Percutaneous injury

You work for a teaching hospital in a major metropolitan city. Your primary area of expertise is GU/GYN. You usually circulate, but occasionally scrub to keep your skills up. You especially enjoy working with “Dr. W.” He prides himself on being efficient and expects the same of the rest of the team. That being said, he is pleasant to work with, is kind to his patients and considerate of his crew, and has been known to pitch in with turning over his room to keep the schedule on track.

During a routine vaginal hysterectomy, you suffer a needle stick injury when the resident acting as first assistant returns a needle holder to you. What events contributed to the needle stick injury? What is your immediate course of action? Provide the evidence-based rationale for your response.

Response:

Despite an ongoing effort to prevent sharps injuries, NIOSH estimates that 600,000-800,000 needlestick injuries occur annually (NIOSH, 1999). Although this figure is shocking, under-reporting of sharps injuries means that this number is probably much higher. Standard precautions, the Blood borne Pathogen Rule, the Needlestick Safety and Prevention Act, and other safety initiatives promoted by AORN, OSHA, CDC, and NIOSH have placed additional focus on decreasing the incidence of this workplace hazard.

Certain conditions contribute to the risk of a sharps injury, including:

- Working in the OR. It is estimated that a percutaneous injury occurs in between 1.4 and 15% of operations (Weiss et al, 2007). Nurses working in the perioperative setting are at nearly double the risk of injury of nurses working in other patient care areas of the health care setting (Clarke, 2006).
- Contact of gloved hands with sharp instruments, bone, and needle tips
- Working in a “blind” space (e.g., confined space or body cavity) where hands or fingertips are not completely visible. Major gynecological and cardiovascular surgeries are considered at especially high risk (Van Herck et al, 2008).
- Inexperienced staff
- Feeling rushed or being in a hurry
- Working longer hours (Clark, 2007).

It is interesting to note that Michelin and Henderson (2009) felt that it is the practitioner, not the procedure, who is problem-prone. This is certainly supported in the literature (Brasel et al, 2007; Clark, 2006; Makary et al, 2007), where surgeons in training have the greatest risk of injury due to frequently performing new technical skills.

In our case, the inexperience of the resident, the infrequency of our staff nurse in performing the scrub role, the efficiency of the surgeon which may have added a sense of urgency to the rest of the team to “keep up”, and the lack of a designated “neutral zone” where needle holders and scalpels could be placed rather than passing them hand-to-hand all contributed towards this accident.
The most significant infection risks from percutaneous exposure to blood and body fluids are Hepatitis B (HBV), Hepatitis C (HCV), and the Human Immunodeficiency Virus (HIV). As anyone who practiced in the early ‘80’s can attest, the greatest fear associated with percutaneous exposure to blood is becoming infected with HIV. However, it is easier to become infected with either HBV or HCV. The HBV virus does not even need direct percutaneous or mucosal contact to be transmitted; it can survive in dried blood at room temperature on environmental surfaces for up to one week (OSHA, 2001b). The risk for transmission of HBV is increased if both the hepatitis B e antigen (HBeAg) and the hepatitis B e surface antigen (HBsAg) are positive. The risk of transmission through percutaneous injury for HBV is 22-31% if both antigens are positive and 1-6% if only the surface antigen is positive. Risks for seroconversion for HCV and HIV are 1.8% and 0.3% respectively (OSHA, 2001b). Many patients do not realize that they are infectious, as all these diseases may remain asymptomatic for years, or initial signs and symptoms of the virus may be attributed to the flu. In addition, reporting of exposure to blood and body fluids remains low, making tracking of exposures and accurate numbers of infected health care providers difficult to obtain. In a study by Makary et al (2007), 51% of surgeons did not report a needlestick injury; 16% of these injuries involved a high risk patient.

Transmission depends on (Prakash et al, 2010):

- the volume and viral load of the inoculated fluid. Hollow bore needles are the most efficient way to transfer blood from the source patient to the exposed individual.
- prolonged contact.
- stage of infection of the source patient.
- the immune status of the exposed individual.

These factors are taken into account when a post-exposure prophylactic plan is developed.

