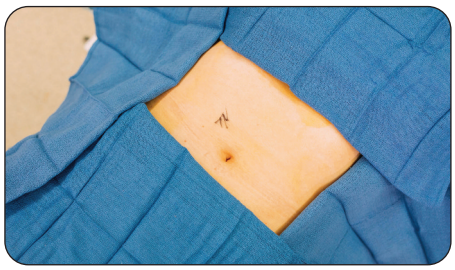
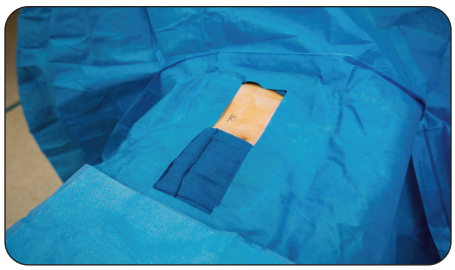
Surgical Draping: Evidence-based Practices





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STUDY GUIDE

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Surgical Draping: Evidence-based Practices

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LEARNING OUTCOME

After completing this study guide and viewing the accompanying video, the perioperative registered nurses (RNs) and other perioperative team members will have increased their knowledge of evidence-based, best practices for draping the surgical patient. The perioperative RN will be able to apply these practices in the clinical setting to help minimize the risk for infections and to promote patient safety.

EDUCATIONAL OUTCOMES

The participant will be able to

- discuss the rationale for using sterile drapes to establish the sterile field,
- evaluate materials and design when selecting drapes,
- describe methods for draping equipment that is used within or adjacent to the sterile field,
- demonstrate basic surgical draping techniques, and
- demonstrate evidence-based, best clinical practices for draping patients in preparation for specific types of surgery.

INTRODUCTION

Perioperative team members have a responsibility to provide a safe environment of care for their patients, and this includes prevention of surgical site infections (SSIs). As many as one in 20 surgical patients (5%) develops an SSI during hospitalization.[1] Health care–associated infections can have serious negative effects on patient outcomes, including pain, increased use of antibiotics, longer hospital stays, delayed wound healing, and even death.[1] Health care–associated infections can also significantly increase costs.[2] Maintaining sterile technique is a key element of SSI prevention.[3] Sterile technique includes all the actions that team members perform to maintain the sterility and integrity of the sterile field.[3] Surgical draping is one of those critical activities.

Surgical draping is the process of creating a sterile field by covering the patient, surrounding area, and, in some cases, equipment with a sterile barrier to minimize the passage of microorganisms from unsterile to sterile areas[3,4] and to provide a sterile surface for placement of sterile instruments, supplies, equipment, and the gloved hands of team members.[5] Perioperative team members cover the patient and operating room (OR) bed in such a way that the surgical site is exposed but isolated from surrounding areas.[5] The surgical procedure takes place within the sterile area created by strategic surgical draping.[5] The World Health Organization states that use of sterile drapes is good clinical practice in surgery.[3,6]

The importance of draping is not limited to surgical procedures in the OR. The Centers for Disease Control and Prevention (CDC) has found that use of maximal sterile barrier precautions, including a cap, a mask, sterile gloves, and a large sterile drape, during insertion of central venous catheters (CVCs) is associated with a lower incidence of catheter-related bloodstream infections compared with use of only sterile gloves and small drapes.[7] The CDC strongly recommends use of sterile, full-body drapes for insertion of CVCs and peripherally inserted central catheters (PICCs) and for guidewire exchange.[3,7] Use of a large sterile drape that covers the patient's entire body during insertion of a central line is required for compliance with the Central Line Insertion Practices (CLIP) bundle for facilities reporting to the National Healthcare Safety Network.[8]

This study guide and the accompanying video provide perioperative RNs and other team members with evidence-based best practices for draping the surgical patient. Application of these practices in the clinical setting will help minimize the risk for infections and promote patient safety.

The manufacturer's instructions for use (IFU) should be followed for each sterile drape selected and used. Although basic principles discussed in this study guide and the accompanying video apply to all surgical draping methods, draping a specific area of a patient's body can be accomplished in different ways and by using different drapes. Health care professionals may determine which sterile drape to use based on the surgical procedure to be performed and patient-specific factors.

