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Rapid Clinical Recovery After Discontinuing Aspartame-Containing Chewing Gum

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Abstract

Background: Clinical conditions such as burnout, attention-deficit hyperactivity disorder (ADHD), and osteoarthritis (OA) have the potential to greatly impact an individual's daily functioning and overall quality of life. *Case Report*: A 52-year-old Caucasian female diagnosed with these conditions experienced significant physical and mental health improvements upon discontinuing aspartame-containing chewing gum. Despite various treatments and natural health products, her symptoms persisted until she stopped consuming aspartame. The patient's joint pain, mood, memory, and energy levels dramatically improved within 36 hours of ceasing aspartame intake. *Conclusion*: The report highlights the potential negative effects of aspartame on neuropsychiatric and somatic health, emphasizing the importance of considering dietary factors in therapeutic plans for complex clinical presentations. Further research is needed to explore the relationship between dietary additives like aspartame and medical conditions like burnout, ADHD, and OA.

Keywords: Aspartame, Aspartic acid, Dietary factors, Formaldehyde, Phenylalanine.

Introduction

In this case report, the patient was diagnosed with burnout, unspecified ADHD, and OA, which led to a complex set of symptoms that affected her physical and mental health. Burnout is a state of emotional exhaustion, depersonalization, and reduced personal accomplishment caused by prolonged occupational stress [1]. On the other hand, ADHD is a behavioral disorder, often beginning in childhood, marked by deficits in paying attention, impulse control, and severe hyperactivity [2]. Osteoarthritis (OA) affects more women than men, often impacting the hips, knees, hands, feet, and spine, and causes tremendous disability and pain [3]. A number of natural health products (NHPs) were recommended to the patient along with therapeutic lifestyle choices, but none of them significantly helped her symptoms and functionality. Only when the patient discontinued aspartame-containing chewing gum did she experience a dramatic improvement in her clinical status. The author hypothesizes that aspartame is a neuropsychiatric and somatic disruptor whose mechanism of action accounts for its deleterious effects, and that eliminating its ingestion should be considered when working with patients having complex clinical presentations.

Case Report

A 52-year-old Caucasian female reported experiencing a range of symptoms related to burnout, ADHD, and joint pain. Her symptoms began in 2022 and were exacerbated by multiple stressors, including her teenager’s hospitalization for a serious medical issue, work stress, and challenges in her intimate relationship. In February 2023, the patient presented with a range of symptoms, including physical pain, a pervasive

sense of negativity, and memory issues. Despite taking methylphenidate and self-prescribed NHPs, her symptoms persisted. The patient was diagnosed with burnout and unspecified ADHD. She was taking methylphenidate (45 mg/day) but continued to have problems with executive functioning. Various NHPs were recommended, including ashwagandha, curcumin extract, and magnesium bisglycinate, as well as instructions to add more regular exercise.

A follow-up appointment in March 2023 revealed a new diagnosis of unspecified osteoarthritis in her right hand and hips. The patient was advised to take additional NHPs that included glucosamine sulfate and saffron extract, and was referred to a psychotherapist. She was advised to speak with her physician about a sleep study and was recommended to consider a restricted feeding plan. The patient reported some improvements with her memory and reduced anxiety at another appointment in May 2023. However, she continued to struggle with weight management and mobility issues due to her osteoarthritis. At the final visit in August 2023, she described a dramatic change in her mental and physical health. About 2 weeks prior, her partner recommended that she stop all aspartame-containing chewing gum since she normally chewed 2-3 packs each day. When not eating, she was constantly chewing gum. Within 36 hours, all her joint pain was gone and had not returned since abstaining from aspartame. She noted that her brain felt better in terms of mood and memory, and that she was no longer exhausted at the end of the day. The patient did her own Google search and found corroborating evidence for this type of response. The patient described feeling as though a miracle had happened given how dramatic the clinical improvements were, and that she felt 10 years younger. She declined further appointments due to her dramatic recovery.

In an email correspondence with the patient, she provided the following statement about her clinical status some 13 months after our last appointment: “I am happy to report that I have not experienced any awful muscle/joint stiffness since stopping aspartame and no depressed mood. I will never touch the stuff again.”

Discussion

The patient's recovery after stopping aspartame-containing chewing gum was remarkable, leading to significant improvements in her energy, joint pain, mood, and memory. This suggests that certain food additives may have a significant impact on an individual's symptoms and should be considered when developing a therapeutic plan. A randomized crossover trial, published in 1994, assessed the impact of aspartame (approximately 30 mg/kg/day) among 32 patients with self-identified headaches [4]. The results showed that a subset of patients reported more headaches when they ingested aspartame under controlled conditions.

The first published report documenting significant clinical reversals from the elimination of aspartame and/or monosodium glutamate (MSG) appeared in 2001 [5]. This report documented complex clinical histories of four patients having fibromyalgia syndrome (FMS) as well as other issues. When three of the four patients discontinued MSG and aspartame, they achieved marked and sustained clinical improvements. One patient only removed MSG and also achieved sustained clinical remission in the majority of their symptoms. Though most of the publication focused on the clinical impacts and benefits from eliminating MSG, anecdotal evidence was mentioned about aspartame being associated with “headaches, seizures, dizziness, movement disorders, urticaria, angioedema, and anaphylaxis [5]”.

