

Protocols and Guidelines for Management of Tuberculous Patients in Dental Office - A Review

S Rajasekar¹, P.L. Ravishankar², G. Balaji Babu³

ABSTRACT

Dentists are increasingly treating patients who have significant medically compromising conditions, a number of which predispose individuals to Tuberculosis. The increased number of patients with tuberculosis has created new challenges for dental practitioners and further, emerging drug resistant strains of the disease complicate treatment. Transmission of *M.tuberculosis* is a recognized risk to patients and health care workers.

Recently, nosocomial TB outbreaks have demonstrated the substantial morbidity and mortality among patients and health care workers that have been associated with incomplete implementation of CDC'S guidelines for preventing the transmission of tuberculosis in healthcare facilities. To meet challenges, dentists will have to identify the high risk groups through proper interpretation of patient histories to manage these patients more appropriately.

Keywords: Tuberculosis, Dental operatory, Aerosol, Transmission, Guidelines

INTRODUCTION

Tuberculosis is a chronic granulomatous disease caused by various strains of mycobacteria, usually *Mycobacterium tuberculosis* in humans¹ TB is principally caused by *Mycobacterium tuberculosis*. However other atypical mycobacterial strains can cause diseases similar to pulmonary TB.¹ The organism *Mycobacterium tuberculosis* is capable of resisting most disinfection for isinfection agents and its transmission is a potential and recognized risk in dental operatory.² TB of the respiratory tract is considered the most infective form and mostly acquired by inhalation of tubercle bacilli contained in airborne particles.

EPIDEMIOLOGY

It has been a major health issue globally for many centuries. Even though the disease prevalence is comparatively reduced worldwide in last few decades, the prevalence is still high in Asian countries. India accounts for nearly one third of global burden of tuberculosis.²

PATHOGENESIS

In response to initial infection, an immune response is developed where macrophages engulf the bacteria and T-lymphocytes are activated. However, some proportion of the organisms survive and multiply and cause localized tuberculous pneumonia. The infected macrophages can spread to hilar and mediastinal lymph nodes and then widely disseminate via the blood stream to other tissues as military tuberculosis.

Most individuals exposed to and infected with military tuberculosis are asymptomatic and develop a carrier state that may last the lifetime of the host. If immunity is disturbed in these individuals, a dormant mycobacteria can multiply and

produce active disease and in some of these cases, there may be systemic dissemination of tuberculous organisms and foci of caseous necrosis. Such patients are highly infectious.³

RISK FACTORS FOR TB

1. Close contact with individuals having active tuberculosis.
2. HIV infection or AIDS.
3. Use of immunosuppressive drugs.
4. Diabetes.
5. Age
6. Intravenous drug abuse and alcoholism.

CLINICAL SIGNS AND SYMPTOMS

The clinical features of tuberculosis may vary depending on the site of involvement and host defences.

Systemic symptoms in pulmonary tuberculosis include anorexia, fever, weight loss, fatigue and night sweats. Cough and sputum production increase as the disease progresses. In more advanced conditions, there may be hemoptysis, chest pain and shortness of breath. Physical findings include elevated temperature, rales and signs of pulmonary consolidation.

RADIOGRAPHIC FINDINGS

The earliest radiological change is an ill defined opacity or opacities, usually situated in one of the upper lobes. In more advanced cases opacities are larger, more widespread and may be bilateral. Occasionally there is a dense, homogenous shadow involving the whole lobe (Pneumonic tuberculosis). An area or areas of translucency within the opacities indicates cavitation. The presence of cavitation in an untreated case usually indicates that the disease is active.

DIAGNOSTIC METHODS

1. Tuberculin skin testing with PPD Purified protein derivative of *M.tuberculosis* culture.
2. Sputum culture or culture of other clinical specimens.
3. Radiological examination.

