Deep vein thrombosis; neutral zone; circulating and recovering; environmental controls; wound classifications; sterile field

QUESTION: We are looking for information about the types of patients who should be considered for deep vein thrombosis (DVT) prophylaxis, types of prophylaxis, and timing of the application of sequential compression devices (SCDs). Our surgeons are inconsistent about ordering SCDs, so we do not always have them available. A delay occurs while we procure the SCD machine and compression devices when a surgeon unexpectedly orders SCDs after the patient is already in the room. As a result, the compression devices often are applied to the patient’s legs, and the machine is turned on after the patient already is anesthetized. Some surgeons and anesthesia care providers become upset if the SCD is activated after the patient is asleep, although others do not seem to mind. Should SCDs be applied and activated before induction of anesthesia? What is the correct protocol and how can we anticipate when patients might need SCDs?

ANSWER: Sequential compression devices should be placed on the patient and activated before anesthesia induction and should be continued throughout the surgical procedure. Effective DVT prophylaxis includes mechanical methods, pharmacological regimes, or a combination of both. The potential of a clot migrating to the right ventricle and progressing to the lungs (ie, pulmonary embolus [PE]) is a major postoperative complication of DVTs. This is an insidious complication because patients often are asymptomatic. Surgical procedures, in general, increase the patient’s risk of developing a postoperative DVT; but the risk is higher during orthopedic procedures. It has been reported that 300,000 and 600,000 hospitalizations result from DVT; and 500,000 hospitalizations from PE result in 50,000 PE deaths annually. Studies demonstrate that 50% of all incidences of DVT begin in the OR, and 75% present within 48 hours postoperatively. Routine prophylaxis can reduce the incidence of DVT after surgery and save thousands of lives.

Three primary factors affect coagulation in a blood vessel, which can lead to venous thrombosis. In 1846, these three conditions were identified as endothelial injury, stasis, or hypercoagulability. Patients undergoing a surgical procedure may be exposed to all three of these conditions. Immobility is a primary factor in venous stasis, and patients are immobile during surgical procedures. Venous stasis during surgical procedures is caused by several mechanisms.

- Decreased actual linear velocity of blood due to the reclining position of the patient leads to venous congestion in the lower extremities, which consequently diminishes venous return.
- General anesthesia causes peripheral vessels to dilate by depressing the sympathetic nervous system. The resulting dilation can cause endothelial damage resulting in microtears in the vascular lining, which provide a site for thrombus formation.
- Some patients have coagulation abnormalities that should be considered before surgery is performed. A decrease in fibrinolytic activity is characteristic of postoperative patients in the first 24 hours after surgery. It reaches the lowest point on the third postoperative day.

Perioperative nurses should assess each patient for DVT risk factors. A preoperative risk assessment can identify risk factors, which will help determine the appropriate method of prophylaxis.
Sequential compression devices reduce venous stasis by external compression, and low-molecular weight heparin treats coagulation defects.

The first step is to perform a thorough patient history to determine if the patient has had a DVT in the past. Risk factors for DVT include:
- age (ie, 40 years or older);
- fractures, orthopedic reconstruction, or total joint arthroplasty;
- heart failure or myocardial infarction;
- history of previous DVT;
- leg edema, ulcers, varicose veins;
- lower extremity trauma;
- malignancy;
- obesity;
- pregnancy;
- prolonged immobilization or paralysis;
- sepsis;
- stroke;
- surgical procedures using general, spinal, or epidural anesthesia lasting more than 30 minutes;
- use of oral contraceptives; and
- venous stasis.¹

Patients can be categorized into low, medium, and high risk categories. Patients in the low risk category have a less than 10% chance of calf vein thrombosis, less than 1% chance of proximal vein thrombosis, and a 0.01% chance of developing a fatal PE. Low risk patients have only one risk factor including:
- being bed bound for less than 24 hours,
- being older than 40 years of age,
- being pregnant,
- having a minor medical illness, or
- having minor surgery that lasts 30 minutes or less.²

Patients in the moderate risk category have a 10% to 40% chance of calf vein thrombosis, 1% to 10% risk for proximal vein thrombosis, and 0.1% chance of developing a fatal PE. Moderate risk patients have two to four risk factors, including:
- being older than 40 years of age,
- being pregnant with varicose veins or having a history of thrombosis,
- having a fracture or history of thrombus and being younger than 40 years of age,
- having a malignancy and being 40 to 60 years of age,
- having surgery that lasts longer than 30 minutes, or
- having trauma with no fractures.³