MATERIAL

To provide an effective barrier against microorganisms, the material used to make sterile drapes should have several essential properties.

Drape material should be resistant to blood and other fluids.[4,6] If blood or other fluids penetrate a drape, an avenue for microorganisms to travel through the barrier can be created.[6] Seeping of fluid through a sterile material with the potential for subsequent bacterial penetration is referred to as "strikethrough."[5] Using material resistant to blood and fluids helps to prevent strikethrough and to maintain the sterile field.[4]

Sterile drape material should be resistant to tears, punctures, and abrasions that might break down the drape and allow microorganisms to pass through, but should also be porous enough to prevent heat buildup.[4]

Drape material should be low-linting because lint can spread airborne contaminants and shed into the surgical site. Loose fibers can cause granulomatous peritonitis. Drape material should also be antistatic to reduce risks of static sparks, should be flame resistant, and should meet the standards of the National Fire Protection Association.[4]

DRAPE CONFIGURATIONS

Different surgeries require drapes with different styles and designs. Many options are available. The perioperative team should become familiar with some of the more common types and review the manufacturer's IFU for drapes that are selected.

Sterile towels are technically not drapes. Drapes have resistant barrier properties. However, sterile towels are often used in the patient draping process to outline or "square off" a surgical site before sterile drapes are placed. Sterile towels can also be wrapped around the patient's head or an extremity before sterile drapes are placed. Sterile towels can be disposable or reusable.[4]

A plain sheet (ie, a flat, sterile sheet) is used to cover flat surfaces (eg, instrument tables, large portions of the patient). It should be large enough to cover the desired area with an adequate margin of safety between the physical environment and the operative field.[5]

Fenestrated drapes have a fenestration or opening.[4,5] The fenestration allows the operative site to be exposed while the rest of the patient is covered.[4,5] Fenestrated drapes are available in different sizes and types to accommodate a variety of surgical procedures.[4,5]

Leggings are drapes specifically designed to cover the patient's legs. They are used for patients in the lithotomy position.[4]

Stockinettes are tubular drapes used to cover extremities.[4]

Plastic adhesive incise drapes are flexible plastic drapes with adhesive material on one side.[4,5] They can be useful for holding towels and other drapes in place without the need for towel clamps.[4] They can also be used to drape irregularly shaped parts of the body.[4] When using an incise drape, the surgeon makes the incision directly through the drape.[4]

Plastic adhesive incise drapes are available with or without impregnated iodophor antimicrobial agents.[4,5] Adhesive incise drapes that do not have antimicrobial properties should not be used. Studies show a correlation between the use of plastic adhesive drapes without antimicrobial properties and an increase in SSI rates.

Unless contraindicated by a patient's allergy to iodine, iodophor-impregnated plastic adhesive drapes may be used in accordance with the manufacturer's IFU. The evidence regarding the use of iodophor-impregnated plastic adhesive incise drapes for prevention of SSIs conflicts.[3,6] A 2015 systematic review of randomized control trials (RCTs) found that use of an iodophor-impregnated drape had no effect on SSI rates.[3] A 2018 RCT found that use of an iodophor-impregnated plastic adhesive drape significantly decreased the level of bacterial colonization on the skin compared to the use of no skin drape.[3] A 2016 RCT found that the use of an iodophor-impregnated adhesive drape did not increase bacterial colonization of the skin and could be safely used for at least 75 minutes.[3] A 2015 quasi-experimental study found that the superficial and overall SSI rates were significantly lower in a group of patients for whom the iodophor-impregnated plastic adhesive incise drape was used.[3] These individual studies are difficult to compare with the 2015 systematic review because one study was not an RCT and the others did not review SSI rates as an outcome.[3]

Additionally, published guidelines offer conflicting recommendations. The World Health Organization recommends that plastic adhesive incise drapes with or without antimicrobial properties not be used for the purpose of preventing SSIs.[6] The CDC states that plastic adhesive drapes with or without antimicrobial properties are not necessary for prevention of SSIs.[10] The Asia Pacific Society of Infection Control and the National Institute for Health and Care Excellence (United Kingdom) support the use of iodophor-impregnated drapes unless the patient has an allergy to iodine or some other contraindication, but recommend against the use of drapes that do not have antimicrobial properties.[9,11]

Following the manufacturer's IFU is critical when using iodophor-impregnated adhesive drapes since there is some research evidence that the adhesion of the incise drape to the skin may improve the effectiveness of the product.