As our alert reader pointed out, maintenance of the sterile field and prompt attention to the injury are the priorities. Contaminated instruments and needles should be removed from the field and accounted for in the count record. The facility’s exposure plan should be followed; a sample plan is found on OSHA’s website at [http://www.osha.gov/Publications/osha3186.pdf](http://www.osha.gov/Publications/osha3186.pdf)

1. The scrub nurse should be relieved at the first possible opportunity and the wound washed thoroughly with soap and water. No evidence exists that using antiseptics for wound care or expressing fluid by squeezing the wound further reduces the risk of bloodborne pathogen transmission; however, the use of antiseptics is not contraindicated. The application of caustic agents (e.g., bleach) or the injection of antiseptics or disinfectants into the wound is not recommended (OSHA, 2001b).

2. The exposed person’s blood should be drawn for baseline testing for HBV, HCV, and HIV.

3. The source patient’s blood should be drawn. In our scenario, the source patient is known. Consent from the source patient should be obtained for the lab draw if required by state or local law. See your state’s policies for regulations regarding blood testing and consent. For injuries in which consent could not be obtained, consider the source patient’s medical diagnoses, clinical symptoms, and any history of risk behaviors. If consent cannot be obtained, employers should
establish that legally required consent could not be acquired (Bobinski, 2010). If the source was unknown, consider the prevalence of blood borne pathogens in the patient population.

Obtaining consent from the source can be one of the biggest barriers to timely post-exposure treatment, especially if the patient is under anesthesia. A practical solution is to include a section on the surgical consent form explaining that blood may be taken for testing during the procedure if a member of the surgical team experiences exposure to blood or body fluids (Kelly, 2009). Counseling for both the source and exposed patient should be initiated based on the results. Immediate post-exposure prophylaxis (PEP) is determined by the degree of risk.

4. The appropriate documentation should be completed. This may include an occurrence or risk management report and completing any other forms as required by the facility’s exposure plan. The date, time and details of exposure, the amount and type of biological material, the severity of the exposure, and details about the source (if known) should be documented. Hepatitis vaccine and antibody status, any other medical conditions, allergies, and current medications will assist in development of a post-exposure plan for the exposed individual.

Timely reporting of the needle stick injury is important for several reasons. Workman compensation claims may be denied if the exposure is not promptly reported. PEP should be initiated as soon as possible (within 24 hours) after the event to ensure maximum benefits.

Recommendations for postexposure management after determining the source and exposed individual’s current infectious status include (OSHA, 2001b):

**For HBV:** initiation of hepatitis B immune globulin (HBIG) and/or hepatitis B vaccine series to any susceptible, unvaccinated person should be considered after evaluation of the hepatitis B surface antigen status of the source and the vaccination and vaccine-response status of the exposed person. “Booster” vaccinations for those individuals who have already received the HBV vaccine are not necessary.

**For HCV:** Currently there is no PEP for HCV. Immune globulin and antiviral agents (e.g., interferon with or without ribavirin) are not recommended for PEP of hepatitis C. Recommendations for postexposure management are intended to achieve early identification of chronic disease and, if present, referral for evaluation of treatment options. The HCV status of the source and the exposed person should be determined, and for health care personnel exposed to an HCV positive source, follow-up HCV testing should be performed to determine if infection develops.

**For HIV:** Recommendations for HIV PEP include a basic 4-week regimen of two drugs (zidovudine [ZDV] and lamivudine [3TC]; 3TC and stavudine [d4T]; or didanosine [ddI] and d4T) for most HIV exposures and an expanded regimen that includes the addition of a third drug for HIV exposures that pose an increased risk for transmission.

It should be noted that all drugs used for PEP carry significant side effects and it is important that the incident is reviewed carefully by a person knowledgeable in PEP to avoid undue risk to the exposed person.
Although the surgery setting site provides an opportunity for early identification of HIV, HBV, and HCV for patients who may otherwise be undiagnosed for years, this identification should not be at the expense of the health care workers providing care for them. Obviously, prevention of a needlestick injury is the best practice. Part II of this Perioperative Question of the Week will answer questions about current methods for prevention of percutaneous injury and ethical issues surrounding infected health care workers.

References and resources:


National Clinicians' Post-Exposure Prophylaxis Hotline ([PEPline] 1-888-448-4911.


