



Oral Clinical Findings in Cadaver with Tuberculosis: A Case Report

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Abstract: Tuberculosis (TB) is a long-lasting infectious disease that usually affects the lungs (pulmonary TB), but can also affect other organs and systems (extra-pulmonary TB). Oral TB is uncommon, particularly primary oral tuberculosis which predominantly affects young adults, and the tongue is the site most frequently affected. This case report aimed to discuss the manifestation of TB in the hard palate, focusing on observation from a cadaver and providing a thorough analysis of the oral clinical symptoms. We reported a case of unidentified 42-year-old female body that was found dead and brought to Dr. Cipto Mangunkusumo Hospital for an autopsy. Poor oral hygiene was found. In the palate, there was bone defect on palatum durum regio teeth 21 22 near to the incisive foramen. Pink teeth was discovered in the anterior part of the lower jaw. Based on the autopsy report, the cause of death was tuberculosis. In conclusion, although tuberculosis of the palate is infrequent, it should be included as a potential cause of palatal perforation during diagnostic evaluations. Additionally, it is crucial to conduct a comprehensive investigation into the primary site of tuberculosis in cases involving palatal tuberculosis.

Keywords: oral tuberculosis; palatal perforation; pink teeth phenomenon

INTRODUCTION

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is a long-lasting infectious disease that usually affects the lungs, but can also affect other organs and systems. In fact, around 25% of TB cases are extra-pulmonary, with 10-35% of those cases occur in the head and neck region.^{1,2} In 2022, the Ministry of Health in Indonesia, along with healthcare professionals, detected over 700,000 cases of TB, which was the highest number since it became a national priority program.^{1,2}

Pulmonary tuberculosis (PTB) is characterized by a high bacillary load in patients' sputum, whereas oral tuberculosis presents as a disease with fewer bacilli in saliva. Various local factors in the oral cavity contribute to decreased susceptibility to oral TB, including the natural resistance of striated muscles to bacterial invasion, the presence of saprophytes, and the thickness of the protective epithelial layer. Additionally, breaches in the oral mucosa play a crucial role in bacterial colonization and susceptibility to oral TB. Factors such as poor oral hygiene, local trauma, leukoplakia, and irritation also contribute to the development of oral tuberculosis.³⁻⁵

While extra-pulmonary TB is not very common, it can still affect any part of the body, including the mouth.⁶ Oral TB is rare. Primary oral TB is more commonly seen in children and teenagers. Its symptoms typically affect areas such as the gums, inner cheeks, and areas surrounding teeth or recent tooth extractions.⁷ These symptoms may appear as shallow sores, patches, firm tissue growths, lumps, cracks, hardened areas, layers of abnormal tissue, nodules, wart-like growths, or even abnormalities within the jaw bone, which could range from tuberculosis-related bone infection to simple bone abnormalities visible on X-rays.⁸

Secondary oral TB can affect individuals of any age, but it is more commonly observed in middle-aged and older adults, often presenting with painful symptoms.⁹ The primary lesion observed is usually an ulcer, distinguished by its irregular borders and minimal hardening of surrounding tissue. The ulcer's base may exhibit a grainy texture or be covered by a thin layer of tissue. Typically, the dorsal surface of the tongue is most affected, followed by the palate, inner cheeks, and lips. Additionally, the salivary glands, tonsils, and uvula are frequently involved. However, secondary lesions on the mandibular ridge (the gum tissue around the teeth) are exceedingly rare.¹⁰

This report discussed the presentation of tuberculosis in the hard palate, specifically in a cadaver, with a detailed analysis of the oral clinical manifestations.

CASE REPORT

Unidentified 42-year-old female body was found dead due to illness in January 8, 2023. The body was brought to Rumah Sakit Cipto Mangunkusumo (RSCM) for an autopsy process in March 17, 2023 after embalmed. An autopsy was performed to determine the possible cause of death. In general examination, it was found: blood type O, height 150 cm, weight not measured, thin body proportion (malnutrition), and no trauma injuries were found. It is known that previously she worked as a scavenger. Dental and oral examination revealed residual roots on teeth 18, 23, 25, 26, 26, 28, and 48, erosion on teeth 13, 12, 11, 21, 22, calculus and plaque in all regions (Figure 1), torus palatinus with spindle shape from molar to premolar region in the palate, bone defect palatum durum regio 21 22 near to the incisive foramen (Figure 2), and pink teeth in the anterior part of the lower jaw (Figure 3).

In this case, the cause of death was TB based on the autopsy report that there were many cavities in the lung typical for TB patients. As we know, TB is one of the most common diseases in Indonesia.

DISCUSSION

In this case, there were no signs or features of oral TB such as ulcers or other typical features because the cadaver had been embalmed previously. During the autopsy process, the mucosa of the palate was opened revealing abnormal features. Based on the autopsy report, it was found that the lungs had many cavities filled with pus. In addition, the cadaver was underweight which was closely related to the description of patient with TB.



