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Review Article

Burning Mouth Syndrome: An Enigma to the Diagnostician

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Abstract

Burning mouth syndrome is an enigmatic condition because the intensity of symptoms rarely corresponds to the clinical signs of the disease. It is a burning or stinging sensation affecting the oral mucosa, lips and/or tongue in absence of clinically visible mucosal lesions. There is strong female predilection. Affected patients often present with multiple oral symptoms including burning, dry mouth, pain & taste alterations. The etiology is multifactorial & remains poorly understood. Burning mouth syndrome is a challenge to diagnose and manage. The present article discusses some of the recent understanding of etiopathogenesis of BMS as well as the role of pharmacotherapeutic management in this disorder.
Keywords: Burning mouth syndrome, Glossopyrosis, Stomatodynia, Glossodynia, Oral dysesthesia

1. Introduction

Burning mouth syndrome also termed glossodynia, orodynia, stomatodynia oral dysesthesia, glossopyrosis, burning tongue, stomatopyrosis, sore tongue, burning tongue syndrome, scalded mouth syndrome, burning mouth, or sore mouth. It is the complaint of a burning sensation in the mouth where no underlying dental or medical cause can be identified and no oral signs are found. Burning mouth syndrome may also comprise subjective symptoms i.e xerostomia, oral paraesthesia and altered taste or smell (dysgeusia and dysosmia) or other associated symptoms[1]. A burning sensation in the oral cavity can be a symptom of another disease when local or systemic factors are found to be implicated, and this is not considered to be burning mouth syndrome, which is a syndrome of medically unexplained symptoms.[1]

The International Association for the Study of Pain definition of burning mouth syndrome is 'a distinctive nosological entity characterized by unremitting oral burning or similar pain in the absence of detectable mucosal changes and "burning pain in the tongue or other oral mucous membranes', and the International Headache Society definition is 'an intra-oral burning sensation for which no medical or dental cause can be found. The state of knowledge on Burning mouth syndrome was presented at the 3rd World Workshop of Oral Medicine. Grushka and Epstein[11] in 1998, and very recently, different selective review papers focusing on specific BMS issues have been published.[16]

Burning mouth syndrome primary or secondary to systemic or local factors[2]. Other sources refer to a "secondary burning mouth syndrome" with a similar definition, i.e. a burning sensation which is caused by local or systemic factors; however this contradicts the accepted definition of Burning mouth syndrome which specifies that no cause can be identified. "Secondary Burning mouth syndrome" could therefore be considered a misnomer. Some consider Burning mouth syndrome to be a variant of atypical facial pain. More recently, Burning mouth syndrome has been described as one of the four recognizable symptom complexes of chronic facial pain, along with atypical facial pain, temporomandibular disorder and atypical odontalgia[3].

2. Types of Burning mouth syndrome

Burning mouth syndrome has been subdivided into three general types, with type two being the most common and type three being the least common.

Type I -Symptoms not present upon waking & then it worsens as the day progresses. It is a non-psychiatric pain.
Type II – Symptoms upon waking and is constant throughout the day. It is associated with psychiatric disorder & chronic anxiety.
Type III – No regular pattern of symptoms. In this type of pain is intermittent and also occurs in unusual sites .This type of pain is often associated with allergic & contact stomatitis.
Type I & Type II show remitting symptoms where as type III show unremitting symptoms[4].

3. Pathophysiology

The pathophysiology of burning mouth syndrome is in ambiguity. The Burning mouth syndrome follows the pathway of chronic intraoral pain disorder. The receptors present in the oral cavity are excited by a stimulus and the impulse is transmitted via adrenergic and specifically via type C to trigeminal sensory ganglion, from here fibers ascend as special trigeminal tract to dorsal horn of spinal cord. Then second order neurons of spinothalmic tract are excited which passes upward through brainstem to intralaminar and ventrolateral nuclei of thalamus. Finally fibres relay to somatosensory cortex and the impulse is perceived as burning pain causing distress to patient. The recent studies demonstrated that patients with burning mouth syndrome have a trigeminal small-fiber sensory neuropathy affecting the tongue, characterized by a significant loss of epithelial and sub-papillary nerve fibers & also patients also showed a decreased density of unmyelinated nerve fibres within the epithelium as well as diffuse axonal derangement demonstrated by histochemical studies. The distribution and quality of sensory symptoms involving the anterior two- thirds of the tongue bilaterally and the sparing of the remaining territories innervated by the trigeminal nerve even in patients with long standing disease, suggest that Burning mouth syndrome is caused by a primary axonopathy rather than a neuronopathy. Nevertheless, selective degeneration of small-diameter sensory neurons cannot be excluded. The epithelial nerve fibers of papilla are naked axons with no Schwann cell ensheathment and have synaptic contacts with the taste buds of fungi form papilla. Hence, their

stimulation can induce a burning sensation and affect the gustatory perception. Moreover, ongoing axonal degeneration could induce nerve fiber sensitization and account for persistent hyperalgesia[5].

