

**Case Report**

## Management of Acute Atrophic Erythematous Candidiasis in a Diabetes Mellitus Patient: A Case Report

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### ABSTRACT

**Introduction:** Acute atrophic erythematous candidiasis is an oral mucosal infection caused by overgrowth of *Candida* spp., commonly associated with immunocompromised conditions such as diabetes mellitus. It presents as painful, erythematous lesions that may impair quality of life if untreated.

**Case:** A 47-year-old male presented with tongue pain. Intraoral examination showed a well-demarcated, elongated erythematous lesion on the anterior one-third of the left dorsal tongue, measuring 2.5 × 1 cm, with a smooth surface and tenderness on palpation. The patient had uncontrolled diabetes mellitus (HbA1c 10.6%) and was on metformin, glimepiride, and amlodipine.

**Case Management:** Fungal culture confirmed *Candida glabrata* and *Candida tropicalis*. The patient received topical nystatin oral suspension four times daily for two weeks. After 22 days, complete healing was observed. Poor glycemic control likely increased susceptibility through impaired immunity and changes in the oral environment. The presence of non-*albicans Candida* species reflects infection patterns in immunocompromised patients.

**Conclusion:** Oral candidiasis is closely associated with diabetes mellitus. Effective management requires antifungal therapy combined with glycemic control and improved oral hygiene.

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## INTRODUCTION

Oral candidiasis, commonly known as oral thrush, is a fungal infection caused by *Candida* species, predominantly *Candida albicans*. This condition presents various clinical manifestations, with acute atrophic erythematous candidiasis being one of the significant forms.<sup>1,2</sup> Acute atrophic erythematous candidiasis, characterized by erythematous and atrophic lesions, often affects the tongue and palate, causing pain and discomfort. This condition is particularly prevalent among immunocompromised individuals, such as those with diabetes mellitus.<sup>3,4</sup> Acute atrophic erythematous candidiasis is a common oral manifestation in individuals with diabetes mellitus. Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. This condition leads to various systemic complications affecting multiple organs, including the cardiovascular system, kidneys, nerves, and oral cavity. The global prevalence of diabetes continues to increase, making it a major public health concern. Patients with diabetes are more susceptible to infections due to metabolic imbalance, impaired immune response, and microvascular changes associated with chronic hyperglycemia.<sup>2</sup>

As the global prevalence of diabetes continues to rise, it becomes increasingly important to comprehend the intricate relationship between glycaemic control and the onset of opportunistic infections like candidiasis. Maintaining optimal blood sugar levels is crucial, as uncontrolled hyperglycemia not only predisposes individuals to a higher risk of infections but also facilitates the growth and colonization of *Candida* species in the oral cavity.<sup>5</sup>

Among the systemic conditions that predispose individuals to oral infections, diabetes

mellitus is recognized as an important risk factor for oral candidiasis. Persistent hyperglycemia alters the oral environment by increasing glucose levels in saliva, reducing salivary flow, and impairing host immune defenses, thereby facilitating the colonization and proliferation of *Candida* species in the oral cavity. As a result, individuals with poorly controlled diabetes are more susceptible to various forms of oral candidiasis, including acute atrophic erythematous candidiasis.<sup>2,3,6</sup> This increased susceptibility is primarily associated with metabolic and immunological alterations caused by chronic hyperglycemia. The high glucose concentration in the saliva of diabetic patients and their reduced immune defenses make them particularly susceptible to *Candida* colonization and infection, including acute atrophic erythematous candidiasis.<sup>1-3</sup>

Erythematous candidiasis, particularly the acute atrophic type, is one of the clinical forms of oral candidiasis that is frequently observed in patients with poorly controlled diabetes mellitus. Chronic hyperglycemia plays an important role in increasing susceptibility to *Candida* infection through several pathogenic mechanisms. Elevated blood glucose levels impair neutrophil function, reduce chemotaxis, and decrease phagocytic activity, thereby weakening the host defense against fungal pathogens. In addition, increased glucose concentration in saliva and alterations in the oral microenvironment facilitate *Candida* adhesion, colonization, and proliferation on the oral mucosa. These metabolic and immunological alterations make individuals with uncontrolled diabetes significantly more susceptible to developing acute atrophic erythematous candidiasis compared with non-diabetic individuals.<sup>7,8,9,10</sup>