Patients in the high risk category have a 40% to 80% chance of calf vein thrombosis, 10% to 30% risk for proximal vein thrombosis, and 1% to 10% chance of developing a fatal PE. High risk patients have more than four risk factors, including:
- having a complex medical illness,
- having a major trauma including fractures,
- having a malignancy and being older than 60 years of age,
- having extensive general surgery,
- having a history of thrombosis or fracture and being 40 to 60 years of age, or
- undergoing total joint arthroplasty.⁴

A DVT prophylaxis regimen is based on the level of risk and addresses the three factors that influence the development of DVT. This prophylaxis consists of one or both of two complementary approaches (ie, physical, pharmacological). The physical approach (eg, sequential compression devices) reduces venous stasis by external compression. The pharmacological approach (eg, low-molecular weight heparin) treats coagulation defects.

The choice of therapy is a medical decision determined by the patient's risk profile. A collaborative approach between surgeons, anesthesia care providers, and perioperative nurses is essential to reduce incidences of DVT and associated complications by using an active risk assessment and aggressive prophylactic program that includes standard protocols based on the level of patient risk. Perioperative nurses play an integral part in preventing DVT and should be part of a multi-disciplinary discussion in developing facility protocols for preventing DVT. By developing a standardized protocol, the patient's risk can be identified and categorized so the
A neutral or safety zone prevents two individuals from touching the same instrument simultaneously so unnecessary exposures to hazardous bloodborne pathogens are avoided.

A neutral or safety zone prevents two individuals from touching the same instrument simultaneously so unnecessary exposures to hazardous bloodborne pathogens are avoided. Work practice controls. They require that work practice controls be in place to reduce exposure hazards to the lowest feasible extent. Proper work practice controls include a no-hands procedure for handling contaminated sharps and eliminating hand-to-hand passing of sharp items (e.g., suture needles, scalpels) in the OR. Employers are required to solicit input from employees, who potentially may be exposed to injuries from contaminated sharps, on the identification, evaluation, and selection of effective engineering and work practice controls. A hands-free technique is part of a multiple-prevention strategy to protect perioperative team members from injury.

The hands-free technique can be established by creating a neutral zone, in which one person places a sharp instrument to be picked up by another. A neutral or safety zone prevents two individuals from touching the same instrument simultaneously so unnecessary exposures of personnel to hazardous bloodborne pathogens is avoided. The neutral zone can be created with items such as magnetic pads or transfer basins. The scrub person should verbally alert the surgeon that the sharp item, such as a scalpel or needle holder, is in the neutral zone. The surgeon picks up the instrument, and after the instrument is used, he or she verbally alerts the scrub person that the sharp item has been replaced in the neutral zone.
AORN’s position is that every patient undergoing a surgical procedure should have a perioperative RN in the role of circulating nurse during the entire intraoperative experience.

 zone. These movements should be clearly announced and controlled. The scrub person should place sharps and instruments back on the Mayo stand and not allow them to remain near the incision site when they are not in use.

Developing a hands-free transfer protocol requires planning, education, coordination, and practice. Involving surgeons and staff members in the development process may smooth the way for compliance. To be comfortable using the hands-free technique, all scrubbed personnel should practice the hand and eye movements required to retrieve a sharp item from the neutral zone.

QUESTION: I am considering taking a position in an office-based plastic surgery center. The recovery area is contiguous with the OR and connects through a doorway directly out of the OR. The surgeon wants me to recover a patient in the adjacent postanesthesia care unit while he operates on another patient having general anesthesia with only a scrub person and anesthesia care provider in the room. He claims there is little need for a circulating nurse during plastic surgery procedures. Additionally, during the surgical procedure, he wants the RN occasionally to go down the hall two doors away and remove a bandage or a few stitches from another patient during the procedure. He says this room is only 20 ft away, and the nurse could be summoned if necessary. I am concerned about providing safe patient care under these circumstances. What is AORN’s recommendation?

ANSWER: AORN does not support an RN simultaneously recovering a patient in the recovery area while circulating for another patient undergoing a surgical procedure with a general anesthetic in an adjacent room. AORN’s position is that every patient undergoing a surgical procedure should have a perioperative RN in the role of circulating nurse during the entire intraoperative experience. When the patient is transported to the recovery area, continued observation by a nurse should take place until the patient is discharged. If there is only one RN, the next procedure should not be started until the first patient is ready for discharge.

