



Virtual Reality and Mindfulness Approaches in the Treatment of Rumination Syndrome

Jeff Angelo Taclob, MD¹, M Ammar Kalas, MD¹, Marcus Juan Esteban, MD², Claudia Didia, MD¹, and Richard McCallum, MD²

¹Department of Internal Medicine, Texas Tech University Health Sciences Center, El Paso, TX

²Division of Gastroenterology, Texas Tech University Health Sciences Center, El Paso, TX

ABSTRACT

Rumination syndrome (RS) is the repeated, effortless food regurgitation during or immediately after eating or drinking, which could be followed by rechewing, reswallowing, or spitting out of the regurgitant gastric contents. The mechanism by which RS ensues is because of the habitual contraction of the abdominal wall muscles leading to increased intra-abdominal pressure and regurgitation of gastric contents. Therefore, diaphragmatic breathing techniques and biofeedback are helpful in these patients to counteract the habitual abdominal contractions. We present a case of a 26-year-old woman diagnosed with RS unresponsive to conventional therapy (antiemetics and antispasmodics).

INTRODUCTION

Rumination syndrome (RS) is characterized by regurgitation of gastric contents into the oral cavity soon after meal intake. The regurgitant material is then either swallowed again or spat out. It is frequently misdiagnosed as gastroesophageal reflux disease resulting in delay in diagnosis.¹ It is classified as a functional gastrointestinal disease and a feeding and eating disorder.^{2,3} The management of functional gastrointestinal disorders is often complex to physicians including gastroenterologists. We present a case of a 26-year-old woman diagnosed with RS on the basis of ROME IV criteria not responding to standard treatment approaches who was successfully managed with virtual reality and mindfulness techniques.

CASE REPORT

A 26-year-old Hispanic woman with a medical history of hypothyroidism initially presented to the gastroenterology motility clinic with a 6-month history of epigastric pain and postprandial nausea and vomiting occurring within 15 minutes of ingesting a meal and even water. She denied any weight loss, melena, hematochezia, or hematemesis, although she mentioned some depression and anxiety. The patient denied any history of smoking, heavy alcohol use, and illicit drug use including marijuana. Physical examination showed that the patient looked according to age; the oral cavity examination was normal with no evidence of enlarged salivary glands. Abdominal examination revealed a positive Carnett sign. Laboratory examinations revealed a complete blood count, comprehensive metabolic panel, thyroid stimulation hormone, and free thyroxine level within normal limits. An upper endoscopy was normal, except for mild gastritis; pathology was negative for *Helicobacter pylori*. A 4-hour gastric emptying study was normal. Given this rather classic clinical presentation, she was diagnosed with RS. The patient was started on omeprazole, promethazine, dicyclomine, and amitriptyline with some improvement but no complete resolution of symptoms. After discussion with the patient, she decided to be enrolled in our ongoing institutional review board-approved program using virtual reality (VR) and mindfulness techniques in the management of refractory gastrointestinal disorders. The patient completed a baseline Patient Assessment of Gastrointestinal Disorders Symptom Severity Index (PAGI-SYM) questionnaire scoring 77 of a possible 110.

The patient underwent a total of 16 VR (2/wk) and 8 mindfulness (2/wk) sessions in a span of 8 weeks. She also continued mindfulness exercises at home once the final treatment session was completed. No medication changes were made during the duration of the sessions. The patient was asked to answer the PAGI-SYM questionnaire at 2-week intervals, and her scores showed

Table 1. Overall distribution of symptom scores at baseline and 2-week intervals

Stats	Baseline	2 wk	4 wk	6 wk	8 wk	Absolute change	Percent change
Mean	3.59	2.73	1.14	0.73	0.45	3.14	85%
SD	1.33	0.83	0.94	0.63	0.51	1.25	23%
Median	4	3	1	1	0	3	100%

Absolute change is the difference between baseline scores and scores at 8 weeks.
Relative percent change is the relative difference between baseline scores and scores at 8 weeks compared with the baseline score.

continued improvement, such that her score at 8 weeks was 10 (85% improvement; Table 1), specifically involving changes in 12 symptoms as identified in Figure 1. No adverse side effects from both the VR and mindfulness technique sessions were reported by the patient.

