

CASE REPORT

The Successful Management Of Ulcerative Colitis With A Nutritional Intervention: A Case Report

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Abstract

Background: A 23-year-old Caucasian female was diagnosed with Ulcerative Colitis (UC) and symptoms were successfully managed with the 5-Rs (e.g. remove, replace, re-inoculate, repair, and rebalance) gut restoration program.

Case/Intervention: Diagnostic laboratory testing was initially utilized which identified microbial imbalances, vitamin D deficiency, and vitamin B12 deficiency. Nutrition therapy was then implemented over a course of 7 months, which included a whole foods elimination diet that was low in fermentable oligo-, di-, monosaccharides and polyols (FODMAPs) and avoided

leading allergens such as cow dairy, soy, gluten, and corn. Nutritional supplements were implemented in phases to aid in rebalancing gut bacteria, repair the mucosal lining, and correct nutritional deficiencies. After good dietary adherence and the 5-Rs program, the patient became 100% asymptomatic with no use of mesalamine suppositories for more than 6 weeks.

Conclusion: This case report demonstrates the effectiveness of the 5-Rs program approach for the successful management of UC. Long-term resolution was supported by the elimination of specific foods, nutrition supplementation, and stress management.

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Introduction

Ulcerative colitis (UC) is a chronic inflammatory bowel disease that affects over 593 000 Americans each year.¹ It is idiopathic with multi-factorial triggers which include genetic polymorphisms involved in recognizing bacteria and nutrition metabolism, overactive immunological responses involving inflammatory cytokines which damage the lining of the intestine and compromise the integrity of the epithelial barrier as well as environmental factors such as diet.² Symptoms may be mild to severe with episodes of abdominal pain, nausea, diarrhea, rectal bleeding and weight-loss.³ This case report

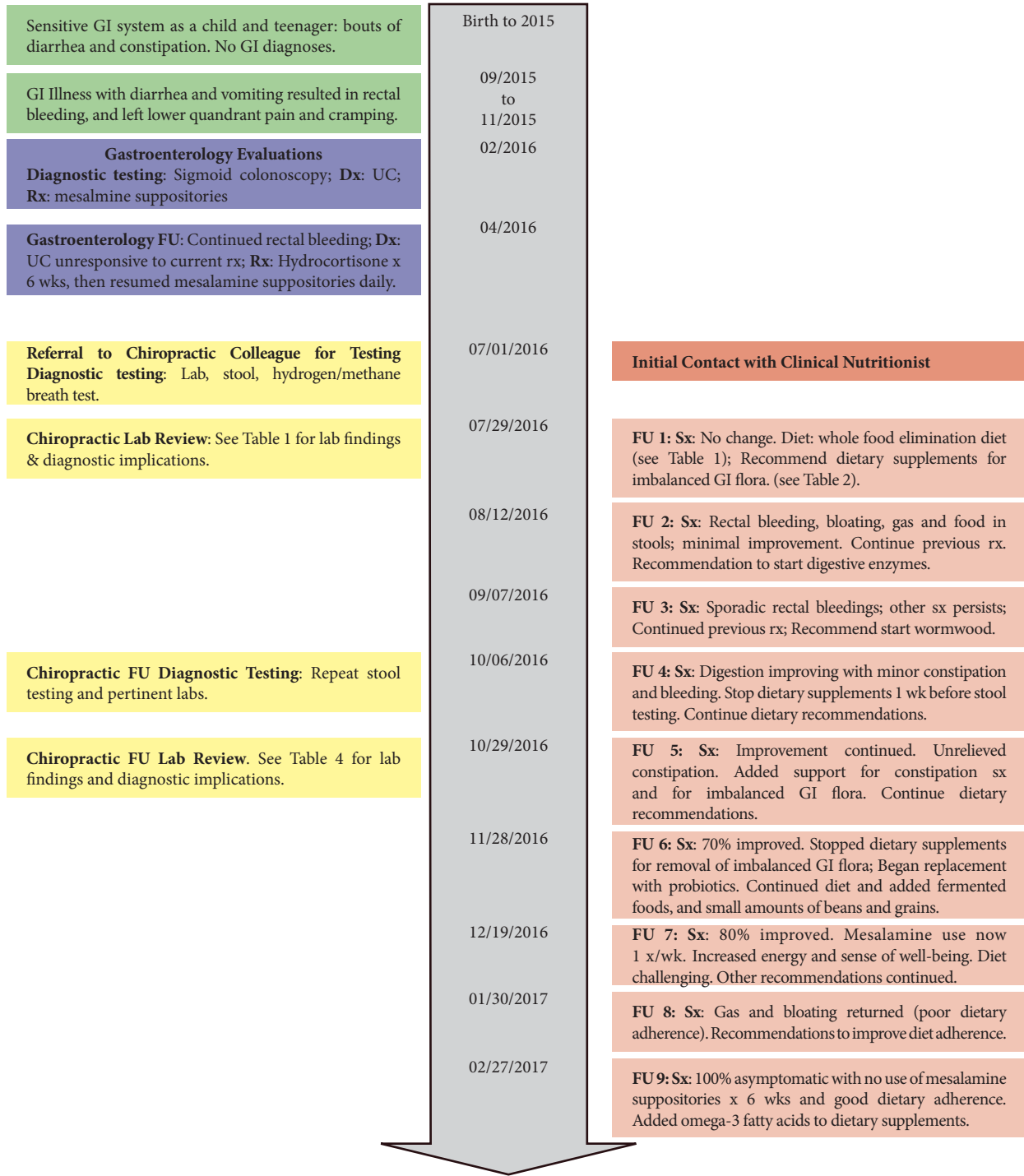
reviews the implementation of the 5-Rs gut restoration program (e.g., remove, replace, re-inoculate, repair and rebalance), which was recently updated by The Institute for Functional Medicine from the 4-Rs program,⁴ to stop the progression of UC in a 23-year-old female. Interventions included a whole foods elimination diet, dietary supplements, and stress reduction, which were guided by nutritional testing and abnormal laboratory biomarkers.

