CASE REPORT

Oral tuberculosis: unusual radiographic findings

K Sansare^{*1}, A Gupta², V Khanna¹ and F Karjodkar¹

¹Department of Oral Medicine and Radiology, Nair Hospital Dental College, Mumbai, India; ²Oral Medicine and Radiology, Government Dental College, Rohtak, Haryana India

Oral tuberculosis and its radiographic findings are not commonly encountered in an oral and maxillofacial radiology practice. Literature has occasional mention of the radiographic findings of oral tuberculosis, which are still ambiguous. When affected, it is manifested majorly in the oral mucosa and rarely in the jaw bones. Here, we report certain unusual radiographic findings of oral tuberculosis which have been rarely mentioned in the literature. Four illustrative cases describe bony resorption, condylar resorption, resorption of the inferior border of the mandible and rarefaction of the alveolar bone as radiographic findings of oral tuberculosis. Follow up of the first case demonstrated regeneration of the condylar head after anti-Kochs therapy was completed, a hitherto unreported phenomenon. The importance of including tuberculosis in the differential diagnosis of some of the unusual radiographic manifestations is emphasized.

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Introduction

Tuberculosis is one of the chronic granulomatous lesions affecting various body systems. Tuberculosis today is a global disease mainly owing to colonialism,¹ immigration and spread of acquired immune deficiency syndrome (AIDS). It is usually caused by *Mycobacterium tuberculae*, although *Mycobacterium bovis*, *Mycobacterium kansasii* and *Mycobacterium scrofulaceum* have also been implicated.² Tuberculosis primarily affects the pulmonary site; however, there has been an increased incidence of extrapulmonary sites being affected as well.

Oral tuberculosis lesions are infrequent but when they occur they are usually secondary to pulmonary involvement. Oral tuberculosis without any systemic involvement is considerably rare and has only occasionally been reported in the literature.^{3–5} This rarity is attributed to the intact oral mucosa, salivary cleansing action, salivary enzymes, tissue antibodies and oral saprophytes. These factors could act as a barrier to oral tuberculosis. A breach in these defence mechanisms by

abrasions, poor oral hygiene, extraction socket, periodontal disease, pulpal exposure or an overhanging restoration may lead to oral tuberculosis.^{3,6,7}

Clinically, oral tuberculosis may present as an ulcer, erythematous patches, granulomas, salivary gland involvement, tuberculous lymphadenitis or tuberculous osteomyelitis of the jaws.^{3,6,8} Jaw bones are rarely involved in oral tuberculosis. However, when involved the mandible is more commonly affected than the maxilla,^{9–11} especially the angle and alveolar regions of the mandible. Tuberculous osteomyelitis of the mandible forms less than 2% of all skeletal tuberculosis.¹² Only approximately 0.05%–5% of total tuberculosis cases manifests orally.¹³ There are no data available on how many of these cases have radiographic manifestations.

With this background of varied clinical manifestations and a relative paucity of literature on radiographic findings of oral tuberculosis, it is quite common that the obvious signs could be missed. This article aims to discuss the varied radiographic findings of orofacial tuberculosis with illustrations from four cases; two cases of condylar resorption, one case of resorption of inferior border of the mandible owing to tuberculous lymphadenitis and another case of tuberculous osteomyelitis of the mandible are discussed.

*Correspondence to: Dr Kaustubh Sansare, MDS, Associate Professor, Oral Medicine and Radiology, Nair Hospital Dental College, Mumbai, India; E-mail: kaustubhsansare@yahoo.com

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Illustrative cases

Case 1

A 50-year-old male patient was referred to the oral and maxillofacial radiology unit by his general practitioner for radiographic evaluation of partial trismus. The patient had a history of trismus and pain on the left side of the face for 3 months. The patient had mild swelling on the left side, mainly over the pre-auricular region, and pain over this region was localized and non-radiating in nature. The patient did not have any history of fever, cough, pus discharge, paresthesia or weight loss and there was no history of trauma prior to the complaint. Skin overlying the left pre-auricular region was normal with no evidence of scarring, draining sinus, fistula formation or raised temperature. Temporomandibular joint (TMJ) movements were faintly palpable on the left side with no evidence of clicking or crepitation over the TMJ region. The maximum interincisal opening was 27 mm. The patient's chest radiograph was clear of any pathology.