BASIC DRAPING PRINCIPLES

Draping and preparation of a sterile field for patients undergoing invasive procedures is key for minimizing the risk for microbial contamination and SSIs.[3] It is helpful to understand some basic draping principles applicable for most procedures before discussing the techniques required for specific types of surgeries.

The perioperative team should prepare the sterile field as close as possible to the time of use to reduce the risk of particulate matter and potentially infectious materials settling on the field. Evidence suggests that contamination of a sterile field increases over time.[3]

Team members should open a sterile field for only one patient at a time. Opening sterile fields or sterile supplies for multiple patients in a single OR or procedure room increases the risk for cross-contamination and errors. The sterile field should be prepared in the room where it will be used and should not be moved. Moving the sterile field to a new location increases the risk for contamination.[3]

Scrubbed team members should place sterile drapes on the patient and equipment in such a way as to prevent contamination. Scrubbed team members should handle drapes as little as possible and should avoid making rapid movements with the drapes because rapid movements can create air currents that might cause dust and other small particles to become airborne and settle onto the sterile field. The scrubbed team members should not lean across an unsterile area or allow their sterile gowns to come into contact with an unsterile surface during placement of drapes.[3]

When placing drapes, scrubbed team members should cuff the drape over their sterile gloves to help protect the gloves from contact with nonsterile items or areas. The team should begin the sterile draping process by placing drapes at the surgical site first, then move outward toward peripheral areas.[3]

Surgical equipment used in the sterile field (eg, cables, tubing) should be secured with non-perforating devices because perforations through the sterile barrier can provide an avenue for microorganisms, blood, and other potentially infectious materials.[3]

Only the top surface of the sterile drape is considered sterile. Items that fall below the level of the sterile field and portions of tubing or cables below the field are considered contaminated. Items below the level of the sterile field (eg, sterile trash bags, suture tails) are not easily monitored for contact with nonsterile surfaces and are at higher risk for becoming contaminated.[3]

Contamination

Despite best efforts, a sterile field can become contaminated from time to time. When this happens, it is important to address the contamination quickly and definitively. If a drape becomes contaminated, the scrubbed team member should not continue to handle it.[4] The team member should discard it and change his or her gloves.[4] If the end of a sheet drops below waist level, it is considered contaminated.[4] The scrubbed team member should drop it and use another drape.[4] A drape should be considered contaminated if there is any doubt about its sterility.[4]

If a drape is placed incorrectly, it should be discarded. The RN circulator should peel the drape away without contaminating the other drapes, the prepped portion of the patient's skin, nearby sterile items, or nearby scrubbed team members.[4]

If a hole is found in a drape after it is positioned, the drape must be discarded or the hole covered with additional sterile material. If a hole is discovered when a procedure is in progress, team members must use their judgment to determine the most appropriate way to address the hole.[4]

DRAPING FOR SPECIFIC TYPES OF SURGERY

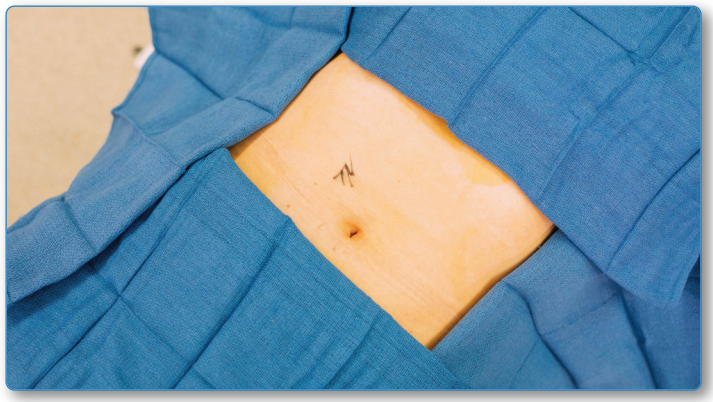
In addition to basic draping principles, the perioperative RN must consider the specific requirements for each procedure when draping for different surgeries.

