Case Study: Treatment of a Male, Pediatric Crohn's Disease Patient with the Specific Carbohydrate Diet (SCD)

Faller, L., Scudiere, J., Davies, Y.

BRIEF SYNOPSIS

Here we report the treatment of a pediatric Crohn's disease patient with the Specific Carbohydrate Diet (SCD) and without medications. The SCD excludes most dairy products and complex carbohydrates to reduce bacterial growth. This is thought to decrease local inflammation and allow the gastrointestinal tract to heal.[2] Some studies suggest that this diet can help control and improve symptoms of Crohn's disease.[8,9]

INTRODUCTION

Crohn's disease is an immune-mediated inflammatory condition that can affect any part of the gastrointestinal tract.[1] Although the cause is thought to be multifactorial and the precise mechanisms are not entirely clear, the fundamental defect is believed to be host immune system recognition of native intestinal bacteria as foreign. This triggers an immune response that leads to inflammation of the gastrointestinal mucosa and culminates in the development of erosions, ulcers, and (if prolonged) structuring.[2]

The mainstay of current Crohn's disease therapy is pharmacologic management tailored to the specific needs of the patient and consists predominantly of aminosalicylates (e.g., mesalamine), immunomodulators (e.g., 6-mercaptopurine, azathioprine), and biologics (e.g., anti-TNFa monoclonal antibody). However, an array of elimination diets and enteral nutrition regimens have been tested as alternatives to pharmalogic therapy, and their use has been associated with symptomatic improvement in some Crohn's disease patients.[3,4,5,6,7] The Specific Carbohydrate Diet (SCD) is one diet that has been found to control and improve signs and symptoms of Crohn's disease in a small number of patients.[8,9] The SCD excludes most dairy products, refined sugars, and all complex carbohydrates, in order to decrease the amount of carbohydrate available for bacteria to consume.[2] The premise is that mucosal inflammation decreases enzymes necessary for breakdown of complex carbohydrates and that this favors metabolism by intestinal bacteria via fermentation and generation of harmful pro-inflammatory byproducts.[2] Restriction of dietary carbohydrate is thought to reduce the pro-inflammatory bacterial byproducts and presumably block further inflammation and injury to the gastrointestinal tract. This diet was developed in the 1920s by Dr. Sidney Valentine Haas, a U.S. pediatrician who authored Management of Celiac Disease.[12] The specific details are outlined in Breaking the Vicious Cycle by the mother of one of his patients who studied biology, nutritional biochemistry and cellular biology.[2,10] In this paper, we report the successful treatment of a pediatric Crohn's disease patient by utilizing the Specific Carbohydrate Diet without any medications.

A 6-year-old boy presented with a history of persistent diarrhea and mouth sores. The patient claims to have been following a gluten-free diet, but is still complaining about persistent diarrhea and mouth sores. His IBD specific p-ANCA test showed a peri-nuclear distribution, a pattern associated with ulcerative colitis.[11] A small-bowel follow-through imaging study revealed evidence of terminal ileitis. Subsequent upper endoscopy revealed ulcers in the duodenum as well as active inflammation in the duodenum, terminal ileum, descending colon, and rectum. The pathologic differential diagnosis included Crohn's disease and based on the clinical and laboratory information listed above, this patient was diagnosed with Crohn's disease.

METHODS

The Specific Carbohydrate Diet restricts all food items that contain grain, refined sugar, dairy, or any other complex carbohydrates. The diet mainly consists of:

- fruits, except plantains
- vegetables, except corn, yams and potatoes
- unprocessed meats
- dairy products that have been fermented for 24 hours or very aged cheeses such as hard cheddar cheese and parmesan.

The complete list of items excluded and included in the SCD can be found in the book, Breaking the Vicious Cycle by Elaine Gottschall or online at www.breakingthevicioussycle.com. The patient strictly adopted the diet on the honors system and was routinely evaluated in clinic before and during the treatment for one year. However, the patient is still on the diet to date. The patient did not record the amount of carbohydrates consumed daily, but rather focused on the types of carbohydrates consumed, as described above. After nine months of treatment, VSL #3, a probiotic, was added to the daily regimen. There was no specific reason of adding it at this time point in therapy, other than the physician had been having success with this brand of probiotic with other gastrointestinal patients. After eighteen months of treatment, a SCD multivitamin and fish oil was added to the daily regimen. Again, there was no specific reason of adding it at this time point in therapy, other than the parent was concerned about the patient growing and getting enough vitamins and nutrients being on the SCD. However, this is not a standard part of the SCD diet. An upper endoscopy was completed 14 months after initiation of treatment to

compare to the biopsies collected before treatment. Routine hematoxylin-and-eosin-stained slides (Fig. 1) were evaluated.

RESULTS

CLINICAL RESPONSE

After one month of the diet, the patient had already gained weight and the persistent diarrhea ceased. Examinations in clinic were completed after four, seven, nine, twelve, eighteen and twenty two months of treatment. At each visit, the patient consistently reported feeling well with no diarrhea. The patient's caregiver reported a stable body weight in between visits. This patient is currently maintained on the SCD with no medications and to date is doing well.