Patient Narrative

The patient is a 23-year-old Caucasian woman who reported having a sensitive stomach since childhood; however, she was never diagnosed with irritable bowel syndrome or sought treatment. She did experience bouts of constipation or diarrhea on occasion during these years but never identified food sensitivities or used medications associated with altering digestion. In June of 2015 (age 21), she experienced a self-limiting gastrointestinal (GI) illness that resolved without treatment but caused diarrhea and vomiting. A few months after this GI illness in November, she began to experience abdominal cramping and rectal bleeding.

Timeline.

Chief Complaint: 23-y-old Female with Ulcerative Colitis treated with mesalamine, hydrocortisone, diet, and dietary supplements.



Outcome: Ulcerative Colitis symptoms 100% resolved with adherence to dietary measures that included a gluten-free diet and supplementation with probiotics, vitamin D3, B complex, L-glutamine and omega-3 fatty acids, at the time of patient's last follow-up.

Abbreviations: Dx, Diagnosis, FODMAPs, fermentable oligosaccharides, disaccharides, monosaccharides, polyols; FU, follow-up; GI, gastrointestinal; Rx, treatment; SIBO, small intestinal bacterial overgrowth; Sx, symptoms; UC, ulcerative colitis; wk(s), week(s).

Table 1: Relevant Abnormal Lab Results from Initial Visit

Visit	Laboratory Biomarker	Result	Lab Reference Range	Diagnostic Significance
Initial Visit, July 2016	• Hydrogen (H ₂)/Methane (CH ₄) (BioHealth)	Baseline: 7/13 20 min: QNS 40 min: QNS 60 min: 19/19 80 min: 28/18 100 min: 16/18 120 min: 24/19 140 min: 42/19 160 min: 65/18	SIBO suspected when one or more criteria are met: Baseline: H ₂ gas ≥20 ppm Elevated H ₂ : ≥20 ppm in first 120 min Elevated CH ₄ : ≥12 ppm in first 120 min	Positive for SIBO
	• Comprehensive 3-day stool Analysis plus parasitology (Doctor's Data)	Bacteriology Culture: 3+ Beta strep (not group A or B) 4+ Enterobacter aerogenes	No positive culture	Imbalanced commensal flora
		Microscopy: Yeast: Moderate RBC: rare WBC: rare	None to rare None None	Dysbiosis Pathologic Pathologic
	• Low vitamin D, 25-OH	34	30-100 ng/ml	Low/Suboptimal
	• Low vitamin B ₁₂	243	211-946 pg/ml	Low/Suboptimal
	• Mycoplasma Pneumoniae Antibodies, IgG	351	0-320 U/ml	Indication of past infection

Abbreviations: ppm, parts per million; min, minutes; NA, not applicable; NR, not repeated; QNS, quantity not sufficient; RBC, red blood cells.

