Continue

Dieta imo pdf

As a library, NLM provides access to scientific literature. Inclusion in an NLM database does not imply endorsement of, or agreement with, the contents by NLM or the National Institutes of Health. Learn more: PMC Disclaimer | PMC Copyright Notice . 2021 Apr;20(2):32–41. This case report documented the outcome of consuming a 14-day homemade elemental diet to normalize intestinal methanogen overgrowth. A prevention protocol after methanogen eradication was employed to prevent recurrence. The patient was a 47-year-old White female with intestinal methanogen overgrowth confirmed by lactulose breath testing. Therapeutic interventions consisted of the homemade elemental diet, carbohydrate modified diet, lifestyle modifications, pharmaceutical and herbal prokinetics, and a probiotic supplement. The homemade elemental diet was conducted for 14 days. The lactulose breath test results on day 15 indicated a reduction of methane levels from an average of 42 ppm to 3 ppm throughout the testing period (120 minutes). The standard prevention protocol of prokinetics, diet, and lifestyle were not effective at preventing relapse. A repeat lactulose breath test on day 122 was positive, with an average of 81 ppm methane. The elemental diet was repeated for 9 days, with fasting on day 10. The lactulose breath test on day 11 indicated a reduction of methane gas to an average of 23 ppm. The homemade elemental diet resulted in a substantial reduction in methane and symptom resolution. It is another treatment option for patients with intestinal methanogen overgrowth. Small intestinal bacterial overgrowth (SIBO) is a condition associated with large numbers of bacteria colonizing the small intestine.1 Intestinal methanogen overgrowth (IMO) is a newer term (possibly replacing methane dominant SIBO) to characterize an overgrowth of archaea throughout the intestinal tract.2 Methanobrevibacter smithii is the predominant methanogen and evidence suggests a strong association between the presence of methane gas and constipation-predominant irritable bowel syndrome (IBS-C).3 The prevalence of SIBO is higher in people with IBS when compared to healthy controls.4 There are many options available to treat IMO and patient responses to these options vary considerably. This case report documents the outcome of consuming a 14-day homemade elemental diet to normalize IMO. An elemental diet formulation consists of hydrolyzed nutrients such that digestion of the product by the recipient will be minimal. A prevention protocol after IMO eradication was employed to prevent recurrence. The prevention protocol consisted of diet therapy [specific carbohydrate diet (SCD), low fermentable oligo-, di-, mono-saccharides, and polyols (FODMAP), intermittent fasting, and a slow increase in fermentable foods) and 2 types of prokinetics [MotilPro (a proprietary ginger-based supplement) and low-dose erythromycin] for a 3-month period. Repeat breath tests were conducted on days 15 and 122 from the onset of the 14-day elemental diet to determine the efficacy of treatment and the recurrence rate of the IMO. The patient was a 47-year-old White female (author of this study) with confirmed IMO by the lactulose breath test (LBT). The patient treated the IMO with rounds of herbal antimicrobials and rifaximin plus neomycin periodically to maintain symptoms, while sustaining a low carbohydrate diet. The return of IMO would result in severe abdominal distention and constipation, and would need to be treated with antibiotics or herbal antimicrobials to provide symptom relief. The patient was born vaginally and was not breastfed. The patient was raised on a whole foods diet (yogurt, fruits, vegetables, organic foods, and nutritional supplements) throughout childhood until around the age of 15. Multiple amalgam fillings were placed due to cavities as a child. Around 15 years of age, the patient adopted the standard American diet and started to experience constipation. At 21 years of age, the patient had a cholecystectomy due to severe cholelithiasis. A family history of cholecystectomy was noted. Between the years of 16-40, the patient managed the constipation with laxatives and enemas. The constipation was chronic, with sporadic periods of left-sided abdominal pain and severe bloating. IBS was diagnosed and various doctors throughout the years gave the general advice to eat more fiber, drink more water, and use fiber supplements and an osmotic laxative [eg, magnesium hydroxide (Milk of Magnesia), polyethylene glycol 3350 (Miralax)]. This advice only led to more bloating, abdominal pain, and constipation. Medical procedures performed during this time