

CASE REPORT

Common Oral Manifestations in a Denture Wearer Patients with Suspected Diabetes Mellitus

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ABSTRACT

Background. Acute pseudomembranous candidiasis, often called oral thrush, is a disease in the oral cavity caused by the overgrowth of *Candida albicans*. Angular cheilitis is an inflammatory lesion on the corners of the mouth. The purpose of this case report is to document the oral manifestations in patients with suspected diabetes mellitus. **Case Report.** A 57-year-old woman complained of a burning sensation throughout the mouth and lips, presenting a white spot on her tongue with soreness in the past year. The patient self-reported to have diabetes mellitus and regularly takes medication. Despite this, the patient still has experienced classical signs of diabetes mellitus, which are polyphagia, polydipsia, and polyuria. Intraorally, the burning sensations were related to the full denture continuous wear, and she was diagnosed with acute pseudomembranous candidiasis and angular cheilitis. The treatment given to this patient was symptomatic therapy in the form of Aloclair Plus mouthwash, causative therapy in the form of Nystatin oral suspension and referral to an internist to further examine the condition of diabetes mellitus, and supportive therapy in the form of lanolin and vaseline.

Keywords: oral manifestation, diabetes mellitus, candidiasis, angular cheilitis, oral complications

INTRODUCTION

The duration of hyperglycaemia influences the oral manifestation and complications of diabetic conditions. In chronic hyperglycaemia, a patient develops complications such as xerostomia (dry mouth), caries, gingivitis, periodontal diseases, burning mouth (glossodynia, dysgeusia), coated and fissured tongue, candidiasis, and defective wound healing. Therefore, blood glucose control is very important to prevent further impairment.

One of the most common complications of denture wearers with a diabetes mellitus background is denture stomatitis or candidiasis. Oral candidiasis is caused by the overgrowth of *Candida albicans* in suitable environments, such as in diabetic oral conditions where salivary flow is decreased, poor metabolic control is present, and defence mechanisms are impaired. *Candida spp.*, as a commensal microorganism comprising 53% of microbes in the oral cavity, will turn into a pathogen when the oral condition favours it.¹ In the xerostomic mouth, one of the suitable conditions where salivary gland dysfunction occurs, candida-related lesions may flourish. Clinically, it may present as denture stomatitis, angular cheilitis, median rhomboid glossitis, and whitish-speckled lesions such as pseudomembranous candidiasis. Acute pseudomembranous candidiasis, often called oral thrush, is often seen in elderly, immunocompromised conditions such as AIDS, diabetes mellitus, the prolonged use of corticosteroids, and those with haematological disorders. The lesions appear as white to whitish-yellow plaques that can be removed by scraping, leaving erythematous and sometimes bleeding surfaces. The areas of the oral cavity that are often affected include labial mucosa, buccal mucosa, tongue, hard palate, soft palate, and oropharynx.^{2,3}

Angular cheilitis is an inflammatory lesion in the corners of the mouth. Clinically, it is characterized as erythema, ulceration, or crusting area in the corner of the mouth, either unilaterally or bilaterally. This lesion can cause pain, tenderness or even a burning sensation. The prevalence in adults reaches 0.7—3.8% equally in both males and females and often occurs in the third to sixth decades. The causes of angular cheilitis are multifactorial, including anatomical factors, allergies, microorganisms, nutritional deficiencies, and systemic conditions such as xerostomia and diabetes mellitus.⁴

To establish the diagnosis of diabetes mellitus, patients can be examined based on anamnesis regarding classic symptoms and objectively on screening tests. The classic symptoms are an increase

in hunger (polyphagia), thirst (polydipsia), and urination (polyuria). A test to establish the diagnosis of diabetes mellitus is the glucose screening test. A glucose level greater than 200 mg/dl may indicate a patient with diabetes mellitus.⁵

In this case, several oral manifestations were found in a diabetes mellitus patient. This case report aims to discuss different oral manifestations of the conditions, starting from understanding the clinical manifestation, aetiology, predisposing factors, diagnosis, and appropriate treatments. Different oral manifestations may provide adequate information for further referral and treatment to other healthcare workers.

CASE REPORT

A 57-year-old female patient came with complaints of a burning sensation in the entire mouth and lips that started a year ago. The patient reported that the burning complaint appeared spontaneously and experienced pain throughout the day. She had already been treated with traditional Chinese herbal remedies and had been prescribed antifungal drops of Nystatin by a general practitioner without much success. No history of fever was reported regarding the present complaint.

