12x18 inches

•Whether standard interferon, pegylated-interferon with or without ribavirin, or treatment with direct-acting antiviral agents is used will depend on the individual scenario, as there have been no randomized, controlled trials to guide this decision.

1. Baseline Management

Following an exposure to blood or body fluid, the clinician should assess the risk for exposure to HCV. Wounds should be washed with soap and water, and should not be squeezed. Mucous membranes should be flushed with water

Once the clinician has determined that exposure to blood or body fluid has occurred, the following baseline tests should be obtained:

Source Patient:

• HCV antibody test (e.g., EIA/ELISA) and, if positive, HCV RNA test

Exposed Worker:

• Liver panel including liver enzymes

• HCV antibody and, if positive, HCV RNA test

If the source patient is tested with an EIA/ELISA and found to be positive, then follow-up testing is necessary to confirm the source patient's status. HCV RNA may be used as the confirmatory test. When the source patient tests positive with the HCV RNA test, the exposed worker should be managed as though the source has chronic HCV.

Hepatitis C Post-exposure Management According to Baseline Test Results

Clinical Scenario	Follow up
Source patient is HCV-antibody negative	No further testing or follow -up is necessary for source patient or the exposed worker
Source patient is unavailable or refuses testing	Exposed worker: Follow -up HCV antibody at 3 and 6 months
Source patient is HCV -antibody positive and HCV RNA negative	Manage the exposed worker as if the source patient has chronic hepatitis C
Source patient is positive for both HCV antibody and HCV RNA *and* Exposed worker is HCV-antibody negative	Source patient: Counsel and manage as chronic hepatitis C regardless of status of exposed worker Exposed worker: Follow up *for HCV*
Exposed worker tests positive for both HCV antibody and HCV RNA	Counsel and manage as chronic hepatitis C

A. If at any time the serum ALT level is elevated in the exposed worker, the clinician should test for HCV RNA to assess for acute HCV infection.

B. A single negative HCV RNA result does not exclude active infection.

Issue VII August - 2021
MICRO-VISION
INFECTION CONTROL BULLETIN
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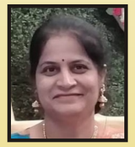

Dr. Neena Nagdeo
Member Secretary

Editorial

Health care workers are exposed to needle prick injuries and exposure to blood and body fluid. This makes them susceptible for infections from blood borne pathogens. It is the duty of hospital management to look after the safety of health care workers. Every hospital should record the number of needle prick injuries. Proper counselling and post exposure drugs should be available in the hospital and health care workers should be made aware regarding reporting of such injuries. It gives me the pleasure to present 7th Issue of Infection Control Bulletin 'Microvision'.This issue gives information regarding needle prick injuries and also mentions NKP Guidelines to be followed after such injuries. I am sure this information will be of great help to every person working in our hospital.

Needle Prick Injuries

Health care settings are constantly exposed to numerous occupational hazards. The growing trend of HIV infection in recent years has rapidly become one of the hazard that people in the healthcare field fear the most. It has been reported that nearly 3 million health care workers suffer percutaneous exposures each year. Of these, an estimated hepatitis B of 66,000, .hepatitis C of 16,000, and HIV infections upto 1000 occur each year.

Healthcare workers are at greatest risk of HIV. They can be exposed to HIV by Needle sticks or cuts, getting blood or other body fluids in their eyes or mouth or on their skin when it is chopped, scraped, or affected by *dermatitis.*

Avoiding occupational blood exposures is the primary responsibility of a nurse to prevent transmission of hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) in health-care settings. Due to an increasing problem of HIV infection from needle sticks, the Center for disease Control has recommended the post exposure prophylaxis (PEP) for health care workers who are involved directly or indirectly in giving care to the patients.

