

Dental Considerations in Patient's with Infectious Disease

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Abstract:- The rapid transportation methods are abundant in this century, so there is like hood of increasing infections being imported into countries though, some infectious disease are under control by continuous research effort and vaccination, the new pathogens getting increased on other side. The dental professionals come in close contact with infectious patients during the dental procedures. This paper emphasizes about precautions to taken by the dentist to prevent them, also preventing the transmission of infectious disease to other patients and adding sound knowledge of viral, bacterial and fungal disease.

Keywords:- Infection, Bacteria, Protocol, Sterilization, Prevention.

• CLASSIFICATION

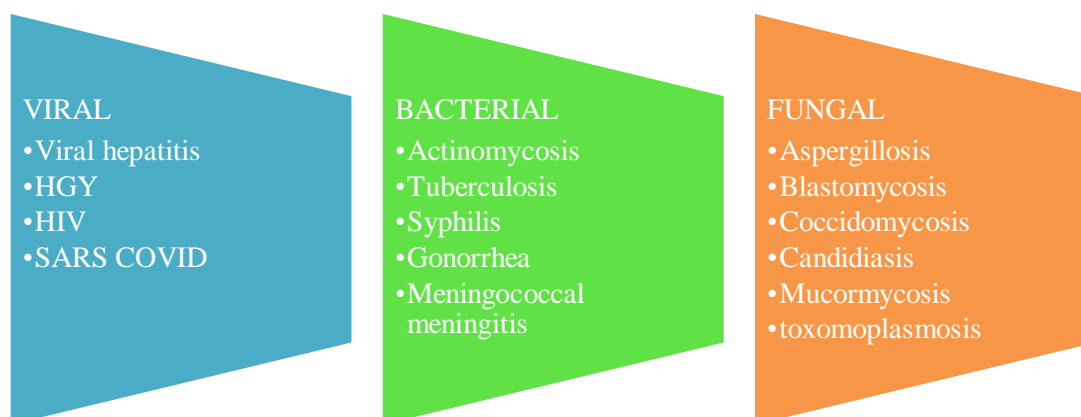


Chart 1: classification of infectious disease

II. DENTAL CONSIDERATION IN HEPATITIS PATIENT

In dental practice, HBV VIRUS infection remains common as the HBV is concentrated in the gingival sulcus. HBV virus is also found in blood and nasopharyngeal secretions. Blood contamination is often found in aerosols produced by ultrasonic scaler, using antiseptic mouthwash before the procedure can reduce contaminants. Hepatitis HCV possibly has salivary route of transmission. HCV RNA is concentrated in gingival sulcus.

I. INTRODUCTION

The oral cavity is a portal of entry for many pathogens like herpes, treponema pallidum, HIV etc, these organisms getting locally proliferated in the oral cavity, it causes damage of tissue in oral and pharyngeal region and enters into bloodstream and gets proliferating rapidly to manifest symptoms of the systemic disease. The oral lesion could be either primary symptoms or secondary manifestations of systemic disease with common symptoms like fever, malaise, headache, sore throat, respiratory disease, rash, pain, etc. The laboratory test are usually aids in definitive diagnosis of the disease and classic presentation in which the patients symptoms correctly fit, it also helps in appropriate management for the patient.(1)

• PREVENTION

- Three doses of Hepatitis B vaccine should be given to all the dental health care providers
- Proper history of hepatitis should be recorded
- A carrier rate is high among patient with conditions like lymphoma, leprosy, down's syndromes.
- Most of the patients on immunosuppressive drugs give positive history of HBV infection.

- **GUIDELINES**
 - Only emergency dental care procedures are provided to the patient.
 - HBV virus remains in the person for about period of 3 months, though patient remain asymptomatic, in this scenario only emergency dental care should be provided.
 - HBsAG and HBs laboratory test are checked before the procedure.
 - If HB antibodies tested negative, but HBV symptoms are detected. The test should be repeated.
 - Patient with anti HBs are positive. the patient is treated
 - Patient with HBsAg are negative, proceeded with treatment.
 - Patient with HBsAg are positive (then patient is chronic carriers) then HbsAg degree of infectivity is determined.
- **TREATMENT**
 - Measuring the bleeding time and prothrombin time before the dental procedures is mandatory.
 - Full barrier technique is should be followed strictly.
 - The headrest also should be covered properly.
 - Using of disposable gauze, gloves, floss, salivary ejectors, face masks, gowns, gloves are advised.
 - 2% activated glutaraldehyde is used to wipe the surfaces.
 - Chlorhexidine gluconate is recommended for prerinseing the mouth.

