

Prevalence of oral lesions in tuberculosis: A cross sectional study

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ABSTRACT

Objective: Tuberculosis (Tb) is a fatal infectious disease that primarily affects the pulmonary system and rarely occurs in other body organs including oral cavity. The aim of this study was to report all patients with primary manifestations of oral tuberculosis and to evaluate the clinical characteristics of oral tuberculosis lesions. All these patients were subsequently diagnosed with tuberculosis based on oral histological findings and referred for management and therapy. **Materials and Methods:** Twelve patients with oral lesions from the year 2010 to 2018 were histologically diagnosed as having tuberculosis, who did not give any history of the disease, following surgical biopsy. Clinical symptoms, auxiliary examinations, treatments, and outcomes were recorded and analyzed. **Results:** Oral TB was found in all 12 patients; 8 males and 4 females, with male to female ratio 8:4. Involved oral sites included the angle of the mandible (one case), right mandibular molar region (two cases), left mandibular molar region (four cases), gingiva (three cases), buccal mucosa (one case), and the tongue (one case). Oral TB patients in this series ranged in the age group of 6–65 years. All the lesions were suggestive of primary tuberculosis. The appearance of the affected mucosa in oral TB was variable. The most common manifestation was ulceration and swelling of the mucosa. **Conclusion:** TB should be considered in patients with oral ulcerations and swellings. A biopsy specimen for histological study, acid-fast stains, and cultures should be obtained for confirmation and differential diagnosis along with other conditions.

Keywords: Acid-fast bacilli, oral ulcerations, tuberculosis

Introduction

Tuberculosis (TB) is an infectious granulomatous disease caused by *Mycobacterium tuberculosis*, an acid-fast bacillus, transmitted primarily via respiratory route. Tuberculosis

is a global health problem with 8 million people infected annually and 3 million people dying from diseases related to TB complications.^[1] Although tuberculosis chiefly affects the pulmonary system, it can also involve extrapulmonary sites including the head and neck region. The host inflammatory reactions play an important role in protection from this disease as well as its pathogens.^[2]

In the initial stages of tuberculosis infection, additional macrophages and other immune cells aggregate with the

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infected cells to form granulomas, the morphology of which is characterized by a central necrotic core surrounded by concentric layers of macrophages, epithelioid cells, multinucleate Langerhans giant cells, and lymphocytes.^[3,4]

A balance between pathogen replication and the immune response is established, and the lesions move into a latent state in most patients. Approximately 5% of otherwise healthy adults will develop into active TB patients within 2 years.^[5] Only in certain situations, such as immune dysfunction, does primary TB occur. Secondary TB involves the reactivation of the dormant bacteria and accounts for most cases of TB. In general, TB-infected tissues can be damaged through a variety of mechanisms, including low oxygen tension and restricted nutrient supply.^[6]

Oral tuberculosis lesions may be either primary or secondary. Primary oral tuberculosis lesions are extremely rare and generally occur in younger patients associated with cervical lymphadenopathy. The secondary lesions, on the contrary, are more common and are seen mostly in older persons.^[7] In the present article, we report 12 cases of tuberculosis diagnosed based on oral lesions. The aim of this study was to report patients with primary oral tuberculosis and to evaluate the clinical characteristics of oral tuberculous lesions, which after diagnosis were referred for appropriate medical management.

If patients with TB are not diagnosed and treated appropriately and in a timely manner, the disease can cause serious damage to the body and can be fatal.^[8]

Oral cavity TB is difficult to differentiate from other conditions on the basis of clinical signs and symptoms alone. While evaluating a chronic, indurated ulcer, clinicians should consider both infectious processes such as primary syphilis and deep fungal diseases and noninfectious processes such as chronic traumatic ulcer and squamous cell carcinoma in the list of differential diagnosis.

