CASE REPORT

Reversal of Irritable Bowel Syndrome, Sleep Disturbance, and Fatigue With an Elimination Diet, Lifestyle Modification, and Dietary Supplements: A Case Report

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Abstract

Background • A 53-y-old Caucasian patient presented in August 2015 with chief complaints of irritable bowel syndrome (IBS; gas/bloating, gastroesophageal reflux), fatigue, and sleep disturbances. He also noted a history of chronic sinusitis, seasonal allergies, multiple chemical sensitivities, and right knee pain (3 surgeries). His primary care physician, in 2014, diagnosed prediabetes based on an elevated hemoglobin A_{1c} and high-sensitivity C-reactive protein, which was treated with diet and lifestyle modification.

Case/Intervention • In the course of 6 mo, the patient was treated using an elimination diet, lifestyle modifications, botanicals, and dietary supplements. By addressing the underlying cause of issues, his symptoms decreased and quality of life increased, resulting in the resolution of his IBS symptoms, improved sleep, and increased energy levels.

Conclusion • This case illustrates the potential diagnostic importance of early testing for gut microbiome imbalances and gastrointestinal infections in the management of IBS as well as the usefulness of a systems-based approach for diagnostic assessment and management of a complex chronic case.

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This case illustrates the potential value of a personalized systems-oriented evaluation that integrates abnormal laboratory biomarker findings to address complex cases (such as irritable bowel syndrome [IBS]) that have multiple comorbidities. For example, no single effective intervention has emerged from clinical trials for the treatment of IBS. This case used diagnosis with specific laboratory biomarkers followed by several therapeutic options including medications, dietary supplements, dietary modifications, and lifestyle recommendations.

Case Presentation

This 53-year-old Caucasian male presented in August 2015 with a chief complaint of IBS accompanied by occasional gastroesophageal reflux, gas, bloating, fatigue, and sleep disturbances. His symptoms had been present for at least 1 year. His medical history was significant for prediabetes, chronic sinusitis, seasonal allergies, multiple chemical sensitivity, and knee pain. His family history was positive for cardiovascular disease, hypertension, type 2 diabetes mellitus, and obesity.

The patient felt he had been healthy most of his life with the exception of 3 knee surgeries in the course of 22 years related to an anterior cruciate ligament injury. He felt that his health decline was related to significant stress he experienced while working as a lobbyist for 6 months in 2013, during which he noted sleep disturbances, poor diet, and a lack of exercise. In addition, he became sensitive to many chemicals, especially paints, paint thinners, adhesives, car exhaust, and gasoline—all of which he used in his hobbies of remodeling houses and cars. In late 2013, he quit his lobbyist position and hobbies to focus on improving his health. Despite resuming his normal diet and exercise routine, he continued to experience sleep disturbances and fatigue. In June 2014, his primary care physician diagnosed prediabetes due to an elevated hemoglobin A_{1c} and high-sensitivity C-reactive protein. He was instructed to continue with diet and exercise, and no medications were prescribed. The patient decided to begin to incorporate meat into his diet and decrease his sugar intake. A previous practitioner prescribed vitamin B_{12}, vitamin C, vitamin D_3 with K_2, and magnesium glycinate. The patient stated that he felt his

