

Management of HIV/Hepatitis Patients in Oral and Maxillofacial Surgery

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Abstract

Objective: Hepatitis B virus (HBV) and Human Immunodeficiency Virus (HIV) remain the greatest threat to dental team which has high chances of unknowingly encountering patients who are infected with HIV/ and Hepatitis B virus. The present review is an attempt to collect and concise the information available on prevention and post exposure prophylaxis as a ready reference for the clinician.

Key Words

Human immunodeficiency virus; hepatitis B virus; post exposure prophylaxis; vaccination; prevention

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INTRODUCTION

Health-care personnel (HCP) are defined as persons whose activities involve contact with patients or with blood or other body fluids from patients in a health-care, laboratory, or public-safety setting.^[1] The potential exists for blood and body fluid exposure to other workers, and the same principles of exposure management could be applied to other settings. An exposure that might place health care personnel at risk for HIV infection is defined as a percutaneous injury (e.g., a needle stick or cut with a sharp object) or contact of mucous membrane or non-intact skin (e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other body fluids that are potentially infectious.^[2] The first published article related to Acquired Immuno Deficiency Syndrome (AIDS) was in 1981 by Michael Gottlieb. In 1982, the term Acquired Immune Deficiency Syndrome is used for the first time. The name was designated by the Centre for Disease Control (CDC). Despite advances in therapy, the median survival following the diagnosis of AIDS is approximately two years.

The etiology of hepatitis was not identified until the 1960 and only following the subsequent development of laboratory markers for infection was its significance as a major cause of morbidity and mortality worldwide fully appreciated.^[3] The dramatic increase in HIV/ Hepatitis cases and their continued poor prognosis has resulted in great concern regarding the risk of transmission of disease from patients to health care workers, hence making the precautionary measures an important aspect of everyday care.

PRECAUTIONS TO PREVENT TRANSMISSION OF HIV^[4]

Universal Precautions

All health-care workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated. Gloves should be worn for touching blood and body fluids, mucous membranes, or non-intact skin of all patients, for handling items or surfaces soiled with blood or body fluids, and for performing venipuncture and other vascular access

Table 1: Disinfectants and their Uses, Advantages and Disadvantages

Disinfectant	Uses	Advantages	Disadvantages
Formaldehyde	Very limited use as chemosterilant Gaseous form used to decontaminate laboratory safety cabinets	Active in presence of organic materials	Carcinogenic Toxic Strong irritant
Glutaraldehydes (CIDEX®)	2% formulations high level disinfection for heat sensitive equipment	Noncorrosive to metal Active in presence of organic material Sterilization may be accomplished in 6-10 hours	Extremely irritating and toxic to skin and mucous membranes Shelf life shortens when diluted (effective for 14-30 days depending on formulation) High cost
Alcohols (iso propyl alcohol)	Intermediate level disinfectant Disinfect thermometers, external surfaces of some equipment (e.g., stethoscopes). Equipment used for home health care Used as a skin antiseptic	Fast acting No residue Non staining	Volatile May harden rubber or cause deterioration of glues Intoxicating
Iodophors (betadiene®)	Low level disinfectant for hard surfaces and equipment that does not touch mucous membranes (e.g., IV poles, wheelchairs, beds, call bells)	Rapid action Relatively free of toxicity and irritancy	Corrosive to metal unless combined with inhibitors Inactivated by organic materials May stain fabrics and synthetic materials Note: Antiseptic iodophors are NOT suitable for use as hard surface disinfectant
Quaternary ammonium compounds	Low level disinfectant Clean floors, walls and furnishings	Generally non-irritating to hands Usually have detergent properties	DO NOT use to disinfect instruments Limited use as disinfectant because of narrow microbiocidal spectrum
Hydrogen peroxide	High level disinfectant (6%) Effective for high level disinfection of flexible endoscopes Higher concentrations used as chemosterilants Stabilized hydrogen peroxide (0.5%) is used a high level surface disinfectant	Strong oxidant Fast acting Breaks down into water and oxygen	Can be corrosive to aluminum, copper, brass or zinc Surface active with limited ability to penetrate

procedures. Gloves should be changed after contact with each patient. Masks and protective eyewear or face shields should be worn during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or other body fluids. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands should be washed immediately after gloves are removed. All health-care workers should take precautions to prevent injuries caused by needles,

scalpels, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needle stick injuries, needles should not be recapped, and must be purposely bent or broken by hand, or removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal. Although saliva has not been implicated in HIV transmission, to minimize the need for emergency mouth-to-mouth resuscitation, mouth-pieces, resuscitation bags, or

Table 2: Disinfectants Product and recommended use

S. No.	Intended use	Disinfectant
1	Cleanup blood spills*	0.5% Sodium hypochlorite
2	Surface Disinfection**	0.1% Sodium hypochlorite
3	Instruments/surfaces contaminated with infective tissue***	2.5 to 5% Sodium hypochlorite

* Contact time at least 10 minutes.

