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BURNING MOUTH SYNDROME AT THE HORMONAL CROSSROADS: THE INTERPLAY OF PERIMENOPAUSE AND ORAL CONTRACEPTIVES

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ABSTRACT

AIM: Burning Mouth Syndrome (BMS) is a chronic, idiopathic orofacial pain disorder characterized by a persistent burning sensation despite clinically normal oral mucosa, with a marked predilection for women in the perimenopausal age group. Its etiopathogenesis is multifactorial, with increasing evidence implicating hormonal disequilibrium and dysregulated peripheral and central neurosensory pathways.

Subjects and Methods: We report a case of a 46-year-old perimenopausal woman who developed progressively worsening oral burning sensations shortly after initiating oral contraceptive therapy for menstrual regulation.

Results: The clinical examination revealed a completely normal oral mucosa with no detectable pathology, and routine hematological investigations were unremarkable.

Conclusion: In the absence of identifiable local or systemic causes, and given the clear temporal association with exogenous hormonal exposure, a diagnosis of primary BMS was established.

KEYWORDS: Burning Mouth Syndrome; Oral Contraceptive Pills; Steroid Hormone; Neurosteroids; Peripheral Neuropathy

INTRODUCTION

Burning Mouth Syndrome (BMS) is a chronic, idiopathic oral pain condition characterized by a persistent burning sensation in patients with clinically normal oral mucosa (Sun et al, 2013). The condition is reported far more frequently in perimenopausal and postmenopausal women, reflecting the substantial influence of hormonal fluctuations on its presentation (Dahiya et al, 2013). Alterations in estrogen and progesterone levels during the menopausal transition can affect oral mucosal sensitivity, salivary gland activity, and peripheral nociceptive processing, creating a heightened predisposition to neuropathic oral discomfort (Sleboida et al, 2014).

The etiopathogenesis of BMS is multifactorial, involving a complex interplay of peripheral and central neuropathic changes, impaired pain modulation, microvascular alterations, psychological factors, and endocrine disturbances (Vaidya et al, 2012).The presence of estrogen receptors within the oral mucosa and salivary glands further supports the notion that hormonal disequilibrium may play a significant role in both the initiation and persistence of symptoms.[5] The consistently higher prevalence of BMS among perimenopausal women reinforces the importance of considering endocrine influences during evaluation(Dahiya et al, 2013).

Diagnosis is largely clinical and requires the systematic elimination of secondary causes, such as nutritional deficiencies, systemic diseases, candidal infections, xerostomia, mucosal pathology, parafunctional behaviors, and medication-related effects (Dieb et al, 2017). In primary BMS, both intraoral examination and laboratory investigations typically yield unremarkable findings, making diagnosis challenging and emphasizing the need for a comprehensive history that includes assessment of hormonal status and pharmacologic exposure (Vaidya et al, 2012).

This case report describes a perimenopausal woman who developed symptoms of BMS following the initiation of oral contraceptive therapy, underscoring the interplay between endogenous hormonal fluctuations and exogenous hormonal modulation in the pathogenesis of BMS.

SUBJECTS AND METHODS

A 46-year-old female reported to the dental outpatient department with history of persistent burning sensation of oral cavity for past six months. The symptoms began gradually and progressed to a continuous burning discomfort involving the anterior tongue and bilateral buccal mucosa. She noted that the intensity of the burning tended to increase toward the later part of the day, while mornings were relatively more comfortable. Despite its persistence during daytime hours, the sensation did not disturb sleep and was typically absent upon waking.

The patient denied any episodes of sharp pain, numbness, tingling, or electric-like sensations. She also reported no associated taste disturbances, oral dryness, or sensitivity to particular food items. There was no history of recent oral trauma, thermal injury, allergy, or exposure to irritants such as alcoholic mouthwashes or acidic beverages. Eating or drinking did not significantly worsen the symptoms.

Her medical history was unremarkable, and she reported no habits such as tobacco use, alcohol consumption, or parafunctional activity. She had been taking a combined oral contraceptive pill for the past year to regulate menstrual irregularities. She recalled that the burning sensation appeared a few weeks after starting the medication, with gradual worsening over time. She was not on any other long-term medications and had undergone no recent dental treatment.