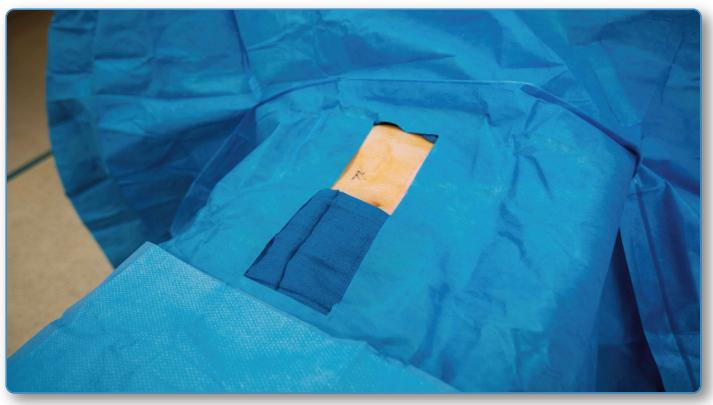
Abdominal Procedures

Draping patients for abdominal procedures in the supine position is a frequent task for perioperative RNs. Laparotomy is a common abdominal procedure that can serve as an example.

Draping the patient for a laparotomy:

1. After the patient is positioned and skin antisepsis has been completed, the surgeon or scrub person outlines the planned surgical site with sterile towels. The towels may be secured with non-perforating towel clips. If the surgeon places the towels, the scrub person should stand on the same side of the OR bed as the surgeon when handing off the towels to avoid reaching over a nonsterile area.





2. A scrubbed team member (eg surgeon, scrub person) places the sterile laparotomy drape onto the patient with the fenestration (ie, opening) directly over the surgical site. The drape may have an arrow or some other indication of which end is the top and which is the bottom.
   a. Two scrubbed team members (eg, surgeon and scrub person) standing on opposite sides of the OR bed, unfold the drape together, opening it to the sides of the patient.
   b. Two scrubbed team members together unfold the upper part of the drape toward the head of the bed. The scrubbed team members should keep their hands under the cuffed upper edge of the drape to protect them from nonsterile areas and personnel. With hands cuffed under the upper edge of the drape, the scrubbed team members can hand off the top of the drape to an anesthesia

professional or other team member for securing onto IV poles or an anesthesia screen.[4]

c. Then, two scrubbed team members, working together, can unfold the lower part of the drape and cover the lower part of the patient and the foot of the OR bed.

Scrubbed team members can drape other flat, smooth areas (eg, neck, chest, flank, back) in a similar fashion.[4]

Extremity Surgery

The draping procedure is similar for upper and lower extremities. Proper application of skin antisepsis to an extremity generally requires the extremity to be elevated.

Draping the patient's extremity:

1. After the patient is positioned and skin antisepsis has been completed, an unscrubbed team member (eg, RN circulator) may hold the extremity elevated while two scrubbed team members (eg, surgeon and scrub person) place a sterile sheet under the extremity.
2. A scrubbed team member places a sterile towel around the extremity above the planned surgical site and secures the towel with a non-perforating towel clip.
3. A scrubbed team member (eg, surgeon) places a sterile stockinette over the end of the extremity (eg, foot, hand) and unrolls it to cover the extremity to a point above the distal edge of the towel. The scrub person or surgeon can now take control of the extremity and allow the unscrubbed team member to let go.
4. The surgeon and scrub person place a sterile medium sheet above the surgical area and secure it with a non-perforating towel clip.
5. The surgeon and scrub person place a sterile fenestrated drape around the extremity (the extremity passes through the fenestration).
6. The surgeon and scrub person cover the rest of the patient and OR bed with a sterile sheet, securing the top edge to an anesthesia screen or IV poles or handing it off to an anesthesia professional or other team member for securing.[4]

Lithotomy Position

The lithotomy position is used for many genitourinary and rectal procedures.