3.1 Etiopathogenesis: About 50% of cases where there is a burning sensation in the mouth have no identifiable cause. There are a number of possible causes of Burning mouth syndrome including: damage to nerves that control pain and taste, hormonal changes, dry mouth, which can be caused by many medications (antiretroviral nevirapine and efavirenz, protease inhibitors angiotensin receptor blockers and angiotensin-converting-enzyme inhibitors e.g. captopril) [6], salivary gland disorders such as Sjögren's syndrome, endocrinal disorders such as hypothyroidism & diabetes. Approximately 90% of women in BMS in studies have been post menopausal, with the greatest frequency of onset reported from 3 years before to 12 years after menopause.

Fungal infections such as oral candidiasis, gastroesophageal reflux disease acid, ill-fitting dentures or allergies to denture materials, amalgam restorations, methyl methacrylate, cobalt chloride, zinc, benzoyl or oral hygiene products (Sodium Lauryl sulfate in toothpastes) & components of lotions such as petrolatum cadmium sulphate, octyl gallate, benzoic acid, and propylene glycol have been implicated. Food allergens include peanuts, chestnuts, cinnamon, and sorbic acid & nicotinic acid are some other causes[7,8]. Psychogenic factors such as anxiety and depression, smoking, alcohol, deficiency of iron, folic acid or vitamin B, neuropathy, e.g. following damage to the chorda tympani nerve & para functional activity, e.g. nocturnal bruxism or a tongue thrusting habit. Geographic tongue, fissured tongue, herpetic infection, lichen planus, hiatus hernia & human immunodeficiency virus, enterobacter, fusospirochetes, helicobacter pylori, and klebsiella infection are some other causes[9,10]. Various cases of drug-associated Burning Mouth Syndrome have been reported in the literature.

ACE inhibitors and angiotensin receptor blockers are perhaps the most commonly noted in case reports. This may be the product of an inflammatory reaction generated by increase in bradykinin (similar to the mechanism by which angioedema may result). The mechanism as it relates to burning mouth symptoms has not been determined, but kallikrein, a molecule active in the kinin pathway, may be increased in the saliva of burning mouth syndrome patients, resulting in increased inflammation. Diabetics are more susceptible to oral infections (including oral thrush) that produce burning mouth sensations. Additionally, diabetics are prone to vascular changes that affect the small blood vessels in the mouth, creating a lower threshold for pain. A better control of blood sugar levels in diabetic patients may prevent onset or help improve symptoms of burning mouth. Recent Studies have pointed to dysfunction of various cranial nerves associated with taste sensation as possible cause of BMS.

Abnormal perception of intensity of pain range, alteration in neuronal transmission and disturbances of neurovascular microcirculatory system approves the neuropathic view on BMS. Serum levels of IL6, a neuroprotective cytokine is found low in BMS patients. The neuroprotective actions of IL6 on trigeminal nociceptive pathway might be weakened because of low levels of IL6 in BMS patients which could aggravate hyperalgesia in these patients.

3.2 Clinical Features:

Burning mouth syndrome is a disorder typically observed in middle-aged and elderly subjects with an age range from 38 to 78 years. Occurrence below the age of 30 is rare, and the female-to-male ratio is about 7:1.[11]

3.3 Signs & Symptoms of BMS

Pain: It is cardinal symptom of burning mouth syndrome. Pain is described as a prolonged burning sensation of the oral mucosa which is similar in intensity but differ in quality from toothache. Quality of pain is burning and scalding. The burning sensation often occurs in more than one intraoral site, with anterior two-third of tongue, the anterior hard palate and the mucosa of lower lip most frequently involved. Common sites for pain are tongue, lip, palate and mandibular alveolar region. Buccal mucosa & floor of mouth are rarely involved. The onset of pain is usually spontaneous in 50 % of cases, in rest of the cases; the pain can proceed as a previous illness, previous dental procedures and previous medications and even due to life stress. The location of pain is not pathognomic, and patients with BMS may complain of burning sensation in different sites, such as in the anogenital region. Oral pain is invariably bilateral, and more than one oral site may be affected.

Dysgeusia: In almost 70% of BMS patients, persistent taste disorders (dysgeusia) are also evident. The dysgeusic taste is most commonly bitter, metallic, or both. Different alterations in taste perception appear at either threshold or suprathreshold levels. In fact, at threshold concentrations, subjects with BMS may perceive sweet solutions as significantly less intense, whereas the capacity to taste both sweet and sour may increase at suprathreshold concentrations. Disorders in the sense of taste may be a sign of a disturbance of sensory modalities at the level of small-diameter afferent fibers.

Xerostomia: Approximately 46% TO 67% of Burning mouth syndrome patients complains of dry mouth. It reflects subjective sensation rather than a dry mouth. It reflects a subjective sensation rather than an objective symptom of salivary gland dysfunction. Most salivary flow rate studies in such patients have shown no decrease in either stimulated or unstimulated salivary flow rate. Usually there is normal salivary volume, but a compositional alteration with increased albumin, total IgM, and total IgG, which are serum components and not originating within salivary glands. This altered salivary composition might play al role in local neuropathy demonstrated in BMS patients.

Other symptoms of BMS include: burning, scalding, tingling, or a numb feeling that persists for most of the day. Tingling or numbness on the tip of the tongue or any other site oral cavity[12,13].

Complications: Burning mouth syndrome may cause or be associated with are mainly related to discomfort. They include: difficulty in falling asleep, depression, anxiety, difficulty in eating, decreased socializing and impaired relationships[14].

3.4 Diagnosis: History taking is the key to diagnosis of BMS. The diagnosis is based on clinical characteristics including either a sudden or intermittent onset of pain, bilateral presentation, a progressive increase in pain during day and remission of pain with eating and sleeping. Normal laboratory findings are found in BMS patients. Alternate causes of oral burning pain should be ruled out before a diagnosis of BMS is entertained. Tests may include blood work to look for infection, nutritional deficiencies, and disorders associated with BMS such as diabetes or thyroid problems, oral swab to check for oral candidiasis, allergy testing for denture materials, certain foods, or other substances that may be causing symptoms.

The second edition of the International Classification of Headache Disorders lists diagnostic criteria for "Glossodynia and Sore Mouth". a) Pain in the mouth present daily and persisting for most of the day, b) Oral mucosa is of normal appearance c) Local and systemic diseases have been excluded[15].

3.4.1 Laboratory Tests: No laboratory tests diagnose burning mouth syndrome (BMS), but the patient's history and examination may indicate the need for any of the following studies: CBC count, Serum vitamin B levels, serum folate, serum ferritin, serum blood glucose (fasting or glucose tolerance test), urine analysis for glucose, TSH, T_4, thyroid binding globulin, anti thyroperoxidase antibodies, antithyroglobulin antibodies, antimicrosomal antibodies, LH, FSH, sialometry, sialochemistry, ESR, Anti SS-A, Anti SS-Ro, Anti SS-B, Anti SS-La antibodies, RF, ANA. Bacterial culture (especially anaerobes), KOH of lingual scraping, fungal culture, biopsy of tongue or mucosa, schirmer's test, laryngoscopy or endoscopy if reflux is suspected. Lumbar puncture with gel electrophoresis. Patch testing for methyl methacrylate mercury, cobalt chloride, benzoyl peroxide, petrolatum cadmium sulfate, octyl gallate, benzoic acid, propylene glycol, peanuts, chestnuts, cinnamon, sorbic acid, and nicotinic acid among others. Psychological questionnaires that can help in determining symptoms of depression, anxiety or other mental health conditions[16].

3.4.2 Imaging: Imaging is rarely indicated but may be useful to identify specific causes of secondary burning mouth syndrome. CT scans of the head may be useful if a mass lesion is suspected. MRI of the head, brain, and/or spinal cord may assist in diagnosing mass lesions (either neoplastic or infectious) or neuropathies such as multiple sclerosis. Thyroid echography is useful if gross thyroid lesions are suspected[17].

4. Home Remedies for Burning Mouth Syndrome

One of the essential home remedies for burning tongue is chewing sugar free gum. Baking soda can be used as dentifrice instead of tooth pastes. Stop using alcohol containing mouth washes. Suck on a piece of ice; it gives a relieving cool sensation. Apply some glycerine on the affected areas of the mouth. Some honey can be added to milk; it helps increase the flow of blood to the tongue. Application of lavender oil on the tongue will help too, since lavender oil is an antiseptic as well as a promoter of blood circulation. Adapting a suitable diet for burning mouth syndrome is necessary for patients

suffering from burning tongue. Stop intake of spicy or acidic food and drinks. Avoid cigarettes; they will aggravate the condition. Restrict the consumption of alcohol.