In February 2016, she saw a gastroenterologist who performed a sigmoid colonoscopy and diagnosed her with ulcerative colitis (UC). A prescription for mesalamine suppositories was dispensed to be used as needed to help limit inflammation and reduce rectal bleeding. The patient continued to regularly use mesalamine as needed daily or every other day. In April of 2016, a 6-week course of hydrocortisone suppositories was prescribed for ongoing rectal bleeding. After experiencing minimal relief, the hydrocortisone was discontinued, and she continued taking mesalamine as prescribed. The patient continued with mesalamine and began self-imposed dietary changes and probiotic supplementation.

After continuing to experience abdominal cramping and rectal bleeding, the patient scheduled an appointment with a clinical nutritionist in July 2016. The nutritionist's initial recommendation was for diet and dietary supplement support to relieve the patient's digestive complaints and identify abnormal microbial colonies that might be associated with digestive disorders. A chiropractor ordered routine labs, a stool analysis with parasitology, and tested for small intestinal bacterial overgrowth (SIBO).

Stool testing confirmed positive commensal bacteria, positive microscopic yeast, insufficient Lactobacillus, as well as the presence of red and white blood cells. In addition, SIBO was suggested by an elevated H₂/CH₄ breath test (relevant abnormal lab results reported in Table 1).

The nutritionist opted for a 5-R approach (Remove, Replace, Re-inoculate, Repair, and Rebalance)⁴ to manage this case based upon the identification of abnormal bacterial levels as well as the patient's unresolved symptoms despite self-imposed probiotic supplementation. To identify food triggers that might be responsible for her symptoms, the clinical nutritionist recommended a whole foods elimination diet (See Table 2).

A strong emphasis was placed on the avoidance of non-organic and GMO foods. Dietary supplements were recommended to balance microbial flora (See Table 3).

At the two-week follow-up in August 2016, the patient reported 100% adherence to diet and supplements but was experiencing increased bloating, gas, and the presence of undigested food in her stool. Digestive enzymes were added to her regimen to support the breakdown of food and eliminate negative digestive symptoms. Two weeks later, she was still experiencing irregular bowel movements

Table 2. Whole Foods Elimination Diet

Low FODMAPs foods, and leading allergens like cow dairy, soy, gluten, and corn.

Meal Suggestions:	Foods to Eat
Breakfast:	SP Complete Dairy Free protein powder (Standard Process) with grass-fed collagen powder, mixed with unsweetened coconut/almond milk, ½ piece of fruit. Other ingredients: cacao powder, chia seeds. OR 2 eggs with vegetables.
Lunch:	Large salad with mixed vegetables, roasted beets, roasted sweet potato, with 4-6 oz organic, lean protein like wild fish, organic chicken, hard boiled eggs. Top with olive oil and lemon or apple cider vinegar.
Dinner:	4-6 oz protein like organic chicken, fish, organic turkey, with 2 cups of veggies (roasted, sautéed, steamed), crockpot soup recipes with bone broth, veggies, and meat.
Snacks:	Limited amounts of goat/sheep yogurt, nuts (almonds, walnuts, macadamia nuts) with fruit. Patient did not consume many snacks. Limited to 1 serving of fruit per day (either in shake or as a snack).
Foods to be avoided:	High FODMAPs foods, corn, gluten, gluten free grains, cow dairy, limited nightshade vegetables, soy, legumes, farmed fish and shellfish, conventional meats, non-organic produce. Patient was advised to avoid sugar and high fructose corn syrup, as well as packaged foods that might contain food additives, chemical preservatives, and food dyes.
Notes on patient's diet:	<p>Patient struggled with following elimination of low FODMAP foods and was unable to identify if any of these foods were of major concern. Patient stayed focused on this diet for several months, with the exception of eating out/at work, where she still followed her recommendations 70-80%.</p> <p>At follow up #6 (Week 15), patient was asked to begin to incorporate some of these eliminated foods back into the diet, including: beans, sprouted grains, and probiotic rich foods. She did not consume the recommended probiotic foods like sauerkraut and kimchi, but did consume kombucha (low sugar) a few times a week. She did not report having any digestive upset due to grains and beans. In the last month of nutritional support and prior to elimination of symptoms, she began to incorporate sauerkraut 2-3x/week.</p>