A panoramic radiograph revealed a lytic lesion of the left condyle with ill-defined margins of the condylar surface (Figure 1). A CT scan revealed resorption of the left condylar head with a heterogeneously enhancing mass in the left TMJ region (Figure 2). The mass was approximately 43 × 33 mm in size. Juxtacortical abscess formation with specks of calcification was seen lateral to the ramus and in the joint space. A heterogeneously enhancing, enlarged, subcentric jugulodiaphragmatic lymph node was also present.

Figure 1 Panoramic radiograph showing resorption of the left condylar process in case 1

Figure 2 CT scan showing heterogeneously enhancing mass in left temporomandibular joint region in case 1

A three-phase bone scan was done using an intravenous injection of 740 MBq of $^{99}\text{Tc}^{\text{m}}$ methylene diphosphonates (MDP) (Figure 3). Dynamic blood pool images were taken immediately and static images after 3 h. Images show increased radiotracer uptake in the ramus and TMJ regions of the left side, which were suggestive of an inflammatory origin. Haematological examination revealed an increased erythrocyte sedimentation rate (ESR) and lymphocyte count.

Figure 3 Scintigraphic picture revealing uptake in the left ramus and condylar region in case 1

The Mantoux test was mildly positive (14 mm). Enzyme linked immunosorbent assay (ELISA) test for human immunodeficiency virus (HIV) 1 and 2 was negative. Finally, an interventional radiographic modality, a CT-guided fine needle aspiration cytology (FNAC), was planned. CT-guided FNAC revealed a granulomatous area with numerous giant and epithelioid cells surrounded by lymphocytes and plasma cells (Figure 4). These findings were suggestive of chronic granulomatous disease consistent with tuberculosis. Culture in Lowenstein–Johnsons media and polymerized chain reaction (PCR) assay was positive for *M tuberculosis* complex. Accordingly, a definite diagnosis of TMJ tuberculosis was rendered. In consultation with the physician, the patient was started with anti-Koch's therapy for 6 months. This patient was regularly monitored for trismus and condylar resorption. A 6 month follow up panoramic radiograph was taken. The panoramic radiograph revealed remodelling of the left condyle (Figure 5).

Case 2

An otherwise healthy 18-year-old female was referred to the oral radiology unit to evaluate her for a dull aching pain over the left pre-auricular region. The patient appeared well nourished and afebrile at the time of examination. This patient did not have any history of evening rise in temperature, weight loss, coughing or chest pain. There was no palpable submandibular lymphadenopathy. Tenderness on the left TMJ could be elicited only on palpation and no clicking or crepitation was evident on TMJ examination. A panoramic radiograph of this patient demonstrated resorption of the head of the left condyle (Figure 6). ESR and lymphocyte counts were raised. The patient tested strongly positive (27 mm) for Mantoux test. The possibility of HIV infection was ruled out as ELISA for HIV 1 and 2 tested negative. A CT scan revealed lytic lesion of the left condyle. A CT-guided FNAC revealed caseous necrosis surrounded by epithelioid cells. PCR analysis was positive for a specific strain of *M tuberculosis* and a diagnosis of TMJ tuberculosis was thus established.

Figure 4 CT-guided fine needle aspiration cytology showing caseating necrosis with epithelioid cells in case 1

Figure 5 A 6 month follow up panoramic radiograph demonstrating evidence of remodelling of the left condylar process in case 1

In consultation with the physician, the patient was started with anti-Koch's regimen for 18 weeks. 3 weeks later the patient reported symptomatic relief. Continuation of the treatment was recommended; however, the patient was lost at follow up and remodelling of the condylar head could not be evaluated.

Figure 6 Panoramic radiograph demonstrating resorption of the head of the left condyle in case 2

Case 3

A 45-year-old male patient was referred for evaluation of a palpable discontinuity over the left angle of the mandible. The patient's history and general examination was non-contributory. No other systemic findings could be elicited from the history. On palpation it was revealed that the patient had an enlarged right submandibular lymph node. The enlarged node was non-tender and not fixed to the underlying tissues. The patient had fair oral hygiene and there was no evidence of infected or missing teeth. This patient was, however, not aware of the duration of the enlarged node. The patient was detected positive for Mantoux test and tested negative for HIV antibodies 1 and 2.

