

AORN Guidance Statement: Sharps Injury Prevention in the Perioperative Setting

Introduction

The purpose of this guidance document is to assist perioperative registered nurses in the development of sharps injury prevention programs using identified best practices to reduce percutaneous injuries. It also suggests strategies to overcome obstacles to compliance with established sharps safety protocols.

The perioperative setting is a high-risk environment, and perioperative RNs are routinely faced with high risk for exposure to bloodborne pathogens from percutaneous injuries. Although the scope of the problem is not completely known, the National Institute for Occupational Safety and Health (NIOSH) estimates that 600,000 to 800,000 percutaneous injuries occur annually among health care workers.¹ Percutaneous injuries primarily are associated with occupational transmission of the hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV, but they may be implicated in the transmission of more than 20 other pathogens.² Understanding the etiology of percutaneous injuries in the perioperative setting is paramount to developing a safe prevention program.

Background

Percutaneous injuries occur throughout all health care facilities, and many occur in the perioperative setting.^{3,4} Exposure to bloodborne pathogens occurs during all phases of the perioperative process. Research indicates that injuries from sharp devices or instruments occur in 7% to 15% of all surgical procedures. Procedures identified as posing the highest risk of injury are thoracic, trauma, burn, emergency orthopedic, major vascular, intra-abdominal, and gynecologic surgeries.⁵ Risk of a sharps injury increases during more invasive, longer procedures that result in higher blood loss.⁶ Fatigue resulting from working extended hours in combination with the fast pace of the perioperative environment also may contribute to increased risk of percutaneous injuries.⁷⁻⁹

Nurses comprise the largest segment of health care workers and are reported to sustain the highest number of percutaneous injuries overall.² Observational studies have demonstrated that perioperative personnel experience the highest percutaneous injury rates, but 70% to 96% of exposures were underreported.⁵ Surgeons and first assistants

have the highest risk of injury and sustain more than half (ie, 59%) of percutaneous injuries in the perioperative setting.⁶ Scrub personnel experienced the second highest frequency of percutaneous injury, followed by anesthesia care providers and circulating nurses.⁶

Injuries from hollow bore needles constitute the majority of injuries and pose the highest risk of exposure to bloodborne pathogens.¹⁰ Although the risk of injury from hollow bore needles is prevalent in the perioperative setting, the epidemiology of sharps injuries in the OR is different from that of other locations in health care. Suture needles have been identified as the most frequent mechanism of percutaneous injury in the OR; they are involved in as many as 77% of such injuries.^{4,6} Scalpels are the second most frequent mechanism of injury, followed by retractors, skin or bone hooks, and sharp electro-surgical tips.^{11,12}

Percutaneous injuries often are self-inflicted. Studies indicate that 6% to 16% of these injuries occur during hand-to-hand passing of sharp instruments, suture needles, and other sharp devices. The most common body part injured is the non-dominant hand. Injuries from suture needles occur most often

- ◆ when loading the needle holder or repositioning the needle;
- ◆ during hand-to-hand passing of sharp devices between scrub personnel and the surgeon;
- ◆ during suturing, particularly muscle and fascia (eg, wound closure) when the needle is being manipulated and guided with fingers;
- ◆ when retracting or stretching tissue with hands;
- ◆ when the surgeon sews toward his or her own or an assistant's hand;
- ◆ when tying suture with the needle attached;
- ◆ after the suture has just been used and remains unattended on the operative field—even if suture is unattended on the field for only a short time, the needle holder can fall off the field onto a health care worker's foot, or scrubbed personnel may reach for it in an attempt to prevent it from sliding off the field; and
- ◆ when placing the used needle in an over-filled sharps container.³

Injuries from scalpels most often occur

- ◆ when loading or removing a disposable scalpel blade on a reusable knife handle;

- ◆ during hand-to-hand passing of the scalpel;
- ◆ during dissection when the tissue is being retracted or spread with hands;
- ◆ when cutting toward the surgeon's or an assistant's fingers;
- ◆ immediately before or after use when the scalpel is left on the operative field unattended—even if this is for only a short time, the scalpel can fall off the field onto a health care worker's foot, or scrubbed personnel may reach for it in an attempt to prevent it from sliding off the field; and
- ◆ when the scalpel is placed in an over-filled or poorly located sharps container.³