Table 3. Supplementation and Associated Symptoms

Visit	Interventions	Nutritional Supplements	Time Frame
IC	Intake and assessment of symptoms; referral for testing	N/A	July 2016
1	Incorporation of whole food elimination diet, low FODMAPs	Ox Bile (Allergy Research Group), ZeoBind (BioPure), GI Synergy (Apex Labs), Interfase Plus (Klaire), GastroFiber (Standard Process), Schisandra (Mediherb), Slippery Elm (Vital Nutrients), Intestinal Cleanse: IMD (Quicksilver)	July 2016
2	Digestion improved, Increased bloating and gas, undigested food in stool	Continued Above, Added: Super Digestive Enzymes (Life Extensions)	August 2016

Table 3. (continued)

Visit	Interventions	Nutritional Supplements	Time Frame
3	Irregular BMs, undigested food in stool, Patient non-compliant with slippery elm.	Continued above, Added: Wormwood Complex (Standard Process)	September 2016
4	Patient now experiencing constipation, but overall digestion and wellness improved.	Continued above, Added Cholacol (Standard Process) for constipation. Referred for comprehensive 1-day stool analysis for follow up.	October 2016
5	Minor constipation present, increased burping, overall wellness increased. Diet continued. New stool test performed (Results in Table 4).	Continued: Ox Bile, Slippery Elm, Super Digestive Enzymes, Wormwood, Cholacol. All other supplements discontinued. New: Iberogast (Iberogast), Oregon Grape (Mediherb)	October 2016
6	Overall digestion improved, minor burping and gas. Begin GI Flora rebuilding regime. Incorporate probiotic rich foods, beans, small amounts of gluten free grains.	Discontinued all above supplements. New: Prescript Assist 2 caps/day (Probiotic), L-Glutamine 500 mg 2x/day (Thorne), Vitamin D 10 000 IU (Thorne), B Complex #12 2x/day (Thorne)	November 2016
7	Difficulties with diet adherence.	Continued above	December 2016
8	Patient reports decreasing use of suppository to one per week or less with no flare of symptoms or blood in stool. Difficulties with diet adherence.	Continued above	January 2017
9	100% asymptomatic and regular digestion for 8 weeks, without the use of suppositories for a minimum of 6 weeks.	Ongoing supplementation: Prescript Assist, Vitamin B Complex, Vitamin D 10 000 IU 3x/week, Omega 3 Fatty Acids	February 2017

Abbreviations: BM, bowel movement; IC, initial consult; IU, international units.

containing visible undigested food. Wormwood was recommended based upon her symptoms and to support the elimination of GI pathogens. She did not report any increase in symptoms although she continued to report sporadic rectal bleeding, while continuing to maintain a high dietary adherence (90-100%).

One month later, her energy levels and overall feelings of wellness were increased. Although she reported experiencing minor constipation, she noted that her digestion was the best it had been since being diagnosed with UC. She reported only a few days of minor bleeding episodes, which she attributed to a new high-stress job rather than any dietary indiscretions. She was recommended to repeat a 1-day comprehensive stool analysis to assess changes since beginning the nutrition program. The patient discontinued all supplements for one week prior to avoid skewing the diagnostic testing results.

In October 2016, the patient continued experiencing irregular rectal bleeding and minor constipation; Cholacol was recommended. Follow-up stool test confirmed increases in *Lactobacillus* (even without probiotic supplementation), negative microscopic yeast, low presence of *Candida albicans*, and an increase in commensal/imbalanced flora (see Table 4). GI support supplementation was continued for a period of one month (see Table 3.)