TB has been diagnosed since the early twentieth century by sputum smear microscopy using Zeil–Neilson or acid-fast bacilli staining. Since the 1970s, the culture of tubercle bacillus using Lowenstein–Jensen medium (LJ) has been used as a gold standard for diagnosis. A decade ago, with the advent of molecular diagnostic aids and complete identification of mycobacterial genome, nucleic acid amplification tests had been performed to diagnose TB with an accuracy of 90%. However, if there is no systemic involvement, one should go for excisional biopsy for tissue diagnosis and bacteriologic examination with culture for a definitive diagnosis. The efficiency of the demonstration of acid-fast bacilli in histological specimens is low, as there is a relative scarcity of tubercle bacilli in oral biopsies.^[9]

Material and Methods

The records of all the patients from the oral pathology department at our institution with a histopathology confirmed

diagnosis of oral tuberculosis were surveyed after obtaining the ethical approval form from the institutional ethical committee and informed consent form from the participants on 12-09-2009. Around 12 cases were identified. Patients with lesions involving the glossal lymph nodes, salivary glands, oropharynx, tonsils, or sinuses were excluded, so were patients with human immunodeficiency virus (HIV) infection or diabetes or who had previously received chemotherapy. The criterion for the diagnosis of oral TB was histopathologic evidence of granulomatous inflammation with epithelioid cells and Langerhans giant cells. The patient's clinical records were reviewed for details related to presenting signs and symptoms, site, and appearance of the lesions. All these patients were treated in the department of oral and maxillofacial surgery.

Results

Clinical data relating to a total of 12 patients with histologically diagnosed TB of the oral cavity is summarized in Table 1. Oral TB was found in all 12 patients; 8 males and 4 females, with male to female ratio 8:4. Involved oral sites included the angle of the mandible (one case), right mandibular molar region (two cases), left mandibular molar region (four cases), gingiva (three cases), buccal mucosa (one case), and dorsal surface of the tongue (one case). Oral TB patients in this series ranged in the age group of 6–65 years. The presenting symptoms with oral TB are summarized in an order of frequency in Table 2. The duration of these symptoms before diagnosis in the patients with oral TB ranged from 15 days to 4 years. None of the patients complained of malaise, weight loss, or persistent cough. All the lesions were suggestive of primary tuberculosis. The appearance of the affected mucosa in oral TB was variable. The most common manifestations were ulceration and swelling of the mucosa, ranging from 1 cm to 5 cm in size.

Imaging and laboratory examination

Computed tomography (CT) scans were performed in 12 patients but no obvious consistent findings were detected. Some masses had clear borders whereas some had unclear borders; some masses showed bone infiltration, whereas some did not. OPG was performed in patients previously diagnosed with osteomyelitis that revealed a low-density area with an unclear border in the

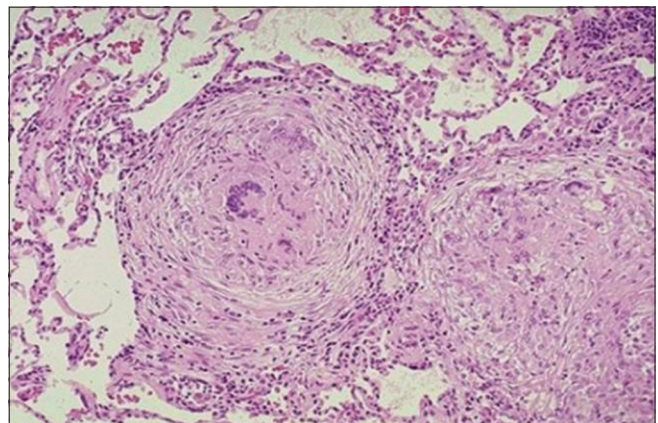


Figure 1: Showing histopathology of tuberculosis (H and E stain)

Table 1: Summary of data relating to 12 patients with oral tuberculosis in the present study

