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MANAGING BURNING MOUTH SYNDROME WITH AMITRIPTYLINE AND MULTIWAVE LOCKED SYSTEM LASER THERAPY: A CASE REPORT

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Background: Burning mouth syndrome (BMS) is a chronic condition marked by oral pain without visible signs, often associated with neuropathic pain and psychological factors. Its complex and multifactorial nature makes complete symptom relief difficult to achieve.

Case Report: A 72-year-old woman with a 15-year history of burning sensations on her tongue and gums, along with dry mouth, was diagnosed with BMS after ruling out other conditions. Previous treatments, including medication adjustments and physical therapy during inpatient care, were unsuccessful in improving her symptoms.

Conclusions: Amitriptyline was introduced with a gradually increasing dose, and multiwave locked system laser therapy was applied daily to the painful areas of the tongue for 12 sessions. Following 2 weeks of treatment, as well as at the one-month and three-month follow-up postdischarge, a significant reduction in pain was observed. To the best of our knowledge, this treatment combination has not been previously explored, making this an area of interest for future research.

Key words: Multiwave locked system laser therapy, burning mouth syndrome, amitriptyline, case report

BACKGROUND

Burning mouth syndrome (BMS) is a chronic condition causing a burning sensation in normal-looking oral tissue for at least 4 to 6 months and is often misdiagnosed due to limited awareness (1). This condition predominantly affects women, particularly during the perimenopausal and postmenopausal periods, and its precise pathophysiology remains incompletely understood. The primary symptom of BMS is a bilateral burning pain in the oral mucosa, especially in the anterior two-thirds of the tongue, dorsal surface of the tongue, lateral borders of the tongue, anterior hard palate, and lip mucosa. The pain can vary throughout the day and typically increases by the end of the day, rarely interfering with sleep. Additional symptoms may include taste changes (parageusia), dry mouth (xerostomia), and other sensory alterations (2). BMS is also associated with neuropathic pain, where mechanisms similar to phantom limb syndrome and small fiber neuropathy may play a role. Mechanical injuries, like bruxism and tongue thrusting, can initiate symptoms, while psychiatric conditions may exacerbate them (3).

The diagnosis of the patient is determined by clinical presentation, with BMS being a diagnosis of exclusion, which requires the elimination of other potential causes of oral pain (4). Scala et al (5) proposed 5 clinical criteria for BMS diagnosis: bilateral burning pain every day for at least 4 to 6 months, pain intensity varying

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throughout the day, no relief with eating or drinking, no sleep disturbance, and accompanying symptoms, such as taste disorders, xerostomia, and sensory changes. The differential diagnosis for the patient includes drug-related side effects, lichen planus, geographic tongue, hormonal disturbances, local nerve damage, contact hypersensitivity, autoimmune reactions, and nutritional deficiencies, such as vitamin B12, folate, iron, and zinc. To diagnose BMS, it is essential to exclude malignancies or rheumatologic diseases. Treatment options include topical, systemic medications, and behavioral approaches (6). Recently, minimally invasive treatments, like low-level laser therapy (LLLT), have gained attention. This painless procedure is well-received by both patients and clinicians, with numerous studies highlighting its positive impact on patient quality of life and symptom relief for BMS. LLLT works by promoting tissue regeneration and wound healing, while reducing inflammation and pain. It also lowers the levels of various biomarkers, including nuclear factor kappa B, tumor necrosis factor alpha, cyclooxygenase-2, and interleukin IL1β (7). Multiwave locked system (MLS) laser therapy, a specific model of LLLT, is an advanced technique that combines 2 synchronized wavelengths: 808 nm (continuous mode) and 905 nm (pulsed mode) (8). LLLT is generally classified as a Class IIIb laser, while MLS is designated as a Class IV laser. The synchronization in MLS boosts therapeutic outcomes by simultaneously targeting different cellular mechanisms. The continuous 808 nm emission activates cytochrome oxidase, promoting adenosine triphosphate production and resulting in anti-inflammatory and anti-edematous effects. Meanwhile, the pulsed 905 nm emission helps alleviate pain by influencing nociceptors and nerve fibers, raising the pain threshold. Together, these wavelengths enhance both analgesic and anti-inflammatory effects. As a Class IV laser, MLS has demonstrated notable success in reducing musculoskeletal pain and disability and is believed to be more effective than traditional LLLT and high-intensity laser therapy (8,9). However, to the best of our knowledge, no studies have explored the use of MLS laser therapy in treating BMS.

Among systemic treatments, amitriptyline, a tricyclic antidepressant (TCA), is a significant option for BMS treatment (10). Administered orally, it enhances the descending inhibitory pain pathway by increasing the concentrations of serotonin and noradrenaline in the synaptic clefts. This TCA is highly recommended for managing neuropathic pain, including that associated with BMS (10). This case report describes a chronic BMS patient who was treated with a combination of amitriptyline and MLS laser therapy.

CASE PRESENTATION

A 72-year-old woman presented to the pain clinic with complaints of pain and burning, particularly at the tip of her tongue and on her gums, along with dryness in her mouth. Her complaints remained the same regardless of eating or drinking. She reported burning and pain at the tip of her tongue with a Visual Analog Scale (VAS) score of 8/10. The symptoms had been present for 15 years, starting after an episode of peripheral facial paralysis, and had worsened over the last 2 years. The patient had repeatedly sought treatment at the hospital over the years but was unable to obtain a diagnosis. Approximately 10 years ago, the neurology department prescribed pregabalin 75 mg twice daily. The patient took this medication for 2 years but stopped due to lack of relief and did not pursue further treatment. For the past 2 months, the patient had been taking pregabalin 75 mg twice daily and escitalopram 10 mg once daily, with minimal relief. Additionally, she was taking vitamin D supplements and proton pump inhibitors. The patient had not undergone any physical therapy.