included x-rays, which revealed large amounts of gas and stool in the colon. The patient was not on any medication except for oral birth control pills. Body mass index and blood pressure were normal with no other medical complaints or issues. Despite a self-prescribed diet of high fiber, plenty of water, whole grains, fruits, some vegetables, various fiber supplements, complex carbohydrates, and sweets in moderation, the constipation continued. In 2009 at the age of 40, the patient had a second child via cesarean section (C-section), with a prior C-section delivery in 2007. The patient developed an infection that was treated with prescription antibiotics. A few weeks later, the patient developed daily bloating that worsened throughout the day. The continuous bloating intensified the patient’s effort to find the underlying cause. In 2010, the patient had a magnetic resonance imaging (MRI), a colonoscopy, and a celiac panel. All tests were negative. After researching SIBO, the patient requested from her primary care physician the prescription rifaximin 550 mg 3 times daily (TID) for 14 days. The rifaximin did not alleviate the symptoms. A hydrogen-only breath test from her gastroenterologist was performed and the results were negative. The physicians were unable to provide an explanation for the severe bloating. In 2011, the patient started the low FODMAP diet, then a strict gluten-free diet with some success. In 2012, a modified carbohydrate version of the (SCD) was adopted, which resulted in a significant alleviation of symptoms. The SCD restricts disaccharides and polysaccharides. These carbohydrates are difficult to digest for some people, allowing undigested substrate to feed microbial overgrowth in the small intestine.5 The patient stayed on a strict SCD for 2 years. Any deviation, in addition to eating many types of fruit, caused the bloating to return. In the same year, a stool test and the LBT were ordered (Genova Diagnostics). The stool test showed evidence of dysbiosis, low diversity, and high amounts of Methanobrevibacter smithii in the colon. The LBT showed an average of 59 ppm methane gas and an average of 3.5 ppm hydrogen throughout the 2-hour collection period. Symptoms of constipation and bloating were in congruence with the findings. From 2015 until 2017, the patient repeated rifaximin 550 mg TID plus neomycin 500 mg twice daily (BID) for 14 days or herbs/supplements when needed to treat IMO symptoms. While treating with the antibiotics, the patient experienced abdominal pain with bloating, but a complete resolution of the constipation. Once the treatment was completed, the abdominal pain and bloating subsided. This may have been due to difficulty tolerating the neomycin, since the rifaximin alone from previous treatments did not have this effect. Herbal treatments were effective but took longer to reduce symptoms and the patient had to take them for at least 2 months. Once the herbal antimicrobials were discontinued, symptoms returned within a matter of weeks. A paleo, low-carbohydrate template was followed regularly. This diet consisted mostly of meats, fish, eggs, non-starchy vegetables, nuts, berries, and other tolerated fruit. A gluten-free diet was strictly adhered to. A repeat LBT in 2016, conducted after worsening of symptoms, indicated an average of 41.5 ppm methane and 9 ppm hydrogen. Complete blood count, comprehensive metabolic panel, and a comprehensive thyroid panel were unremarkable. In 2016, a food sensitivity panel through Cyrex Laboratories indicated out-of-range reactions for tapioca, teff, and Brazil nuts. The patient abstained from these foods for 3 months. Reintroduction did not produce noticeable symptoms. In 2017, the Mercury Tri-Test (conducted due to history of multiple amalgam fillings) revealed total mercury levels slightly less than the Centers for Disease Control and Prevention (CDC) average and significantly less than the company’s reference ranges. The patient experimented with betaine HCl, various probiotics, bovine IgG, and gut-soothing combination supplements (glutamine, N-acetyl glucosamine, citrus pectin, deglycyrrhizinated licorice, aloe vera, slippery elm, mucin, marshmallow, etc) with mixed results. The supplements with the most positive impact were magnesium citrate (400-600 mg) and digestive enzymes. In between antimicrobial treatments, the patient tried various promotility agents, including low-dose naltrexone, low-dose erythromycin, a proprietary ginger-based supplement, and Iberogast (a proprietary herbal liquid supplement). In 2017, the patient was treated again with rifaximin 550 mg TID plus neomycin 500 mg BID for 21 days in hopes of