Glove barrier failure is a common occurrence in the perioperative setting. Glove failures can be caused by punctures, tears by sharp devices, or spontaneous failures. These failures expose the wearer to bloodborne pathogens. Studies have demonstrated that glove perforations often occur after an average of 40 minutes of use during surgical procedures. When two pairs of gloves are worn (ie, double gloving), in most instances, only the outer glove is perforated when punctured by a sharp device. In addition, research demonstrates that when two pairs of gloves are worn and a puncture occurs, the volume of blood on a solid sharp device (eg, suture needle) is reduced by as much as 95%. There is evidence that double gloving can reduce the risk of exposure to blood and body fluids, if the outer glove is punctured, by as much as 87%.⁶

The Occupational Safety and Health Administration (OSHA) requires health care organizations to protect their workers and have a written exposure control plan. Protection occurs by using universal precautions, engineering controls, work practice controls, organizational controls, and communication. The standard also requires employers to maintain a log of injuries from contaminated sharps.¹³

Guidance Statement

The perioperative environment poses unique challenges for reducing the risk of injuries from sharp devices. Surgery involves precise, regimented actions that require planning, communication, and team work. These same elements can be employed to mitigate the inherent hazards associated with sharp devices encountered in the perioperative setting. Perioperative RNs should actively participate

in the development and implementation of strategies to reduce the risk of sharps injuries to health care team members.

Perioperative nursing management should work with the facility risk manager or safety officer to identify the types of sharp devices and how they are used in the perioperative setting. Both perioperative nursing management and the risk manager or safety officer should have a thorough understanding of OSHA's standards.³

By law, an effective sharps injury and bloodborne pathogen exposure control program must be written, communicated to all workers in the perioperative setting, and uniformly supported and enforced by perioperative leadership.^{2,13} A multidisciplinary team is key to the success of this process. This team, using steps consistent with the continuous quality improvement process, must conduct a baseline assessment and set priorities for developing an action plan.^{2,6}

Perioperative-Specific Risk Reduction Strategies

- Adopt and incorporate safe habits into daily work activities when preparing and using sharp devices.
- Focus attention on the intent of the action when working with sharp items, and minimize rushing and distractions while applying safety techniques during critical moments.
- During preparation for operative or other invasive procedures:
 - inspect the surgical field for adequate lighting and space to perform the procedure;
 - organize the work area so that the sharps are always pointed away from staff members;
 - establish a separate area to place a reusable sharp for safe handling during the procedure;
 - use standardized sterile field set-ups; and
 - include identification of the neutral zone in the preoperative briefing.¹⁴
- During the operative or other invasive procedure:
 - wear two pairs of gloves (ie, double gloving);
 - monitor gloves for punctures;
 - encourage the use of blunt suture needles;
 - use neutral or hands-free technique for passing sharp items whenever possible or practical, instead of passing hand-to-hand;