The patient reported that she had amlodipine for her hypertension and had it changed to Adalat Oros (nifedipine) six months ago. She was diagnosed as diabetic and regularly took medication for that. However, she still had feelings of hunger and excessive thirst and urinated frequently. There was no hospitalization history, and she was not aware of any drug allergies. The patient had a complete maxillary denture that was made six years ago, and that was also the last time she saw her dentist. The patient brushed her teeth once a day at night with foamy toothpaste and cleaned the dentures afterwards, brushing with the same toothpaste. She did not take off the denture at night and always wore the denture during the day.

There is no familial history of similar conditions, and no hereditary disease was detected. The patient admitted that she was not in a stress condition. The patient's diet was self-reported as balanced, but she was aware that she had only consumed about two glasses of water a day. The patient was a nonsmoker and had no drinking problems.

On extra oral examination, there were fissured, irregular, red-based, yellowish-dried peeling areas on the right and left corners of the mouth measuring around 2x0.5mm (Figure 1). Intraorally, irregular white plaque lesions, multiple with different sizes varying from 0.5 to 1 cm, presented on the dorsal of the tongue and the ventral of the tongue. Atrophic surfaces also lost the normal taste buds and were replaced by smooth, reddish surfaces (Figure 2).

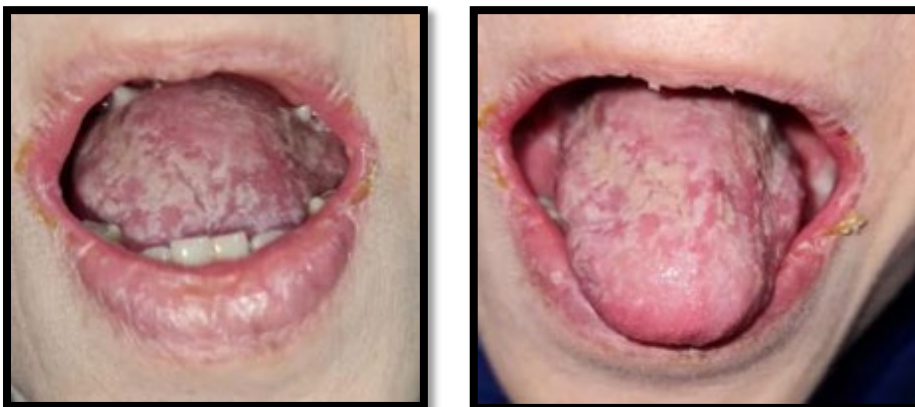


Figure 1. Extra orally on the corner of the mouth showed a dried yellowish crust with cracked vermilion borders. Figure 2. Whitish speckled on the dorsum of the tongue, the dried surface of oral mucosa consistent with xerostomia.

Similar atrophic mucosa counterparts are also present in both buccal mucosa, measuring around 3x1.5cm. On palpation, its consistency was similar to the surrounding tissue (Figure 3). Well-defined,

multiple atrophic lesions were presented oval, measuring 3.5x1 cm on the hard palate adjacent to the palatal alveolar ridge, red in colour with surrounding colour and consistency similar to surrounding tissue bilaterally (Figure 4).



Figure 3. Reddish atrophic lesions on the left and right buccal mucosa showed increased saliva viscosity. Saliva was reduced to sticky threads on teeth surfaces and mucosal surfaces.



Figure 4. A well-defined, multiple atrophic lesions on the hard palate, extending to the soft palate.

Based on history and clinical examination, this case was diagnosed with acute pseudomembranous candidiasis and angular cheilitis. Symptomatic treatment was to reduce pain with hyaluronic acid (Alocclair Plus oral rinse). The causative treatment was Nystatin oral suspension, referral to an internist, and supportive care in the form of lanolin and Vaseline to apply to the cracking area on both corners of the mouth.

Other than that, based on the patient's education approach, which was communication, information and education (Indonesian abbreviation was KIE), the patient was given all the information she needed to understand her condition and also helped her consider and decide what was best for her health conditions. In the communication, the patient was explained about the nature of her presentation on her mouth, that the condition in her mouth is not harmful, not a malignancy, can be cured, is not contagious, and has a good prognosis if treated accordingly.