Timeline

Medical history: Arthritis, chronic sinusitis, seasonal allergies, multiple chemical sensitivity, prediabetes, knee surgies (1979, 1985, 2002); severe whiplash MVA (2010)			
3 appointments in 6 mo	08/04/15	09/01/15	01/05/16
Patient Complaints			
Primary: gas, bloating, reflux, poor sleep, fatigue **Secondary**: prediabetes, chronic sinusitis, seasonal allergies, multiple chemical sensitivies, chronic right knee pain (surgery ×3)			
Patient-reported Outcome Survey (Medical Symptom Questionnaire)			
Functional Medicine Patient Survey	27	—	12
Functional Medicine Systems Assessments			
(1) Lifestyle; (2) Matrix; (3) Antecedants, Triggers, Mediators	See Case Presentation & Discussion sections		
Laboratory Biomarkers			
Helicobacter pylori (stool)	Positive	—	Negative
Blastocystis hominis (stool)	Positive	—	Negative
Total cortisol (salivary)	17.1	—	—
Ketoisovalerate (organic acids)	0.67	—	—
Keto-B-methylvalerate (organic acids)	<DL	—	—
Ketoiscaproate (organic acids)	<DL	—	—
Hippurate (organic acids)	881	—	—
Initial Diagnoses			
IBS and reflux; sleep disturbances; decreased energy			
Therapeutic Interventions			
Medications at Initial Visit			
Testosterone cypionate (200 mg)	Q2 wk	Q2 wk	Q2 wk
Vitamin D_3 (1000 IU) with K_2 (5 mg)	QD	—	—
Vitamin C (1000 mg)	QD	—	—
Vitamin B_{12} (1 mg)	QD	—	—
Magnesium (325 mg)	QD	—	—
Dietary Recommendations			
GF	GF	GF	GF
Dietary Supplements			
See table in Case Presentation section			
Lifestyle Recommendation			
Nutrition/Diet	ED, BSC	ED, BSC	ED, BSC
Exercise	Light	Light	Moderate
SH	SH	SH	SH
SR	SR	SR	SR
Outcome: Resolution of patient reported IBS and GERD symptoms. Patient reported regular sleep improvement from 6 h to 8 h increased energy levels. Resolutions of abnormal laboratory biomarkers were confirmed by follow-up laboratory testing.			

Abbreviations: MVA, motor vehicle accident; DL, below detectable limits; IBS, irritable bowel syndrome; QD, once daily; GF, gluten free; ED, elimination diet; BSC, blood sugar control; SH, sleep hygiene; SR, stress reduction.

Table 1. Functional Medicine Assessment

Lifestyle Assessment	08/04/15	09/01/15	01/05/16
Nutritional Assessment	FS	FS	FS
Exercise Assessment	Moderate	Light	Moderate
Sleep Assessment (h)	6	6.5	8
Stress Assessment	Moderate	Moderate	Low
Relationships Assessment	Good	Good	Good
Mental/Emotional/Spiritual Assessment	Good	Good	Good
Functional Medicine Matrix Scores			
Assimilation	28.5		
Structural Integrity	27.5		
Communication	26		
Transport	21		
Biotransformation & Elimination	24.5		
Energy	26		
Defense & Repair	28		
FM Matrix Score Total	181.5		
Antecedants/Triggers/Mediators	Antecedents	Triggers	Mediators
Patient and Clinician Assessment	Allergies, sinusitis, family history of diabetes and hypertension	Job stress, car accident	Multiple chemical sensitivities, stress, prediabetes, diet (gluten)

Abbreviation: FS, food sensitivity.

energy improved slightly with his supplement and diet regimen but he sought additional support to resolve the gastrointestinal (GI) symptoms that had continued unabated. He was willing to comply with dietary modifications and other recommended treatment programs (confirmed on his intake readiness assessment citing a 5/5 for commitment to treatment).

At the time of his first appointment, he was taking testosterone cypionate, magnesium glycinate, vitamin B_{12}, vitamin C, and vitamin D_3 with K_2 as prescribed by previous health care providers. His diet was low in starches and sugars, and high in phytonutrients and healthy fats, but lacked adequate protein. He noted increased fullness, bloating, and reflux when consuming gluten-containing foods such as pasta and bread.

Diagnostic Testing and Assessment

Stool testing revealed the presence of the bacterium *Helicobacter pylori* and the parasite *Blastocystis hominis*. Organic acids testing revealed an elevated α-ketoisovalerate, suggesting the need for B complex vitamins. Four-point salivary Adrenal Stress Index testing revealed hypothalamic-pituitary-adrenal (HPA) hypofunction with decreased cortisol production and an altered circadian rhythm (see Timeline).