III. DENTAL CONSIDERATIONS IN BACTERIAL DISEASE

Several studies have observed the transmission of bacteria in dental practice. Bacterial carriers remains asymptomatic and risk of spread of disease to the dentist from patients can prevented by following infection control measures, such as using hand gloves, face masks, protective eye wear and hand hygiene practices in order to prevent the bacterial contamination.

A. *Staphylococcus aureus*

The *S. aureus*, including methicillin-resistant *S. aureus* (MRSA) are commonest reason for nosocomial infections. These strains are no longer confined. The oropharynx is natural locale of *S. aureus*, which are evident on denture bearing areas are identified. Failure of following infection control protocol leads the dental professionals into trouble. (4)

B. Other Bacteria

In the mouth and throat of the people who has infected person who have no symptoms. Asymptomatic carriers can transmit these bacteria to vulnerable people in whom infection can easily occur. The route of transmission is via droplet spread, which can be prevented by wearing a facemask and washing or proper disinfection of hands, Only 10 to 20% of people are asymptomatic carriers. Bacteria that can spread in aerosols include: group A streptococci, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Neisseria meningitidis*, *Corynebacterium diphtheriae* and *Bordetella pertusis*. These bacteria can

produce a wide range of illnesses from pneumonia, to “strep throat” to meningitis, which is a risk.

C. Tuberculosis

Mycobacterium tuberculosis, is the bacteria which is the cause for tuberculosis which. Aerosolized bacteria may remain adjourned in the air for long periods of time and then inhaled into the lungs of person who is prone for infection. The transmission of tuberculosis is not only prevented by wearing a mask, it is important duty of the dentist to identify patients at high risk. Before providing the dental treatment the susceptible individuals must be referred to the appropriate physician for treatment of the disease. In case of emergency dental care is necessary for patients with active tuberculosis, they should be referred to a dedicated branches.

The detailed history taking and physical examination of patients, particularly high risk groups will support the dentist in identifying the TB patients and referred appropriately for medical treatment. For those who are already on anti-tuberculous treatment (ATT), sputum culture must be done to confirm that disease is not in active state. The liver function of the patient should be monitored properly because of hepatotoxic antituberculosis drugs and prescribing certain drugs which are metabolized in the liver should be avoided. Transmission of TB infection occurs very frequently in the dental clinics either from doctor to patient or from patient to dental staff. The possible routes of transmission are through direct contact either by filthy instruments or mycobacteria on dentist's fingers. Hence it is important that proper office protocols are followed to prevent its transmission of the disease. The guidelines for infection control in dental settings 2003 from the CDC reinforcing the dentist regarding need for proper handling and surface disinfection of instruments.

D. Potential routes of transmission of infection include

- Getting direct contact with oral fluids, blood or other body fluids.
- The contaminated instruments, equipment or environmental surfaces are contacted indirectly.
- Contact with eyes, nose, mouth and / or mucous membranes with droplets/splatter which contains the microorganisms.
- Inhalation of microorganisms that can remain suspended in the air for longer periods of time.

E. Guidelines for dental management of tuberculosis patients;

- Using the ultrasonic scalers and highspeed handpieces in TB infected patients should be avoided. (Aerosolized *M. tuberculosis* can endure more than nine hours). During the dental procedures the aerosol production is reduced by using high volume suction.
- The rubber dam isolation with high vacuum suction is performed, if the patient has productive cough it is better to avoid using rubber dam.
- Maintenance of proper hand hygiene, personal protective equipment like eye shields, facemasks, head caps, gloves and surgical gowns is essential.

- Using a well constructed, soft pleated, high filtration facemasks. The Standard face masks not ever protect against TB transmission, hence particulate face masks must be used and often changed at regular intervals to prevent infection. Face masks should have at least 95% Bacterial filtration efficiency (BPE) for particles 3µm diameter. While treating patients with symptoms of TB infection, the operator should wear respirator masks.

IV. DENTAL CONSIDERATIONS IN HIV PATIENT

The Human immunodeficiency virus (HIV) is etiology for AIDS. HIV infection is a communal threat and can easily be termed as expletive upon the human race. The scientific community first perceived and recognized the presence of AIDS as an actual disease following a growth in the incidence of very rare opportunistic infections and cancers among homosexual men.