Patient no.	Year of presentation	Age at diagnosis (Years)	Sex	Duration of symptoms	Site and clinical appearance	Clinical impression prior to diagnosis	Classification
1	2010	35	M	3 months	Swelling, 2 × 3 cm, firm, nontender, Right angle of the mandible	TB Lymphadenitis	Primary
2	2010	26	F	1 month	Swelling, 2 × 3 cm, nontender, Right mandibular molar region	Garre's Osteomyelitis	Primary
3	2010	28	F	2 years	Generalized gingival enlargement involving marginal and attached gingiva	Inflammatory gingival enlargement	Primary
4	2010	12	M	15 days	Grossly decayed left lower first premolar, nontender, with the periapical lesion, Left mandibular region	Periapical lesion	Primary
5	2011	6	M	2 months	Chronic ulcer on Buccal mucosa, nontender 3 × 3 cm in size.	Tuberculous ulcer	Primary
6	2012	39	M	1 month	Swelling, 3 × 3 cm, nontender involving extraction socket lower first molar, Left mandibular region	Granulomatous lesion	Primary
7	2013	53	M	3 months	Ulcer, 3 × 2 cm with undermined edges, nontender, Left mandibular region	Tuberculous ulcer	Primary
8	2013	55	M	2.5 years	Nonhealing ulcer, nontender, 2 × 1 cm, Right mandibular, molar region	Tuberculous ulcer	Primary
9	2014	62	F	20 days	Swelling lower left third molar, 1 × 2 cm with discharge, nontender, Left mandibular molar region	Odontogenic keratocyst	Primary
10	2015	65	M	4 years	Gingival enlargement involving mandibular anterior region, 5 × 1 cm, nontender	Inflammatory gingival lesion	Primary
11	2016	44	F	2 years	Chronic ulcer measuring 3 × 2 cm on the dorsal surface of tongue	Granulomatous lesion	Primary
12	2018	50	M	1 year	Gingival enlargement associated with upper posterior teeth, 4 × 2 cm, nontender	Inflammatory gingival lesion	Primary

Table 2: Presenting symptoms of patients found to have oral TB in the present study

SYMPTOMS	NO. OF PATIENTS
SWELLING	8
ULCERATION	4

left mandibular ramus No obvious abnormalities were found in routine laboratory examinations and all the patients were found to be HIV negative. None of the 12 patients displayed lowered resistance or increased virulence of the organism.

Treatment

An excisional biopsy was performed in 11 patients under local anesthesia and the mass was resected, with the patient under general anesthesia and in the remaining patient, who had previously been diagnosed with osteomyelitis, the lesion was curetted. After 11 patients were diagnosed with TB in the oral cavity, through pathologic examination, they underwent a Mantoux test (purified protein derivative test) and carbol-fuchsin-stained *M. tuberculosis* were detected in those patients. Only one patient had negative results showing typical histopathological features but was still diagnosed with TB.

Discussion

Although tuberculosis has a definitive affinity for the lungs, it can affect any part of the body including the mouth. Oral manifestations of tuberculosis are usually seen secondary to infection in some other parts of the body, as a result of direct inoculation or, rarely, as a result of hematogenous spread from sites in the pulmonary, gastrointestinal, or genitourinary tract.^[10] Compared with tuberculous involvement of the other parts of the body, the primary occurrence of this disease in the oral cavity and jawbones is relatively rare.^[11] However, in our study, all the oral tuberculosis lesions were of primary occurrence as they were undiagnosed till then.^[12]

When primary lesions of tuberculosis occur in the mouth, the most frequent sites of involvement are gingival, tooth extraction sockets, the tongue, and the buccal folds.^[11] In our study, in three cases the lesions were found to be present in the gingiva, six cases were reported on the left and right mandibular molar region in the form of ulceration (two cases) and swelling (four cases), In one case ulcer was present on the buccal mucosa. One case was associated with tooth extraction socket and one case appeared in the form of periapical lesion. Lingual TB may appear as

ulcers, nodular swelling, fissures, tuberculomas, or granulomas. The most frequent lesion is a superficial ulcer, characterized by undermined edges, a granulating floor, and occasional small tuberculous nodules around the periphery. The ulcer may be ragged and indurated and is often painful.^[13,14] The systemic factors that favor the chances of oral infection in tuberculosis include lowered host resistance and increased virulence of the organisms. The local predisposing factors may be poor oral hygiene, local trauma, the presence of existing lesions such as leukoplakia, periapical granulomas, dental cysts, dental abscess, jaw fractures, and periodontitis.^[14,15] In our study, two cases showed granulomatous lesion, one case showed periapical lesion, one case was diagnosed through the surgical enucleated specimen of odontogenic keratocyst and three cases were reported with gingivitis.