** Contact time at least 5 minutes. Wet surface with bleach solution and allow drying.

***Contact time 1 hour, then rinse. Instruments require sterilization following disinfection.

Table 3: Recommendation for postexposure prophylaxis for percutaneous or permucosal exposure to Hepatitis B (HB) virus

Vaccination and antibody status of exposed person	HBsAg seropositive	Treatment when source is HBsAg negative	Treatment when source is not tested or status is unknown
Unvaccinated	Hepatitis B Immunoglobulin (HBIG*) × 1 and initiate HB vaccine series	Initiate HB vaccine series	Initiate HB
Previously vaccinated <i>Known responder</i> † <i>Known non responder</i>	No treatment HBIG* × 2 or HBIG* × 1 and initiate revaccination	No treatment No treatment	No treatment If known high-risk source, treat as if source were HBsAg positive
Antibody response unknown	Test exposed person for anti-HBs: <i>If adequate, † no treatment;</i> <i>If inadequate, † HBIG × 1 and vaccine booster</i>	No treatment	Test exposed person for anti-HBs: <i>If adequate, † no treatment;</i> <i>If inadequate, † initiate revaccination</i>

*Dose 0.06 mg/kg IM.

†Responder is defined as a person with adequate serum levels of anti-HBs (≥ 10 mIU/ml); inadequate vaccination defined as serum anti-HBs < 10 mIU/ml

other ventilation devices should be available for use in areas in which the need for resuscitation is predictable. Health-care workers who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient-care equipment until the condition resolves.

Precautions for Dentistry^[4]

In addition to wearing gloves for contact with oral mucous membranes of all patients, all dental workers should wear surgical masks and protective eyewear or chin-length plastic face shields during dental procedures in which splashing or spattering of blood, saliva, or gingival fluids is likely. Rubber dams, high-speed evacuation and proper patient positioning, when appropriate, should be utilized to minimize generation of droplets and spatter. Handpieces should be sterilized after use with each patient, since blood, saliva, or gingival fluid of patients may be aspirated into the handpiece or waterline. Handpieces that cannot be sterilized should at least be flushed, the outside surface cleaned and wiped with a suitable chemical germicide, and then rinsed. Handpieces should be flushed at the beginning of the day and after use with each patient. The same precautions should be used for ultrasonic scalers and air/water syringes.

Blood and saliva should be thoroughly and carefully cleaned from material that has been used in the mouth (e.g., impression materials, bite registration), especially before polishing and grinding intra-oral devices. Contaminated materials, impressions, and intra-oral devices should also be cleaned and disinfected before being handled in the dental laboratory and before they are placed in the patient's mouth. Because of the increasing variety of dental materials used intra-orally, dental workers should consult with manufacturers as to the stability of specific materials when using disinfection procedures. Dental equipment and surfaces that are difficult to disinfect (e.g., light handles or X-ray-unit heads) and that may become contaminated should be wrapped with impervious-backed paper, aluminum foil, or clear plastic wrap. The coverings should be removed and discarded, and clean coverings should be put in place after use with each patient.

STERILIZATION

All form of sterilization will destroy HIV/ HBV. Methods of sterilization recommended by world Health Organisation (WHO) (2000a) are; a) steam (or moist heat) under pressure (eg. autoclave or pressure cooker); b) dry heat (such as an oven) or;

Table 4: Basic and Expanded HIV Post-exposure Prophylaxis Regimens**BASIC REGIMEN****Zidovudine (Retrovir™; ZDV; AZT) + lamivudine (Epivir®; 3TC); available as Combivir™***Preferred dosing*

- - ZDV: 300 mg twice daily or 200 mg three times daily, with food; total: 600 mg daily
 - 3TC: 300 mg once daily or 150 mg twice daily
 - Combivir: one tablet twice daily

Advantages

- ZDV associated with decreased risk for HIV transmission
- ZDV used more often than other drugs for PEP for health-care personnel (HCP)
- Can be used by pregnant HCP

Disadvantages

Source-patient virus resistance to this regimen possible

ALTERNATE BASIC REGIMENS**Lamivudine (Epivir®; 3TC) + stavudine (Zerit®; d4T)***Preferred dosing*

- 3TC: 300 mg once daily or 150 mg twice daily
- d4T: 40 mg twice daily; 30 mg twice daily if body weight is <60 kg

c) gas sterilization (with ethylene oxide) for non-heat resistant equipment.^[4]