Treatment and Outcome

At the first appointment, the patient was given a chromium combination supplement to potentially stabilize blood sugar control as well as digestive enzymes to address poor nutrient absorption**.** He was instructed to complete a hydrochloric (HCL) acid challenge to determine whether he had hypochlorhydria and required supplementation with betaine HCL with pepsin. The patient completed the test and had a warming sensation with 5 capsules. He decreased the dose to 4 capsules per meal totaling 2.08 g betaine HCL and 80 mg pepsin with no GI discomfort. Because of his history, he was placed on a gluten-free diet and asked to consume smaller meals containing protein every 3 to 4 hours, including a small snack before bed to maintain blood sugar throughout the day and night. Lifestyle modifications implemented included light exercise (walking, hiking, yoga, or light weight lifting), stress reduction, and mitigation techniques, sleep hygiene guidelines, and limitation of caffeine to 1 small cup of coffee or tea per day.

The second appointment on September 1, 2015, included a review of laboratory results and an updated symptom assessment. The patient reported that he followed the treatment plan and felt his reflux (and inflammation) decreased due to dietary changes and

Table 2. Botanical and Dietary Supplement Treatment

Medication Recommendations		08/04/15	09/01/15		01/05/16
Concern/Diagnoses	Medications (Company)				
Adrenal (HPA)	Chromium Synergy (DFH)	X	X	X	—
GI (GERD, IBS)	Betaine HLC w/Pepsin (TR)	X	X	X	—
Adrenal (HPA)	B Supreme (DFH)	—	X	X	—
GI (GERD, IBS)	Dipan 9 Digestive Enzymes (TR)	—	X	X	—
Adrenal (HPA)	Pregnenolone (BM)	—	X	X	X
Adrenal (HPA)	DHEA (BM)	—	X	X	X
Blastocystis hominis	Artemisinin (ARG)	—	X	—	—
Blastocystis hominis	Oil of Oregano (DFH)	—	X	—	—
Blastocystis hominis	Paracid Forte (OM)	—	X	—	—
Blastocystis hominis	Therbiotic Complete (KL)	—	X	—	—
Helicobacter pylori	Therbiotic Complete (KL)	—	X	—	—
Helicobacter pylori	Pyloricil (OM)	—	—	X	—
Helicobacter pylori	Biofilm Defense (K)	—	—	X	—
Helicobacter pylori	Mastica (ARG)	—	—	X	—
GI (GERD, IBS)	*Saccharomyces boulardii* (KL)	—	—	—	X
GI (GERD, IBS)	GI Revive (DFH)	—	—	—	X

Abbreviations: HPA, hypothalamic-pituitary-adrenal; DFH, Design for Health; GERD, gastroesophageal reflux disease; IBS, irritable bowel syndrome; TR, Thorne Research; BM, BioMatrix; ARG, Allergy Research Group; OM, Ortho Molecular; KL, Klaire Labs; K, Kirkman Labs.

supplementation. He also felt that the betaine HCL reduced his reflux and bloating. The patient reported waking less frequently during the night, but he was still getting only 6.5 hours of sleep per night on average. At this time, his treatment plan was updated to reflect the laboratory findings from his initial visit of GI infection, adrenal hypofunction, and poor nutrient absorption. This included a 4-month HPA hypofunction treatment program concurrent with an 8-week treatment program for *H pylori*, followed by an 8-week treatment program of *B hominis*. His previous treatment plan was continued and is outlined in Table 2.

This patient's third appointment on January 5, 2016, included a review of laboratory results and updated symptom assessment. The patient had complied with the dietary supplementation programs, dietary modifications, and lifestyle recommendations. He reported that he now averaged 8 hours of uninterrupted sleep and experienced almost no daytime fatigue, and his GI symptoms had resolved. He noted that his energy and stress levels were "the best they've been in years" and bloating and gas were "so rare it seemed weird." Follow-up stool testing revealed that the *H pylori* and *B hominis* had been eliminated. The final treatment included a 4-week GI healing and restoration program with probiotics, a comprehensive GI healing support supplement, and addition of dietary fibers to support the gut microbiome as outlined in Table 2. I recommended that he remain gluten free, maintain increased protein intake, and resume normal exercise frequency and intensity.

