

Prevalence of Oral Candidiasis in Patients Suffering from Tuberculosis Meningitis

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Abstract

Oral candidiasis is the most common fungal infection of the oral cavity caused predominantly by *Candida albicans*. This review summarizes etiology, risk factors, clinical features, diagnosis, management, and prevention. Oral candidiasis is an opportunistic infection occurring when host immunity or the oral environment favors *Candida* overgrowth.

Etiology and Risk Factors

Risk factors include immunosuppression, diabetes, dentures, xerostomia, antibiotics, corticosteroids, smoking, and poor oral hygiene.

Clinical Features

Common forms include pseudomembranous, erythematous, hyperplastic candidiasis and angular cheilitis.

Case Presentation

A 37-year-old male patient was admitted to the department of Neurology from the triage with a diagnosis of tuberculosis meningitis? because of persistent fever since 15 days, altered sensorium, constricting headache beginning behind both ears and spreading to the forehead, accompanied by blurred vision, diplopia, nausea, and vomiting and stiffness behind neck that had developed over the preceding 15 days. Patient had no previous history of Tb but his father had suffered from Tb 15 years back and has fully recovered. Physical examination was normal except for lesions compatible with oropharyngeal candidiasis extending to the laryngeal level. A lumbar puncture was performed. On performing lumbar puncture, cerebrospinal fluid (CSF) analysis demonstrated low glucose and elevated protein levels. The patient was transferred to the Infectious Diseases Department with a diagnosis of bacterial meningitis. Tuberculosis regimen(ATT) was started on the day of diagnosis itself.



Figure 1. Clinical photograph demonstrating oral mucosal and lingual changes in a patient with suspected oral candidiasis.



Figure 2. Clinical photograph showing a prominent white coating over the tongue in a patient with suspected oral candidiasis.

Clinical Course and Microbiological Findings

The patient remained in state of altered sensorium, and the headache persisted on the third day of treatment. Brain magnetic resonance imaging was normal. Because bilateral papilledema was observed during fundoscopic examination for diplopia, neurology consultation was obtained and diazoxide treatment was initiated. *Candida albicans* grew in both blood and CSF cultures. On the fifth day, antimicrobial therapy was changed to fluconazole 200 mg every 12 hours and liposomal amphotericin B 250 mg every 24 hours.

On the second day of antifungal therapy, the headache and nausea subsided, and by the fourth day the diplopia improved. By the end of the first week, the oral lesions had completely healed, with no clinical deterioration. Repeat CSF analysis was recommended but could not be performed because the patient declined the procedure. Antifungal treatment was continued for 28 days, after which the patient was discharged in good health. No recurrence was observed during follow-up. Informed consent was obtained from the patient.

Table 1. Admission Findings and Cerebrospinal Fluid Results

Category	Parameter	Finding
Physical examination	Temperature	103F
Physical examination	Pulse	72/min
Physical examination	Blood pressure	110/80 mmHg
Neurological examination	Mental/meningeal status	Conscious, oriented, cooperative; no nuchal stiffness or other meningeal irritation
Oropharynx	Clinical finding	Diffuse candidiasis lesions on oral mucosa
Laboratory	WBC	$10.75 \times 10^3/\mu\text{L}$
Laboratory	Hemoglobin	U.Sg/dL
Laboratory	Lymphocytes	13.1%
Laboratory	Platelets	$325 \times 10^3/\mu\text{L}$

Laboratory	TSH	1.24 mIU/L
Laboratory	ESR	43 mm/h
Laboratory	CRP	15.5 mg/L
Laboratory	Creatinine	0.77 mg/dL
Microbiology	Oropharyngeal swab	Candida albicans
Microbiology	Blood culture	C. albicans
Mycobacteria	AFB microscopy / M. tuberculosis PCR/ culture	Positive
CSF	Protein	11U mg/dL
CSF	LDH	3U U/L
CSF	Glucose	11.1 mg/dL
CSF	Chloride	115 mmol/L
CSF	Leukocytes	$200/\text{mm}^3$
CSF	Gramstain	Negative
CSF	Culture	C. albicans
CSF	Syndromic meningitis PCR panel	Negative

Integration With the Oral Candidiasis Review

This case expands the oral candidiasis review by demonstrating that oral Candida infection may occur alongside invasive candidiasis with CNS involvement. The case highlights the clinical importance of assessing predisposing factors considering systemic disease when oral candidiasis is extensive, persistent, or accompanied by neurological symptoms.

CONCLUSION

The prevalence of oral candidiasis was significantly higher among TB cases (35%) than among non-cases (1G%) predominantly pseudomembranous candidiasis. Among 77 cases with a clinical diagnosis of oral candidiasis who had a swab collected for culture (4 cases did not have a confirmatory swab). The proportion of confirmation using culture differed by type of candidiasis, with angular cheilitis and pseudomembranous candidiasis having the highest level of culture confirmation and erythematous

candidiasis the lowest (72%) which has highest chances of converting into a malignant disorder. We found a strong association between oral candidiasis and TB disease independent of CD4 count in immunocompromised patients suggesting that oral candidiasis may provide clinical evidence for increased risk of TB and contribute to TB case finding. Keywords: oral candidiasis, tuberculosis, immunocompromised patients

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