The instructions given to the patient were to maintain oral hygiene by brushing their teeth twice a day at the right time, in the morning after breakfast and at night before going to bed, in addition to cleaning in between the teeth with dental floss and regular check-ups with the dentist at least every six months. The patient is also taught to clean her maxillary denture with gentle soap and running water. Also, the patient was given denture hygiene procedures, which included the removal of dentures during

nighttime and soaking them in water after washing or cleaning them up. The antiseptic drug in the prescription was Aloclair mouthwash, which was used 3 times a day for plaque control. It was used after the oral hygiene routine, which involved tooth brushing. The instruction was to gargle as much as two teaspoons or about 10mL for one minute, then spit it away. Instruct the patient not to eat or drink 30 minutes after gargling. The next drug is an antifungal in the form of Nystatin oral suspension, which was to be used four times a day for two weeks. The instruction was to take 1mL of Nystatin drop on the tongue, swish it around the oral mucosa with the help of the tongue for 1-2 minutes, and then swallow it. Instruct the patient not to eat or drink for 30 minutes. The last prescription was lanolin and vaseline, applied to dry lips and mouth corners. Patient were instructed to increase their drinking intake by 2L/day or the equivalent of eight glasses. Patients were also referred to an internist.

The patient was educated about the condition of white patches on the tongue, which, in medical terms, was called acute pseudomembranous candidiasis. While the condition in the corners of the mouth is called angular cheilitis. These two conditions are caused by a fungal infection of *Candida albicans*, exacerbated by suspected uncontrolled diabetes mellitus. On examination, the patient's mouth was seen as dry and thick saliva, a feature of xerostomia. Mainly, the suspected cause of this condition, as the patient admitted, was the small amount of drinking intake, which is only two glasses a day and is aggravated by uncontrolled diabetes mellitus. Therefore, the patient was referred to an internist for further examination of her Diabetes mellitus condition. The patient was scheduled for follow-up to see if the lesion was healing, but she failed to attend.

DISCUSSION

The patient was suspected of having undermedicated diabetes mellitus based on a history of extreme hunger, excessive thirst, and frequent urination, even though she already had diabetic medication. Then, on the medical history, the patient was also prescribed Nifedipine by a general practitioner. As we know, in diabetic patients, high glucose levels in the blood would form blood clots, which in turn could lead to atherosclerosis and high blood pressure.⁶ Unfortunately, the patient refused to have a further investigation related to blood sugar examination.

The diagnosis of the lesion on the patient's tongue was acute pseudomembranous candidiasis. These lesions are caused by *C. albicans*, a commensal microorganism in the oral cavity, but can become pathogenic due to changes in the oral environment and, in this case, were aggravated by high glucose levels in the blood. High and uncontrolled glucose levels will cause impaired nutritional intake for epithelial, endothelial, and acinar cells. As a result, these cells will become enlarged, causing narrowing of the lumen and microangiopathy, where blood flow will be reduced. Acinar cells, over time, became damaged and reduced saliva production, causing dry mouth. These things will contribute to the oral cavity's susceptibility to Candidal infections.¹

In addition to these pathophysiologic processes, the patient's oral hygiene was also compromised. She barely removed her denture, including at nighttime when sleeping. The prolonged denture-mucosa contact provides the perfect niche for *Candida* sp colonies. The unpolished surface significantly affects the adhesion of *C. albicans* to the denture, especially if the acrylic resin surface is rough. The accumulation of plaque and microorganisms on the polished surface supports the transition of *C. albicans* from commensal to pathogenic. In addition, the fitting surface allows the colonization of microorganisms because the environment is relatively anaerobic.⁷

The differential diagnosis of acute pseudomembranous candidiasis includes non-erosive oral lichen planus and homogenous leukoplakia. Both appeared as a white lesion, but acute pseudomembranous candidiasis can be removed by scraping, leaving erythematous and sometimes bleeding surfaces. Moreover, non-erosive oral lichen planus cannot be removed and has a characteristic feature, namely Wickham striae.³ While acute pseudomembranous candidiasis is symptomatic, homogeneous leukoplakia is asymptomatic. The white patch in homogenous leukoplakia was also hardly removed when scraped off. The aetiology of homogeneous leukoplakia is unknown but is thought to be related to smoking.⁸

The diagnosis of lesions on the corners of the mouth was angular cheilitis. Based on the depth and number of folds, angular cheilitis is divided into 4 types. Type I is characterized by a single fissure limited to the corners of the mouth. Type II is characterized by wider and longer lesions than type I.