In November 2016, the patient reported only one day of minor bleeding, gas and bloating, and little to no other digestive concerns. Because of this improvement, the nutritionist recommended replacing the current supplement regimen with a GI flora rebuilding regimen (see Table 3 for details) consisting of probiotics, glutamine, vitamin D, and vitamin B complex. Dietary recommendations were expanded to include fermented foods (kombucha, sauerkraut, kimchi) and the reintroduction of small portions of gluten-free grains and beans.

In the following month, the patient reported high levels of job stress. Her home meal preparation declined, and she found herself consuming more prepared and processed foods; however, she continued her current supplement recommendations. Her digestive symptoms continued to improve, without any other pain or discomfort, except for rare, inconsistent bleeding. At this point, she had reduced her use of mesalamine suppositories to once per week. She continued the current recommendations and focused on stress reduction. By January 2017, she experienced an increase in gas and one day of rectal bleeding in the previous five weeks, probably associated with poor dietary adherence. The client was counseled on the importance of dietary adherence.

Table 4. Relevant Abnormal Lab Results of Follow Up Analysis

Visit	Laboratory Biomarker	Result	Lab Reference Range	Diagnostic Significance
Follow up, October. 2016	• 1-day comprehensive stool with parasitology (Doctor's Data)	Bacteriology Culture: 1+ Alpha hemolytic strep 2+ Beta strep, not group A or B 1+ Citrobacter freundii complex 1+ Enterobacter cloacae complex 3+ Mucoid Escherichia coli 2+ Pseudomonas chlororaphis group	No positive culture	Imbalanced commensal flora
		Yeast Culture: 1+ Candida albicans	Negative	Normal
		Microscopy: Yeast: rare RBC: rare	None to rare None	Pathologic
	• Low vitamin D, 25-OH	NR	30-100 ng/ml	NA
	• Low vitamin B ₁₂	301	211-946 pg/ml	Low/Suboptimal

Abbreviations: ppm, parts per million; min, minutes; NA, not applicable; NR, not repeated; RBC, red blood cells.

In February 2017, the patient reported 100% resolution of symptoms without the use of mesalamine suppositories for more than 6 weeks. This improvement in symptom relief increased her dietary adherence to 80-90%. She identified that dried fruits, specifically mango, consistently caused the gas that she had experienced over the past few months. She also identified gluten as a trigger for past headaches and possible inflammation in the digestive tract that lead to bleeding. She continues with ongoing probiotic supplementation, vitamin D 10 000 IU 3x/week, omega-3 fatty acids, and vitamin B complex. She is very happy with her results and relieved to no longer worry about her digestion.

Patient Perspective

In the beginning of this process, my flares subsided to about once per month with no cramping and significantly less blood. During the first 30 days of my diet change my digestion was the best it had ever been! Now that I'm about 7 months into the process, I haven't had a flare in about 2 months (which is the longest I've ever gone without having one) and I've stopped using my medication.

I'm confident that this process has decreased my inflammation and improved my gut. I used to dread going to the bathroom because I never knew what was going to happen, but now I can go to the bathroom without having to worry about any pain/blood and I know that my digestive system is in much better condition.

Discussion

Ulcerative colitis (UC) is an inflammatory bowel disease (IBD) that affects the mucosa of the distal part of the colon and can cause bloody diarrhea, abdominal cramps, ulcers and fecal urgency.⁵ It is characterized by ongoing periods of relapse and remission and has an unclear etiology. Genetic risks are a component of the prevalence of UC. HLA-DqA1, CHD1, and LAMB1, along with genes involved in markers of inflammation are genetic variants associated with UC. Nonsteroidal anti-inflammatory drugs (NSAIDs), antibiotics, and intestinal infections are associated with an increased risk for developing UC.⁵

Medications for UC focus on reducing inflammation and suppressing the immune reactions associated with the symptoms. These include mesalamine (prescribed for this patient) and other 5-aminosalicylic acid (5-ASA), thiopurines, corticosteroids (also prescribed for this patient), and anti-TNF monoclonal antibodies.^{5,6} Colectomy is a surgical option in patients unresponsive to medical therapy.⁵ In this case report, the patient was prescribed mesalamine suppositories as well as hydrocortisone to manage her symptoms with limited success. This patient elected to seek nutritional support after self-imposed dietary changes and the use of probiotics were unsuccessful.

