

Universal Precautions: A Common Sense Approach

"An overriding principle which would extend to all health care settings would involve scrupulous attention to the avoidance of skin or mucous membrane contact with potentially HBsAg (hepatitis B surface antigen) positive blood or other secretions." J. E. Maynard, 1978 (1).

The concern for the health care workers' safety and prevention of exposure to potentially infected blood of patients is not a new concept. Hepatitis B was recognized as an occupational risk to health care workers as early as 1951, when 16 cases of viral hepatitis were reported among health care workers from four different hospitals. Thirteen of the reported cases were in health care workers who had regular contact with blood; the remaining three cases were blood bank personnel (2). The United States Department of Labor, Occupational Safety, and Health Administration reported in 1987 that ~ 18,000 health care workers each year develop hepatitis B as a result of exposure in the workplace and ~ 300 health care workers die each year as a result of occupationally acquired hepatitis B (3).

Given this recent information and the knowledge that strong recommendations for safe handling of blood and body fluids were made as early as 1951, one may conclude that the adjustments in practices have not been effective in preventing nosocomial (hospital-acquired) infections related to hepatitis B in health care personnel. In addition, most health care workers are unaware of the variety of other blood-borne diseases in their environment that have been known to cause infection through direct blood inoculation or needle stick injuries. The following are a few examples of such hospital-acquired infections in health care workers.

Rocky Mountain spotted fever was reported in 1975 in a physician who had sustained a needle stick injury while caring for a farmer who later died of the disease (4). Six cases of herpes simplex infection in health care personnel were described in 1962. Two surgical residents and four student nurses developed primary herpes simplex of the fingers (herpetic whitlow), attributed to both needle stick injuries and the presence of lacerations on their fingers. The source patients were infected with herpes simplex in their respiratory tracts, however, they did not have clinical evidence or symptoms of infection (5).

In 1971, of the 57 cases of malaria acquired in the United States, one case occurred in a medical student. His infection was directly associated with a needle stick injury incurred while caring for a malaria-infected Vietnam veteran who later died of his disease (6). Tuberculosis infection has also been reported as a blood transmitted disease through needle stick injury in 1974 (7).

In addition, ever present in the health care setting are communicable diseases capable of being transmitted from a variety of body substances other than blood. Hepatitis A, for example, is excreted in high concentrations of up to 100 million viral particles/milliliter in the stool or feces of infected persons (8). Hepatitis A can survive for up to 1 mo on surfaces such as bedside tables and, therefore, is capable of creating reservoirs of potential infection in the patient care setting for unsuspecting health care personnel. Other diarrhea causing organisms, such as *Shigella*, *Giardia lamblia*, and an enteric organism, Rotavirus, have been responsible for outbreaks in day care settings and hospitals. These organisms are spread person-to-person through the fecal-oral route. Hands become contaminated while directly handling items soiled with stool or indirectly by handling contaminated surfaces. Later, the organisms are ingested because of lack of knowledge of their presence, and thereby the disease is spread (9).

Another interesting example of a potential threat in the health care environment is the Respiratory Syncytial Virus (RSV), a seasonal virus associated with annual outbreaks of upper and lower respiratory tract infections. This virus can remain viable for up to six hours on environmental surfaces. This is believed to have a role in transmission of the virus to health care workers and patients since, once again, the presence of the potential hazard is undetected (10). Such information should lead us to conclude that the health care environment poses many possible opportunities for infection of health care workers as well as patients. Hence, attempts need to be made to analyze the risks and intervene with preventive measures whenever possible in a reasonably consistent fashion.

SIGNIFICANCE OF AIDS

As previously noted, it is well documented that hepatitis B is a major hazard to health care workers. In addition, other blood-borne diseases and diseases transmitted in other body fluids frequently cause occupationally-acquired infections in health care personnel. These other potential risks in our

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environment, however, have not commanded the attention that the Human Immunodeficiency Virus (HIV), the causative virus of AIDS, now commands.

Lack of a cure and/or vaccine for this virus, the social stigma attached to infection with HIV, as well as the association of death following a lengthy, extremely physically and emotionally debilitating illness are factors which necessitate that health care workers examine their practices to prevent work-related infections to themselves.