Extraoral findings were within normal limits. Intraorally, the mucosa appeared healthy, with no signs of erythema, ulceration, atrophy, candidal deposits, geographic tongue, lichenoid changes, or mechanical irritation. The tongue exhibited normal morphology and mobility, salivary flow appeared adequate, and there was no tenderness on palpation. Overall, oral hygiene was satisfactory.

To rule out secondary causes, a complete hematological and biochemical profile was obtained. Results for complete blood count, fasting glucose, serum iron, ferritin, folate, vitamin B12, thyroid function, and zinc were all within the normal limits. No systemic illness, nutritional deficiency, endocrine abnormality, or xerostomia-inducing condition was identified.

RESULTS

Based on the persistent burning sensation, normal clinical and laboratory findings, absence of identifiable etiological factors, and the temporal relationship between the onset of symptoms and oral contraceptive use in a perimenopausal patient, a provisional diagnosis of **"**Burning Mouth Syndrome" was made.

The patient was counselled regarding the chronic and hormonally influenced nature of the condition, advised to review contraceptive use with her gynecologist, and initiated on symptomatic and behavioral management strategies.

DISCUSSION

Hormonal fluctuations and exposure to exogenous hormones are increasingly recognized as significant factors in the pathogenesis of BMS. The condition exhibits a marked female predominance, with the highest incidence observed during the menopausal transition. This period is characterized by substantial variations in estrogen and progesterone levels, which can modify oral mucosal sensitivity and trigeminal sensory processing, thereby lowering the threshold for persistent oral burning (Sun et al, 2013; Dahiya et al, 2013).

Such endocrine instability may heighten neurosensory responsiveness and predispose susceptible individuals to chronic oral symptoms. The identification of estrogen receptors within the oral mucosa and salivary glands further substantiates the role of hormonal mediation in influencing oral sensory pathways (Grover et al, 2014).

Beyond endogenous hormonal shifts, oral contraceptive pills (OCPs) represent a notable exogenous factor capable of altering systemic hormonal balance. OCPs deliver synthetic estrogens and progestins that modify physiological steroid levels and disrupt the natural estrogen–progestin rhythm. This pharmacologic alteration may intensify neurosensory imbalance, particularly in women who are already experiencing hormonally dynamic phases of life. Hormonal modification of this nature can affect neuroactive steroid synthesis, influence salivary composition, and impair central pain modulation mechanisms closely aligned with neuropathic pathways implicated in BMS (Sun et al, 2013; Dahiya et al, 2013, Slebioda et al, 2014). Previous literature consistently indicates that abrupt hormonal changes, whether linked to menopause, hormone therapy, or contraceptive use, may precipitate or exacerbate BMS manifestations (Sun et al, 2013; Dahiya et al, 2013, Slebioda et al, 2014).

When secondary causes such as nutritional deficiencies, systemic conditions, and endocrine abnormalities are effectively ruled out, as in presentations of idiopathic BMS (Dieb et al, 2017), hormonal dysregulation becomes a compelling explanatory mechanism. In such situations, the temporal relationship between the initiation of hormonal therapy and the onset of symptoms assumes clinical significance, suggesting that exogenous hormone exposure may trigger or unmask BMS in predisposed individuals.

Overall, current evidence supports the concept that both natural hormonal variability and OCP-induced hormonal modulation can destabilize steroid-responsive neurosensory circuits, contributing to the onset or worsening of BMS in susceptible women. Consequently, a thorough assessment of hormonal status, contraceptive use, and menstrual history should be an integral part of the diagnostic evaluation of unexplained oral burning. Collaboration with gynecologic care providers may further aid in optimizing hormonal balance and improving patient outcomes.

The administration of oral contraceptives introduces a synthetic hormonal profile that overrides normal ovarian cycling, creating a non-physiologic estrogen–progesterone environment. This shift influences numerous oral sensory mechanisms, including epithelial receptor responsiveness, salivary film integrity, and the synthesis of inhibitory neurosteroids that modulate trigeminal pathways. As inhibitory control diminishes, peripheral sensory fibres become increasingly reactive, and central processing pathways display enhanced sensitivity. These combined disturbances lower the threshold for perceiving oral discomfort, offering a plausible explanation for the development of Burning Mouth Syndrome in hormonally vulnerable individuals (Figure 1).