Type III is characterized by multiple fissures that spread from the corners of the mouth to the surrounding skin with a limited reddish area around the fissure. Type IV is characterized by widespread erythema of the adjacent skin in the absence of fissures.⁴

Angular cheilitis in this patient was caused by *C. albicans* infection and was exacerbated by the xerostomia condition due to high blood glucose level. The condition of the patient's angular cheilitis may also be associated with the ill-fitting old dentures. The patient may also have lost the height of the vertical dimension, resulting in excessive occlusive folds at the corners of the mouth. Saliva tends to gather in that area, making it prone to maceration and fissures and increasing *C. albicans* colonies.⁴

The angular cheilitis on the corner of the mouth sometimes involve the lips and might be similar to herpes labialis. The aetiology of angular cheilitis is *C. albicans* and *Staphylococcus aureus*, while the aetiology of herpes labialis is the reactivation of the Herpes simplex virus type 1. Herpes labialis is also preceded by prodromal symptoms 6-24 hours before the lesions appear. The lesions begin as vesicles that rupture and crust within two days. The appearance of crusts at the corners of the mouth is similar to that of angular cheilitis.⁹

The second differential diagnosis of angular cheilitis is erythema multiforme. The aetiology of angular cheilitis is *C. albicans* and *S. aureus*, while erythema multiforme is viral, bacterial, or drug infection. In erythema multiforme, the lesion begins with the formation of bullae, which will later rupture and become crusted. Erythema multiforme is also accompanied by lesions on the skin called target lesions. Meanwhile, angular cheilitis is not preceded by bullae formation or accompanied by a target lesion.⁸

In this case, the patient also had a burning mouth and xerostomia. Based on anamnesis, the patient reported that the burning complaint appeared spontaneously, and the pain was felt throughout the day. Xerostomia is a concomitant symptom in patients who complain of burning mouth, with a prevalence varying between 34% and 39%. Xerostomia is characterized by hyposalivation, where the salivary flow rate is below 0.1 mL/min in unstimulated saliva or below 0.7 mL/min in stimulated saliva examined by sialometry. Salivary secretion is regulated by the sympathetic and parasympathetic nervous systems. The sympathetic nervous system regulates saliva's protein content and composition, while the parasympathetic system regulates salivary secretion volume. The patient belongs to the elderly group, in which there is usually a decline in the function of the salivary glands. When coupled with high glucose levels in diabetic conditions, it further disrupts acinar cells' function and triggers neuropathy. This would interfere with the performance of the sympathetic and parasympathetic nerves.

It was a notably significant contribution to her xerostomic condition that the patient had Adalat Oros (Nifedipine) for her hypertension. Nifedipine is an antihypertensive, classified as a calcium channel blocker, can cause xerostomia through the muscarinic M3 receptor, and causes a reduction in salivary flow. Moreover, in this patient, polyuria, as admitted, would worsen the dehydration and further compromise the salivary functions.¹⁰⁻¹²

The treatment approach was primarily for symptomatic therapy, which involves administering hyaluronic acid in mouthwash to overcome the stinging sensation throughout the mouth. Hyaluronic acid is a linear polymer of glucuronic acid and N-acetyl glucosamine disaccharide. The mechanism of action of hyaluronic acid is to form a protective layer around the oral cavity to protect exposed or sensitive nerve endings from excessive stimulation. Hyaluronic acid will bind to water proteins to provide protection, attract fibroblasts to accelerate wound healing, reduce tissue weakness to support the regeneration process, inhibit bacteria to relieve inflammation, and reduce capillary permeability. In addition, other ingredients, such as aloe vera as an anti-inflammatory, will reduce inflammation around the lesion and speed up healing.¹³

The causative therapy for candidiasis was by administering the antifungal drug Nystatin oral suspension and a referral to an internist to examine the suspected diabetes mellitus condition further. Nystatin is a membrane-active polyene macrolide produced by the *Streptomyces noursei* strain and available in various preparations such as suspension, topical cream, and oral pastilles. The recommended dose for children and adults is 200,000 – 600,000 IU, while in infants, it is 100,000 – 200,000 IU. Nystatin has a high affinity for ergosterol, a component of fungal cell walls, where it will interact and bind, causing pores in the cell walls and making it permeable. This will allow intracellular

potassium to leave the cells and finally disrupt the cell's functions. Nystatin has no effect on bacteria because bacteria's cell walls do not have sterol components.^{14,15}

Further treatment was for supportive therapy by administering lanolin and Vaseline as lip moisturisers. Besides its moisturiser effect to soften the skin, lanolin is an emollient that spreads easily on the skin, forming an occlusive oil layer on the epithelial stratum corneum, thereby reducing transepidermal water loss. Meanwhile, Vaseline is an occlusive type that forms a layer on the skin's surface and locks in the moisture underneath, creating the illusion of hydration.^{16,17}

CONCLUSION

The common symptoms in patients with suspected high glucose levels, such as in this case, are xerostomia, burning mouth sensations, white patches related to oral candidiasis and angular cheilitis. Finding all these features warrants the dentist to send the patient for further medical examination. Patients with acute pseudomembranous candidiasis and angular cheilitis usually have underlying systemic conditions that must be addressed to eradicate *Candida albicans* successfully. This patient's challenge was that she refused further workup on her underlying conditions. Despite that, the dental professional still provided a comprehensive treatment plan and communicated it with the patient, which will help her make the right decision for her health.