Diagnostic test results from July 2016 detected elevated mycoplasma pneumoniae AB, IgG antibodies in her blood. Mycoplasma pneumoniae-specific DNA has been found in the intestinal biopsies of patients with UC and associated gastrointestinal symptoms including anorexia, nausea, vomiting, and transient diarrhea.⁷ IBD is associated with

Mycoplasma pneumoniae and many other pathogens such as *Escherichia coli*, *Clostridium difficile*, and *Fusobacterium varium*.⁸

Initial stool sample identified strains of commensal bacteria and yeast, associated with an imbalance of microflora and decreased levels of beneficial bacteria. IBD is associated with a genetic predisposition to chronic or excessive immune system responses to endogenous bacteria, and imbalances in the diversity of the gut microbiota has been identified in patients with IBD.⁸ Probiotics containing various beneficial bacteria species such as *Lactobacillus*, *Bifidobacterium*, and *Streptococcus* have been a component of the successful treatment of some patients with UC.⁸

There is also evidence that increased intestinal permeability and dietary factors that trigger an immune reaction are associated with IBD.⁹ Food allergies (IgE) and intolerances (IgG) have also been reported to be a factor involved in the pathogenesis of UC and IBD.¹⁰ Symptoms related to food intolerances include abdominal pain, diarrhea, fatigue, and headache. A low fiber diet that is also high in sugars such as monosaccharides and disaccharides commonly observed in a Western Diet has been associated with UC.¹¹ Fiber, such as fructans, pectin, β -glucans, cellulose, hemi-celluloses, and lignin are beneficial in slowing down fecal transit time and increasing stool volume. Fiber also provides bacteria with necessary fermentable material that can be used to form short-chain fatty acids (SCFAs) needed to fuel enterocytes. Increased consumption of total fat from oleic acid, saturated fatty acid, polyunsaturated fatty acid, trans fat, monounsaturated fatty acids, and omega-6 linoleic acid have been linked to increased risk for UC.¹² No increased risk was found between omega-3 fatty acid and UC.¹² Lastly, lower levels of vitamin 25 (OH) D has been found to be higher in patients with 'moderate disease activity' when compared to patients with 'mild disease activity'.¹³ Low vitamin 25 (OH) D is associated with increased disease activity and is evidenced in this patient.

The nutritional therapy approach implemented in this case report involved what is known as the 4-Rs or 5-Rs Program.⁴ It was developed by The Institute for Functional Medicine initially as the 4-Rs program and later updated to the 5-Rs Program (remove, replace, re-inoculate, repair, and rebalance). The first phase involved the removal of parasites, toxins, infections, and inflammation causing foods that could be involved in triggering the immune system leading to chronic inflammation and damage to the mucosal lining.

Supplementation with digestive enzymes, vitamins, botanicals, and eventually probiotics were implemented to help replace, re-inoculate, and repair the patient's intestine. The patient was also encouraged to form healthier lifestyle habits to help lower stress levels and rebalance her mind, body, and spirit. The patient had some difficulty sticking with her modified whole food elimination diet. Overtime,

the patient's UC symptoms were eliminated through adherence to the 5-Rs nutritional therapy program, allowing her to discontinue mesalamine suppositories.

Limitations

There are no established protocols for management of inflammatory bowel disease. Contributing factors include food allergies or intolerances, pathogens, nutritional deficiencies, stress, and exposure to environmental toxins. Diagnostic testing is helpful to guide management of UC. The combination of diet, supplements, and stress management were collectively associated with this patient's positive response to the therapeutic recommendations.

Conclusion

This case report demonstrates the usefulness of implementing a plan, in this case the 5-Rs gut restoration program, for the successful management of UC. Because the etiology of UC can involve multiple factors (e.g., genetics, intestinal parasites, imbalance of microflora, food allergies and intolerances, poor diet and lifestyle, the use of medications such as NSAIDs and antibiotics, as well as environmental toxins and nutritional deficiencies), the removal of these potential causes of UC was an important first step of the management for this patient. A whole foods elimination diet along with nutritional supplements taken in two phases to remove and then replace, re-inoculate, and repair the gastrointestinal tract were effective in helping the patient achieve remission of UC.

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Author Disclosure Statement

Written consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review. No source of funding was used in the preparation of this case report. The authors declare they have no conflicts of interest.

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