use of probiotics is critical to mitigating the disease process in both CD and UC [9-11]. Probiotics are live microorganisms that inhabit the gut and provide a benefit to the host. Supplementing with *Lactobacillus* and *Bifidobacterium* species has shown the greatest benefit in regard to controlling pathogenic bacteria. These two species have multiple strains of beneficial bacteria and are able to adhere to the wall of the mucosa preventing colonization by pathogens. It has been shown that they also stimulate the production of secretory IgA. The use of the fungus Saccharomyces has demonstrated an ability to decrease symptoms when supplemented in patients with IBD [12]. The use of fecal microbiota transplant (FMT) is an older treatment that is re-gaining some of its previous popularity [13]. The first documented use of FMT dates back to the 4th century China. In the 1950's it first appeared in the medical literature as a successful treatment for pseudomembranous colitis. Since then, FMT has been used to treat CD, UC and *Clostridium* infections.

Probiotics are negatively affected by alcohol and antibiotics. Some strains of acidophilus may interfere with the metabolism of a variety of antibiotics.

Homeopathy

A review of three randomized, clinical trials revealed the use of asafetida, a homeopathic remedy, as a safe and effective means for treating IBD [14]. Additionally, other studies have reported benefit from the use of homeopathic medicines [15]. With homeopathy, careful

selection of the appropriate remedy involves physical and psychological symptoms. The most common ones used are Sulphur, Pulsatilla, Nux Vomica, Phosphorus, Lycopodium Clavatum, Silicea, and Argentum Nitricum.

Glutamine

Glutamine is the most abundant amino acid in the blood. It is considered conditionally essential, that is during times of physiological stress. Dietary sources include cabbage, beef, chicken fish, legumes miso and dairy products. It has been shown to stimulate intestinal mucosal growth in both animal and human studies [16-18]. It has also been demonstrated that glutamine improves intestinal permeability [19]. Dosage is 1000 mg 3x/day. Up to 30 g/day has been used to heal the intestines post-surgically. No known side-effects were reported even in the high dose studies.

Zinc

Zinc deficiency is a well-known complication of CD [20]. It is estimated that up to 45% of patients with CD have a zinc deficiency. This can result is several of the complications seen in CD patients, including poor healing of fistulas and fissures, anorexia, chronic diarrhea, and depressed cell-mediated immunity. Oral supplementation in IBD patients is sometimes of limited value. Some may need IV zinc supplements. However, for the best results orally, it should be given in the form of zinc picolinate or zinc citrate at 50 mg/day. Copper at 3 mg/day should be given with zinc.

Magnesium

Magnesium is deficient in the majority of Americans. Due to absorption challenges in patients with IBD, they are particularly susceptible to a deficiency [21]. Correlation with plasma levels and intracellular levels is poor. Patients with low levels of magnesium my present with weakness, abnormalities in their ECG, irritability, anorexia, hypotension and/or confusion. Supplements should be chelated with citrate or aspartate in the dose of 400 to 800 mg/day. Magnesium can cause diarrhea in higher doses, so monitor the patient carefully.

Iron

Iron deficiency anemia is common in patients with both CD and UC [22]. This is usually due to the chronic blood loss from intestinal bleeding. Rather than supplementing with iron, which can promote intestinal infection, supplementing with vitamin C at 500 mg 2x/day is recommended to increase iron absorption from food.

Other vitamins/minerals

Due to the loss of absorptive surface, patients with IBD are prone to low levels of calcium, potassium, vitamins A, D, E, K Folate, B_{12} and C. A high quality multivitamin/mineral is recommended as a foundation to build on with additional supplements. Antioxidants are especially important to prevent oxidative damage to the intestinal mucosa. Vitamin E should be 800 IU/day total. Most multivitamins don't provide that level, so supplementing with additional E is needed.

Curcumin

Curcumin is the yellow pigment in *Curcuma longa* (turmeric), a member of the ginger family. There are several stories suggesting that it has been used in China and India for over 10,000 years. It is used in Ayurvedic medicine to treat inflammation and abdominal symptoms. Curcumin (diferuloylmethane) is a curcuminoid, one of major chemical constituents of turmeric. It has been used in both Asia and Europe as an alternative to the much more expensive saffron spice. Research has focused on its ability to modulate a variety of cytokines, including TNF-α, MMP-9, JNK, p38, JAK, NF-kB, ERK, and PKC. It has known hypoglycemic effects, and has been used to treat cancer as well [23-25]. Its ability to positively impact inflammation in the gut are well documented [26-28]. Curcumin, in doses of 500 - 1000 mg 3x/day are recommended in both UC and CD. There are no known side-effects of curcumin supplementation.

Aloe vera gel

Aloe vera gel has been demonstrated to have a positive effect on inflammatory prostaglandins and other cytokines. The effect is dose dependent. There were no significant side effects in those treated with *Aloe vera* [29,30].

Boswellia serrata (Frankincense)

Another Ayurvedic herb, *Boswellia* has been established as beneficial in treating the inflammation seen in both CD and UC [31,32]. The boswellic acids inhibit inflammatory eicosanoids (leukotrienes) by inhibiting the lipoxygenase pathway. With *Boswellia* supplementation, some patients achieved remission of their symptoms. Additionally, it has been shown to have anti-proliferative effects on tumors, reduces the risk of asthma, and has beneficial effects on bronchitis and sinusitis [32].

Quercetin

It is well established that flavonoids have modulatory effects on a variety of processes and are potent antioxidants and have been shown to decrease oxidative stress [33]. The flavonoid quercetin, found in a variety of fruits, vegetables, leaves and grains, has an effect on a variety of enzyme systems involved in gut function [34]. It has been shown to inhibit aldose reductase activity *in vitro*, thus preventing the intracellular accumulation of sorbitol in a variety of tissues, including the lens of the eye and myelin sheaths. It has been shown to decrease inflammatory damage in the colon [35]. It has been shown to strengthen the epithelia barrier of the gut [36]. It has been suggested by several studies that quercetin has a protective effect on the colon in regard to the development of cancer [37,38].

Butyric Acid (Butyrate) Enemas

Butyric acid is a short-chain fatty acid (SCFA) that is essential to the function of the colon. The majority of the SCFAs produced by bacterial action on fiber are acetic acid, proprionic acid and butyric acid. Acetate and proprionate are used by the liver for energy, whereas butyrate is used by the colonocytes as an energy source. The use of butyric acid enemas to treat disorders of the colon have been shown to be helpful [39-41].

Conclusion

Given the complexity and difficulty of successfully treating ulcerative colitis and Crohn's disease, a more holistic and comprehensive approach is warranted. The current conventional treatments have a myriad of side effects, some of which can actually be fatal. In severe cases, conventional medical treatment may be the only option. However, incorporating diet, nutritional supplements and botanical medicines has been shown to improve outcomes in even the most difficult cases.

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