The patient's lung fields were clear of any pathology. A lateral oblique radiograph of the mandible was taken which showed a crater-like 2×2 cm resorption of the angle of the mandible (Figure 7). The resorbed surface was ill defined and diffuse in nature. The location of the enlarged node coincided with the defect at the angle of the mandible. The aspirate from the enlarged node demonstrated a granulomatous area with numerous giant and epithelioid cells surrounded by lymphocytes and plasma cells. The patient was diagnosed with resorption of the inferior border of the mandible secondary to tuberculous lymphadenitis and was started on anti-Koch's therapy in consultation with the physician. This patient had an uneventful recovery.

Case 4

A 20-year-old female presented with an intraoral draining sinus following extraction of the lower right first molar. The patient's history revealed an uneventful extraction of lower right first molar about 3 months previously. Subsequently, this patient developed an intraoral draining sinus. The patient's systemic history was non-contributory. It was decided to trace the origin of the drainage by inserting a sterile gutta percha point through the sinus tract. An intraoral radiograph demonstrated that the track ended in the bone which

Figure 7 Lateral oblique radiograph showing resorption of angle of mandible in case 3

Figure 8 Intraoral periapical radiograph with a gutta percha point through the sinus tract in case 4

was possibly the periapical area of the extracted tooth (Figure 8). A panoramic radiograph demonstrated an ill-defined, diffuse area of rarefaction in the mandible near the extraction socket with specks of radiopacity (Figure 9), which was suggestive of focal sclerosing osteomyelitis. Microbial culture report revealed presence of rod-shaped bacilli. On further investigation, Ziehl–Neelsons staining disclosed acid-fast bacilli (AFB) from the intraoral drainage. The patient's chest radiograph did not reveal any lesions. The Mantoux test for the patient was positive and a working diagnosis of tuberculous osteomyelitis of the mandible was established. The patient had an uneventful recovery after anti-Koch's therapy and subsequent curettage.

Discussion

In spite of dramatic improvement in public health care measures in the last four to five decades, tuberculosis still remains a dreaded disease of today's world. It is estimated that about 32% of the world's population are infected with tuberculosis.¹⁴ Each year 3 million people worldwide die from tuberculosis.¹⁵ The World Health

Figure 9 Panoramic radiograph showing diffuse area of rarefaction in the mandible near the extraction socket in case 4

Organization (WHO) estimates approximately 20 million active cases of tuberculosis, 80% of which belong to the developing countries.¹⁶ The regions with the highest incidence of tuberculosis are the Indian sub-continent, South East Asia and Africa.¹ The epidemiology of tuberculosis differs considerably with ethnicity. Age has also been implicated as an important risk factor, as well as differing ethnic and socio-economic group age distribution.¹⁷

There has been resurgence in the cases of tuberculosis owing to an increased incidence of co-infection with HIV, which decreases cell-mediated immunity. Cell-mediated immunity acts as a mode of defence against the tubercle bacillus. HIV infection is considered the most important risk factor in acquiring active tuberculosis.^{13,18} All over the world approximately 8% of people with HIV are co-infected with tuberculosis.³ However, orofacial tuberculosis (primary or secondary) has not yet been reported in cases of HIV. This may be hypothesized as HIV impeding the formation and function of the granuloma, thus preventing the bacilli to avoid localization.¹⁹ It may also be attributed to early and liberal use of anti-retroviral therapy for HIV, thereby limiting the spread of lesions by enhancing cell-mediated immunity.

Traditionally, the diagnosis of tuberculosis has been made on the basis of clinical and radiographic findings. Oral manifestations of tuberculosis are rare and are seen in less than 5% of tuberculosis patients.¹ Orofacial tuberculosis has been rarely reported in the literature.²⁰ The diagnosis of orofacial tuberculosis can be quite challenging, mainly because of a lack of definite signs and symptoms.