achieving a negative LBT. A repeat LBT, 1 week after treatment, revealed an average of 42 ppm methane (Table 1). Even though gastrointestinal symptoms were improved, the patient wanted to test the efficacy of an elemental diet to achieve a negative LBT. Figure 1 provides a timeline of the patient’s health history. Lactulose Breath Test Results After 21 Days of Rifaximin and Neomycin Minutes Baseline 20 40 60 90 120 Hydrogen (H2) (ppm) 3 3 2 2 2 2 Methane (CH3) (ppm) 35 46 35 36 53 45 Total 38 49 37 38 55 47 Timeline of Patient’s Medical History. The LBT, visual analog scale for symptom assessment, and body composition measurements were used as assessment tools. In order to determine the efficacy of treatment, a 2-hour LBT was conducted the day after the elemental diet treatment. The LBT was determined positive, according to the North American consensus guidelines, if by 90 minutes H2 was ≥ 20 ppm above baseline and CH3 was ≥ 10 ppm anytime during the timed period.6 The patient followed the pretest diet based on the laboratory recommendations. The LBT was performed at home and mailed to the lab. IMO symptoms consisting of abdominal pain, bloating, constipation, diarrhea, fatigue, gas, heartburn, and nausea were recorded daily for 17 days using a visual analog scale, with 0 being “I had no symptoms” and 10 being “I had the worst possible symptoms.” After Day 17, a diary was kept daily for 3 months, outlining diet changes, symptom changes, and any changes in condition and treatment. Body composition measurements were taken using the InBody segmental, 8-lead, multi-frequency bioelectrical impedance analysis device (MF-BIA8). Basal metabolic rate (BMR), weight in pounds, and percent body fat were collected approximately 1 week before and after the 14-day elemental diet. The therapeutic interventions used in this case were the homemade elemental diet, carbohydrate modified diet, lifestyle modifications, pharmaceutical and herbal prokinetics, and a probiotic supplement. The homemade elemental diet was developed by Dr. Allison Siebecker and is published on her website at www.siboinfo.com. The diet has 2 versions, low carbohydrate/higher fat or high carbohydrate/low fat. The low carbohydrate/higher fat version was used for this study. The ingredients were mixed with water in a blender. The drink was consumed once to twice per day. The homemade elemental diet (low carb/higher fat option) ingredients included: 1000-g bag of Jo Mar Labs Amino Acids: Black Label Pure Form 21 Blend 63-93 oz honey* or 10 lb NOW dextrose 1575-1890 mL of oil*, such as medium chain triglyceride, coconut, olive, macadamia, cod liver 1 bottle of Pure Encapsulations Nutrient 950 Multivitamin 1 bottle salt, preferably unrefined (eg, Real Salt, Celtic sea salt) Optional flavorings such as vanilla may be used in small amounts Calorie calculations were determined from the BMR provided through body composition analysis. Caloric intake was calculated by adjusting the BMR for an activity factor and to promote some weight loss. Protein requirements were calculated using the recommended dietary allowance (RDA) of 0.8 g/kg body weight. The elemental diet ingredients were adjusted to provide the appropriate calories and protein needed and to achieve a very low carbohydrate macronutrient level. The percent calories from carbohydrate, protein, and fat were 6%, 14%, and 80% respectively, for a total of 1400 calories/day. Chicken stock, chicken soup, and low FODMAP vegetables were eaten for 3 days. During IMO prevention, the patient consumed a combination of a low carbohydrate diet, low FODMAP diet, and the SCD. Once symptoms were stable, fermented vegetables were increased slowly, according to patient tolerance. In addition to the diet, the patient practiced intermittent fasting for 16-18 hours per day, at least 5 days per week, to stimulate the migrating motor complex (MMC). The patient started a pharmaceutical prokinetic medication and dietary supplements the day after the diet was completed to help prevent relapse (Table 2). Supplement/Pharmaceutical Treatment After The 14-Day Homemade Elemental Diet Name Dose Times per day When Description Active Ingredients MotilPro (proprietary ginger-based prokinetic) 3 capsules 2 Upon arising and before bedtime Prokinetic Pyridoxal-5-phosphate, Zingiber officinale (ginger) root extract, Acetyl-L-carnitine, 5-hydroxytryptophan Low-Dose Erythromycin Approx. 