TUBERCULOSIS AND DENTISTRY

Dr.Manikandan G., Dr.Surya V., *Department of Dentistry*

Shri Sathya Sai Medical College & Research Institute,
Sri Balaji Vidyapeeth, Nellikuppam, Kancheepuram Dist., Tamil Nadu – 603 108, India.

Introduction

Tuberculosis is an Infectious disease caused by mycobacterium tuberculosis, which primarily affects the lungs but also capable of involving almost any site in the body including the oral cavity.

Transmission:

- Aerosolized droplets 5µm in diameter.
- Estimated 5-200 orgs required for infection.
- Spreads through the air when a person:
- Sneezes
- Coughs
- Speaks

Diagnosis:

- Chest x-ray -> air appears black in lungs.
- Tuberculin skin test (TST or PPD).

Relationship of TB with dentistry:

- In dentistry, the incidence of exposure to an active TB patient is quite low.
- This does not mean the dental health care worker should not concern themselves with good diagnosis and preventive measures and realization that patients may be infected with TB.
- Most common oral manifestation include typical lesion in indurate chronic, non-healing ulcer that is usually painful.
- Bony involvement of maxilla and mandible may result in tuberculosis osteomyelitis.
- In fact it may involve submandibular and cervical lymph nodes leading to tuberculosis lymphadenitis.
- Tongue is the most common site affected followed by palate, lips, buccal mucosa and superficial deep painful ulcers.
- This does not mean the dental health care worker should not concern themselves with good diagnostic and preventive measures and realization that patients may be infected with TB.
- Most common oral manifestation include typical lesion in indurated chromic, non-healing ulcer that is usually painful.
- Bony involvement of maxilla and mandible may results in tuberculosis osteomyelitis.
- In face it may involve submandibular and cervical lymph nodes leading to tuberculosis lymphadenitis.
- Tongue is the most common site affected followed by palate, lips, buccal mucosa & superficial deep painful ulcers. Chronic sinus infection/ use of decongestants leads to dry mouth.
- Aspiration of oral cavity secretions containing oral bacteria into respiratory tract cause pneumonia.
- Inflammatory products from gingival tissue & pathogenic bacteria can aspirated in lower airway promotes lung infection.
- Medications such as corticosteroids used over a period of time causes candidiasis.
- Exposure to dental materials such as meth acrylate and natural rubber latex increases the risk for allergic respiratory hypersensitivity.

Safety measures by dentist:

- Clinical dental practice has a potential for transmission of various infections from patient to dentist, patient

to patient as well as dentist to patient due to close proximity to the nasal and oral cavities of the patient.
- Barrier should be created to prevent the transmission of the infections and to make the clinical procedures safe from the threat of cross infection.
- For known active tuberculosis patients, TB isolation rooms which are appropriately equipped room with effective evacuation

Risk for infectiousness:

- Coughing
- Undergoing cough-inducing or aerosol-generating procedure
- Failing to cover cough
- Having cavitation on chest radiograph
- Risk for transmission
- Exposure in small, enclosed spaces
- Inadequate ventilation
- Recirculating air containing infectious droplets
- Inadequate cleaning and disinfection of equipment
- Improper specimen-handling procedures

Sterilization

- Proper sterilization of all the instruments should be done before and after the treatment of that patient.
- The dentist should also disinfect his/her hand after treatment.

Treatment:

Treatment of oral tuberculosis lesion is the same as the systemic tuberculosis. The most effective regimens require a combination of four drugs namely Isoniazid, rifampicin, pyrazinamide and ethambutol, administered daily for the first two months and followed by an additional four months with only two drugs[isoniazid and rifampicin]

Case Report : 1

A 40 year old man presented to the department of dental and oral surgery complaining of an ulcer in the mouth which had been present for the last two months and was gradually increasing in size. He did not have any systemic complaints, was not on any medications and had no history of any allergy. He was a chronic smoker and was unable to give up the habit. Physical examination did not reveal any extra oral abnormality. His left submandibular lymph nodes were enlarged, mobile and non-tender to palpation.

Intraorally, his oral hygiene was graded as poor with generalized mobility of all teeth and moderate deposits of stains present throughout the dentition. Almost all of his teeth had some degree of attrition and some of his teeth were clinically missing. Soft tissue examination revealed a single discrete ulcer of less than 1 cm in diameter present on the left buccal mucosa. The ulcer was bordered by well-defined margins around which were several small nodular swellings. On palpation, the ulcer was tender with indurated margins. The other mucosal surfaces in the mouth were normal. Panoramic radiographs did not reveal any abnormality in the maxillofacial region.