TREATMENT REGIMEN

Most cases of TB are readily treatable with anti-tuberculous

¹Professor, Division of Periodontology, Rajah Muthiah Dental College and Hospital, Annamalai University, Annamalai Nagar, ²Professor and HOD, Division of Periodontics, SRM Dental College, Kattankulathur, Chennai, ³Professor Of Periodontics, CSI Dental College and Hospital, Madurai, Tamil Nadu, India

Corresponding author: Dr. S. Rajasekar, Professor, Division Of Periodontology, Rajah Muthiah Dental College and Hospital, Annamalai University, Annamalai Nagar-608 002, Tamil Nadu. India

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drugs like isoniazid, ethambutol, rifampicin, pyrazinamide and streptomycin. Combination drug therapy is often used to prevent drug resistance. A standard adult regimen for active TB is daily administration of Isoniazid and Rifampicin for 9-12 months.

GUIDELINES FOR DENTAL MANAGEMENT OF TUBERCULOSIS PATIENTS

A meticulous case history and physical examination of patients, particularly high risk groups will enable the dentist identify the TB patients and appropriately referred for medical treatment. For those who are already on anti-tuberculous treatment (ATT), sputum culture should be done to ascertain that disease is not in active state. Also, their hepatic function should be monitored since some antituberculous drugs are hepatotoxic and certain medications that are heavily metabolised in the liver should be avoided.⁴

Transmission of TB occurs very frequently in the dental clinics either from doctor to patient or from patient to dental staff. The possible routes are airborne transmission, which is the more common route or through direct contact either by contaminated instruments or mycobacteria on dentist's fingers.⁵ Hence it is important that appropriate office protocols are in place to prevent its transmission.

The guidelines for infection control in dental settings 2003 from the CDC reinforces the need for managing dental environmental surfaces and should serve as the standard for clinicians to follow regarding surface disinfection.⁶

Potential routes of transmission of infection include

1. Direct contact with blood, oral fluids or other body fluids.
2. Indirect contact with contaminated objects including instruments, equipment or environmental surfaces.
3. Contact of eyes, nose, mouth and / or mucous membranes with droplets/splatter containing microorganisms.
4. Inhalation of Airborne microorganisms that can remain suspended in the air for longer periods of time.

The following are the recommended guidelines for dental management of tuberculosis patients;

1. Limit the use of ultrasonic scalers and highspeed handpieces in actively infected patients. (Aerosolized M.tuberculosis can survive more than nine hours). High volume suction is mandatory for carrying out any procedure to minimize aerosol generation.
2. Use rubber dam isolation with high vacuum suction. However, if the patient has productive cough it is better to avoid Rubber dam.
3. Maintenance of proper hand hygiene, personal protective equipments like eye shields, facemasks, head caps, gloves and surgical gowns.
4. Use a well constructed, soft pleated, high filtration face masks. Standard face masks do not protect against TB transmission, hence particulate face masks should be used and often changed at regular intervals. Face masks should have atleast 95% Bacterial filtration efficiency (BPE) for particles 3µm diameter. While treating patients with symptoms of active TB, the operator should wear respirators rather than routine face masks.
5. Provide dental operatories with fresh, non recirculated outdoor air to dilute the contaminated operating air. TB rooms should have effective air evacuation with either

exhausted or HEPA-filtered if re circulation is necessary.

6. Regular fumigation of dental operatories. Cleaning and disinfecting critical and semi critical contact surfaces like Dental chair and accessories. Anti bacterial sprays may be used.
7. Use of barrier techniques.
8. Use of high efficacy filters or UV light in the exhaust air ducts.
9. All dental settings should conduct an annual risk assessment for TB transmission.

DISCUSSION

Mahboobi et al (2010)⁷ reported that Dentists have the highest risk of acquiring cross infections among the health professionals with 2.5 to 6 fold higher experience of hepatitis B among dentists.

The aerosols that form in the dental clinics from both the equipment and patient sources can cause droplet infections such as tuberculosis, influenza, sudden acute respiratory syndrome (SARS) etc.⁸

Elective dental treatment should be deferred until the patient has been declared non infectious by a physician. Urgent dental care for patients with active TB should be provided in a facility that has the capacity for airborne infection isolation and has a respiratory protection program in place.

CONCLUSION

Given the increased incidence of TB cases, the dental surgeons should be on high alert to identify the patients and refer them for adequate medical management. Infection control measures should be properly followed to minimize the transmission of M.tuberculosis.

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