62.5 mg (250 mg tablet cut into quarters) 1 Before bedtime Prokinetic Erythromycin Prescript-Assist (broad spectrum probiotic and prebiotic - 29 strain original formula) 1 capsule 1 Before bedtime Soil-based probiotics 145 million cells in a proprietary blend of a Leonardite and the following microorganisms: Arthrobacter agilis, Arthrobacter citreus, Arthrobacter globiformis, Arthrobacter luteus, Arthrobacter simplex, Acinetobacter calcoaceticus, Azotobacter chroococcum, Azotobacter paspali, Azospirillum brasiliense, Azospirillum lipoferum, Bacillus brevis, Bacillus macerans, Bacillus pumilus, Bacillus polymyxa, Bacillus subtilis, Bacteroides lipolyticum, Bacteroides succinogenes, Brevibacterium lipolyticum, Brevibacterium stationis, Kurthia zopfii, Myrothecium verrucaria, Pseudomonas calcis, Pseudomonas dentrificans, Pseudomonas fluorescens, Pseudomonas glathei, Phanerochaete chrysosporium, Streptomyces fradiae, Streptomyces cellulosae, Streptomyces griseoflavus Innate Response Formula Digestive Enzymes Clinical Strength 2 capsules 2-3 With meals Digestive enzymes Protease 3.0, Protease 4.5, Protease 6.0, Neutral bacterial proteas, Bromelain, Papain, Amylase, Glucoamylase, Alpha-Galactosidase, Lactase, Invertase, Bacterial amylase, Pectinase, Cellulase, Beta-Glucanase, Hemicellulase, Phytase, Lipase The homemade elemental diet was started in March 2017 after 21 days of combination antibiotics did not normalize the patient’s LBT. Daily symptoms were tracked by the patient for 17 days using a visual analog scale (Figure 2). Nausea and gas were excluded from the symptom results since these symptoms were not an issue. Visual Analog Scale Symptom AssessmentOn day 2, the patient had a headache and started experiencing cold-like symptoms (sinus congestion, body aches, and fatigue). These symptoms could have been due to dehydration, so fluids were increased. Magnesium citrate was started to reduce symptoms of constipation. The fatigue started to decline after day 8. Abdominal pain, bloating, and diarrhea were variable from days 1-10, with 0 abdominal pain by day 15. Constipation was rated as a 0 by day 6. Symptoms of heartburn increased from a 1-2 (starting on day 5) to a 10 on day 10. Symptoms of vaginal burning occurred on day 10, which was suggestive of a Candida overgrowth. The patient was prescribed fluconazole, 150 mg/day for 6 days. All symptoms improved by day 15. The psychological aspects of the elemental diet were challenging. The patient was unable to participate with family and friends during mealtime. By days 10-14, the patient felt depressed about not being able to eat. The homemade elemental formula was extremely unpalatable. The patient added orange essential oil and/or cinnamon in attempts to mask the taste. To overcome the taste, the patient would drink the formula as quickly as possible, immediately followed by teeth brushing. On days 10-14, the patient was only able to drink half of the caloric value (due to the unpalatable taste), which was consumed during the lunch hour. On day 15, the patient conducted the LBT (Table 3). Day 15 was chosen according to the procedure published by Pimentel et al.7 who evaluated the ability of an elemental diet to normalize the LBT. The homemade elemental diet was able to normalize the LBT after 14 days, reducing methane levels from an average of 42 ppm to 3 ppm throughout the collection period (Table 3). The negative breath test coincided with the patient’s reduction in symptoms. Lactulose Breath Test Results After The 14-Day Homemade Elemental Diet (Day 15) Minutes Baseline 20 40 60 90 120 Hydrogen (H2) 8 0 0 0 0 2 Methane (CH3) 2 2 2 4 5 5 Total 10 2 2 4 7 7 Body composition measurement results were expressed in pounds (Table 4). The patient lost a total of 5.4 pounds. Fat mass decreased by 1.7 pounds, dry lean mass decreased by 1.1 pounds, and total body water decreased by 2.6 pounds. This indicated that 48 percent of the weight loss on the 14-day elemental diet was from water loss. Body Composition Measurements Before and After The 14-Day Homemade Elemental Diet Measurements Body weight lbs Body fat mass lbs (%) Dry Lean Mass lbs Total Body Water lbs Before Elemental diet 133.6 39.5 (29.5) 25.1 69 After Elemental Diet 128.2 37.8 (29.4) 24 66.4 The prevention protocol was started on day 15. An outline of symptoms following the elemental diet were as follows: Week 1: The reintroduction phase was a smooth process. Stools were a 4 on the Bristol stool scale, indicating a healthy stool. Medication and supplements were started (Table 2). Week 2: Moderate bloating returned with symptoms of anal burning. During the next few days, the patient experienced severe abdominal bloating, constipation, and abdominal pain. The patient restarted 150 mg fluconazole for 2 days and nystatin at 500 000 units was started 3 times a day. On the 6th day, symptoms improved, and stools returned to Bristol stool scale 4. Week 4: The patient