
Continuing Education

Care and Management of the AIDS Patient

Geraldine K. Grandberry

Baptist Memorial Hospital, Memphis, Tennessee

This is the final article in a four-part continuing education series on patient care and the clinical management of disease. After studying this article, the reader should be able to: 1) understand the different types of infectious viral diseases and their effects; 2) review proper technique for handling of infectious patients; 3) have a better understanding of the complexity of involvement in AIDS-related patients; and 4) improve their patient handling technique to reduce the chance of infection.

As with any fatal disease whose etiology is not understood, acquired immune deficiency syndrome (AIDS) continues to cause considerable concern throughout the United States. The number of people estimated to be infected with the virus that causes AIDS is 1.5 million. Of these, an estimated 100,000 to 200,000 will develop symptoms of AIDS without the presence of an opportunistic infection. The resulting condition is called AIDS-related complex (ARC). The symptoms are often less severe than those of patients with "classic AIDS," and these patients may or may not go on to develop a full-blown case of the disease. It is difficult to predict who will develop ARC or AIDS because of the long incubation period, which varies from five to nine years. The number of persons known to have AIDS in the United States to date is over 57,000 (Fig. 1). Of these, approximately 31,800 have died of the disease, and the others face a future of uncertainty (1).

Care and management of these patients also is causing great concern among health-care workers. Health-care professionals, while trained to respond to the medical, surgical, and psychological needs of their patients, face added challenges in caring for people with AIDS. There are two major challenges confronting health-care professionals working with AIDS patients. First, health professionals must provide information, treatment, and solace to people infected with the virus, the vast majority of whom face great suffering and death. Second, health-care workers must provide this help while at the same time coping with their own fears and pain in caring for patients who do not get well or those whose outcome is uncertain. Adding to the strain is the need to be especially

mindful of behaving respectfully and sensitively toward individuals who are considered to be social outcasts.

Generally, hospitals have followed one of two models in treating people with AIDS. Some have set aside specialized units designed to meet the unusual needs of people with AIDS; only those staff members who are comfortable working with AIDS patients work in these areas. Other hospitals have found it more useful to follow the other alternative, the "scatter-bed" model, where AIDS patients are integrated with other patients on general medical floors. In either situation, hospital staff members follow Universal Precautions to avoid contact with the virus. Universal Precautions is the name given to the practice that requires all health-care workers to wear appropriate barriers (i.e., gloves, gowns, masks, goggles) when handling blood or body fluids from *all* patients. Although many of these measures are familiar, caring for people with AIDS can nonetheless be emotionally threatening to professionals.

The stresses associated with caring for people with AIDS can be lessened if there is a workable knowledge of the etiology of the disease, if the methods of transmitting the disease are understood, and if proper precautions are followed.

THE AIDS VIRUS

Scientists have named the AIDS virus the human immunodeficiency virus (HIV). It has also been referred to as Human T-Lymphotropic Virus Type III (HTLV-III), and lymphadenopathy associated virus (LAV). These abbreviations describe a virus that is transmitted chiefly during sexual contact or through exposure to infected blood or blood components. This virus also attacks white blood cells (T-Lymphocytes) in the human body. The defense network or immune system consists of specialized cells, primarily white blood cells called lymphocytes, which are found in lymph nodes and the spleen. These cells recognize substances that are foreign or "nonself" and attack them. The T-Lymphocyte is one of these cells and is the cell most severely afflicted by the AIDS virus. Infection of the T-Lymphocytes by the AIDS virus causes them to decrease in number, thereby altering their function. With this crippled immune system, the person becomes sus-

For reprints contact: Geraldine K. Grandberry, Infection Control, Baptist Memorial Hospital, 899 Madison Ave., Memphis, TN 38146.

ceptible to a myriad of diseases, referred to as opportunistic infections. These illnesses are not usually found, or are relatively mild, if they occur, in people whose immune system is normal. Invasion of the immune system stimulates the production of antibodies which can be detected in the blood by simple tests called the ELISA or the Western Blot. These tests can detect antibodies to the virus usually within 6–12 wk of infection. Even before the antibody is positive, the victim can pass the virus to others.

Once the individual is infected, the results could be either ARC or AIDS. If AIDS develops, the protective immune system may be destroyed by the virus and allow other viruses, bacteria, protozoa, fungi, and cancers to cause “opportunistic

diseases.” These pathogens seize the opportunity of lowered resistance to infect and destroy. Some of the most common opportunistic diseases are *Pneumocystis carinii* pneumonia and tuberculosis. Individuals infected with the AIDS virus also may develop certain types of cancers such as Kaposi’s sarcoma or Burkitt’s lymphoma. These infected people have classic AIDS. Evidence shows that the AIDS virus also may attack the nervous system, causing damage to the brain (1).