HIV-Associated Risks in the Health Care Setting

HIV, similar to the hepatitis B virus, is predominantly present in blood. Health care workers may unknowingly and inadvertently be exposed to the blood of patients infected with the HIV during their daily work practices. Current data, however, indicate that HIV-associated risk of infection in comparison to other potential communicable diseases in the health care setting is relatively low (11). The risk, however low, of acquiring HIV infection creates fear in the minds of many hospital personnel. This fear, not the risk of infection, often is the real issue. It is interesting to note, however, that the guidelines for the prevention of nosocomial infections were largely ignored, in general, until the Centers for Disease Control (CDC) published a report of seroconversions (the development of antibodies in response to infection or administration of a vaccine) in three health care workers after nonparenteral exposures (12).

Since the first report from the CDC and widespread dissemination of these guidelines, there has been much controversy regarding the appropriate use of techniques to protect health care workers. The use of Universal Precautions has been recommended by the CDC, but this approach focuses only upon HIV and hepatitis transmissions.

UNIVERSAL PRECAUTIONS AND BODY SUBSTANCE ISOLATION

A primary fact that guides the philosophy of handling all blood and all patients, regardless of age, sex, socioeconomic status, geographical location or previous familiarity with that patient within the health care system, needs to be understood by health care workers in order to make decisions about disease prevention. It is seldom acknowledged by those in health care and consequently provides the broken link in the chain of prevention of occupationally acquired infections. The fact is that many patients are admitted to hospitals or access other health care resources such as clinics and Emergency Rooms with misdiagnosed or undiagnosed infectious diseases. It is not uncommon for a patient to be admitted to a hospital for a health care problem such as a broken bone, when days or weeks later it is realized that the patient also has a communicable disease. Isolating that patient at the time of discovery of the communicable disease does not protect the health of those who have already administered days or weeks of care. Careless handling of such a patient's blood or body fluids prior to the diagnosis of the presence of an infection can easily provide the necessary environment for

transmission of the undiagnosed disease to unsuspecting health care providers and possibly other patients as well (12).

The specific extent of unrecognized HIV in an urban population was analyzed by the Divisions of Emergency Medicine at Johns Hopkins University School of Medicine in Baltimore, Maryland (12). The study analyzed blood samples drawn from patients presenting to the emergency department. Over a 6-wk time period, 119 of 2,302 consecutive adult patients tested positive for the HIV antibody. Of the total examined, 4% (92 patients) had unrecognized infection. The potential risk to the emergency personnel involved in the care of the patients in this study is evidenced by a seropositive rate of 6% in those patients who presented with active bleeding; 3.8% required venous access to peripheral veins while in transport; and 4.6% required emergency major surgery. The unrecognized infected patients' blood poses particular risk when precautions are applied inconsistently or selectively only to those who are perceived to be at risk rather than for all patient contact situations involving blood.

The realization that many undiagnosed cases of various infectious diseases exist in our environment must remain an integral part of our approach to patient care at all times. In other words, the best defense is a good offense, avoid the diagnostic-dependent mentality.

Infections are not caused simply by the presence of an infectious agent such as hepatitis B or HIV. It is caused by several factors; specifically, the host factors or susceptibility of the uninfected person to the disease; the presence of a potentially infectious agent in sufficient amount to cause disease; and an efficient method for the agent to enter the susceptible host (Fig. 1).

Universal Precautions, a specific application of preventive practices in the handling of blood and body fluids containing blood, is a philosophical attempt to prevent transmission to susceptible hosts of potentially infectious blood-borne agents