An analysis of incident reports of surgical procedures performed in office-based surgery centers revealed a 10-fold increase in the risk of adverse incidences and death. Regardless of the complexity of the surgical procedure, the primary concern must be patient safety. The perioperative nurse plans, coordinates, and delivers nursing care to patients throughout the surgical procedure and needs to be present to do so. The perioperative nurse implements nursing care that addresses physical, psychological, and spiritual responses of patients undergoing surgery, regardless of how minor the procedure. The perioperative nurse is accountable for patient outcomes resulting from nursing care provided during a surgical or invasive procedure. It could be a liability risk, as well as a patient safety issue, if something adverse were to happen to a patient in either the recovery area or the OR when the nurse was not present.

QUESTION: Where can I find guidelines on appropriate temperature, humidity, and air exchanges for the OR?

ANSWER: The information you are looking for can be found in a publication called “Guidelines for Design and Construction of Hospital and Health Care Facilities.” The American Institute of Architects Academy of Architecture for Health published this document with assistance from the US Department of Health and Human Services. AORN supports the information published in this document, which also is used by the Centers for Disease Control and Prevention (CDC). This document recommends air exchanges should be at least 15 per hour, and temperature should be maintained between 68°F to 73°F (20°C to 23°C), with a relative
humidity of 30% to 60%.

If your facility library does not have a copy, you can order one by calling (800) 365-2724. More detailed information can be found on AORN Online (http://www.aorn.org) in the frequently asked questions section under clinical practice.

**QUESTION:** I am the educator in a surgical services department. We are reviewing our documentation and need information about wound classifications. I am looking for information on wound classification criteria and listings of surgical procedures associated with each wound classification.

**ANSWER:** The CDC wound classification commonly is used by health care professionals to classify procedures and to reliably predict the probability that a wound can become infected. The classification can alert personnel to patients at high risk of infection, allowing them to take appropriate perioperative preventive measures. The classification information also is used to track infections and compare infection rates to determine the most effective infection control practices.

Table 1 contains definitions from the CDC’s “Guidelines for prevention of surgical site infections.”

There is no specific list of surgical procedures with corresponding wound classifications. The wound classification system is designed to be used based on the specific situation. Perioperative nurses and managers should work with the infection control professionals in their facility to develop a sample procedure list correlated with wound classifications for staff member use.

**TABLE 1**

Surgical Wound Infection Classifications

| Class I/Clean | An uninfected surgical wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Surgical incision wounds that follow nonpenetrating (ie, blunt) trauma should be included in this category if they meet the criteria. |
| Class II/Clean-contaminated | A surgical wound in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, procedures involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered. |
| Class III/Contaminated | Open, fresh, accidental wounds. In addition, procedures with major breaks in sterile technique (eg, open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category. |
| Class IV/Dirty-infected | Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscerae. This definition suggests that the organisms causing postoperative infection were present in the surgical field before the procedure. |


**QUESTION:** While waiting for a surgical procedure to start, the scrub person was standing with her arms folded, hands under her armpits, and leaning with her back against the sterile back table. When I confronted the scrub person and told her she had contaminated the back table, she argued with me and claimed it was fine because her gown was closed and sterile. I always have been taught that the back of the gown is considered unsterile and that personnel in sterile attire should not have their back to sterile supplies or fields. What is AORN’s recommendation?
ANSWER: You are correct, the back of the gown is never considered sterile. The only part of the gown considered sterile is the front from the chest to the level of the sterile field. Gown sleeves are considered sterile from two inches above the elbow to the cuff, circumferentially. The back of the gown is considered unsterile because it cannot be monitored visually. It is not acceptable for a scrub person to turn his or her back and lean on the sterile back table. Furthermore, it is not acceptable to place sterile gloved hands under the upper arms and armpits. The neckline, underarms, sleeve cuffs, and gown back are areas that experience friction and are not considered effective microbial barriers. Refer to the AORN "Recommended practices for maintaining a sterile field" for more information. Sterile scrubbed personnel should always have the sterile field in view and not behind them. Additionally, hands should be kept within the sterile area in the front of the gown.

CAROL PETERSEN  
RN, MAOM, CNOR  
Perioperative Nursing Specialist  
AORN Center for Nursing Practice

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