The patient sent a follow-up e-mail stating that he still feels great and can tolerate an occasional beer without having any IBS symptoms. Other than the occasional beer, he has remained gluten free. He reports being able to ride his bike and play golf with minimal knee pain. He is very happy with his results.

Patient Perspective. "I feel better than ever—even better than in my 20s. I went into this process with a high desire to feel better since my gut symptoms and fatigue began to impact everything I enjoy in life—golf, cycling, and the outdoors, but I was a little hesitant knowing it would involve so many changes. I thought it would be a difficult process, but it really wasn't once I established my lifestyle, diet, and supplement routines. The hardest part of treatment was going 100% gluten free. Had I known I would feel this good, I would've done this long ago. Finding the root causes and making lasting lifestyle changes are the key to health. Working with a knowledgeable practitioner makes all the difference!"

Discussion

IBS affects an estimated 14.1% of the US population and 11% of the global population and is a condition that has remained elusive to investigators and clinicians searching for the underlying pathogeneses.[1-3] IBS is characterized by chronic abdominal pain, gas, cramping, bloating, constipation, and diarrhea in the absence of any detectable organic cause, yet the diagnostic criteria and treatment solutions remain inconsistent.[4] The diagnostic and treatment ambiguity compounds the episodic and chronic nature of the condition, which dramatically affects the quality of life of those affected. More than one-half of all patients with IBS suffer from depression or anxiety.[4] Missed work, social interactions, and travel are among the top stressors for these individuals.[2,5] Several studies have shown a compromised gut microbiome to be associated with IBS.[1,4] Factors considered contributory to IBS such as gut motor dysfunction, visceral hypersensitivity, immune activation, inflammation, and an altered gut microbiome can result from GI infections.[1,6,7,8] In addition, decreased nutrient absorption has been linked to GI infections.[9,10] Investigation of potential GI infections and dysbiosis should be considered among the standard first line testing for the treatment of IBS.

Functional medicine is an individualized scientific approach to treating chronic disease that takes into account a person's unique biochemistry, personal and family history, diet, and lifestyle factors to diagnose and treat patients. A comprehensive timeline is created for each patient that identifies antecedents (predisposing factors), mediators (perpetuating factors), and triggers (factors that provoke symptoms/disease). This patient had an antecedent history of allergies, sinusitis, and family history of type 2 diabetes mellitus and hypertension. His mediators were multiple chemical sensitivities, stress, prediabetes, and dietary gluten. The triggers included a significant car accident and 6 months in a very high-stress job.

To shift thinking from organ systems to physiologic systems, the functional medicine model maps signs/symptoms and diagnoses into areas of imbalance that are organized into a 7-sided matrix: (1) assimilation (GI), (2) structural integrity (musculoskeletal), (3) communication (neuroendocrine), (4) transportation (circulatory: cardiovascular and lymphatics), (6) biotransformation and elimination (detoxification and excretion), (6) energy (mitochondrial function), and (7) defense and repair (immune and integument). In this case mapping identified significant issues in the GI, immune system and endocrine nodes, further guiding the therapeutic approach. See Appendix 1, a graphic example of a functional medicine matrix and Appendix 2, a patient timeline.

The Medical Symptom Questionnaire (MSQ) is a functional medicine patient reported outcomes survey tool similar to other conventional patient reported outcomes measurements. Using the MSQ on the first and last appointment, the patient showed a 66% improvement in symptoms.