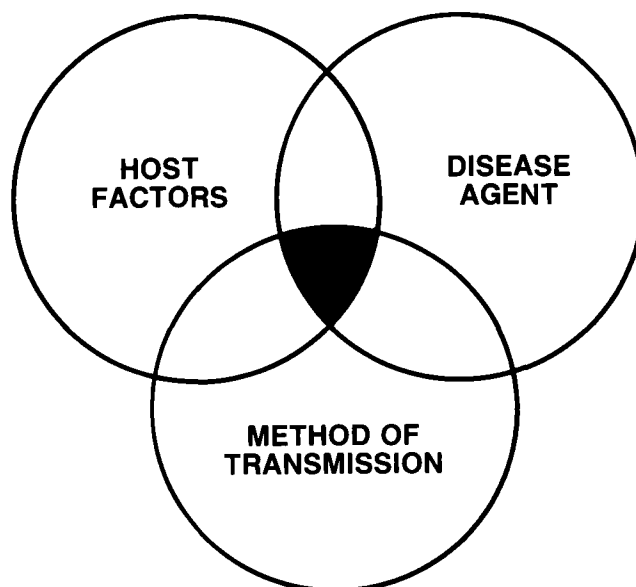


Fig. 1. Schematic representation of disease transmission.

through the use of barriers. The purpose of utilizing Universal Precautions incorporates two significant points: (a) to minimize the health care worker's contact with blood and body fluids containing blood; and (b) to minimize the likelihood of transmitting organisms present in blood and body fluids containing blood to the health care worker. Universal Precautions, as defined by the CDC in 1987, and updated in 1988, specifically emphasizes protection of health care workers from HIV and hepatitis B (13).

On a broader perspective, Body Substance Isolation (BSI) is a similar philosophical prevention system with emphasis placed on prevention of patient-to-patient cross infection in addition to protection of the health care worker from all organisms in all body substances (14). BSI differs from Universal Precautions in that Universal Precautions are targeted only to blood and body fluids containing blood, whereas, BSI is targeted to all body fluids, including blood.

The recent update, however, from the CDC (15) states that Universal Precautions do not apply to feces, nasal secretions, sputum, tears, sweat, urine, or vomitus unless they contain visible blood. Herein lies the problem. Although stool, urine, etc. may not provide a vehicle for the transmission of hepatitis B or HIV, careful handling of these body fluids is a reasonable approach to prevention of the transmission of other potentially infectious agents present in these body fluids. Unification of the two systems would, in theory, provide a safer environment for both patients and health care workers since risk reduction is targeted for all potential pathogens from all body substances.

Currently, there is very little data to substantiate the philosophy of Universal Precautions. However, a recent study from the University of Iowa examining the use of gloves is an initiation of the much needed data gathering (16-18). The study found that neither plain soap and water nor an alcohol preparation or one that contained chlorhexidine would adequately remove bacteria or yeasts from artificially contaminated gloves on volunteers. Also, of major importance, when the washed and dried gloves were removed from the volunteers the bacteria could be recovered from the skin of the hands. Thus, their conclusion that latex gloves can not be washed free of bacteria supports the need for changing gloves between each patient and good handwashing!

SUMMARY

The common sense approach to reducing the risk of disease transmission from all body substances is through the consistent use of BSI, which encompasses the practices of Universal Precautions on a larger scale. Moreover, diligent use of these practices will assist in targeting risk reduction for both patients and health care workers and not one or the other. Strict adherence to the care and practice in handling body substances from all patients prevents the health care worker from developing a diagnostic-dependent mentality. The objective is to eliminate the risk of being caught "off guard" in patient encounters. It is a given that unknown infection processes are present in many patients whose blood and body substances are handled by many health care workers.

The health of each health care worker and patient is a valuable commodity which needs to be protected. The responsibility of maintaining a safe work environment, thereby securing one's health from occupational infectious diseases, is a joint responsibility for the employer and the employee. Our responsibility as health care workers is to acknowledge and identify potential and known risks within our work setting and take the appropriate actions to reduce these risks. We need to stay informed by participating in educational programs that address this issue. Above all, we need to accept responsibility for our own personal prevention of hospital-acquired infections. Employers need to assist in this process by providing access to the necessary equipment, such as needle containers, handwashing facilities and protective barriers, and provide the educational programs that apply to safety issues. Employers also need to provide access to employee health programs for handling accidental exposures or injuries as they occur.

The evolutionary process of safer health care environments is a slow one. Since we are in an era of problem identification and problem solving, this is an ideal opportunity to improve the health care safety setting. The refinement of such concepts as Universal Precautions is dependent on the input and analysis of all members of the health care team.

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