A complete general examination revealed no other contributory abnormalities. Correlating these features of a chronic ulcer of two months duration with an associated history of smoking and involvement of the sub mandibular lymph nodes, a differential diagnosis of malignant neoplasm, tuberculosis and mycoticulcer was arrived at.

The diagnostic workup included serum analysis for human immunodeficiency virus which turned out to be non-reactive. Cultures for acid fast bacilli and fungi were negative. An incisional biopsy of the oral ulcer was done and the specimen was sent for histopathological examination. The histopathology showed multiple confluent and discrete granulomas composed of epithelioid histiocytes and Langhans giant cells with central caseous necrosis confirming the diagnosis of tuberculosis. Following the biopsy report, a chest radiograph and a routine medical consultation were requested both of which turned out negative results. AFB tissue culture and smear were positive for M. tuberculosis. The patient was then referred to the Department of Internal Medicine where he was started on anti-tuberculosis therapy. Six months later at follow up, the oral ulcer had healed.

Case Report : 2

A 7 year old girl was referred to the Department of Dental and Oral Surgery for evaluation of a chronic painful ulcer in the mouth. History obtained from the parent revealed that the oral ulcer was present in the left lower gingiva since the last one month. The child had difficulty in eating and brushing her teeth. Her family history disclosed that one of her maternal aunts had been diagnosed with pulmonary tuberculosis and was on treatment.

On extra oral examination, multiple cervical lymph nodes and the left submandibula group of lymph nodes were enlarged and tender. Intra orally, her oral hygiene was fair and she was in the mixed dentition stage. A large irregular ulcer was present in the lower left gingiva involving the labial and the lingual aspects in relation to 31,72 and 73. The ulcer had extended to the labial vestibule, had a granular surface and was tender. The margins were well defined.

There was no other abnormality elsewhere within the oral cavity. Intra oral radiographs revealed unerupted 32 and 33. There was no radiographic evidence of involvement of the underlying bone. A complete general examination did not yield any significant findings. The differential diagnosis included tuberculosis and autoimmune disorder.

Laboratory investigations which included evaluation of immunoglobulins were found to be within normal limits. Sero analysis for HIV was negative. The ESR was 92mm at 1 hr. A chest radiograph showed increased vascular markings with no infiltrates or mediastinal adenopathy. An incisional biopsy of the ulcer was then done under general anaesthesia along with excision of the left submandibular lymph node and the specimens were sent for histopathological analysis.

Tissue samples were also sent for AFB culture and smear and returned positive for M.tuberculosis.The histopathology of the oral mucosal biopsy showed epithelioid granulomas . Biopsy of the submandibular lymph node showed multiple confluent and discrete necrotizing granulomas . The reports were confirmatory for tuberculosis. The child was then referred back to the Department of Child Health where she was started on anti-tuberculosis therapy.

Discussion

Although tuberculosis has a definite 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 part of the body [(1)]. Studies of Farber et al [(2)] indicated that less than 0.1% of tuberculosis patients whom they examined exhibited oral lesions. According to Tiecke [(3)], the prevalence of oral manifestations in patients with pulmonary tuberculosis ranges from 0.8% 3.5%.

Occasionally the recognition of an oral tuberculous lesion precedes the detection of pulmonary tuberculosis [(4)]. Compared with tuberculous involvement of other parts of the body, the primary occurrence of this disease in the oral cavity and jaw bones is relatively rare. Oral lesions of tuberculosis are nonspecific in their clinical presentation and are often overlooked by the clinician [(1)]. Although the pathogenesis of oral involvement is not definitely established, it appears most likely that the organisms gain entry into the mucosal tissue through a break in the surface [(5)] The probable importance of an intact mucosal epithelium in providing protection against the infection has support from the observation of Abbot et al [(6)] who were able to isolate the tubercle bacilli from mouth washings of 44.9 % of the patients with active pulmonary lesions. When the primary lesions of tuberculosis occur in the mouth, the most frequent sites of involvement are gingiva, tooth extraction sockets and the buccal folds [(1)]. The systemic factors that favor the chances of oral infection in tuberculosis includes lowered host resistance [(7)] and increased virulence of the organisms. The local predisposing factors may be poor oral hygiene [(8)], local trauma [(9)], and the presence of existing lesions like leucoplakia [(10)], periapical granulomas [(11)], dental cysts [(12)], dental abscess [(13)], jaw fractures [(14)] and periodontitis [(15)]. 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 [(1)]. Tiny single or multiple nodules called 'sentinel tubercles' may also be seen surrounding the ulcer [(8)].