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CONFLICT OF INTEREST

No conflict of interest was disclosed.

REFERENCES

1. Lidya A, Dewi SRP. Penatalaksanaan Kasus Kandidiasis Pseudomembran Akut pada Diabetes Melitus. *Jurnal Ilmiah dan Teknologi Kedokteran Gigi*. 2019;15:37.
2. Patil S, Rao RS, Majumdar B, Anil S. Clinical Appearance of Oral Candida Infection and Therapeutic Strategies. *Front Microbiol*. 2015 Dec 17;6:1391.
3. Greenberg M, Glick M, Ship J. Red and white lesions of the oral mucosa. In: *Burket's Oral Medicine*. 11th ed. BC Decker Inc; 2008. p. 82.
4. Krishnan PA, Anil S, Vijayan S. Angular Cheilitis - An Updated Overview of the Etiology, Diagnosis, and Management. *Journal of Dentistry and Oral Sciences*. 2021 Feb 14;8:1433–8.
5. Kardika IBW, Herawati S, Yasa IWPS. Preanalytic and Interpretation Blood Glucose for Diagnose Diabetes Mellitus. *E-Jurnal Medika Udayana*. 2013;1707–21.
6. Petrie JR, Guzik TJ, Touyz RM. Diabetes, Hypertension, and Cardiovascular Disease: Clinical Insights and Vascular Mechanisms. *Can J Cardiol*. 2018 May;34(5):575–84.
7. Nurdiana N, Jusri M. Pseudomembranous Candidiasis in Patient Wearing Full Denture. *Dental Journal (Majalah Kedokteran Gigi)*. 2009;42(2):60–4.
8. Neville BW, Damm DD, Allen CM, Chi AC. *Dermatologic Diseases*. In: *Oral and Maxillofacial Pathology*. 4th ed. Elsevier; 2016. p. 729–36.

9. Neville BW, Damm DD, Allen CM, Chi AC. *Viral Infections*. In: *Oral and Maxillofacial Pathology*. 4th ed. Elsevier; 2016. p. 220–3.
10. Noor TNE binti TA. Burning Mouth Syndrome Caused by Xerostomia Secondary to Amlodipine. *Dental Journal (Majalah Kedokteran Gigi)* 2020 53(4), 187–190. <https://doi.org/10.20473/j.djmk.v53.i4.p187-190>
11. Talha B, Swarnkar SA. Xerostomia. [Updated 2023 Mar 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK545287/>
12. Kurniawan AA, Wedhawati MW, Triani M, Imam DNA, Laksitasari A. Laporan Kasus: Xerostomia pada Penderita Diabetes Mellitus Tipe 2. *STOMATOGNATIC - Jurnal Kedokteran Gigi*. 2020;17(1):33–6.
13. Ruslijanto H. *Obat Topikal untuk Lesi Mulut: Pemilihan dan Cara Aplikasi*. Jakarta: EGC; 2019. 31–44 p.
14. Lyu X, Zhao C, Yan ZM, Hua H. Efficacy of Nystatin for the Treatment of Oral Candidiasis: a Systematic Review and Meta-Analysis. *Drug Des Devel Ther*. 2016 Mar 16;10:1161-71. doi: 10.2147/DDDT.S100795. PMID: 27042008; PMCID: PMC4801147.
15. Quindós G, Gil-Alonso S, Marcos-Arias C, Sevillano E, Mateo E, Jauregizar N, Eraso E. Therapeutic tools for oral candidiasis: Current and new antifungal drugs. *Med Oral Patol Oral Cir Bucal*. 2019 Mar 1;24(2):e172-e180. doi: 10.4317/medoral.22978. PMID: 30818309; PMCID: PMC6441600.
16. Santos PS, Tinôco-Araújo JE, Souza LM, Ferreira R, Ikoma MR, Razera AP, Santos MM. Efficacy of HPA Lanolin® in Treatment of Lip Alterations Related to Chemotherapy. *J Appl Oral Sci*. 2013 Mar-Apr;21(2):163-6. doi: 10.1590/1678-7757201302308. PMID: 23739860; PMCID: PMC3881864.
17. Lugović-Mihić, L., Pilipović, K., Crnarić, I., Šitum, M., & Duvančić, T. Differential Diagnosis of Cheilitis-How to Classify Cheilitis? *Acta Clinica Croatica*, 2008;57(2), 342-351. <https://doi.org/10.20471/acc.2018.57.02.16>