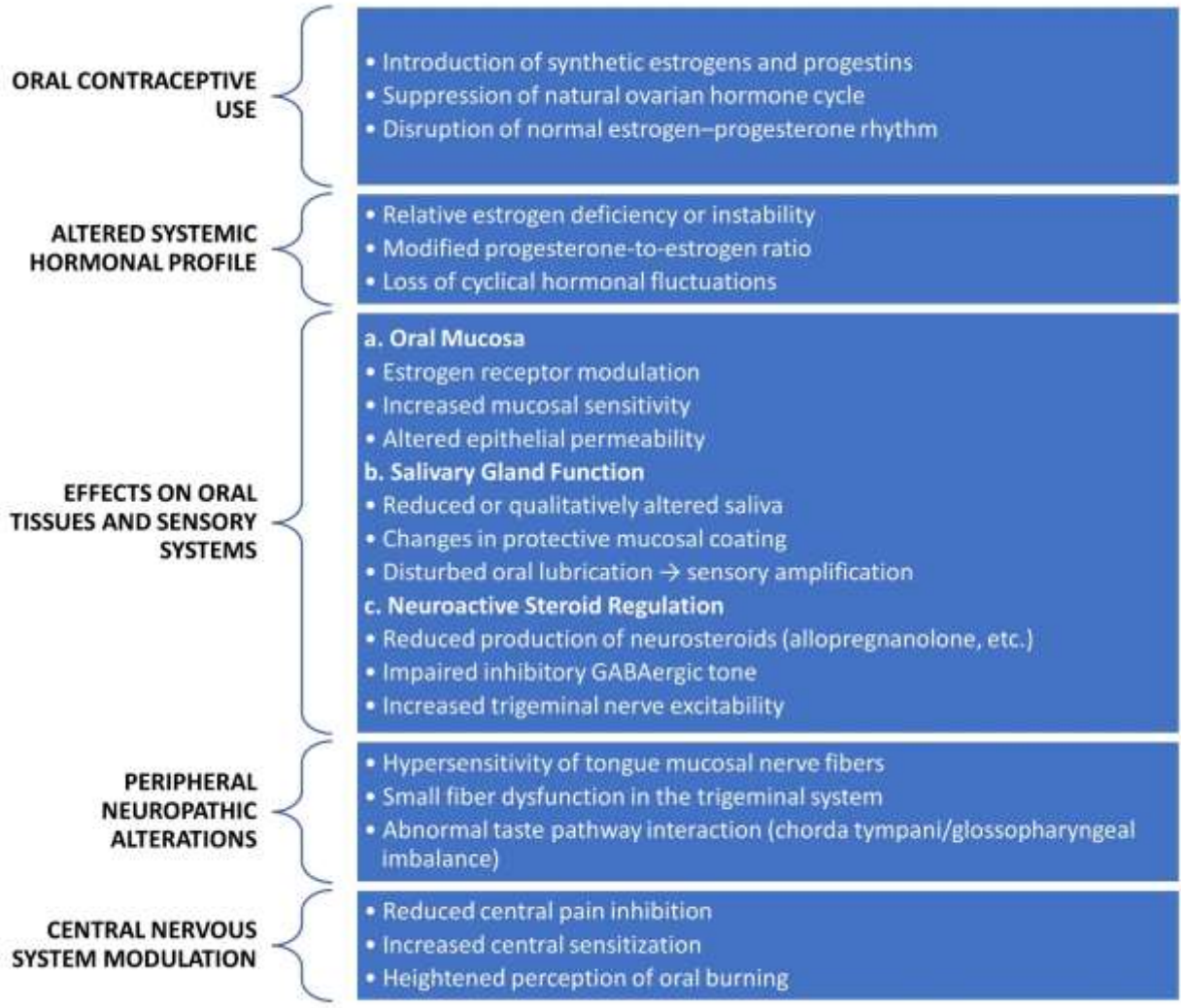

Figure 1. Pathophysiological link between hormonal fluctuations, oral contraceptive use, and Burning Mouth Syndrome (BMS).