Draping a patient in the lithotomy position:

1. After the patient is positioned and skin antisepsis has been completed, the scrub person places a sterile sheet under the patient's buttocks. The scrub person should keep his or her hands under the cuffed edge of the drape to protect them from contamination.
2. surgeon and scrub person place sterile leggings over each of the patient's legs, taking care to keep their hands protected within folded cuffs.
3. The surgeon and scrub person place a sterile sheet across the patient's abdomen and extends it toward the head of the bed for securing. Hands are kept within the cuffed top edge of the sheet.
4. The surgical team may use a fenestrated perineal sheet instead of a simple sheet to cover the abdomen. Use of a single fenestrated drape with built in leggings requires help from an assistant. The two scrubbed team members (eg, surgeon and scrub person) open the folds and position the leggings over the legs simultaneously. In this case, scrubbed team members keep their hands on the outside of the drape to avoid contamination.[4]

Head

Proper exposure and draping of the head is required for many procedures on the face, nose, and eyes or eyelids.

Draping the patient for procedures on the face and head:

1. The scrub person or surgeon prepares the sterile drape by placing an open towel on a sheet with the center of the towel edge approximately 2 inches from the center of the sheet edge.
2. The anesthesia professional or other unscrubbed team member (eg, RN circulator) elevates the patient's head.
3. The surgeon or scrub person places the sterile towel and sheet under the patient's head.
4. The surgeon or scrub person draws the sterile towel up on each side of the patient's face, over the forehead at the hairline, and secures it with a non-perforating towel clip.

5. The surgeon or scrub person frames the surgical site with additional sterile towels.
6. The surgeon or scrub person places a fenestrated U-shaped sheet just below the surgical site and brings the sides up to overlap the drape under the head.
7. The surgeon and scrub person cover the rest of the patient's body and the OR bed with a sterile sheet.[4]

If the patient is intubated, a sterile minor sheet can be used instead of a towel to wrap the head. A minor sheet is large enough to cover the endotracheal tube and anesthesia circuit to prevent them from contaminating the surgical site.[4]

Eye

Considerations for procedures on the eye include the need to repel water and to provide an environment free of lint and other fibrous particles.[12] Cataract surgery is often performed with the patient under local anesthesia with little or no sedation. Team members must ensure that the patient has adequate air exchange.[12] A Mayo stand placed under the drape may be used to raise the drape off of the patient's face to facilitate breathing.[4,12]

Draping for eye procedures:

1. After the patient is positioned and antisepsis has been completed, the scrub person places a sterile eye pad over the nonoperative eye.
2. The anesthesia professional or another unscrubbed team member (eg, RN circulator) elevates the patient's head, and the surgeon or scrub person places two sterile towels and a sheet under the head. One towel is drawn up and over the nonoperative eye and fastened with a non-perforating towel clip. Only the operative eye is exposed.
3. The surgeon isolates the operative eye with sterile towels or a sterile fenestrated plastic eye drape.
4. The scrub person covers the patient and OR bed with a sterile sheet.[4]

In an alternate method, the patient's head is not wrapped with towels. Instead, the patient is covered with a one-piece sterile drape with a self-adherent, fenestrated plastic section over the eye.[12]

DRAPING EQUIPMENT

Unsterile equipment that is brought into, over, or near the sterile field should be covered with sterile drapes.

The scrub person should cover unsterile equipment (eg, Mayo stand) on the top, bottom, and middle with a sterile drape or drapes before it is introduced to the sterile area or brought over the sterile field. The scrub person should also use a sterile drape to cover equipment that will be positioned immediately adjacent to the sterile field. Scrubbed team members should drape large pieces of equipment (eg, microscope, fluoroscopy unit) as close to the time of use as possible. The team should follow the IFU provided by the drape manufacturer and equipment manufacturer. The IFU may include recommendations for proper drape placement and for ensuring adequate equipment ventilation.[3]

Robotic Surgery

Draping the robotic arms is a complex process that requires a team effort between a scrubbed team member and RN circulator. The Association of Surgical Technologists recommends practicing draping the robot arms as a team before attempting to drape during surgical procedures. If the drapes are placed too tightly, the movement of the arms can be impaired. The scrub person and RN circulator should carefully follow the manufacturer's IFU during draping.[13]

Draping for robotic surgery:

1. The cables are connected, the system is turned on, and a self-test is performed. The RN circulator must not move any of the robotic arms during the self-test.
2. The RN circulator positions the instrument and camera arms to allow sufficient room for draping.
3. Each robotic arm is draped separately, and the instrument arms must be completely covered. The arms should be fully extended to allow the sterile drape to slide over them. The scrub person places the drape over each arm and the RN circulator grasps the inside of the drape to help pull it over. The trocar mount must be completely covered by the drape.
4. The camera arm is draped in similar manner.
5. The touchscreen monitor is then draped.