DISCUSSION

Epidemiological data on RS are lacking because of the perceived low prevalence due to frequent misdiagnosis and decreased awareness of the disease. The estimated prevalence in adults based on small-scale studies was 0.8% and rising to 7% in patients with fibromyalgia.^{4,5}

Symptoms occur within 20 minutes after food or even liquid intake, last for 1–2 hours, and are not associated with retching. Belching and burping precede the “fountain-like” regurgitation of ingested contents. Patients commonly complain of abdominal fullness, burning sensation, or nausea, with overt abdominal pain being a common feature of RS.

Evaluation primarily includes ruling out of other etiologies such as mechanical obstruction and utilization of the ROME IV criteria because RS is a clinical diagnosis. Gastroduodenal manometry was found to be useful because the presence of a simultaneous pressure spike, referred to as the R wave, in the small intestine and stomach and is suggestive of RS.⁶ The Carnett sign is elicited by leg raising or doing a sit-up to tighten the rectal muscles, leading to increased abdominal/epigastric pain. The primary mechanism attributed to RS is the habitual abdominal wall contraction (primary maintenance pathway). Through this, there has been evidence suggesting that regurgitations are a habit or reflex developed through a conditioned response to oral intake and is essentially an exaggerated belching process.⁷ This condition may also be maintained secondarily by features that either negatively or positively reinforce continued regurgitations.⁸ Regurgitations can occur because of learned associations with foods, because of concerns about body weight/shape, or even to alleviate psychological distress.⁹ Our patient had substantial stress, anxiety, and depression because of loss of a family member.

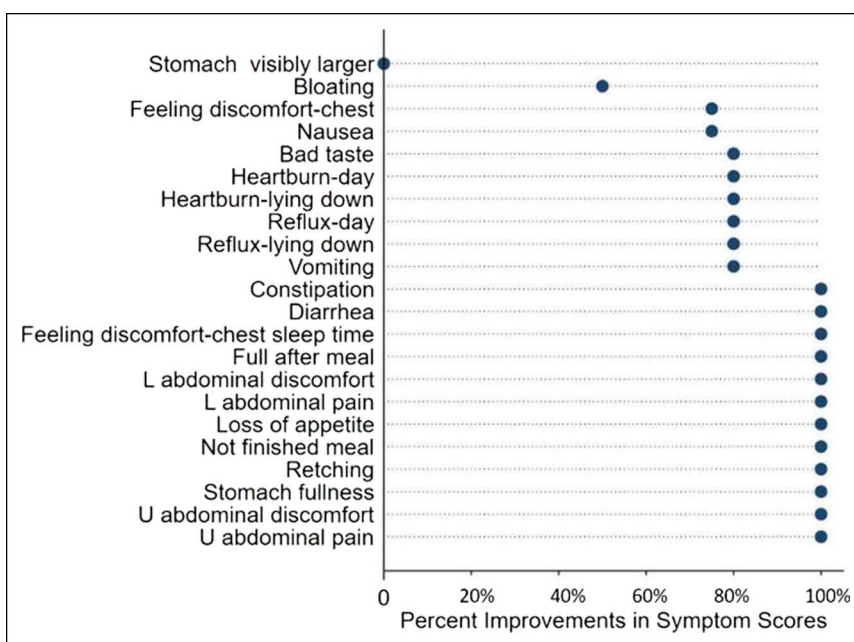


Figure 1. Percent change in each symptom score between baseline and last follow-up.

The approach to RS starts with patient education and explaining the entity to the patient and the family; in doing this, the psychological aspects must be included, screening for associated psychiatric disorders, diaphragmatic breathing techniques, and medications (baclofen). Diaphragmatic breathing involves breathing deeply and expanding the lungs into the diaphragm. It focuses on slowing the respiratory rate through expanding the abdomen and inhaling deeply through the nose, pausing, then contracting the abdomen, and exhaling slowly through the mouth. This assists in blood flow, lowers the pulse rate and blood pressure by improving vagal activity, and reduces the sympathetic reaction.¹⁰ Diaphragmatic breathing operates as a competing response to habitual abdominal wall contraction.¹¹ In the event that this is inadequate, biofeedback-guided diaphragmatic breathing can be recommended. Biofeedback is derived from psychological learning theory based on operant conditioning, in which a patient is taught to recognize and subsequently control a physiological function. This is through an easily perceived signal, such as visual or auditory, in which the patient then learns to modify.¹²