The cases presented in this article illustrate a spectrum of unusual radiographic findings of oral tuberculosis. Two cases demonstrate the involvement of the condylar head in a rather unusual form causing condylar resorption. Condylar resorption is defined as a progressive alteration of condylar shape and decreased condylar mass.²¹ Possible initiating factors for condylar resorption have been reported as multifactorial.^{22,23} There have been no previous reports of condylar resorption occurring in a patient with orofacial tuberculosis. Tuberculosis was given priority over TMJ disorders (TMDs) in the investigation. This was mainly because of two reasons: firstly, the degree of resorption was too extensive and did not represent the traditional flattening or erosion of the condylar head seen in TMDs. Secondly, the prevalence rate of tuberculosis in this part of the world is too high to warrant the precedence over TMDs. Moreover, considering the overall prevalence of tuberculosis in this region, the presence of epithelioid cell granulomas is indicative of tuberculosis unless proven otherwise.²⁴ These are the very reasons why tuberculosis tests took priority over rheumatoid factor and other tests related to TMDs. To the best of our knowledge, case 1 could be the first case in the literature to document remodelling of a resorbed condyle after anti-Koch's therapy. A follow-up CT image of case 1 was not

available as the patient refused exposure to ionizing radiation; as the patient was recovering well post-treatment, it was not warranted to expose this patient again to a CT scan.

Tuberculosis is known to cause erosion of cortical plates.²⁵ In case 3, a chronic long-standing tuberculous lymphadenopathy can therefore lead to resorption of the bone around it. Surprisingly, the patient did not have any systemic findings or local findings of pus drainage, which could be attributed to low virulent infection. The radiographic picture of tuberculous osteomyelitis usually presents as a blurring of bone details, producing a diffuse radiolucency and erosion of the cortical plate, or even a mixed radiopaque–radiolucent appearance. When it affects the periodontal tissues, the findings are similar to that of the destructive disease.^{12,26–28} Case 4 was unusual as the patient's systemic history was non-contributory for osteomyelitis. Tuberculous osteomyelitis was diagnosed mainly based on culture, detection of AFB in the discharge and positive Mantoux test. Anti-Koch's therapy was started on the basis of working diagnosis and the patient responded positively to the regimen, favouring the diagnosis of oral tuberculosis. This finding is in concordance with the study conducted by Lanka *et al* who stated that all their patients, irrespective of AFB positivity, responded to standard anti-Koch's therapy.²⁹ This case also demonstrates the importance of considering tuberculous osteomyelitis in differential diagnosis of jaw lesions. Tracking the intraoral draining sinus tract through a gutta percha point also helped in localizing the origin of the lesion.

Diagnosing cases 1 and 2 reinforces the idea that a CT scan is a more sensitive aid than plain radiography when findings on the film are inconsistent or absent. A CT scan may even reveal occult abscesses and pathological extent of the lesion.³⁰ An interventional radiographic modality was preferred over a surgical approach. A CT-guided FNAC was therefore an important diagnostic tool for the first two cases, which was not only adequate for diagnosis but also deferred a major surgery needed to obtain a biopsy. Management, however, depends upon clinical findings and at least two imaging techniques that complement each other in specificity and sensitivity.³¹

Conclusion

Generally, tuberculosis in the oral cavity manifests as a non-healing ulcer of the mucosa or as jaw bone lesions that get affected, secondary to pulmonary or non-pulmonary tuberculosis. In contrast, all four cases discussed in this article have no history of any ulcer. In fact, they exhibited unusual features of jaw lesions at the time of presentation. Only after thorough diagnostic work up, including radiographic evaluation, could the diagnosis of the tuberculosis be made. Varied manifestation of orofacial tuberculosis can lead to misdiagnosis if the condition is not understood completely. The

cases discussed in this article make an attempt to present some of the unusual radiographic findings of oral tuberculosis. We believe that any interesting and unusual radiological presentation of oral tuberculosis warrants reporting in the literature as these radiological features can be confused with other conditions and could affect the final management of the patient. This report also highlights the need to consider oral tuberculosis in the differential diagnosis of unusual

resorption of bone. Regardless of the scarcity of reported cases, oral radiologists should be aware of these unusual findings of oral tuberculosis.

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