In 2010, the elimination of aspartame was believed to be “an usual but curable cause of chronic pain” in two patients with aspartame-induced FMS [6]. The first patient was a 50-year-old French female with widespread pain that was more pronounced in her lower limbs, and a history

of fatigue of more than 10 years. The patient had an intake of aspartame that was approximately 160 mg/day for at least 10 years. When the patient stopped all aspartame ingestion, she experienced swift relief of her FMS symptoms. When she reintroduced aspartame several months later, her pain and fatigue returned. Once she eliminated aspartame again, she experienced complete resolution of her symptoms. The other patient was a 43-year-old male with a 3-year history of bilateral upper body pain, cervical pain, fatigue, and sleep problems. Numerous pharmaceutical and non-pharmaceutical measures were taken without much clinical success. Physical examination and laboratory investigations were normal. Upon questioning, it was determined that his daily intake of aspartame was 120 mg for the past 3 years. When aspartame was removed from his diet, he experienced complete remission of the bilateral upper body and cervical pain. A couple years later the patient had not experienced any recurrence of the pain and refused a reintroduction test to confirm his adverse reaction to aspartame. In 2013, a randomized dietary elimination trial assessed if the discontinuation of MSG and aspartame would improve perceived pain among patients having FMS [7]. One group of patients (n=36) were randomized to their normal diets but without any aspartame and MSG, and the control or wait-list group (n=36) continued eating regularly without excluding these food additives. All patients rated their pain on a seven-point Likert scale at baseline and at the end of the trial, which consisted of a one-month baseline period followed by two months of the exclusionary diet. Statistically, there were no differences in the pain ratings between both groups at the end of the trial. From my perspective, the trial had two significant limitations that make the results questionable [7]. First, both groups should have been given a controlled diet, with one diet having absolutely no aspartame and MSG, and the other with usual amounts of these food additives. By having both groups eat their normal diets, except for the instructions given to the experimental group about eliminating them, it is difficult to determine how effective the experimental group was at fully eliminating these food additives from their diet. Second, the lack of scrutiny given to the wait-list groups' diet is a major limitation. It is conceivable that some patients in the wait-list group would have also eliminated aspartame and MSG without telling the investigators since they were informed of the study procedures, including the possible clinical benefits from eliminating these food additives.

When considering the daily intake of aspartame, the European Food Safety Authority has an established Acceptable Daily Intake (ADI) of 40 mg/kg of body weight/day [8]. Given the patient's intake of 2-3 packs of aspartame-containing chewing gum each day, she was estimated to have been consuming between 294 and 441 mg of aspartame daily until she eliminated it from her diet. This range was established by estimating the average number of pieces of gum per packet (approx. 14), and the average amount of aspartame contained in a piece of sugar free chewing gum (approx. 10.5 mg) [9-11]. Though the patient's daily intake of aspartame was much less than the established ADI, it was likely responsible for all sorts of negative cascading biological effects until she stopped ingesting it.

When aspartame is ingested and absorbed, its metabolism in the intestinal lumen yields 50% phenylalanine (involved in neurotransmitter regulation), 40% aspartic acid (an excitatory neurotransmitter), and 10% methanol [12]. Methanol is then converted to formaldehyde and formate, the latter of which is excreted [12]. Formaldehyde adducts concentrate in tissues, disrupt mitochondrial deoxyribonucleic acid (DNA) and nucleic acid DNA, and are carcinogenic and mutagenic [13]. Though speculative, formaldehyde could have been implicated in the patient's joint pain since it has been used experimentally to induce OA in rats [14]. As noted above, aspartame ingestion yields high concentrations of phenylalanine and aspartic

acid. This high concentration of phenylalanine crosses the blood-brain barrier [15], altering the brain's neurochemical composition by increasing adrenergic neurotransmitters, and dopamine and catecholamine metabolites in various brain areas [16]. It has also been purported that the increased amount of phenylalanine in the brain from aspartame ingestion lowers the concentration of brain tyrosine (i.e., due to less tyrosine binding to the large neutral amino acid transporter), leading to reduced levels of dopamine [12], and not high levels as previously noted [16]. The brain levels of serotonin would similarly be low due to less binding of tryptophan to the large neutral amino acid transporter; once again, due to the increased amount of phenylalanine from aspartame ingestion [12]. Given the widely known and important roles that the catecholamines and neurotransmitters play in neurobehavioral health and wellbeing [17,18], it is conceivable that the brain alterations or imbalances induced by persistently ingesting aspartame led to the patient's persistent mood (i.e., dysphoric) symptoms and memory problems that only ameliorated when she stopped ingesting aspartame on a regular basis.

Aspartic acid, as described above, increases substantially from aspartame ingestion. It is known to be a substrate for the production of glutamate, which can act as a neurotoxin [19]. High amounts of glutamate activate glutamate receptors in the brain, resulting in neuronal dysfunction and death, i.e., a process known as excitotoxicity [20]. It is conceivable that the excitotoxicity induced by the increased amount of glutamate generated from increased aspartic acid resulted in mood [21] and memory disturbances [22]. Only when the patient stopped her habit of constantly chewing aspartame-containing gum, did both her memory and mood improve and normalize.

The main limitations of this case report are twofold. First, I did not continue working with this patient following her dramatic recovery. To strengthen the potential cause and effect from aspartame-containing chewing gum, it would have been instructive to have reintroduced the chewing gum to assess its impact and then discontinue to see if there would be a reversal of symptoms. Second, case reports provide possibilities of treatment but cannot be generalized to a wider group of similar patients. Only through well-designed randomized controlled trials can the real effects of aspartame elimination be determined.

Conclusion

This case report highlights the complex interplay between burnout, ADHD, and OA, and the impact they can have on an individual's physical and mental health. The patient's recovery after stopping aspartame-containing chewing gum underscores the importance of considering dietary factors in developing a therapeutic plan. Asking patients about aspartame-containing food and beverage items is necessary when working with patients having complex medical presentations, especially when recalcitrant to treatment. Further research is needed to better understand the relationship between complex patient presentations and food additives to develop more effective therapeutic interventions.

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