ran out of nystatin for 4 days and the constipation returned. Weeks 5-6: The patient restarted nystatin and continued the prevention protocol as outlined above. Intermittent bloating occurred that seemed to coincide with an increase in sugar and/or starchy foods. Weeks 7-14: Bloating increased with small amounts of sugar and starchy food. The diet was restricted to very low carbohydrates to control symptoms. Week 15: The patient conducted a repeat LBT (Table 5). Results indicated a relapse of IMO, with an average of 81 ppm methane throughout the collection period. Lactulose Breath Test Results After The 14-Day Homemade Elemental Diet (Day 122) Minutes Baseline 20 40 60 90 120 Hydrogen (H2) 4 4 3 3 5 5 Methane (CH3) 81 81 81 81 81 81 Total 85 85 84 84 86 86 The patient restarted the elemental diet. The psychological symptoms of being on the elemental diet were more challenging the second time than the first. The patient was unable to maintain the diet past 9 days and fasted on day 10. A repeat LBT was conducted on day 11 (Table 6). Although the breath test was not negative, just 9 days of the elemental diet plus 1 day of fasting resulted in an average decrease of methane levels from 81 ppm to 23 ppm. Symptoms significantly improved with the decrease in methane gas. Lactulose Breath Test Results After Repeat of 9 days of The Homemade Elemental Diet Plus 1 Day of Fasting (Day 11) Minutes Baseline 20 40 60 90 120 Hydrogen (H2) 4 4 5 5 4 6 Methane (CH3) 22 18 24 28 25 23 Total 26 22 29 33 29 29 A 3-week course of combination antibiotics (rifaximin and neomycin) improved symptoms but were not able to normalize gas levels. More than likely, this was due to very high levels of methane gas prior to treatment. Patients who fail antibiotic treatment, who are unable to tolerate the treatment, or who do not have the option of a prolonged antibiotic course due to insurance coverage, can choose a 14- to 21-day elemental diet. The success of an elemental diet in normalizing LBT was published by Pimental et al.7 who evaluated the ability of an elemental diet to normalize the lactulose breath test LBT. In their study, 93 subjects with IBS and an abnormal LBT implemented a low-fat, elemental diet (Vivonex Plus) for 14-21 days. Eighty percent of study participants achieved a normal LBT on day 15. Seventeen participants continued the diet for another 7 days, and of these, 5 participants had a normal LBT after 21 days (a combined success rate of 85%).7 The elemental diet is typically used as a last resort due to poor palatability, negative psychological aspects, and potential for weight loss. The taste of the homemade elemental diet was very unpleasant. In conversation with A. Siebecker, ND (February 2020) to increase palatability, it was recommended to drink the shake ice cold and to use flavorings such as Crystal Light powder and flavoring extracts. The psychological effects caused by the inability to eat and enjoy the pleasures that food brings can be difficult to overcome. Practices such as positive thinking (e.g., “this diet is helping me heal from SIBO,” “it is only for 2 weeks”), exercising, meditation, and emphasis on self-care while on the diet is important. Many patients with SIBO struggle with being underweight and are afraid that the diet will lead to more weight loss. Body composition measurements indicated that there was a 1.7 pound decrease in fat mass, and lean body mass only decreased by 1.1 pounds. The caloric value for this patient was used to encourage some weight loss. If calorie, protein, and fluid needs are met, weight loss should not be an issue on the elemental diet. The reduced palatability of the diet, and therefore under-consumption, may be a reason for weight loss reported by patients. The advantages of the homemade elemental diet as compared to commercial elemental diets are that the macronutrient ratios can be controlled, and it is less expensive than commercial elemental formulas (Table 7). Price and Macronutrient Distribution For Various Elemental Diet Formulas Company/Formula Name Amount Neededa Macronutrient Ratio (% calories) Approximate Price ($)b Dr. Allison Siebecker/Homemade Elemental Diet: low carb/higher fat option Ingredients and amounts can be found at: CHO: 20-31%PRO: 14%FAT: 55-66% 275 Dr. Allison Siebecker/Homemade Elemental Diet: high carb/low fat option Ingredients and amounts can be found at: CHO: 64-66%PRO: 16%FAT: 6% 275 Nestle/Vivonex Plus 93 packets CHO: 76%PRO: 18%FAT: 6% 1,000 Integrative Therapeutics/Physicians Elemental Diet 5 – 45.71 oz bags of powder CHO: 67%PRO: 13%FAT: 25% 600 Imix Nutrition Inc/Absorb Plus, Unsweetened Version 7 containers CHO: 20%PRO: 54%FAT: