

Burning mouth syndrome – a common dental problem in perimenopausal women

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Abstract

Burning mouth syndrome (BMS) is characterized by the presence of burning, paresthesia or pain of the oral mucosa in the absence of pathologic lesions revealed during the clinical examination. Moreover, the pain may be accompanied by oral dryness, hypersensitivity to some food compounds and taste disorders. Etiopathogenesis of this condition remains unclear. Potential local causative factors include among the others mechanical irritation, parafunctions and dysfunctions of the stomatognathic system, contact allergy to dental materials and electro-galvanic phenomena. Potential systemic causes include diabetes mellitus, B group vitamin deficiency (vitamins B₁, B₂, B₆ and B₁₂), folic acid and iron deficiency, hormonal imbalance, gastrointestinal diseases, psychiatric and neurological disorders and drug-induced side effects. The hypothesis concerning the role of hormonal changes in the development of BMS seems to be confirmed by a high incidence of this condition in perimenopausal women. Up to now, due to an unclear etiology of the disease, the treatment is very often ineffective and mainly symptomatic, which may exacerbate patient's anxiety and discomfort. In this paper we present the main etiologic factors of the burning mouth syndrome. We discuss the basic diagnostic and therapeutic methods and the influence of hormonal replacement therapy on the course of BMS based on the current medical reports.

Key words: burning mouth syndrome, glossodynia, xerostomia, menopause.

Introduction

Various local and systemic factors may interfere with the oral cavity condition [1-4]. The local homeostasis in the oral region strongly depends on the hormonal balance in the body, as the receptors for sex steroid hormones, similar to those located in the genital epithelium, were also detected in the oral mucosa and salivary glands [5-8]. During the female lifetime, distinct changes in oestrogen and progesterone activity occur several times. The serum hormonal imbalance in puberty, menstruation, during pregnancy and in the perimenopausal period results in numerous systemic and local symptoms [5, 7, 9, 10]. Characteristic systemic signs in perimenopausal women include hot flashes, related with the disruption of the control mechanisms in hypothalamic thermoregulatory centre, increased sweating at night and emotional lability [7, 10]. A higher risk of osteoporosis, ischaemic heart disease and anaemia has been reported in this age group of females [7, 10]. Based on the literature, the menopause symptoms localized in the oral region include decreased salivation, higher incidence of periodontitis, candidiasis and jaw fractures due to ongoing osteoporosis and severe pain and burning of the oral mucosa, described as burning mouth syndrome (BMS) or stomatodynia [6, 7, 10-13].

Burning mouth syndrome

Burning mouth syndrome is a medical entity characterized by burning, numbness or pain of the oral mucosa with a moderate severity and with no evident clinical symptoms [14-17]. The following signs: oral dryness, hypersensitivity to some food compounds and taste disorders may accompany the condition [1, 4, 18]. Most commonly, the burning is located on labial mucosa, especially on the tip of the tongue. The other frequently affected areas include lips, the buccal mucosa, the palate, the pharynx, regions covered with the removable dental appliance's plate and the floor of the mouth. The symptoms usually occur bilaterally [14, 16, 18, 19].

Lamey *et al.* defined 3 clinical types of the burning mouth syndrome [20]. Type 1 is characterized by the increasing severity of pain during the day – directly after awakening the patient does not feel any pain or discomfort, the symptoms gradually develop during the day and reach the top in the evening. It has been suggested that the aetiology of BMS type 1 may be related with systemic background. The constant pain intensity during the day with no remissions is typical of BMS type 2. The aetiology in this type seems to be mostly related with psychogenic factors. In both discussed types of BMS, the discomfort does not appear at night. In the

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third type of BMS the symptoms occur intermittently and the patients report periods free from pain and burning. According to some authors, the development of the third type of BMS may be related with allergic reactions to food preservatives [3, 20].

Burning mouth syndrome occurs more frequently in females than in males (depending on the author, the proportion of female and male patients with BMS ranges between 3 : 1 and 7 : 1) [14, 18]. Female predominance in BMS frequency increases with age, which may suggest that the hormonal changes due to menopause play a noted role in the etiopathogenesis of the condition. The mean age of BMS patients is estimated at 50 to 60 years, with the 4-5% prevalence in the general population. A slightly higher BMS frequency is observed in Europe (7%), while in Asia and the United States of America it is lower and reaches 2-3% and 0.7%, respectively [14, 21, 22]. Burning mouth syndrome prevalence among the menopausal women ranges between 10% and 40%, depending on the research centre [2, 23]. A high discrepancy of the results may partially be caused by different diagnostic criteria used in compared studies. The performance of epidemiologic observation on representative study groups is handicapped by the lack of a uniform, international system of classification and diagnosis of burning mouth syndrome [3, 24].

Etiopathogenesis of burning mouth syndrome

Burning mouth syndrome is a clinical entity with no clear, multifactorial aetiology [14, 18, 19, 25]. The possible causative factors can be divided into local and systemic ones.

The first group is comprised of several oral diseases and conditions, including e.g. fungal, bacterial and viral infections, geographic tongue and lichen planus in its exacerbated, erosive form. The other local predisposing factors that require consideration are trauma and mechanical irritation, parafunctions and dysfunctions of the stomatognathic system, electro-galvanic phenomenon and improperly adjusted prosthetic appliances. Another commonly reported local cause of BMS is contact allergy to dental materials (e.g. methyl-methacrylate (MMA) monomer, nickel sulphate, cobalt chloride and mercury) and food or cosmetic preservatives (cinnamaldehyde, nicotinic acid and propylene glycol) [14, 18, 21].

Systemic causative factors include diabetes mellitus, B group vitamin deficiency (vitamins B₁, B₂, B₆ and B₁₂), folic acid and iron deficiency, hormonal imbalance, menopause, gastrointestinal diseases, conditions with reduced salivation, some medications (e.g. angiotensin converting enzyme inhibitors (ACEI) – captopril and enarenal, angiotensin II receptor blockers and antagonists, chemotherapeutics), psychiatric and neurological disturbances [21, 26, 27]. Many researchers relate the

aetiology of BMS with the disruption in receiving and analysing the sensory stimuli on various levels of the central and peripheral nervous system and with the dysfunction of the nigrostriatal system – comparable to the one observed in degenerative disorders with an impaired function of the dopaminergic system (Parkinson's disease) [19, 28]. Numerous reports confirm also a higher incidence of BMS in depressed, phobic or paranoid patients, in people with personality disorders and living in a high stress environment [1, 29, 30, 31]. Concurrently, it seems that in some cases, psychogenic disorders develop secondarily to BMS as a response to prolonged, ineffective therapy of the oral pain and discomfort [1, 32].

Meanwhile, Scardina *et al.* demonstrated that also the local microcirculation in the area affected with pain is disturbed in BMS patients. That may also indicate the role of circulatory factors in the etiopathogenesis of the condition [33].

Considering the presence or absence of the above mentioned, possible local and systemic causative factors, it was suggested to introduce a division into primary and secondary burning mouth syndrome [34]. Primary (idiopathic, real) BMS refers to a situation where no local or systemic etiologic factors of the oral burning can be found. Secondary BMS is defined as an oral pain syndrome resulting from some evident local or general medical cause. In the secondary syndrome the treatment is directed to the elimination of the defined causative factor and usually results in rapid improvement of the patient's condition [34, 35].

Diagnosis of burning mouth syndrome

The diagnosis of burning mouth syndrome is based on a very careful, detailed medical interview and clinical examination [14, 19, 35]. At the beginning, the type and localization of pain need to be classified. Scala *et al.* defined 5 basic features of the pain in the course of BMS: the pain persists constantly for the last 4-6 months, it is present during most of the daytime and usually spontaneously decreases at night, it does not exacerbate while eating or drinking and it is directly localized on oral mucosa. Additional BMS signs listed by the same authors include taste disorders, xerostomia, paresthesia and personality/mood disorders [35]. A special attention should be paid to the history of systemic diseases, medicines used, habits and addictions. It should be clarified whether the patient uses any prosthetic appliance. If yes, the type, age of the denture and the patient's hygienic customs related to the appliance should be noted and discussed.

In burning mouth syndrome, no evident, clinical pathologic symptoms appear on the oral mucosa during the clinical examination [10]. The presence of erythema, erosions, ulcers and removable or non-removable coat-

ings indicate the infectious, inflammatory or traumatic cause of the oral discomfort. In those cases, the initial diagnosis of burning mouth syndrome should be modified and the patient should receive an appropriate treatment suitable for the cause of the disease [14]. In the clinical examination some oral conditions, which may be accompanied by the pain and burning, need to be considered. It includes e.g. candidiasis, lichen planus, geographic tongue, recurrent aphthous stomatitis, pemphigus and contact allergic mucositis induced by dental materials [6, 14]. In further diagnostic steps, the function of the temporo-mandibular joint and the masseters' tension should be evaluated. A careful teeth examination and assessment of the occlusal conditions are required to exclude the tooth-related pain cause. In patients undergoing prosthetic treatment, the condition of currently used dentures should be checked and the presence of denture stomatitis should be excluded [14, 35].

Recommended additional laboratory tests include full blood count, evaluation of blood serum levels of folic acid, iron, vitamins B and steroid sex hormones and glycaemia. Oral swab and culture are indicated to exclude candidiasis and infections with non-physiologic oral bacteria. Salivary glands tests (sialometric and sialochemical analysis) allow to detect disturbances in saliva production and composition [15, 16, 19]. Several researchers emphasize the role of disturbances in the central and peripheral nervous system function in the etiopathogenesis of BMS, therefore the neurologic observation seems to be also indicated in patients with this condition [19, 28, 36].

Treatment of burning mouth syndrome

Due to the multifactorial nature of the BMS aetiology, its treatment requires co-operation of specialists in various fields of medicine and dentistry. That makes it a diagnostic and therapeutic challenge. The key point is to detect all the potential local and systemic causative factors and to define whether the patient suffers from the primary or secondary BMS.

The causative treatment of the secondary BMS comprises elimination of the local etiologic factors, e.g. fungal and bacterial oral infections, irritation due to electro-galvanic phenomenon or ill-fitting dental appliances and treatment of the occlusal dysfunctions. On the other hand, the therapy of detected systemic diseases potentially related to the oral burning and pain, like diabetes mellitus and nutritional deficiencies, needs to be implemented. The improvement of the general health condition and the elimination of local irritants results in the remission of symptoms in a significant part of the patients with secondary BMS [11, 37, 38].

In the case of primary burning mouth syndrome the treatment is mainly symptomatic and based on softening the pain and concurrent signs. The application of

local and systemic analgesics (lidocaine hydrochloride, benzocaine, benzydamine) is recommended. Additionally, topical agents with coating properties, composed of chamomile and linseed, and available in form of gels, ointments and aerosols may be used. In concordant xerostomia some topical moisturizing agents with carboxymethylcellulose and enzymes as those present in natural saliva, like lactoferrin and lactoperoxidase, can be applied. It was also proved that antidepressants exhibit a moderate effectiveness in the treatment of pain syndromes [19, 24, 37]. Decrement in pain severity in the course of BMS was observed after benzodiazepines (clonazepam, diazepam), tricyclic antidepressants (TCA) (amitriptyline, doxepin) and selective serotonin reuptake inhibitors (SSRI) (sertraline, paroxetine) [2, 19, 24, 37]. The adverse effect of sertraline in the management of the oral discomfort in perimenopausal women was however reported by Grady *et al.*, who observed that the drug did not eliminate periodic hot flashes and increased the oral dryness [39]. Meanwhile, the promising results were presented by Femiano *et al.*, who attempted to treat BMS with alpha lipoic acid (ALA). This compound belongs to a group of antioxidants with neuroprotective and stimulating effects on the neuronal growth factor (NGF) [15]. In patients with BMS, in whom concomitant neurological disturbances similar to those typical of Parkinson's disease were revealed during neurological observation, a therapy with levodopa and bupropion – a dopamine reuptake inhibitor – may be considered [19].

People with burning mouth syndrome are motivated to obey the oral hygiene rules meticulously and to eliminate addictions (nicotinism, alcohol overuse) [16, 19]. Mouth-rinses with alcohol are also contraindicated as they may additionally dry and irritate the oral mucosa. Spicy and salty food should be limited in the diet [19].

Influence of hormonal replacement therapy on the course of burning mouth syndrome

The influence of hormonal replacement therapy on the oral pain and burning intensity in BMS perimenopausal women raises lot of controversy and the results of international studies remain conflicting. The comparative analysis based on randomized epidemiological data and evaluating the impact of particular hormonal replacement therapy (HRT) types on the oral cavity condition has not been performed up to now [6]. After the administration of HRT in 149 menopausal women with BMS, Wardrop *et al.* observed the improvement of the oral condition in 70% of the examined subjects [40]. Forabosco *et al.* described a decrease of pain in the oral mucosa in 15 out of 27 perimenopausal women who underwent estradiol supplementation and in 12 out of 22 perimenopausal women treated

with estriol. Concurrently, the authors emphasized that the rapid decrement in the steroid sex hormones level during the menopause may lead to the discomfort and burning sensation only in some women as generally the number of nuclear receptors for sex steroids in the oral cavity is rather low [8]. Meanwhile, Tarkkila *et al.*, based on the results of a questionnaire performed on 3173 perimenopausal women, did not confirm the positive impact of the hormonal replacement therapy on the oral cavity condition. According to the participants of their study, the use of HRT did not influence the severity of xerostomia and did not prevent burning and pain of the oral mucosa [41]. Dissimilar results were achieved by Yaçın *et al.* [42] and Jansson *et al.* [43]. In their observations, dry mouth affected a higher percentage of menopausal women not using any type of hormonal replacement therapy than women on HRT. Kaczmarek *et al.* stated that the implementation of individually adjusted HRT in 16 volunteers recruited from a group of perimenopausal women with concomitant oral discomfort helped to improve some of salivary parameters. Already after one month from the beginning of the treatment, the flow of unstimulated saliva was increased, while the total protein and calcium salivary content was reduced. There was also observed an elevation in the concentration of salivary peroxidase – an important antioxidant which limits the bacterial, fungal and viral growth in the oral environment. After the treatment, the levels of the above mentioned salivary parameters in the study group were comparable to those reached in the control group of 16 females in reproductive age. Meanwhile, HRT did not influence the pH level in the oral cavity of the study group' volunteers [9].

Conclusions

Burning mouth syndrome is a condition, which may severely decrease the quality of life in perimenopausal women [44]. Due to its multifactorial and still not fully understood aetiology, the therapeutic procedures in BMS require the cooperation of specialists in various fields of medicine and dentistry. Very often the treatment options do not ensure full recovery, which raises stress and frustration in some patients. The imbalance in oestrogen and progesterone serum levels in the perimenopausal period may in some women also induce anxiety and depression. Psychogenic factors play an important role in the development of BMS, therefore psychological care seems to be another important element in the management of this condition.

Disclosure

Authors report no conflicts of interest.

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