Studies indicate that there are a select group of people within our society that appear at increased risk of developing AIDS. This increased risk is caused either by factors beyond the victim’s control or by behavioral factors. High risk factors include homosexuality or bisexuality, intravenous drug abuse, transfusion recipients, and hemophiliacs.

Comparison of the total number of AIDS cases per year.
Table reflects May 1988 data.

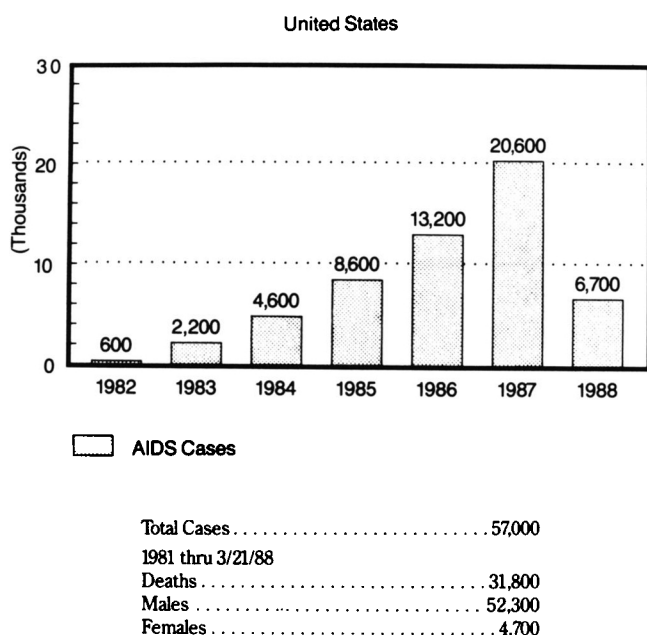


FIG. 1. Comparison of the total number of AIDS cases per year. Figure 1 reflects May 1988 data.

WHAT IS THE RISK OF HIV TRANSMISSION TO HEALTH-CARE WORKERS?

For health-care workers, the risk of acquiring AIDS through an occupational transmission remains very low. The AIDS virus is not transmitted by casual contact. There has to be a mode of entry through nonintact skin, mucous membranes, or parenteral exposure. Experts agree that employees who correctly follow the Universal Precautions and who are careful to avoid accidental exposure (such as through a needle-stick injury) continue to be at low risk.

Health-care workers should follow Universal Precautions not only to prevent transmission of HIV but to prevent hepatitis B transmission, which is far more likely to occur with blood exposure. It has been proven that the HIV and the hepatitis B virus have similar modes of transmission, however, hepatitis B infection is transmitted with much more efficiency than is AIDS in the same type of health-care environment. This probably is due to the accumulating evidence that the titer of the agent that causes AIDS (HIV) is not as high as hepatitis B in the blood of infected patients, and/or that high numbers of HIV virus are needed to produce infection. For these reasons, health-care workers should respect all blood

TABLE 1. Comparison of Health-Care Workers with AIDS and Other AIDS Patients by Transmission Category*

Transmission Category	Health-Care workers with AIDS		Other AIDS patients	
	No.	%	No.	%
Homosexual or bisexual male	1,916	74.1 [†]	28,820	64.1
Heterosexual intravenous drug abuser	161	6.2 [†]	8,263	18.4
Homosexual or bisexual male and intravenous drug abuser	187	7.2	3,267	7.3
Hemophilia/Coagulation disorder	20	0.8	451	1.0
Heterosexual	119	4.6	1,772	3.9
Blood/Blood component recipient	47	1.8	1,105	2.5
Other [‡]	1	<1.0	0	0.0
Undetermined [§]	135	5.3 [†]	1,268	2.8
Total	2,586	100.0	44,946	100.0

* Data are derived from Centers for Disease Control through March 14, 1988.

[†] p < 0.001, chi-square analysis.

[‡] Represents health-care worker who seroconverted to HIV and developed AIDS after documented needle-stick exposure to blood.

[§] Includes patients who: are under investigation, died or refused to interview, or for whom no risk was identified after follow-up.

and body fluids from all patients to prevent transmission of both the AIDS virus and the hepatitis B virus (2).