Clinically, acute atrophic erythematous candidiasis is characterized by erythematous and atrophic

lesions of the oral mucosa, most commonly involving the dorsal surface of the tongue and the palate. The affected mucosa typically appears as smooth, depapillated, and reddish areas that may be associated with symptoms such as burning sensation, pain, or discomfort, particularly during eating or drinking. In some patients, these lesions may also be accompanied by altered taste sensation or sensitivity to spicy foods. These clinical manifestations can interfere with oral function and negatively affect the patient's quality of life, especially in individuals with poorly controlled diabetes mellitus.<sup>1,7</sup> Furthermore, the altered immune response associated with diabetes mellitus further increases the susceptibility to oral candidiasis. Oral candidiasis is not merely a superficial infection but also serves as a clinical marker of poor glycemic control. This fungal infection, often seen in patients with fluctuating or persistently elevated blood glucose levels, can lead to discomfort, pain, and inflammation, complicating routine oral functions such as eating and speaking.<sup>6,11,12</sup>

Furthermore, oral candidiasis represents a significant health concern that can severely impact the quality of life in diabetic individuals. It can exacerbate underlying health issues, delay wound healing, and increase the risk of further complications, especially in patients already dealing with other diabetes-related comorbidities.<sup>8</sup> For these reasons, the presence of oral candidiasis should prompt healthcare providers to assess and potentially adjust the patient's diabetes management plan. A deeper understanding of this relationship can lead to more effective interventions aimed at preventing both the onset of candidiasis and the broader health implications associated with poor glycemic control in diabetic patients.<sup>13,14</sup>

The purpose of this case report is to describe the clinical presentation, diagnosis, and management of

acute atrophic erythematous candidiasis in a patient with diabetes mellitus, and to highlight the relationship between poor glycemic control and increased susceptibility to oral candidiasis.

## CASE

A 47-year-old male patient presented to the Dental Hospital of the Faculty of Dentistry Universitas Airlangga with the chief complaint of a sore and stinging sensation on the left tip of his tongue, similar to the onset of a mouth ulcer. The discomfort began approximately three days ago, before the first visit to the hospital. The pain worsened during eating and drinking, with a pain intensity of 3-4 on the Visual Analog Scale (VAS). The patient has not received any treatment to reduce the complaint. The patient has a habit of drinking very hot coffee every morning, a routine that has been followed for over 10 years. There was no similar lesion on other parts of his body, and no family members had experienced similar conditions.

For medical history, the patient has systemic diseases Diabetes Mellitus and hypertension. The patient takes regular medication, including metformin 8mg at night after meals, which has been taken for 1 year, glimepiride 2 mg once daily in the morning, has been taken for 1 year, and amlodipine 10mg is taken once daily in the morning, which has been taken for 1 year. The patient presented with laboratory results from an HbA1c test, showing an HbA1c value of 10.6% indicating poor glycemic control as seen in table 1. The patient denied having any allergies or a history of smoking or alcohol consumption.

Table 1. Glycemic Laboratory Examination Results

Parameter	Result	Reference Value	Unit
HbA1c (NGSP)	10.6	< 5.7	%
HbA1c (IFCC)	92	< 39	mmol/mol
Estimated Average Glucose (eAG)	258	-	mg/dL

Extra-oral examination revealed no abnormalities in the lymph nodes. Intraoral examination revealed depapillation on the anterior one-third of the left dorsal surface of the tongue, elongated, measuring  $2.5 \times 1$  cm, reddish in color, well-demarcated with regular borders, smooth surface, surrounded by a whitish area, and slightly painful on palpation. Additionally, a coated dorsal surface was noted (Figure 1). Sialometry using the unstimulated whole saliva method showed a salivary flow rate of 0.2 mL/5 minutes, indicating hyposalivation. Based on the patient's history and clinical findings in the first visit, a provisional diagnosis of a thermal burn lesion was made, with differential diagnoses Acute Atrophic Erythematous Candidiasis and geographic tongue.