UPPER ENDOSCOPY

The first set of biopsies showed patchy active inflammation in the duodenum, terminal ileum, descending colon, and rectum. The duodenum showed mildly active peptic-type duodenitis with villous blunting and gastric mucin cell metaplasia. While the villi showed blunting, there was no prominence of surface or crypt intraepithelial lymphocytes. Goblet cells were present and evenly distributed. The lamina propria showed a mild lymphoplasmacytic infiltrate. As shown in figure 1A, the terminal ileum showed features compatible with Crohn's disease, including a patchy lymphoplasmacytic lamina propria infiltrate, erosions, and active inflammation. In one focus, the active inflammation extended from the luminal surface to the superficial submucosa, where a loose, non-caseating granuloma was present. Architectural distortion was minimal in this sample. While biopsies from the cecum, ascending colon, transverse colon, and sigmoid colon were essentially unremarkable, the descending colon and rectum showed a few areas of active inflammation. Additionally, poorly cohesive noncaseating microgranulomas were seen in both the descending colon and rectum. Correlation of the histologic findings with clinical and endoscopic findings produced a diagnosis of Crohn's disease.

In the second set of biopsies taken approximately one year after the first set, peptic-type changes were persistent in the duodenum, including minimal villous blunting and gastric mucin cell metaplasia. Absent, however, was the active inflammation identified in the first duodenal sample. Likewise, the terminal ileum, colon, and rectum showed a marked decrease in inflammation in figure 1B. Active inflammation was not observed in the descending colon or rectum, and mucosal architecture was preserved. The only residual evidence of Crohn's disease was a few lamina propria microgranulomas found adjacent to prominent lymphoid nodules.

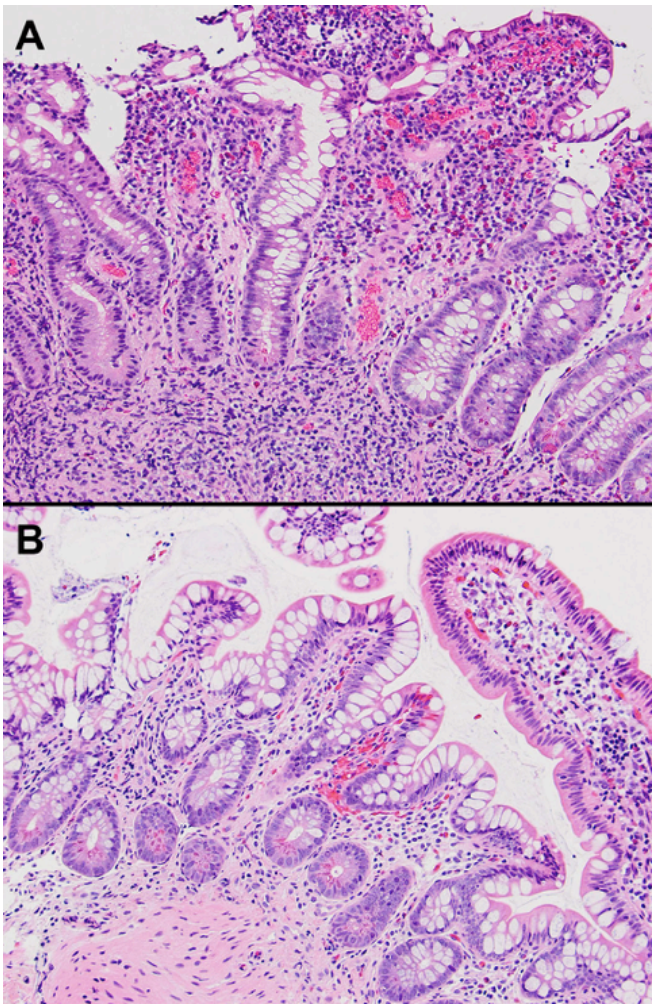

Figure 1

A. Histologic sections of the terminal ileum. Before treatment, the ileum showed active inflammation, a lymphoplasmacytic lamina propria infiltrate, non-caseating granulomas, and reactive epithelial changes (A). After treatment, the ileum showed essentially unremarkable mucosa (B) with a few lamina propria microgranulomas (not pictured). Hematoxylin-eosin, original magnification 100x.

DISCUSSION

We describe the successful use of the Specific Carbohydrate Diet in the treatment of Crohn's disease. Not only did the patient's symptoms improve but also the comparison of biopsy micrographs before and after the SCD revealed a return to normal mucosal architecture. This case is another example suggesting the SCD may be an effective alternative therapy to pharmacologic therapy for treatment of Crohn's disease.[8,9] However, as the number of Crohn's disease patients enrolled in the previous studies was quite small and studies that directly compare the efficacy of the SCD to standard pharmacologic therapy and investigate the long-term effects of the diet are currently lacking, much more research is needed.[8,9]

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