HEALTH-CARE WORKERS WITH AIDS

As mentioned previously, the risk of health-care workers acquiring AIDS through occupational exposure is low. Most exposures occur outside of the health-care setting. However, a small number of health-care workers have been infected with HIV through occupational exposures. The most recent update of Center for Disease Control (CDC) findings cited 15 seroconversions among health care workers, and seven undocumented cases (4). Four of these cases followed needle-stick exposures to blood from patients infected with HIV. In one case, the worker sustained a deep, intramuscular injection from a needle used on an AIDS patient. Another case resulted after the health-care worker was actually injected with a small amount of an AIDS patient's blood. The other two incidents appeared to have occurred after simple needle sticks. Two cases did not involve needle stick injury but prolonged exposure to blood or body fluids of infected patients without the benefit of Universal Precautions; three cases involved health-care workers who were exposed to the virus through nonintact skin and mucous membrane exposure. The remaining cases also involved exposure by needle sticks, mucous membrane exposure, and one cut with a sharp object.

As of March 1988, a total of 55,315 adults with AIDS had been reported to the CDC. Occupational information was available for 47,532 of these persons, 2,586 (5.4%) of whom are classified as health-care workers (3). Health-care workers with AIDS had a median age of 35 yr. Males accounted for 91.6% of health-care workers with AIDS and 92.4% of other patients with AIDS. The majority of health-care workers with AIDS (62.8%) and other AIDS patients (60.5%) were caucasian. Health-care workers with AIDS were significantly less likely than others with AIDS to be intravenous drug abusers and more likely to be homosexual or bisexual men (Table 1). They also were less likely to have a known risk factor reported. Present data and observations concur that the acquisition of HIV in the health-care setting is most often associated with percutaneous inoculation of blood from a patient with an HIV infection. Prospective surveillance studies (CDC), which provide data on the magnitude of the risk of HIV infection, indicates that the risk of seroconversion following needle stick

exposures to blood from HIV infected patients is <1.0%. The level of risk associated with the exposure of nonintact skin or mucous membranes is likely even less than those associated with needle-stick exposures (Table 2) (4).

The reasons that a higher proportion of health-care workers with AIDS have no identified risk than do other persons with AIDS are unknown. They could include a tendency of health-care workers not to report behavioral risk factors for HIV infection, the occupational risk of HIV infection as a result of blood exposure, or both. The first hypothesis is suggested by the over representation of men among these health-care workers, a finding that is similar to the over representation of men among AIDS patients infected with HIV through sexual activity or intravenous drug abuse (4).

The increasing number of persons being treated for HIV-associated illnesses makes it likely that more health-care workers will encounter patients with HIV. The risk of transmission of HIV can be minimized if health-care workers use care while performing all invasive procedures and use Universal Precautions when caring for all patients (4).

UNIVERSAL PRECAUTIONS

Universal Precautions may include the following measures:

1. Consider all patient specimens and body fluids as potentially infectious.
2. Wear gloves when it is likely that there will be contact with any patient's body fluids, mucous membranes, nonintact skin, or any item or surface contaminated with body fluids. Change gloves between patients.
3. Wear masks and protective eyewear or face shields when it is likely that there will be contact with droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose, and eyes. Wear gowns or aprons during procedures that are likely to generate splashes of blood or other body fluids.
4. Wash hands and other skin surfaces immediately and thoroughly after contamination with blood or other body fluids. Wash hands after removing gloves.
5. Take care to prevent injuries caused by needles, scalpels, and other sharp instruments. Dispose of needles in puncture proof containers. Do not recap, purposely

TABLE 2. HIV Infection among Health-Care Workers by Type of Exposure and Body Fluid*

Type of Exposure	No. of health-care workers with exposure to:				No. of infections
	Blood	Saliva	Urine	Other/Unknown	
Parenteral (needle stick or cut with sharp object)	870	7	3	21	4 [†]
Contamination of mucous membrane, open wound, or nonintact skin	104	42	12	11	0

* Data derived from CDC Prospective Study, August 15, 1983-December 31, 1987.

[†] All four health-care workers had parenteral exposure to HIV-infected blood; risk is 4:870 or 0.5% (upper bound of 95% confidence interval = 1.1%).

- bend or break, or remove needles from disposable syringes.
6. Minimize the need for mouth to mouth resuscitation by keeping mouth pieces and resuscitation bags in a readily accessible location.
 7. Clean blood and body fluid spills promptly with a solution of bleach and water or an approved tuberculocidal hospital disinfectant.
 8. Bag all patient specimens in a ziploc plastic bag at the time of collection to prevent contamination from accidental spillage.
 9. Place patient care items, which are to be returned to central processing for reprocessing, in plastic bags when contamination with blood or body fluids is evident.
 10. Use sturdy red plastic bags to discard disposable items heavily contaminated by blood or containing liquid volumes of blood. This will identify it as waste to be incinerated.
 11. Place patient linen that is wet with blood and body fluids in clear plastic bags prior to transportation to the linen chute or the laundry.
 12. Immediately report all needle sticks or incidents involving contamination by blood, body fluids, or tissues.
 13. Health-care workers who have exudative lesions or weeping dermatitis are to refrain from all direct patient care and from handling patient care equipment until the condition resolves.
 14. Pregnant health care workers are not known to be at increased risk for acquiring blood and body fluid borne diseases. However, the unborn baby cannot protect himself, and depends upon the practices of the mother to decrease as much as possible the risk of disease transmission. Pregnant health care workers should be especially familiar with and strictly adhere to Universal Precautions (5).