Figure 1. Clinical appearance of the depapillated area on the dorsal surface of the tongue at the first visit.

### CASE MANAGEMENT

At the initial visit, the patient was referred to the microbiology laboratory, mycology division for a fungal culture test as seen in Table 2. The patient was also prescribed a topical medication consisting of an anti-inflammatory and antiseptic agent, chlorine dioxide dental gel, with instructions to apply it four times a day to the affected area, and to avoid food and drink for one hour after application.

The patient was given proper education and instructed to return for a follow-up visit.

Table 2. Microbiological Examination Results

Candida Spesies	Result
Candida glabrata	Positive
Candida tropicalis	Positive

At the second visit, 15 days after the first visit, the fungal culture test revealed that the patient was infected with *Candida glabrata* and *Candida tropicalis* (Figure 2). The diagnosis was confirmed as acute atrophic erythematous candidiasis. At this visit, treatment focused on antifungal therapy, and nystatin oral suspension was prescribed to be taken four times a day for 2 weeks. The patient was given proper education about the correct way of using nystatin oral suspension and instructed to stop using dental gel. Additional education was provided, and the patient was instructed to return for a follow-up appointment.



Figure 2. Clinical appearance of depapillated on the dorsal surface of the tongue on the second visit

By the third visit, 14 days after the second visit, the patient reported that the burning sensation on the surface of the tongue had significantly reduced, though a slight pain remained with a pain scale of 1 during eating and speaking. The patient also stated that he has been using the prescribed antifungal medication. The patient was advised to continue

antifungal therapy, nystatin oral suspension. Additional education was provided, and the patient was instructed to return for a follow-up appointment.



Figure 3. Clinical appearance of depapillated on the dorsal surface of the tongue on the third visit

By the fourth visit, 7 days after the third visit, the patient stated that the pain and stinging sensation on the tongue had disappeared, and there was no further complaint. Since the lesion had healed (Figure 4), the focus shifted to maintenance and preventive care. Aseptic treatment with 1% povidone-iodine mouthwash was recommended to ensure oral hygiene and prevent further infections. Further education was provided to improve oral hygiene practices and to encourage follow-up visits if there are new symptoms.



Figure 4. Clinical appearance on the fourth visit, the lesion had healed.

## DISCUSSION

The relationship between diabetes mellitus and oral infections, particularly oral candidiasis, is well recognized. Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia that can impair both innate and adaptive immune responses. Chronic hyperglycemia affects neutrophil function, reduces chemotaxis, and decreases phagocytic activity, thereby weakening the host defense against opportunistic pathogens, including *Candida* species. These immune alterations make patients with diabetes mellitus more susceptible to fungal infections in the oral cavity.<sup>1,15,16</sup>

In addition to immune dysfunction, diabetes mellitus also alters the oral environment in a way that promotes fungal colonization. Elevated glucose levels in saliva provide a favorable nutrient source for *Candida* growth, while decreased salivary flow and changes in oral microbiota facilitate fungal adhesion and biofilm formation on the oral mucosa.<sup>2,10</sup> These alterations create a microenvironment that supports the persistence and proliferation of *Candida* species in the oral cavity.<sup>5,11</sup> Consequently, individuals with poorly controlled diabetes mellitus are at a significantly higher risk of developing oral candidiasis compared with non-diabetic individuals.<sup>1,2,17</sup>