On the tongue, the common sites for atuberculous ulcer are the lateral border, tip, anterior dorsum and the ventral surface [(2)]. The tongue lesions are usually painful, greyish yellow, firm and well demarcated. The palatal lesions of tuberculosis may be seen as granulomas [(16)] or ulcerations [(17)] and are usually more common in the hard palate than in the soft palate. The gingival lesions may present as exuberant and granulating or as mucosal erosions. Sometimes these lesions may be seen simultaneously with marginal periodontitis [(18)]. Involvement of the maxilla and mandible usually results in tuberculous osteomyelitis. Tuberculosis of the jaw bones may be secondary or primary [(19)] and occurs as a result of either deep extension of the gingival lesion, from an infected postextraction socket or through hematogenous spread of the infection. The mandible shows a greater predisposition to the infection than the maxilla In a study conducted by Chapotel[(20)], fifty cases of tuberculous osteomyelitis involved the lower jaw bone.

Conclusion

Tuberculous lesions of the oral cavity can assume a nonspecific clinical appearance. If the mucosais involved, the lesions may present as ulcerations, nodules, fissures, plaques, granulomas and vemicous proliferations. When the jaw bones are involved, the disease presents features of chronic osteomyelitis. Primary lesions of tuberculosis manifest in the oral cavity as non-healing chronic ulcers. When diagnosing such lesions with non-healing tendency, tuberculosis should be considered in the differential diagnosis. In this assessment, a complete physical examination should also be included, with diagnostic tests such as chest radiographs, biopsy specimens for histological studies and culture of the organism. An early diagnosis with prompt treatment will usually result in a complete cure.

Case Report : 3

A 17-year-old female patient reported to the Department of Oral Medicine and Radiology, complaining of a painful swelling in her right submandibular region that had been present for two months and was originally noticed on June 13th 2009. The swelling was initially the size of a peanut and had been gradually increasing until it reached the present size.(Fig1) On general examination the patient was thin and malnourished. There was no fever, cough, or weight loss symptoms present. Past medical history and family history was not significant. On extraoral examination, inspection showed a single diffuse swelling with ill-defined borders of approximately 4 × 3 cm in the right submandibular region. The overlying skin was the same as surrounding skin. On palpation a mass was felt in the right submandibular region, which was firm in consistency, tender, nonfluctuant, noncompressible, mobile, and showed signs of matting. On intraoral examination, odontogenic involvement due to the swelling was not present. Other lymph nodes were not palpable.(Fig 2)A clinical diagnosis of right submandibular tuberculous lymphadenitis was considered. Differential diagnosis of right submandibular sialadenitis, right submandibular gland calcification was considered.A panoramic radiograph was carried out and it did not reveal odontogenic origin in relation to the swelling (Fig 3). A Mantoux test was positive. No abnormality was detected in chest radiographs (Fig 4). A complete hemogram showed a hemoglobin level to be 8.8 gm%, the red blood cell reading was 3.3 million/cu mm, and the total white blood cell count was 8,200 cells/cu mm. By comparison, normal range hemoglobin is 12%–16 gm%, red blood cells 4–5 million/cu mm, and total white blood cells 4000–11000 cells/cu mm. Erythrocyte sedimentation rate (ESR) was raised 1st hour 75 mm, 2nd hour 105 mm.

Fig 1: Swelling in right submandibular region.

Fig 2: Swelling with ill-defined borders.

Fig 3: Panoramicradiograph showing no odontogenic orgin in relation to the swelling

Fig 4: Chest radiograph showing no abnormality

Fig 5: Ultrasound scan showing right submandibular tuberculosis lymphadenopathy

An ultrasound scan of the patient's neck revealed multiple hypoechoic nodular lesions of varying sizes in the right submandibular region, abutting and displacing the right submandibular salivary gland. The largest of the lesions measured 3.4*2.9 cm and matting was apparent (Fig 5). There were a number of other similar smaller lesions along the right jugular vein, which is suggestive of lymphadenopathy. The ultrasound report was consistent with that of right submandibular and jugular tuberculous lymphadenopathy.

Ultrasound-guided fine-needle aspiration biopsy (FNAB) revealed a cellular aspirate showing plenty of small and large lymphocytes. Necrotic debris was seen in focal areas, and few epithelioid cells or giant cells seen.(Fig 6 & 7)

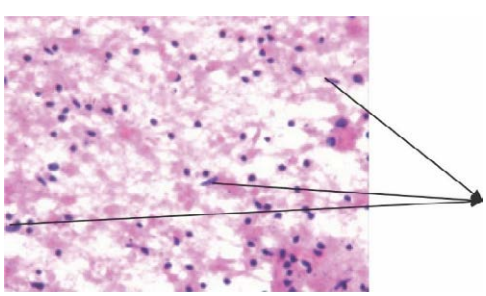

Fig 6: Fine needle aspiration biopsy showing epithelioid cells.