- give verbal notification when passing a sharp device;
 - keep visual contact with the procedure site and the sharp device;
 - take steps to control the location of the sharp device;
 - be aware of other staff members in the area when handling a sharp device;
 - keep track of and account for all sharp items throughout the procedure;
 - contain used sharps on the sterile field in a designated, disposable, puncture-resistant needle container, and replace it as necessary;
 - check to be sure the disposable, puncture-resistant needle container is securely closed before handing it off the field;
 - load suture needles using the suture packet to assist in mounting the suture needle in the needle holder, and use the appropriate instrument to adjust and unload the needle;
 - remove the needle from the suture before tying, or use “control-release” sutures that allow the needle to be removed with a straight pull on the needle holder;
 - activate the safety feature of a safety engineered device immediately after use according to manufacturers’ instructions;
 - keep hands away from the surgical site when sharp items are in use (eg, suturing, cutting);
 - use one-handed or blunt instrument-assisted suturing techniques to avoid finger contact with the suture needle or tissue being sutured;
 - provide a barrier between the hands and the needle after use; and
 - use gloves and an instrument to pick up sharp items (eg, suture needles, hypodermic needles, scalpel blades) that have fallen on the floor.^{2,3,6,13-17}
 - During postprocedure clean up:
 - inspect the surgical setup used during the procedure for sharps;
 - transport reusable sharps in a closed, secure container to the designated clean-up area;
 - inspect the sharps container for overfilling before discarding disposable sharps in it;
 - make sure the sharps container is large enough to accommodate the entire device;
 - avoid bringing hands close to the opening of a sharps container;
 - do not place hands or fingers into a container to dispose of a device; and
 - keep hands behind the sharp tip when disposing.^{3,14,18}
- Health care organizations and their employees are responsible for actively participating in strategies to reduce percutaneous injuries. The employing facility should provide an environment that reduces the risk of percutaneous injuries from contaminated sharp devices. A well-developed safety program and support from management sends a clear message to employees about the organization’s commitment to preventing injuries and keeping employees safe. Fewer percutaneous injuries are reported in organizations that have a strong culture of safety. Individual health care workers have a responsibility to be educated about the prevalence and mode of transmission of bloodborne pathogens and to use measures to protect themselves.¹⁹

Individual Perioperative RNs’ Responsibilities

- Observe local, state, and federal regulations (eg, OSHA regulations).
- Comply with methods to protect yourself from disease transmission (eg, get the hepatitis B vaccination).
- Use devices with safety features that are provided by your employer.
- Prevent hollow bore percutaneous injuries during injections or bodily fluid retrieval by using
 - needleless systems or sharps with engineered sharp injury protection devices whenever possible;
 - retractable, protective sheath or self-resheathing, self-blunting, or hinged re-cap needles to administer local anesthetics and other injectable medications;
 - blunt cannulas to withdraw medications and fluids from vials; and
 - the one-handed recapping technique, only if no other alternatives exist.
- Practice using safety devices to establish familiarity and experience with them before using them in practice.
- Actively participate in the safety conversion process and help others adapt to the change.
- Use personal protective equipment.

- Use sharps receptacles that are
 - identifiable (ie, orange, orange-red), closable, and labeled with the biohazard symbol;
 - appropriately sized with a full line that is readily visible;
 - puncture resistant and leak proof;
 - located close to the point of use;
 - maintained upright when in use; and
 - routinely replaced and not allowed to overfill.
- Participate in education about bloodborne pathogens, and follow recommended infection prevention practices.
- Support and guide perioperative team members to follow these risk reduction strategies.
- Encourage perioperative staff members to proactively report hazards that pose a threat of percutaneous injury.
- Know the location in your department of the exposure control plan.
- Follow exposure control policy if injured (ie, wash site with soap and water, provide immediate care to the exposure site).^{9,13}

Employer Responsibilities

- Comply with local, state, and federal regulations regarding percutaneous injury prevention.
- Create a safety-oriented culture.
- Encourage timely reporting of all percutaneous injuries by all perioperative team members.
- Analyze needle-stick and other sharps-related injuries in the perioperative setting to identify hazards and injury trends.
- Establish a communication mechanism to seek input from perioperative team members regarding risks specific to the perioperative setting.
- Provide training for all perioperative personnel that includes risk reduction strategies designed specifically to address the risks encountered in the perioperative setting.
- Evaluate and select safety devices that are acceptable to all members of the perioperative team who use them. The safety device should provide features that work effectively, are reliable, do not compromise patient or worker safety, and are ergonomically designed to the acceptable specifications of the users.
- Provide and have readily available the appropriate sharps safety devices, and provide adequate training on their use.