In the present case, the patient had poorly controlled diabetes mellitus with an HbA1c level of 10.6%, which likely contributed to the development of acute atrophic erythematous candidiasis. Poor glycemic control has been reported as an important predisposing factor for oral candidiasis because elevated blood glucose levels promote fungal proliferation and impair the host immune response. The clinical findings observed in this patient, including erythematous depapillated lesions on the dorsal surface of the tongue accompanied by burning sensation, are consistent with the typical

presentation of acute atrophic erythematous candidiasis described in previous studies.<sup>1,18,19</sup>

One of the challenges in managing this case was the initial clinical presentation, which resembled a thermal burn lesion. Erythematous lesions on the tongue may mimic other oral mucosal conditions, making the diagnosis less straightforward during the initial examination. Therefore, microbiological investigations such as fungal culture were essential to establish the definitive diagnosis. This highlights the importance of considering candidiasis in the differential diagnosis of erythematous oral lesions, particularly in patients with systemic conditions such as diabetes mellitus.<sup>2,18</sup>

Another notable finding in this case was the identification of *Candida glabrata* and *Candida tropicalis*. Although *Candida albicans* is the most common causative species of oral candidiasis, non-*albicans* *Candida* species are increasingly reported in immunocompromised individuals, including patients with diabetes mellitus. These species may possess different virulence characteristics and may exhibit reduced susceptibility to certain antifungal agents. Therefore, accurate microbiological identification is important to guide appropriate antifungal therapy.<sup>1,5,20</sup>

Management of oral candidiasis in diabetic patients requires not only antifungal therapy but also adequate control of the underlying systemic condition. In this case, topical antifungal therapy with nystatin oral suspension was administered, resulting in complete healing of the lesion after 22 days. Nystatin is widely used as a first-line topical antifungal agent due to its effectiveness against *Candida* species and its minimal systemic side effects. In addition to antifungal therapy, patient education regarding oral hygiene and the importance of glycemic control was also emphasized to prevent recurrence of the infection.<sup>1,20</sup>

This case highlights the significant interplay between diabetes mellitus and oral candidiasis. The presence of oral candidiasis may serve as a clinical indicator of poor glycemic control, and dental practitioners should be aware of the potential association between systemic diseases and oral infections. Early diagnosis, appropriate antifungal treatment, and collaboration with medical professionals for optimal diabetes management are essential to achieve successful clinical outcomes in such cases.

Regular monitoring of blood glucose levels and adherence to prescribed antidiabetic medications are crucial in preventing future episodes of candidiasis. In addition to pharmacological interventions, patients are encouraged to maintain good oral hygiene practices, such as brushing, flossing, and using antimicrobial mouth rinses, to reduce the risk of fungal colonization. The use of saliva substitutes or moisturizers may also be beneficial for those experiencing dry mouth as a result of diabetes.<sup>1,2</sup>

## CONCLUSION

Acute atrophic erythematous candidiasis may occur as an oral manifestation in patients with poorly controlled diabetes mellitus. In this case, the patient presented with erythematous depapillated lesions on the dorsal surface of the tongue, and microbiological examination confirmed the presence of *Candida glabrata* and *Candida tropicalis*. Topical antifungal therapy with nystatin oral suspension resulted in complete healing of the lesion after 22 days, indicating that the treatment was effective in controlling the infection.

This case emphasizes the importance of addressing the underlying systemic condition when managing oral candidiasis. The patient's elevated HbA1c level indicated poor glycemic control, which likely contributed to the development of the

infection. Therefore, successful management of oral candidiasis in diabetic patients requires not only appropriate antifungal therapy but also adequate control of blood glucose levels.

Early diagnosis supported by microbiological examination and timely antifungal treatment plays a crucial role in achieving favorable clinical outcomes. Furthermore, collaboration between dental practitioners and medical professionals is essential to ensure comprehensive management of diabetic patients, particularly in controlling systemic conditions that predispose individuals to opportunistic infections. Clinicians should consider oral candidiasis as a potential indicator of poor glycemic control in patients with diabetes mellitus. Routine oral examinations and interdisciplinary management may help improve treatment outcomes and reduce the risk of recurrence.

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