AIDS is now chronic disease with new antiviral strategies, HIGHLY ACTIVE ANTIRETROVIRAL THERAPY (HAART) has significantly reduced mortality rate among HIV patients, who can survive up to 20 years with disease. Only 20% of HIV positive patients were unaware of their infectivity.

The prevention of infection starts from recording proper history of the patient, using protection barriers like PPE, sterilizing instruments and the laboratory materials. If HIV infection is suspected it is better for the patient is analyzed by laboratory investigations. The CDC recommends Enzyme immunoassay is standard technique to detect presence of HIV antibodies.

The protection attires include wearing proper chin length plastic face shield or surgical masks along with protective eyewear which protects the dentist during the splatter, to avoid contamination of blood latex vinyl gloves should be used. The disinfection of chair should be done properly. The handles of light in the dental chair should be properly covered by plastic wrap or aluminum foil. During the procedures, the needles, blades and scalpels should be handled carefully, which must be disposed in puncture resistant containers. The one handed scoop technique is advised during the needle recapping. All heat tolerant instruments should be autoclaved while hand piece should be sterilized according to instructions of the manufacturer. The handpiece should run for 30 secs to clear the water lines. The laboratory supplies and materials are disinfected by tuberculocidal disinfectant. The material received from dental laboratory should be cleaned and disinfected before using in patient's mouth. In case of sending biopsy specimen, the outer surface of the specimen container should not be contaminated.

The needles are used repeatedly they should be recapped and placed in a instrument tray which is sterile. There is a high chance of sharp injuries during dental treatment, it is suggested that most needle stick area should be washed immediately with washed with water and soap, any splashes in skin or mucosa must be flushed with water, eyes must be cleaned with clean water. Any kind of exposure should be treated with an hour.

V. DENTAL CONSIDERATIONS IN COVID

The novel Corona virus is RNA virus which is single stranded which belongs to family of Corona viridae, which infection through idroplets. Saliva plays most important role in transmission among humans. In dentistry, procedures are done directly on the patient's mouth and getting contact with saliva which is inevitable. Most of the procedures in dentistry involve production of aerosols, thereby dentists lies in a high-risk category with risk of 92.3%

A. Guidelines by DCI

Patient waiting area (previewing area):

- The previewing area is the initial point of contact with the patient.
- Displaying the information about covid -19 as posters.
- Visual alerts at the entrance of clinical area about respiratory hygiene, cough, social distancing is mandatory.
- Wearing of PPE is compulsory
- In the checking area, the patient is counselled to get tested for COVID-19 if patient has positive travel history, epidemiological contact history, or fever and respiratory symptoms.
- The triage area is disinfected immediately. The patients are elucidated about the route of spread of COVID-19, involved risks, and they are asked to sign obligatorily. (5)

VI. OPERATING ROOM GUIDELINES

As per the modern suggestion given by the Ministry of Health and Family Welfare (MOHFW) on ventilation and air quality management in dental clinics and central AC buildings. In stand-alone dental clinics or single room operatory, use of a ceiling fan should be avoided while performing the dental procedures. The natural air must be circulated in and out through frequent opening of windows and using an exhaust blower to extract the room air into the atmosphere. The table fan may be kept behind the operator to let air flow towards the patient. For operatory rooms that has central air-conditioning systems, blocking of return air vents in the patient area must be blocked and fresh air into the room must be allowed by opening of windows.

- The dental water lines are disinfected with 0.01% NaOCl is mandatory.
- Dental professional should wear PPE
- Fumigation the operating room should be done regularly
- For changing PPE, the private room should be provided
- The dentist are advised to wear goggles/face shields for protection. (6)
- Triple-layer surgical mask or N95 respirator masks are advised during the dental procedures.
- FFP3 standard mask are used while treating COVID-19-positive patients.
- During procedures the surgical gloves are advised
- The proper disposal of coverall/gowns with hood/waterproof lining are advised.
- The covering of shoes are compulsory
- In a designated rooms, PPE wearing and removing protocol must be followed.
- The surgical mask must be disposed for every patients.

A. Treatment Guidelines

- The non aerosol-generating (non-AGP) and the aerosol-generating procedure (AGP) are types of types of dental procedures.
- All the dental procedures are preceded by using preprocedural oral rinse 1% hydrogen peroxide or 0.2% povidone iodine for 1 minute. Scrubbing of the face with antiseptic wipe.
- The AGP is to be done ideally in designated isolated rooms which is equipped with HEPA filters/augmented ventilation. To minimize aerosol contamination, during the dental procedures using rubber dams and high-volume saliva ejectors.