Post-exposure prophylaxis (PEP) means taking anti-HIV drugs as soon as possible after exposure to HIV to reduce the chances of becoming HIV positive. There are two types of PEP. First one is occupational PEP, ("oPEP"), and next one is non-occupational PEP, ("nPEP"). Occupational PEP (oPEP) means someone working in a health-care setting is potentially exposed to material infected with HIV and non-occupational PEP (nPEP) means someone is potentially exposed to HIV outside the workplace (e.g., condom breakage, sexual assault).To be effective, PEP must begin within 72 hours of exposure, if not virus may rapidly replicate in the body.PEP consists of 2-3 *antiretroviral* medications and it should be taken for 28 days. The physician will decide the type of treatment based on the exposure to HIV. These medications have serious side effects that can make it difficult to complete the treatment.

Several clinical studies have demonstrated that HIV transmission can be significantly reduced by the post-exposure administration of antiretroviral agents.

ESTIMATED PROBABILITY OF ACQUIRING HIV FROM A KNOWN HIV-INFECTED SOURCE BY EXPOSURE ACT

Type of Exposure	**Risk per 10,000 Exposures**
Parenteral	
Blood Transfusion	9,000
Percutaneous (needlestick)	30
Other	
Biting	Negligible
Spitting	Negligible
Throwing body fluids (including semen or saliva)	Negligible

Issue VII August- 2021
MICRO-VISION
INFECTION CONTROL BULLETIN

Both HBIG and the first dose of the hepatitis B vaccine should be ideally administered within 24 hours of exposure; HBIG should not be given later than 14 days post-exposure. The three-dose HBV vaccine series is given at 0, 1 to 2 months, and 6 months. Hepatitis B antibodies should be obtained 1 to 2 months after completion of the third dose of the vaccine.Even if the risk of exposure to HBV is not deemed significant, HBV vaccination should still be advised for all non-HBV-immune exposed workers. Household, sex, and needle-sharing contacts of HBsAg-positive individuals should be identified and vaccinated according to the guidelines for patients exposed to known HBsAg-positive individuals.

RECOMMENDED POST-EXPOSURE PROPHYLAXIS FOR HEPATITIS B VIRUS

Vaccination and/or antibody Response status of exposed person	Treatment when soursept	
	HBsAg positive,has unknown status or is unavailable for testing	Is HBsAg Negative
Unvaccinated/non-immune	HBIG *b* ×1; initiate HBV vaccine series	Initiate HBV vaccine series
Previously vaccinated,*c*known responder *d*	No treatment	No treatment
Previously vaccinated,*c*known non-responder *d*	HBIG *b* ×1 and initiate revaccination *e* or HBIG *b* ×2	No treatment
Previously vaccinated,*c*known non-responder *d*	HBIG *b* ×1 and initiate revaccination *e* or HBIG *b* ×2	No treatment
If still undergoing vaccination	HBIG *b* ×1; complete series	Complete series

HBsAg, hepatitis B surface antigen; HBIG, hepatitis B immune globulin; anti-HBs, antibody to hepatitis B surface antigen.

a Persons who have previously been infected with HBV are immune to re-infection and do not require PEP.

b Dose 0.06 mL/kg intramuscularly.

c Vaccinated with full three-dose series.

d Based on information available at presentation. Responder is defined as person with previously documented adequate levels of serum antibody to HBsAg (serum anti-HBs >10mIU/mL); non-responder is a person with previously documented inadequate response to vaccination (serum anti HBs <10mIU/mL). It is not recommended that decision-making be delayed while testing for anti-HBs at presentation.

e The option of giving one dose of HBIG and re-initiating the vaccine series is preferred for non-responders who have not completed a second three-dose vaccine series. For persons who previously completed a second vaccine series but failed to respond, two doses of HBIG are preferred

Hepatitis C Virus Post-Exposure Management

• Clinicians should consider concurrent exposure to HCV when exposed workers present with an HIV exposure. • Neither immunoglobulin nor antiviral agents are recommended for HCV PEP.

• When HCV infection is identified, the exposed worker should be referred for medical management to a clinician with experience in treating HCV.

• Currently, no effective prophylaxis for HCV has been identified. Immunoglobulin and antiviral agents are not recommended for HCV PEP. However, if an individual becomes acutely infected with HCV and is diagnosed at that time, immediate referral to a specialist experienced in the treatment of HCV is strongly recommended. Data suggest that early treatment of acute HCV with interferon for 24 weeks is highly effective, perhaps as high as 98%.37 However, the best regimen or duration of therapy is unknown, and no data currently exist for treating acute infection with newer direct-acting HCV antiviral therapy.