Her medical history included previous right peripheral facial paralysis, along with several unrelated surgical procedures. The patient did not have any comorbidity. There were no similar conditions reported in the family. The patient had not received any recent dental treatments at the onset of symptoms. She experienced significant stress related to her family issues around the onset of symptoms and had intermittently used escitalopram for anxiety, which improved her anxiety but not the burning sensation. Her laboratory results were normal, and a physical examination revealed House-Brackmann Grade 1 without any tongue deformity. She was diagnosed with BMS after other differential diagnoses were ruled out.

The patient was admitted to the pain medicine/physical medicine and rehabilitation department for inpatient treatment, where transcutaneous electrical nerve stimulation, neuromuscular electrical stimulation, and an exercise program for facial paralysis were initiated. Due to a lack of improvement, escitalopram and pregabalin were gradually discontinued, and amitriptyline was introduced, starting with 25 mg once daily for one week, then increased to 25 mg twice a day. The patient received dual-wavelength MLS laser therapy (ASA, Arcugnano, Italy)

at 808 nm and 905 nm, using M6 laser equipment, with the following parameters: power of 7.53 W, frequency of 500 Hz, energy output of 226.013 J, and energy density of 12.00 J/cm². The treatment targeted 6 points on the tongue, as shown in Fig. 1. Each point was treated daily for 30 seconds across 12 sessions, with the laser positioned 2 cm away from the tongue. The most painful point, situated at the outer middle point, was treated for an extra 50 seconds before ending each session. The patient only experienced a mild tingling sensation from the laser, which contributed to her adherence to the treatment and its overall good tolerability. No adverse reactions were observed. Two weeks after starting treatment, the patient's VAS score reduced to 2/10. She was discharged with a prescription of amitriptyline 25 mg twice daily and scheduled for follow-up visits in one month and three months. During these follow-up visits, her pain levels were reported as 2/10 and 3/10 on the VAS scale, respectively. From the patient's perspective, the treatment brought significant relief after years of pain. The combination of amitriptyline and MLS laser therapy was effective, with noticeable improvement after just a few sessions, ultimately restoring quality of life by the end of the 12 treatments.

DISCUSSION

In the current case of chronic, treatment-resistant BMS, we observed a significant improvement in the patient, with a substantial reduction in pain as a result of combining amitriptyline and MLS laser therapy.

The etiology of BMS is multifactorial, involving hormonal changes, psychiatric disorders, neural alterations, infections, dental materials, and food allergies. Psychological conditions, particularly major depression and chronic anxiety, are frequently associated with BMS (11). Furthermore, facial paralysis, as demonstrated in this case, might be a contributing factor. While we cannot be entirely certain, we suspect that the onset of BMS in this case may be linked to the considerable stress she experienced due to her family issues during that period.

The treatment of BMS involves a multidisciplinary approach focused on symptom management, as full resolution is often not possible. Common pharmacological treatments include topical capsaicin and clonazepam, and systemic medications, such as antidepressants and anxiolytics (2). Amitriptyline was chosen due to the association of BMS with psychiatric disorders. Watanabe et al (12) suggested that in the treatment of BMS, amitriptyline might provide a greater efficacy and tolerability compared to other psychopharmacological treatments, such as aripiprazole. Based on these investigations, we initiated treatment with amitriptyline; however, upon recognizing its inadequacy, we examined additional studies for a combination therapy. While some authors recommend combination pharmacological therapies (13,14), concerns about side effects have led us to believe that integrating nonpharmacological treatments could be a more favorable approach. Nonpharmacological treatments include behavioral therapies, such as cognitive

Fig 1. Diagram depicting the specific points on the tongue where MLS laser therapy is applied. MLS, multiwave locked system.

behavioral therapy, relaxation techniques, and LLLT (15). Recently, LLLT has demonstrated effectiveness in alleviating pain in patients with BMS (16). Spanemberg et al (17) used LLLT with an 808 nm wavelength in continuous mode and observed significant pain relief. Similarly, Finfter et al (18) treated BMS patients with a 940 nm wavelength laser in pulsed mode, resulting in immediate pain relief. Based on these findings, we believe that the MLS laser, which combines synchronized wavelengths, may offer an even more effective treatment option. In line with previous studies, we have observed a marked reduction in pain intensity in our case.

The prognosis of BMS varies, dependent on underlying mechanisms and comorbidities. While some cases improve with symptomatic treatment and time, others may persist for months or years without resolution.

The strength of this case report lies in the fact that the patient was treated in an inpatient setting, where medications, mood, diet, and activities were closely monitored to prevent any factors that could interfere with the treatment outcome. However, the limitations include the absence of multiple patients with the same diagnosis, which prevents the inclusion of a control patient for comparison of the intervention, and the short-term duration of 3 months is insufficient for a comprehensive evaluation.

CONCLUSIONS

Due to the complex and multifactorial nature of BMS, it is important for patients to understand that complete resolution of symptoms may not always be possible. Since no single treatment has consistently proven effective, we have focused on exploring new combinations of therapies in the search for a more effective solution. In this case, the patient's symptoms improved significantly following MLS laser therapy and amitriptyline treatment. Therefore, we proposed that combining amitriptyline with MLS laser therapy would be a promising approach for treating BMS. Continued follow-up and individualized treatment remain essential for managing this chronic condition. Further research is required to assess the management of this challenging and chronic disease, including studies with diverse laser parameters, different treatment combinations and dosages, larger patient populations, and extended long-term follow-up.

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