Limitations

Chronic conditions and their treatments are usually multifactorial, complicating the evaluation of cause-and-effect relationship between symptoms and treatment. The aggregated effect of the therapies as well as the patient's choices and involvement contributed this patient's outcome. However, the identification, treatment, and elimination of GI infections and the resolution of IBS offers a compelling case for the laboratory evaluation of the gut microbiome and potential infectious causes of IBS.

Conclusion

Resolution of the symptoms in this patient resulted from a personalized functional medicine approach that incorporated laboratory evaluations for diagnosis and guiding treatment that used targeted botanical and dietary supplements, an elimination diet, and lifestyle modifications.

Acknowledgements

This case report was prepared according to the CARE guidelines.[11]

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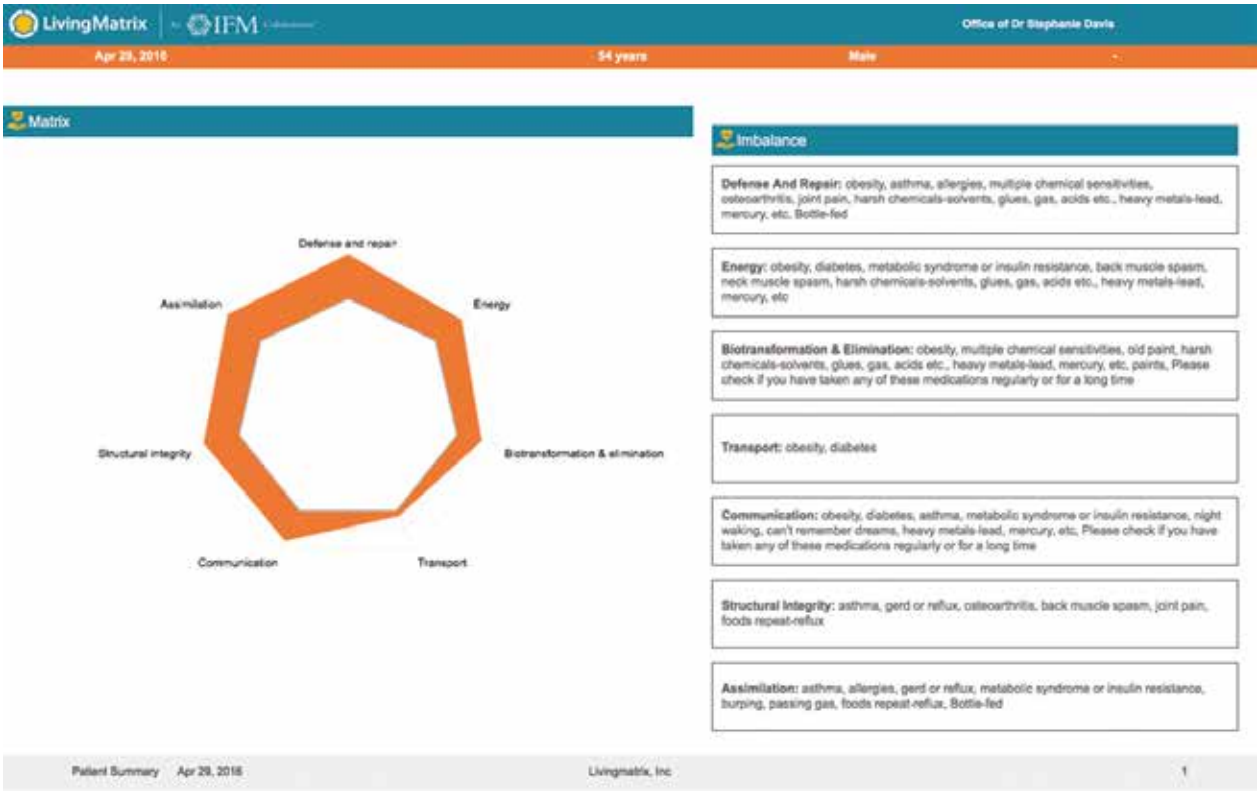
Appendix 1. Functional Medicine Matrix



Appendix 2. Patient Timeline