Drink a lot of water as it keeps the body cool and the mouth moist. Add fruits and vegetables containing vitamin B and C to the diet. Bananas, lentils, liver, liver oil, turkey, tuna contain Vitamin B whereas oranges, papaya, sweet melons contain Vitamin C. Avoid tea, coffee & intake of carbonated beverages. Add iron rich vegetables such as broccoli, parsley and spinach. Iron rich food helps the production of new blood cells and replacing the damaged ones. Instead of fried and cooked food, resort to boiled food. Try different mild or flavour-free brands of toothpaste, such as one for sensitive teeth or one without mint or cinnamon. Take steps to reduce excessive stress. Anxiety and depression are common in people with burning mouth syndrome and may result from their chronic pain. Chew sugarless gum, preferably sweetened with xylitol[18].

Management: Treatment should be tailored to individual needs. Depending on the cause of burning mouth syndrome, possible treatments may include: adjusting or replacing irritating dentures treating existing disorders such as diabetes, Sjogren's syndrome, or a thyroid problem to improve burning mouth symptoms recommending supplements for nutritional deficiencies, alteration of medications to relieve burning mouth syndrome. Iron, zinc, vitamins B_{12}, folic acid supplements may also help. In a recent study hormone replacement therapy was found to be efficacious in BMS patients who had demonstrated nuclear estrogen receptors on the immuno-histochemical assay and ineffective in those who did not have receptors[19].

Estrogen replacement therapy alleviates psychological distress in post menopausal women. Good oral hygiene should always be practiced, as plaque can contribute in burning mouth syndrome. Low level laser therapy may play an important role in the management of number of burning mouth syndrome cases[20].

Multiple management of Burning mouth syndrome cases includes nortryptline (10-75 mg/day), clonazepam (0.25-2 mg/day), gabapentin (300-2400 mg/day), tramadol (50 mg taken up to 4gm/ day).These drugs are believed to facilitate the inhibitory actions of gamma amino butyric acid (GABA). Therapy for BMS involves the use of centrally acting medications as for other neuropathic pain conditions. Clonazepam is a benzodiazepine used either topically or systemically which appears to have excellent efficacy in BMS. Studies support the use of tricyclic antidepressants (10-40 mg), including amitryptyline, desipramine, nortryptline, imipramine and clomipramine. The beneficial effects of tricyclic antidepressants in decreasing chronic pain indicate that in low doses these agents may act as analgesics[21]. Studies suggest the use of combination of medications in treatment of Burning mouth syndrome rather than higher doses of single medication, especially with regard to controlling adverse effects.

Systemic therapies, such as alpha lipoic acid, amisulpride, selective serotonin reuptake inhibitors and the antidepressants paroxetine and sertraline, have also been proposed with controversial results. Recently, Femiano et al. have shown the use of alpha lipoic acid in management of BMS. 96% of patients had shown significant improvement in their symptoms. It is a potent antioxidant and neuroprotective agent. It has been tried in diabetic neuropathy. It increases intracellular glutathione level and helps in elimination of free radicals. Cognitive behavioural therapy has also been cited by some authors. Patients with BMS and reduced salivary flow have shown an improvement in symptoms with the use of salivary substitutes. Moreover, the use of mechanical salivary stimulation therapy has been shown to reduce BMS symptoms. Treatment of BMS focuses on symptomatic relief and psychological management. Since the etiology is complex treatment remains symptomatic. Relief is usually provided by topical application of dyclonine- 0.5%, aq diphenhydramine 0.5%, lidocaine and other analgesics. If indicated, nutritional or estrogen therapy should be initiated. These results support the theory that BMS has a neuropathic origin. A study conducted by Ohio State University has shown the use of capsaicin for desensitization. Hot pepper sauce commonly found in grocery stores is a good source of capsaicin. Hot pepper sauce in water is used in ratio of 1:2. Swish in mouth for 45 seconds and spit. It acts by depletion of substance p so results in decreased peripheral burning. Patient should be reassured that it is not fatal nor is it cancerous and will eventually resolve[22].

5. Conclusion

Burning mouth syndrome remains fascinating, though poorly understood condition remains in the field of oral medicine. There should be proper coordination between the dentist and physicians in diagnosing the underlying cause in case of secondary burning mouth syndrome. The clinician must also consider for neurological disease or diminished psychological functioning that may require psychological management. Finally, to conclude with multiple etiological factors are included under the umbrella of BMS. So it becomes a challenge to diagnose and manage.

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