1. Moist heat (autoclaving) readily kills HIV/ HBV at 121⁰ C for 15 minutes or 126⁰ C for 10 minutes or 134⁰ C for 3-5 minutes
2. Dry heat at 121⁰ C for 16 hours, 140⁰ C for 3 hours, 160⁰ C for 2 hours or 170⁰ C for 1 hour is sufficient to kill HIV/ HBV
3. Exposure to ethylene oxide for between 4 and 16 hours, depending on the object and its volume, will be sufficient. The object must then be left for several days to allow the gas to evaporate.^[4]

The various disinfectants and their uses, advantages and disadvantages are as described in the Table 1,^[5] disinfectants product and recommended use are shown in Table 2.

Hepatitis B vaccination

Administer missing doses to complete a 3-dose series of hepatitis B vaccine to those persons not vaccinated or not completely vaccinated. The second dose should be administered 1 month after the first dose; the third dose should be given at least 2 months after the second dose (and at least 4 months after the first dose). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, give 3 doses at 0, 1, and 6 months; alternatively, a 4-dose Twinrix schedule, administered on days 0, 7, and 21-30 followed by a booster dose at month 12 may be used.^[6] Recommendation for postexposure prophylaxis for percutaneous or permucosal exposure to hepatitis B virus shown on Table 3.^[7]

Situations for which expert consultations for HIV post exposure prophylaxis (PEP) is advised^[8]

- Delayed (i.e., later than 24-36 hours) exposure report
 - Interval after which lack of benefit from PEP undefined
- Unknown source (e.g., needle in sharps disposal container or laundry)
 - Use of PEP to be decided on a case by case basis
 - Consider severity of exposure and epidemiologic likelihood of HIV exposure
 - Do not test needles or other sharp instruments for HIV
 - Known or suspected pregnancy in exposed person
 - Use of optimal PEP regimens not precluded
 - PEP not denied solely on basis of pregnancy
- Breastfeeding in the exposed person
 - Use of optimal PEP regimens not precluded
 - PEP not denied solely on basis of breastfeeding
- Resistance of the source virus to antiretroviral agents
 - Influence of drug resistance on transmission risk unknown
 - If source persons virus is known or suspected to be resistant to one or more of the drug considered for PEP, selection of drugs to which the source person virus is unlikely to be resistant recommended
 - Resistance testing of the source persons virus at the time of exposure not recommended
 - Initiation of PEP not to be delayed while awaiting any results of resistance testing
- Toxicity of the initial PEP regimen

Table 5: Recommended HIV postexposure prophylaxis for mucous membrane exposure and nonintact skin exposure

Exposure type	Infection status of source				
	HIV positive class 1	HIV positive class 2	Source of unknown HIV status	Unknown source	HIV negative
Small volume	Consider basic 2-drug PEP	Recommend basic 2-drug PEP	Generally no PEP warranted; however consider basic drug PEP for source with HIV risk factors	Generally no PEP warranted however consider basic 2 drug PEP in settings where exposure to HIV infected persons is likely	No PEP warranted
Large volume	Recommend basic 2 drug PEP	Recommend expanded 3 drug PEP	Generally no PEP warranted however consider basic 2 drug PEP for source with hiv risk factors	Generally no PEP warranted however consider basic 2 drug PEP in settings where exposure to HIV infected persons is likely	No PEP warranted

- Adverse symptoms common with PEP
- Symptoms often manageable without changing PEP regimen by prescribing antimotility or antiemetic agents
- In other situations, modifying the dose interval might help alleviate symptoms when they occur.

Timing and duration of PEP are important, but the optimal duration is unknown.^[9-12] PEP should be initiated as soon as possible after an exposure.^[9,13] PEP is most effective when initiated before 24 to 36 hours after exposure;^[13,14] regimens started more than 72 hours after exposure and continued for less than four weeks are believed to be less effective. Although appropriate PEP is almost always effective in preventing HIV infection, failures have been documented.^[9,13] Basic and expanded HIV postexposure prophylaxis regimens is discussed on Table 4.^[8] Recommended HIV postexposure prophylaxis for mucous membrane exposure and nonintact skin exposure is shown on Table 5.^[14]

SUMMARY

Avoiding occupational blood exposure is the primary way to prevent transmission of HBV and HIV in health care settings. An appropriate post exposure management is an important element of work place safety. Maintenance of immunity is an integral part of prevention of disease for health care workers because of their contact with patients or infective material from patients. Proper immunization schedule could substantially reduce both the number of susceptible health care workers and the attendant risks for transmission of vaccine preventable diseases to other workers and patients.

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