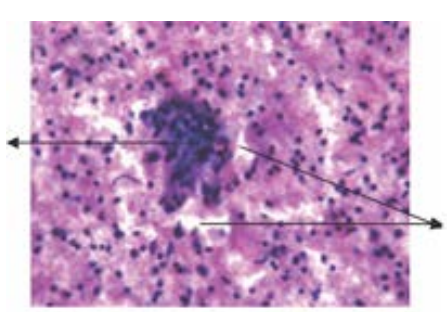

Fig 7: Fine needle aspiration biopsy showing giant cell and necrotic debris.

The ultrasound-guided FNAB report was compatible with that of tuberculous lymphadenitis. Regarding the clinical presentation of the case and the investigation reports a final diagnosis of right submandibular tuberculous lymphadenitis was arrived at. The patient was referred to the TB hospital for further treatment. Treatment consisted of anti-TB drugs for a period of 6 months. No complications occurred, and no further surgery was required.

Discussion

In the case three report, the patient had a swelling of about 4 × 3 cm in the right submandibular region. Intraoral examination revealed no obvious odontogenic involvement, which could be the cause of the swelling. A panoramic radiograph of the affected area was taken to check for any underlying source of odontogenic involvement with respect to the swelling; it did not reveal any odontogenic origin in relation to the swelling and thus it was determined that the swelling was nonodontogenic in origin.

The presence of matting in the mass of the swelling and nonodontogenic nature of the swelling was taken into consideration for a clinical diagnosis of right submandibular tuberculous lympadinitis.

The target organ of MTB is the bronchopulmonary apparatus and the head and neck are usually secondary.[16–22] The patient underwent a Mantoux test and complete hemogram. The Mantoux test was positive and the complete hemogram showed raised ESR 75 mm at 1st hour, 105 mm at 2nd hour. The positive Mantoux test and the raised ESR further strengthened our clinical diagnosis of right submandibular tuberculous lymphadenitis. There is no single diagnostic test for TB23 although positivity for the tuberculin skin test was found in 84% of TB patients.[24]

A chest radiograph of the patient was taken and no abnormality was observed in the chest radiograph. If a tubercular lesion is suspected, a chest X-ray is indicated to investigate the possibility of pulmonary involvement.[25] To evaluate the swelling further, an ultrasound scan of the patient was taken. The ultrasound scan report was consistent with that of right submandibular tuberculous lymphadenopathy.

With the results of all the above investigations pointing towards a diagnosis of TB lymphadenitis, an ultrasound-guided FNAB was carried out for the histopathological examination. The ultrasound-guided FNAB revealed clusters of epithelioid cells and few giant cells, which was compatible with that of tuberculous lymphadenitis. Fine needle aspiration is the most frequent and useful diagnostic technique available to diagnose lymph node TB.[26]

Histopathological examination of the biopsy specimens or material collected by fine needle aspiration of the cervical swellings was an important aid in the diagnosis of the disease because the finding of granulomatous lesions with epithelioid cells was highly suggestive of TB. The microbiological detection of mycobacteria was negative in almost 50% of the cultures and smears performed.[24] The difficulties in detection of mycobacteria in orofacial TB, either by staining or by culture, are clearly reported in the literature.[27]

Conclusion

Primary TB of the orofacial region is more commonly found in children and adolescents than in adults.[3,4] In the present case, adolescent age, poor socioeconomic and nutritional status of the patient, the clinical presentation of the case, and the investigation reports were taken into consideration for a final diagnosis of right submandibular primary tuberculous lymphadenitis.

Overall Summary

TB affecting primarily cervical lymph nodes is uncommon. In absence of systemic signs and symptoms, as in our case, it can be difficult to diagnose TB. Awareness by the clinician of such a presentation would make diagnosis of TB easier. Diagnosis of the disease in the initial stages would be beneficial not only to the patient to allow them to receive early treatment, but also in preventing the spread of the disease to others. Thus, oral clinicians can contribute to the diagnosis of TB with awareness of the presentation of the disease and extra care in their regular practice.

Acknowledgement:

The authors would like to thank Dr. Don K. Abraham for his technical expertise.