Figure 1. Poor oral hygiene



Figure 2. Defect on palatal durum near incisivus foramen (red arrows)



Figure 3. Pink teeth phenomenon (red arrows)

Extrapulmonary TB rarely affects the orofacial region, with an incidence of about 0.1-5% among all TB infections. Oral TB can either be primary, which is rare (only 0.1%–0.4%) and mostly affects children and adolescents; or secondary, which is more common (0.005% to 1.5% of cases) and usually affects middle-aged and elderly patients.⁷ A classification system for orofacial tuberculosis was proposed by Andrade et al based on the affected site (Table 1). This case was type V because its location was palatum durum.³⁻⁵

The lungs are the primary site of infection for TB. When a person inhales droplet nuclei which are tiny and can evade bronchial defenses, they reach the terminal alveoli where phagocytic immune cells (macrophages and dendritic cells) engulf them. In the initial stages of infection, *Mycobacterium tuberculosis* replicates inside these immune cells, and the bacterial cells can even cross the alveolar barrier and spread systemically.⁶

Saliva produced by the human oral cavity acts as a protective agent with its antibacterial properties, preventing tuberculosis bacilli from penetrating the epithelial walls. However, clinical observations have shown that epithelial trauma can allow tuberculosis bacilli to infect the connective tissue below. The likelihood of infection depends on systemic factors such as compromised immune function and increased virulence of microorganisms.^{4,6}

Table 1. Classification of orofacial tuberculosis³⁻⁵

Orofacial TB	Dental and oral examination
Type I	Lumpy jaw; mandible/maxilla is involved and when extraoral swelling is present without extraoral and intraoral draining sinuses
Type II	Nonhealing extraction sockets with/without intraoral or extraoral draining sinus/sinuses
Type III	Intraoral or extraoral draining sinus/sinuses in the orofacial region and in osteomyelitic bony lesion
Type IV	TB lymphadenitis of the head-face-neck region without any features of type I, II, III, or V
Type V	Lesion of other sites in and around the oral cavity, e.g., maxillary antrum, salivary glands, gingiva, orofacial muscles, tongue, etc.

Local factors in the oral cavity that may contribute to the development of oral TB include trauma to the area, poor oral hygiene, the presence of pre-existing lesions like leukoplakia, periapical granuloma, cysts, abscesses, jaw fractures, and periodontitis.^{4,6}

It has been reported that TB infection can involve the periapical tissue and post-extraction socket. Tuberculosis can enter through an exposed pulp and cause periapical granuloma tuberculosis or tuberculoma. Lesions in the periapical area can result in tooth loss and post-extraction sockets may be filled with a large mass of granulated tissue. Even if its presence is not apparent, patients who do not respond to usual periodontal treatments may be hosting tuberculous infection of the paradental tissues. The lesions are typically painless and can rapidly extend to involve a significant amount of bone.⁶

Tuberculosis lesions on the palate can take the form of granulomas, ulcers, or perforations, and are more frequently observed in the hard palate than in the soft palate.¹¹ Baruah et al¹² suggested that palatal TB involvement resulting in perforation was typically found in patients with robust immune responses and may be due to an overactive response to acid-fast bacilli that led to tissue destruction.

On living human, the most common type of oral TB lesions that occur on the palate are usually secondary TB in the form of small and painless ulcers. These lesions are more commonly found on the hard palate than on the soft palate. On the other hand, lesions that occur in the gingiva are mostly primary tuberculosis lesions. Gingival lesions typically contain numerous granulated lesions and can also appear as erosions accompanied by marginal periodontitis.⁶

Both systemic and local factors are significant in the development of oral TB lesions. Examples of systemic factors include immunosuppression and increased pathogen virulence. Meanwhile, the list of local factors includes poor oral hygiene, chronic inflammation, tooth eruption, surgical wounds, periodontal disease, dental caries, pulp exposure, cysts, and dental abscesses. The virulence of the *M. tuberculosis* strain may also play a role in the involvement of oral structures. The situation seems to apply to the patient in this case report. The local factors like caries and periodontal disease will be predisposing factors. The bacteria can break down the bone barrier in palatum or the dental caries itself could have been responsible.¹³

The pink teeth phenomenon was found in the lower anterior teeth during autopsy. This phenomenon has been observed in cases of violent or unnatural death, with asphyxia-related deaths such as drowning, strangulation, hanging, and suffocation by plastic bags being the most common. Additionally, pink teeth have been observed in cases of injuries caused by gunshots, stabbings, blunt force to the head, as well as in cases of poisoning, intoxication, and hypothermia.^{7,8}

Pink staining of the teeth most commonly occurs in cases of sudden death, where the blood remains liquid post-mortem due to either increased fibrinolytic activity or inhibition of the coagulation process.¹⁴ The pink teeth phenomenon entails the infiltration of hemoglobin from the dental pulp into the dentinal tubules following death. Normally, these tubules are filled with sterile dentinal fluid. However, postmortem alterations permit hemoglobin from the tooth pulp to enter the dentinal tubules, resulting in a pink or reddish discoloration.¹⁵

Asphyxia is a condition resulting from insufficient oxygen supply to the body, leading to inadequate oxygenation of organs and tissues. Fatalities from asphyxia can occur due to obstructions in the respiratory tract that block airflow or due to compression of nerves and blood vessels in the neck. The physical mechanisms of asphyxia define different forms, including suffocation, smothering, hanging, choking, and death by inhaling foreign objects. Although rare, pulmonary infections like tuberculosis (TB) can also cause asphyxiation.¹⁶

The causes of sudden death in young people can vary widely. Therefore, it is crucial to investigate the etiology of sudden and unexplained deaths, particularly in workplace settings. The potential role of unknown infectious diseases, such as tuberculosis (TB), in these fatal incidents should not be overlooked. It is important for odontology forensic practitioner to be able to recognize oral lesions or an abnormal anatomy associated with tuberculosis and distinguish them from other potential diagnoses. While TB of the palate is not a common occurrence, it should still be considered as a possible cause of palatal perforation during diagnosis.

CONCLUSION

In this case, the cause of death was lung tuberculosis based on forensic examination. This is accompanied by a palatal perforation due to oral tuberculosis which is a rare condition. Pink teeth phenomenon may involve acute asphyxiation episodes. In such instances, an autopsy is essential to determine the cause of death and should include toxicological tests to check for any intoxication. Autopsies are mandatory for similar cases to assess the etiology and to conduct a comprehensive investigation into the primary site of tuberculosis in cases involving palatal tuberculosis.

Conflict of Interest

No conflict of interest in this study.

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