Note: These precautions may differ from the policies and procedures of individual hospitals.

RISK OF TRANSMISSION OF HIV IN THE ENVIRONMENT

No environmentally mediated mode of transmission of AIDS has been documented. Nevertheless, the precautions described below should be taken routinely in the care of all patients.

1. Standard sterilization and disinfection procedures for patient care equipment currently recommended for use in a variety of settings, including hospitals, medical and dental clinics and offices, hemodialysis centers, emergency care facilities, and long-term nursing care facilities are adequate to sterilize or disinfect instruments, devices, or other items contaminated with blood or other body fluids from persons infected with blood-borne pathogens including HIV.

2. Instruments or devices that enter sterile tissue or the vascular system of any patient, or through which blood flows, should be sterilized before reuse. Devices or items that contact mucous membranes should be sterilized or receive high level disinfection.
3. Medical devices or instruments that require sterilization or disinfection should be thoroughly cleaned before being exposed to the germicide, and the manufacturer's instructions for the use of the germicide should be followed.
4. Gloves should be worn for all contact with contaminated items. Gloves should be removed and hands washed when cleaning procedure is finished (5).

SURVIVAL OF HIV IN THE ENVIRONMENT

Tests indicate that HIV is inactivated rapidly after being exposed to commonly used chemical germicides at concentrations that are much lower than used in practice. In addition to commercially available germicides, a solution of sodium hypochlorite (household bleach) prepared daily is an inexpensive and effective germicide. Concentrations ranging from ~500 ppm (1:100 dilution of household bleach) sodium hypochlorite to 5,000 ppm (1:10 dilution of household bleach) are effective depending on the amount of organic material (i.e., blood, mucus) present on the surface to be cleaned and disinfected (5).

SUMMARY

Currently, there are no antiviral drugs available that have been proven to cure AIDS, although the search for such drugs continues vigorously. Doctors have had some success in using drugs, radiation, and surgery to treat the various illnesses of the patient with AIDS. These therapeutic agents are needed at all stages of infection to block action of the virus and to restore full function in patients whose immune systems have been damaged.

When caring for these patients the health-care worker should:

- Be alert to the possibility of motor, behavioral, and cognitive changes indicative of compromised brain function resulting from HIV or related infections.
- Be responsive to the differing psychologic reactions to the various stages of HIV infection.
- Utilize Universal Precautions.

Understanding can do much to ease the burden of patients diagnosed with AIDS and can also lessen the stress of the health-care workers caring for these patients.

Prudent judgement regarding the possibility of contact with blood and body fluids and the use of Universal Precautions should adequately protect the health-care worker from transmission of blood-borne infections. To effectively implement Universal Precautions, all health-care workers should receive inservice training on this concept. Supplies such as gowns, masks, gloves, and goggles should be available and conven-

iently located, and adherence should be periodically monitored.

Health-care workers have to work defensively; they have to anticipate and be prepared to handle situations in which contact with blood and body fluids may occur. The safe health-care worker is a prepared health-care worker.

ACKNOWLEDGMENT

The author gratefully acknowledges information from the Department of Health and Human Services pamphlet "Coping With AIDS," 1986.

REFERENCES

1. U.S. Department of Health and Human Services. *Surgeon General's Report on Acquired Immune Deficiency Syndrome*. Washington, DC: Public Health Service, 1987:9-12.
2. Favero M. Recommended precautions for patients undergoing hemodialysis who have AIDS or non-A, non-B hepatitis. *Infect Control* 1985;6:301-302.
3. Centers for Disease Control. Update: Human immunodeficiency, virus infections in health-care workers exposed to blood of infected patients. *Morbidity and Mortality Weekly Report* 1987;36:285-289.
4. Centers for Disease Control. Update: Acquired immunodeficiency syndrome and human immunodeficiency virus infection among health-care workers. *Morbidity and Mortality Weekly Report* 1988;37:229-244.
5. Centers for Disease Control. Recommendations for prevention of HIV transmission in health-care settings. *Morbidity and Mortality Weekly Report* 1987;36:1-17.