REFERENCES

1. Crompton GK, Haslett C, Chilvers ER. Diseases of the respiratory system. Davidson's principles and practice of medicine. 18th ed. London, UK: Churchill Livingstone; 1999;347–353.
2. Lee KC, Schecter G. Tuberculous infection in the head and neck. EarNose Throat J. 1995;74:395–399.
3. Popowich L, Heydt S. Tuberculous cervical lymphadenitis. J OralMaxillofac Surg. 1982;40:522–524.
4. Ishikawa H, Hyo Y. Tuberculous submandibular lymphadenitis. J OralMaxillofac Surg. 1982;40:302–305.
5. Iype EM, Ramdas K, Pandey M, et al. Primary tuberculosis of the tongue: report of three cases. J Oral Maxillofaic Surg. 2001;39:402–403.
6. O'Conell JE, George MK, Speculand B, Pahor AL. Mycobacterial infection of the parotid gland: an unusual cause of parotid swelling. J Laryngol Ootal. 1993;107:561–564.
7. Hock-Liew E, Shin-Yu L, Chuang-Hwa Y, Wei-Jen C. Oral Tuberculosis.Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1996;81:415–420.
8. Phelan JA, Jimenez V, Tompkins DC. Tuberculosis: infectious diseases and dentistry. Dent Clin North Am. 1996;40:327–340.
9. Reichmand LB. The U shaped curve of concern. Am Rev Respir Dis.1991;144:741–742.
10. Ito FA, de Andrade CR, Vargas PA, Jorge J, Lopes MA. Primary tuberculosis of the oral cavity. Oral Dis. 2005;11:50–53.
11. Rinaggio J. Tuberculosis. Dent Clin North Am. 2003;47:449–465.
12. Yepes JF, Sullivan J, Pento A. Tuberculosis: medical management update. Oral Surg Oral Med Oral Pathol Oral Radiol Endod.2004;98:267–273.
13. Aziz MA, Wright A, Laszlo A, DeMuynck A, Portaels F, VanDeun A.Epidemiology of ant tuberculosis drug resistance (The global project on ant tuberculosis drug resistance surveillance): an updated analysis. Lancet. 2006;368:2142–2154.
14. Prabhu SR, Sengupta SK. Bacterial infections due to mycobacteria.Oral Diseases in the Tropics. 1st ed. Oxford University Press; Delhi, India: 1993;195–202.
15. Ajay GN, Laxmikanth C, Prashanth SK. Tuberculous ulcer of tongue with oral complications of oral antituberculosis therapy. Ind J Dent Res. 2006;17:87–90.
16. Hashimoto Y, Tanioka H. Primary tuberculosis of the tongue: report of a case. J Oral Maxillofac Surg. 1989;47:744–746.
17. Rauch MD, Friedman E. Systemic tuberculosis initially seen as an oral ulceration: report of case. J Oral Surg. 1978;36:387–389.
18. Prabhu SR, Daftary DK, Pholakia HM. Tuberculosis ulcer of the tongue:report of case. J Oral Surg. 1978;36:384–386.
19. Worsae N, Reibel J, Rechnitzer C. Tuberculous osteomyelitis of the mandible. Br J Oral Maxillofac Surg. 1984;22:93–98.
20. Haddad NM, Zaytoun GM, Hadi U.Tuberculosis of the soft palate and unusual presentation of OFT. Otolarynol Head Neck Surg. 1987;97:91–99.
21. Pande T.K, Hiran S, Rao VVB. Primary Lingual Tuberculosis caused by M. Bovis infection. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1995;80:172–274.
22. Kolokotronis A, Antoniadis D, Trigonids G. Oral tuberculosis. OralDis. 1996;2:242–243.
23. Barga M, Blum JH, Graeme-Cook FM. A 57-year old man with fever and jaundice after intravesical installation of bacilli calmette-guerin for bladder cancer. Weekly clinicopathological exercises. N Engl J Med.1998;339:831–837.
24. Mignogna MD, Muzio LLO, Favia G, et al. Oral tuberculosis: a clinical evaluation of 42 cases. Oral Dis. 2000;6:25–30.
25. MacFarlane TW, Samaranayake LP. Clinical oral microbiology.Butterworth; London; 1989;112–115.
26. Chao SS, Loh KS, Tan KK, Chong SM. Tuberculous and non-tuberculouscervic allymphadenitis:Aclinicalreview.Otolaryngol Head Neck Surg. 2002;126:176–179.
27. Hocking TL, Choi C. Tuberculosis: a strategy to detect and treat new and reactivated infections. Geriatrics. 1997;52:52–64.