- Evaluate the effectiveness of established risk reduction strategies and products, provide feedback, and modify them as necessary to reduce the risk of percutaneous injuries.⁷
- Establish staffing patterns that minimize extended work hours and allow for adequate recuperation to decrease the risk of fatigue-related injuries.²⁰

Overcoming Obstacles to Compliance

Psychosocial and organizational factors may impede change. An employee's risk-taking personality profile, perception that the organization is not committed to worker safety, and a perceived belief that there is a conflict between providing optimal patient care and protecting oneself from exposure contribute to an employee's resistance to changing to safer practices.² For example, although percutaneous injuries continue to occur in the perioperative setting, 71% of respondents in a national survey indicated that they have not evaluated blunt-tip suture needles for use in the OR, and only 2% of respondents have fully implemented blunt-tip suture needles. Only 14% of respondents had implemented safety scalpels into their ORs.⁴

Changes in attitudes about risk of exposure must occur before practice can change to comply with sharps safety protocols. It is difficult to change ingrained habits. People are most likely to change behavior when they perceive a significant personal risk. Education about the risk of contracting a bloodborne disease from a percutaneous injury with a contaminated sharp device should be presented in the early stages of a health care worker's career in order to develop safe practice habits.⁵

Surgery involves precise, regimented actions requiring planning, communication, and team work. These same elements can be employed to overcome obstacles to compliance with measures meant to mitigate the inherent hazards of sharp devices encountered in the perioperative setting. Suggested strategies to overcome obstacles to compliance include the following.

- Use frequent and multiple training methods that include audiovisual aids, articles, hands-on clinical practice, and visual reminders (eg, laminated posters).
- Develop a multidisciplinary sharps injury prevention education plan.

- Incorporate sharps injury prevention instruction into initial nursing education to promote well-established, safe habits.
- Include sharps injury prevention strategies during orientation of new employees.
- Form a multidisciplinary sharps safety committee that includes, but is not limited to, perioperative RNs, surgeons, anesthesia care providers, surgical technologists, and first assistants. This team could be asked to
 - help with the selection and evaluation of acceptable safety devices (eg, scalpels that employ a one-handed technique or are totally disposable) and
 - work with physicians to explore alternative techniques, such as adhesive skin closures; alternatives for securing catheters; use of blunt suture needles, rounded scalpels, or stapling devices, when procedurally appropriate; and use of alternative methods for cutting tissue (eg, harmonic scalpel, rounded scissors, laser devices, electrocautery active electrodes).
- Network with other facilities to learn about their success stories.
- Collaborate with personnel who use the device, and facilitate change instead of dictating change.
- Inform perioperative team members about current research on disease transmission from percutaneous injuries and relate it to the individual's experience.
- Work with resisters to gain buy-in to the sharps safety program.
- Remove as many conventional sharp items as possible from stock.
- Create a culture of safety in which every team member is empowered to call attention to deficiencies in sharps management.^{2,9,12,13}

Selecting and Evaluating New Products

As risk reduction strategies are identified, a multidisciplinary team should evaluate and select the best products to meet the facility's needs. An ongoing review process should be developed to assess, evaluate, and modify the plan as needed. Product evaluation and selection should include the following.

- Assemble a multidisciplinary team to develop, implement, and evaluate a process for selecting

products to reduce sharps injury in the OR. Staff members who work with the product are key components of the team. A strong interdisciplinary commitment to best practices and worker safety is the optimal foundation necessary for change to occur.

- Review the literature for research about the mechanism, frequency, time, and place of injuries, as well as the role and body part of the person sustaining the percutaneous injury to determine priority areas on which to focus.
- Identify the products to be evaluated. Focus on their intended use in the facility and identify any special technique or design factors that will influence safety, efficiency, and user acceptability. Seek data from all sources on the safety and overall performance of the devices.
- Ensure that participants in the evaluation represent all of the end users. To ensure a successful evaluation, users must have adequate training. Use clear, objective, consistent criteria to evaluate safety devices.
- Continue to monitor a safety device after it has been implemented to assess performance and to identify if there is a need for additional training.^{2,10}

Summary

Occupational exposure to bloodborne pathogens via percutaneous injuries is one of the most serious dangers perioperative team members face on a daily basis. The risk of sustaining a percutaneous injury can be decreased through employee education, clear communication, device engineering, and focused work practice controls. Risk reduction strategies should include specific practices aimed at reducing the unique risks of percutaneous injuries encountered in the perioperative environment. AORN recognizes the various settings in which perioperative RNs practice, and the suggested risk reduction strategies in this guidance statement are intended to be adaptable to any setting where surgical or other invasive procedures are performed.

NOTES

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