Sputum smear microscopy, solid culture, and chest radiography are the traditionally considered useful diagnostic methods.^[16,17]

However, these tests are time-consuming and lack enough sensitivity and specificity. In recent years, several diagnostic detection methods based on TB-related molecules in blood or saliva specimens have been reported to be more accurate, with easier, safer, and more uniform sample collection. If possible, a pathologic biopsy of the oral lesion should be performed as early as possible. The characteristic histologic manifestations of TB include a granuloma, consisting of epithelioid histiocytes and multinucleate Langerhans giant cells, with a central necrotic focus that is usually acidophilic and surrounded by lymphocytes [Figure 1]. Some TB granulomas can also be of the hyperplastic type, with a proliferation of fibrous tissue and with no necrotic center. Histologic diagnosis is a reliable method but there is an error rate. Hence, acid-fast staining is necessary.^[3,18] Thus, the combination of acid-fast staining and histopathology can serve a reliable indicator for an accurate diagnosis.^[19,20]

The common manifestation of oral tuberculosis is an ulcerative lesion of the mucosa. The lesion may be preceded by an opalescent vesicle or nodule which may break down as a result of caseation necrosis to form an ulcer. The typical tuberculous ulcer is an irregular lesion with ragged undermined edges, minimal induration, and often with a yellowish granular base.^[10] In our study, four cases were reported with clinical manifestation of tuberculous ulcer.

Involvement of the bones of the maxilla and mandible usually results in tuberculous osteomyelitis. Tuberculosis of the jawbones may be secondary or primary^[21] and occurs as a result of either deep extension of gingival lesions, from an infected postextraction socket, or through the hematogenous spread of the infection. The mandible shows a greater predisposition to the infection than the maxilla. In our study, none of the cases involved the bones of maxilla and the mandibular region.

Compared with the previous studies on oral TB, the present study has similar findings such as presentation of oral ulcers and the

majority of the patients being males.^[22] However, in the previous studies, most of the patients were at the fifth decade of life, our study showed that patients were at the third and second decade of life and some were even less than 10 years of age.^[23,24]

Implications for clinical practice

The primary care physician is the first contact person of the patient for consultation of the illness. Early diagnosis and a multi-disciplinary approach are key components of managing the oral manifestations of TB. Increased awareness and research in this field have facilitated the identification of risk factors and causation pathways. The clinical dental practice has potential for transmission of various infections from patient to dentist, patient to patient as well as a dentist to patient due to close proximity to the nasal and oral cavities of the patient. Thus, a barrier should be created to prevent the transmission of infections and to make the clinical procedures safe from the threat of cross infections. A detailed history of TB should prompt the dental practitioner to discern whether the person is an active case under treatment, the active case without treatment, or previously infected but currently disease-free. The nontreated active cases pose a maximum risk to dental healthcare personnel. Dental healthcare professionals are at constant risk of getting exposed to TB by means of splatter, aerosols, or infected blood. Dental treatment for those with active tuberculosis should be limited to urgent and essential procedures.^[25]

Conclusion

With the increasing number of TB cases, unusual forms of the disease in the oral cavity are more likely to occur and be misdiagnosed. Therefore, dental practitioners need to be aware that TB may occur in the oral cavity and consider TB in their differential diagnosis of any ulcerated or granulated and indurated lesions of the oral cavity. This is especially important considering difficult clinical diagnosis because TB can mimic a variety of other conditions including reactive and traumatic lesions, malignant tumors, deep fungal infections, inflammatory gingival enlargements, and oral manifestations of systemic diseases such as sarcoidosis and Wegener's granuloma. Any lesion presenting in the oral cavity must be fully investigated and assessment should include full physical examination, biopsy, and chest X-ray examination. Diagnosis of TB is made by identification of a caseating granuloma, macrophages, epithelioid cells, and Langerhans giant cells in the biopsy specimen. Acid-fast stains and cultures obtained from the tissue specimen should be used to confirm the diagnosis. If tuberculosis is suspected, the patient should be referred to a pulmonary or infectious disease specialist for confirmation of the final diagnosis and treatment.

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Conflicts of interest

There are no conflicts of interest.

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