OCCUPATIONAL EXPOSURES TO HEPATITIS B AND C

When an occupational exposure occurs, the source patient should be evaluated for both hepatitis B and hepatitis C.

The risk of transmission of hepatitis B virus (HBV) and hepatitis C virus (HCV) from an occupational exposure is significantly greater than the risk of HIV transmission. The risk of HCV infection following a needlestick is 1.8%, whereas the risk of HBV infection ranges from 1% to 30% depending on the presence of hepatitis e antigen . The risk of transmission of HCV from a single mucous membrane exposure is negligible.

AVERAGE RISK FOR TRANSMISSION OF HEPATITIS B AND C VIRUSES AFTER NEEDLESTICK

Source	Risk
HBV	22.0% - 30.00%
HBeAg	1.0% -6.0%
HBeAg	
HCV	1.8%
HIV	0.3%

Hepatitis B Virus Post-Exposure Management

The hepatitis B vaccine series should be initiated in *non-HBV-immune* exposed workers who sustain a blood or body fluid exposure.

Determination of antibody response of previously vaccinated exposed workers should be based on information available at presentation. Decision-making should *not* be delayed while testing for anti-HBs.

Administration of prophylactic hepatitis B immune globulin (HBIG) and the initiation of the hepatitis B vaccine series injected at different sites is recommended when the non-HBV-immune exposed worker sustains a blood or body fluid exposure to a source patient with known acute or active HBV.) Both HBIG and the first dose of the hepatitis B vaccine series should be ideally administered within 24 hours of exposure ; HBIG should not be given later than 14 days post-exposure. The three-dose HBV vaccine series is given at 0, 1 to 2 months, and 6 months. Hepatitis B antibodies should be obtained 1 to 2 months after completion of the third dose.

Needlestick injuries and wounds should be washed with soap and water and should not be squeezed. Mucous membranes should be flushed with water.

Initiation of the HBV vaccine series within 12 to 24 hours of an exposure has been demonstrated to be 70% to 90% effective in preventing HBV infection. The combination of vaccine and HBIG achieves a similar level of efficacy. Among known non-responders to vaccination, one dose of HBIG is 70% to 90% effective in preventing HBV when administered within 7 days of percutaneous HBV exposure,35 and multiple doses have been shown to be 75% to 95% effective.36 Pregnant women can safely receive both the HBV vaccination and HBIG.

When considering PEP for HBV exposures, both the source patient's HBsAg status and the exposed worker's vaccination status should be considered . Determination of antibody response of previously vaccinated exposed workers should be based on information available at presentation. It is not recommended that decision-making be delayed while testing for anti-HBs. If antibody response is unknown, follow recommendations for “antibody response unknown”

EXPOSURES FOR WHICH PEP IS INDICATED

Break in the skin by a sharp object (including hollow-bore, solid-bore, and cutting needles or broken glassware) that is contaminated with blood, visibly bloody fluid, or other potentially infectious material, or that has been in the source patient's blood vessel.

Bite from a patient with visible bleeding in the mouth that causes bleeding in the exposed worker. Splash of blood, visibly bloody fluid, or other potentially infectious material to a mucosal surface (mouth, nose, or eyes).

A non-intact skin (e.g., dermatitis, chopped skin, abrasion, or open wound) exposure to blood, visibly Bloody fluid or other potentially infectious material.

Exposed sites should be cleansed of contaminated fluid as soon as possible after exposure. Wounds and skin sites are best cleansed with soap and water, avoiding irritation of the skin. Exposed mucous membranes should be flushed with water. Alcohol, hydrogen peroxide, Betadine or other chemical cleansers are best avoided. HCWs should be trained to avoid “milking” or squeezing out needlestick injuries or wounds. Squeezing the wound may promote hyperemia and inflammation at the wound site, potentially increasing systemic exposure to HIV if present in the contaminating fluid.