B. According to Instrument Sterilization Guidelines :

All the instruments pertaining to dental procedures are disinfected, cleaned, and sterilized as per the standard infection-control protocol (CDC, 2003). All the instruments must be obligatorily sterilized in color-changing sterilization autoclave pouches .The proper storage to be done in the UV chamber.

The UV sterilization of the instruments for minimum of 10 minutes between procedures is effective. The dental operatory room after the procedure, should be thoroughly fumigated and sterilized under UV light overnight.

C. Biomedical Waste Management:

All biomedical waste pertaining to patient care should be carefully inclined as per the Bio-Medical Waste (Management and Handling) Rules 1998, which is been

revised from time to time through an authorized biomedical disposal agency by the State Pollution Control Board.

VII. INSTRUCTION FOR THE PATIENTS

Before entering the clinic the patient are advised to wear mask. The hand should be properly sanitized. The dentist has to maintain automated treatment records only. Cashless/contactless payment methods is to been cougared. If patients develop covid symptoms after procedure ,He/she should be guided to inform back to the dental clinic.

The dental practice stands regulated by the regulatory authorities provided by DCI, should function accordingly .The guidelines for dental management put forth by the DCI will guarantee safe dental practice, which is the need of the hour. These guidelines may vary from time to time and regional need based on disease course. It is the accountability of healthcare facilities and individual dentists to be aware of the updates and redefine their facilities and practice accordingly.

- Route of transmission (7)
- Infection spread through hand – Hepatitis B,C,D ,Meningitis
- Infection from hand – Hepatitis B,C,D conjunctivitis ,Candidiasis ,Rhinitis
- Infection from splashed material -Diphtheria,Flu,Common cold Tuberculosis ,Candidiasis
- Infection from inhalation of aerosol – Meningitis ,Rheumatic fever, Pneumonia, Candidiasis, Tuberculosis

MICROORGANISM	INCUBATION PERIOD
□ HSV	□ 2 YEARS
□ Varicella zoster virus	□ 2 weeks
□ Hepatitis B/C/D	□ 6months
□ HIV	□ months to years

Table 2: SHOWING INCUBATION PERIOD OF MICROORGANISMS(8)

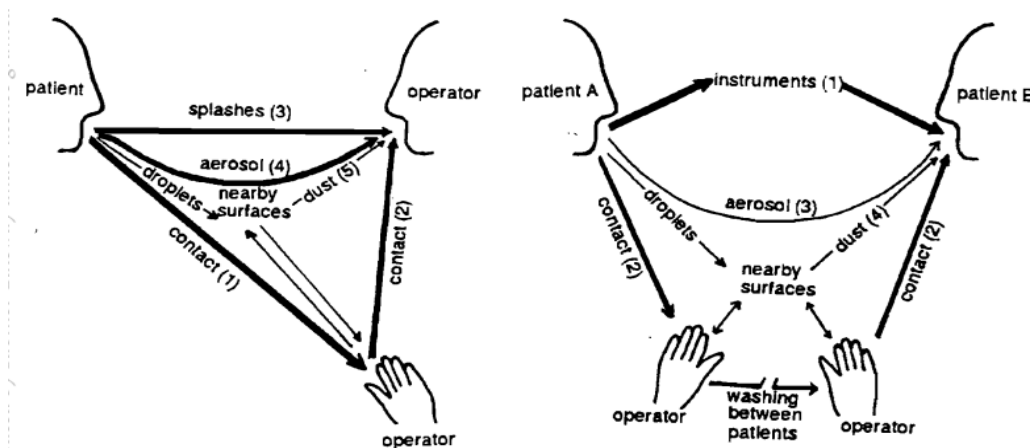


Image 1: SHOWING TRANSMISSION OF INFECTIONS IN DENTISTRY(9)

VIII. CONCLUSION

The dental surgeons should remain highly alert on the infected patients and referring the mint ended for satisfactory medical management. Infection control measures are strictly followed to minimize the transmission of infectious diseases. The dental practice is structured by the regulatory authorities of DCI and should function according to their DCI recommendations. The guidelines for dental management by the DCI will ensure safer dental practice, which is essential need of the hour. These guidelines vary according to external circumstances, depending on the course of the diseases of the era and local needs. It is the obligation of healthcare amenities and individual dentists to be aware of the dental practice describes and redefine their facilities and practice accordingly.

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