The contraceptive–related disruption of estrogen and progesterone balance may contribute to Burning Mouth Syndrome (BMS) (Figure 2). Altered hormone signaling can heighten TRPV1 and P2X3 sensitivity, increasing peripheral pain responses and trigeminal nerve excitability. Simultaneously, reduced neuroactive steroids and estrogen withdrawal may weaken inhibitory pathways and enhance central excitatory signaling. Progesterone suppression may further influence dopaminergic activity and TRPV1 regulation. Together, these hormone-driven peripheral and central changes may sustain the chronic burning sensation characteristic of BMS. Informed consent was obtained from the patient to report this case.

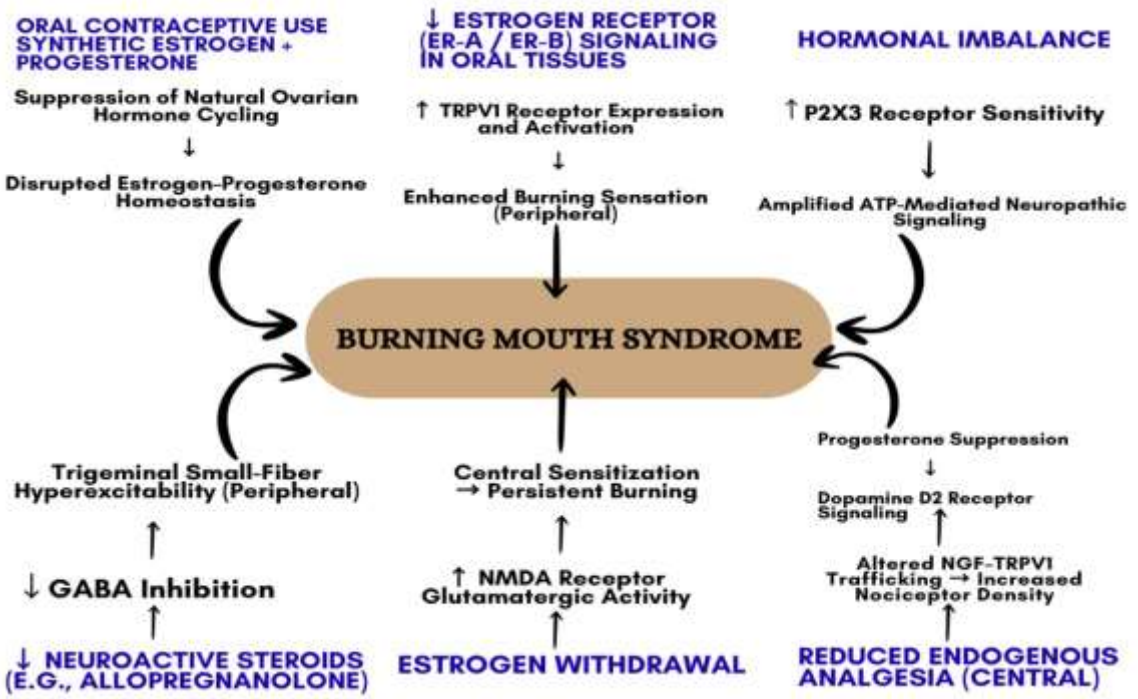

Figure 2. Molecular interactions linking oral contraceptive–induced hormonal changes to biomarker alterations in burning mouth syndrome.

CONCLUSION

Burning Mouth Syndrome may be mediated by dysregulation of systemic endocrine pathways, including contraceptive-induced alterations in steroid hormone profiles. In the absence of detectable clinical or biochemical abnormalities, recent hormonal perturbations should be considered as potential pathogenic factors. Recognizing these influences can refine diagnostic interpretation of idiopathic oral burning and facilitate coordinated, multidisciplinary management tailored to the patient's endocrine status.

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Conflicts of interest
There are no conflicts of interest.

Consent for Publication: Written informed consent for publication of clinical details and accompanying images was obtained from the patient and is included in patient consent statement.

Credit statement:
TC: Conceptualization, Methodology, Data curation, Resources, Writing draft, Writing review &editing.
AAB: Conceptualization, Methodology, Data curation, Resources, writing draft, Writing review &editing.
NN: Investigation, Data curation, Resources, Writing draft, Writing review &editing.
PS: Conceptualization, Methodology, Data curation, Resources, Writing draft, Writing review &editing.
JS: Investigation, Data curation, Resources, Writing draft, Writing review &editing.

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