MONITORING RECOMMENDATIONS AFTER INITIATION OF PEP REGIMENS FOLLOWING OCCUPATIONAL EXPOSURE

	Baseline	Week1	Week 2	Week 3	Week 4	Week 12
Clinic Visit	+	+	+	+	+	
Pregnancy test	+					
Serum liver enzymes, BUN, creatinine, CBC	+		+		+	
HIV TEST*	+				+	+

CBC should be obtained for all exposed workers at baseline. Follow-up CBC is indicated only for those receiving a zidovudine-containing regimen.

*Recommended even if PEP is declined.

Sequential HIV Testing

Sequential confidential HIV testing should be obtained at baseline, week 4, and week 12 post-exposure:

- **HIV testing at 6 months post-exposure is no longer recommended**
- **HIV testing of the exposed worker at 4 weeks and 12 weeks should be performed with laboratory-based fourth-generation antigen/antibody combination HIV tests rather than point-of-care HIV tests**

• If the post-exposure evaluation determined that PEP was indicated, but the exposed worker declines PEP, serial testing should still be obtained. If at any time the HIV test result is positive, a confirmatory assay must be performed to confirm the diagnosis of HIV infection.

If the exposed worker presents with signs or symptoms of acute HIV seroconversion, an HIV serologic screening test should be used in conjunction with a plasma HIV RNA assay (AII) to diagnose acute HIV infection. A fourth-generation HIV antigen/antibody combination test is the recommended serologic screening test ,immediate consultation with a clinician experienced in managing ART should be sought for optimal treatment options.

Exposed Workers Who Are Pregnant

Based on increasing clinical experience with ART, PEP is indicated at any time during pregnancy when a significant exposure has occurred, despite possible risk to the woman and the fetus. (AII) Expert consultation should be sought. When occupational exposure to HIV occurs, every effort should be made to initiate PEP within 2 hours. (AII) The recommended PEP regimen is the same for pregnant women as for non-pregnant adults (see Section VIII: *Recommended PEP Regimen*). (AII)

Before administering PEP to a pregnant woman, the clinician should discuss the potential benefits and risks to her and to the fetus.

PEP Drugs to avoid during Pregnancy

Drug(s) to Avoid	Toxicity
Efavirenz	Teratogenicity
Combination of stavudine and didanosine	Mitochondrial toxicity
Nevirapine	Hepatotoxicity
Unboosted indinavir in the 2nd or 3rd trimester	Substantially lower antepartum indinavir plasma concentrations; risk for nephrolithiasis

Exposed Workers Who Are Breast feeding

Clinicians should advise women who may have been exposed to HIV through occupational exposure to avoid breast feeding for 3 months after the exposure. (AII) If HIV infection is definitively excluded in the source patient at any time prior to 3 months post-exposure, the woman may resume breast feeding.

NACO Guidelines for PEP

Exposed Person	Preferred Regimen for PEP	Alternate Regimen (if the preferred regimen is not available or Contraindicated)
Adolescents and Adults (> 10 years of age and > 30 kg weight)	Tenofovir (300mg) + Lamivudine (300mg) + Dolutegravir (50mg) (FDC – One tablet OD)	Tenofovir (300mg) + Lamivudine (300mg) (FDC – One tablet OD) + Lopinavir (200mg) / Ritonavir (50mg) (Two tablet BD) or Tenovir (300mg) + Lamivudine (300mg) + Efavirenz (600mg) (FDC – One tablet OD)
Children(>_ 6 years and > 20 kg weight)	Zidovudine + Lamivudine (dose as per weight band) + Dolutegravir (50mg) (1 tablet OD)	If Hb <9 gm/dl: Abacavir + Lamivudine (Dosage as per weight bans) + Dolutegravir (50mg) (1 tablet OD)
Children (< 6 years old or < 20 kg weight)	Zidovudine + Lamivudine + Lopinavir / Retonavir (dose as per weight band)	If Hb <9 gm/dl: Abacavir + Lamivudine / ritonavir (Dosage as per weight bans)

The first dose of PEP should be administrated immediately (preferably within 2 hours) and maximum within 72 hours of exposure. Duration of the PEP is 28 days , irrespective of regimen.