VR is an “advanced form of human–computer interface that allows the user to interact with and become immersed in a computer-generated environment in a naturalistic fashion.”¹³ Most proposed mechanisms attribute the benefit to simple distraction wherein the mind is deeply engaged in an immersive experience leading to difficulty to perceive stimuli outside the field of attention.¹⁴

After the utilization of VR and mindfulness techniques, our patient had significant improvement in her Pagi-SYM symptom score. The application of VR in functional gastrointestinal disorders, specifically involving nausea and vomiting as well as abdominal pain, should be studied further because our positive results could open up further options in the gastroenterology world.

DISCLOSURES

Author contributions: Concept and design of the work: JA Taclob, MA Kalas, MJ Esteban, C. Didia, and R. McCallum. Drafting the paper: JA Taclob and MA Kalas. Revising the paper: JA Taclob, C. Didia, MJ Esteban, and R. McCallum. Guarantor: R. McCallum is the article guarantor.

Financial disclosure: None to report.

Previous presentation: The poster was presented at the 2022 Southern Regional Meeting; February 2022; New Orleans, LA.

Ethics approval: Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent was obtained for this case report.

Received July 21, 2022; Accepted August 17, 2022

REFERENCES

1. Stanghellini V, Chan FKL, Hasler WL, et al. Gastrointestinal disorders. *Gastroenterology*. 2016;150(6):1380–92.
2. Drossman DA, Hasler WL. Rome IV-functional GI disorders: Disorders of gut-brain interaction. *Gastroenterology*. 2016;150(6):1257–61.
3. APA. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. 5th edn. American Psychiatric Publishing: Arlington, VA, 2013.
4. López-Colombo A, Morgan D, Bravo-González D, Montiel-Jarquín A, Méndez-Martínez S, Schmulson M. The epidemiology of functional gastrointestinal disorders in Mexico: A population-based study. *Gastroenterol Res Pract*. 2012;2012:606174.
5. Almansa C, Rey E, Sánchez RG, Sanchez AA, Diaz-Rubio M. Prevalence of functional gastrointestinal disorders in patients with fibromyalgia and the role of psychological distress. *Clin Gastroenterol Hepatol*. 2009;7(4):438–45.
6. Halland M. Rumination syndrome: When to suspect and how to treat. *Curr Opin Gastroenterol*. 2019;35(4):387–93.
7. Kanner L. Historical notes on rumination in man. *Med Life*. 1936;43:27–60.
8. Johnson WG, Corrigan SA, Crusco AH, Jarrell MP. Behavioral assessment and treatment of postprandial regurgitation. *J Clin Gastroenterol*. 1987;9:679–84.
9. Delaney CB, Eddy KT, Hartmann AS, Becker AE, Murray HB, Thomas JJ. Pica and rumination behavior among individuals seeking treatment for eating disorders or obesity. *Int J Eat Disord*. 2015;48:238–48.
10. Janet SK, Mangala Gowri P. Effectiveness of deep breathing exercise on blood pressure among patients with hypertension. *Int J Pharma Bio Sci*. 2017;8(1):B256–60.
11. Barba E, Burri E, Accarino A, et al. Biofeedback-guided control of abdominothoracic muscular activity reduces regurgitation episodes in patients with rumination. *Clin Gastroenterol Hepatol*. 2015;13:100–6.e1.
12. Denis P. Methodology of biofeedback. *Eur J Gastroenterol Hepatol*. 1996;8(6):530–3.
13. Schultheis MT, Rizzo AA. The application of virtual reality technology in rehabilitation. *Rehabil Psychol*. 2001;46(3):296–311.
14. Tashjian VC, Mosadeghi S, Howard AR, et al. Virtual reality for management of pain in hospitalized patients: Results of a controlled trial. *JMIR Ment Health*. 2017;4(1):e9.

Copyright: © 2022 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of The American College of Gastroenterology. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.