6. To drape the endoscope, the scrub person connects the sterile camera adaptor to the endoscope and the drape is taped to the sterile adaptor. The camera head is then connected to the endoscope and the drape is inverted over the camera head and optical cables.
7. The sterile light cable is connected, and the scrub person performs a series of calibrations.[13]

MAINTAINING THE STERILE FIELD

After the patient has been draped and the sterile field established, it is important for team members to take conscientious steps to maintain the field's integrity.

Perioperative team members should move within and around the sterile field in such a way as to minimize the risk for contamination. Scrubbed and unscrubbed team members each have a set of precautions that they should observe.[3]

Scrubbed team members should stay close to the sterile field and only touch sterile areas or items. They should keep their hands and arms above waist level at all times. Contamination can occur if the arms are allowed to drop below waist level. Team members should avoid folding their arms with their hands in the axillary area because perspiration in the axillary area could potentially lead to strikethrough and contamination of the gloves.[3]

Scrubbed team members should not change levels during surgery because changing levels could potentially bring unsterile portions of the gown into contact with sterile areas. Team members should sit down only if the entire procedure will be performed seated.[3]

Scrubbed team members should not turn their backs on the sterile field, because the back of the gown is not considered sterile. When changing position, team members should remain back to back or face to face to avoid contaminating each other. Team members should maintain adequate distance between each other, between themselves and the sterile field, and between themselves and non-sterile areas during position changes.[3]

If a horizontal unidirectional air delivery system (eg, laminar airflow) is in use, the scrubbed perioperative RN should not be positioned between it and the surgical field. The RN should not leave the sterile field to get items from the sterilizer.[3]

Unscrubbed team members should face the sterile field when they approach it and should avoid walking between sterile fields or between scrubbed team members. Unscrubbed team members should not reach over an uncovered sterile field and should stay as far from sterile fields and scrubbed personnel as possible.[3]

If a horizontal unidirectional air delivery system is in use, unscrubbed team members should stay outside the air curtain and should not walk between the air curtain and the sterile field.[3]

Team members should monitor each other for potential breaks in sterile technique and take corrective action immediately, if possible, or as soon as patient safety allows.[3]

SUMMARY

Patient safety is an important responsibility that all perioperative team members share, and this responsibility includes maintaining sterile technique to reduce the risk of health care–associated infections. Conscientious application of evidence-based best practices for surgical draping is a vital component of sterile technique. By following these practices, the perioperative team helps to reduce the risk for perioperative infections and promotes patient safety and satisfaction.

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POST-TEST

SURGICAL DRAPING: EVIDENCE-BASED PRACTICES

Multiple choice. Please choose the word or phrase that best completes the following statements.

1. Approximately what percentage of surgical patients develop a surgical site infection during hospitalization?
   a. 1%
   b. 5%
   c. 10%
   d. 15%
   e. 20%

2. Which of the following terms is used to refer to seepage of fluid through a sterile material with subsequent bacterial penetration?
   a. Breakthrough
   b. Pierce through
   c. Punch through
   d. Strikethrough

3. Which of the following type of drape is designed to be tubular?
   a. Fenestrated drape
   b. Flat sheet
   c. Stockinette
   d. Towel

4. Which of the following is recommended when opening a sterile field in the perioperative setting?
   a. All sterile fields for all patients should be opened in a designated central sterile area and transported to the OR for use.
   b. Cables and tubing should be secured with non-perforating devices.
   c. Drapes should be shaken after opening and before placement to remove dust.
   d. When draping a patient, the RN should drape the peripheral areas first and move inward toward the surgical site.

5. Which surfaces of the sterile drape are considered sterile?
   a. Top only
   b. Top and bottom but not sides
   c. Top and sides but not bottom
   d. Top, bottom, and sides
   e. Bottom and sides

6. Drapes are considered contaminated under which of the following conditions?
   a. A hole is discovered.
   b. The drape drops below waist level.
   c. The drape is placed incorrectly.
   d. There is some doubt about the drape's sterility.
   e. All of the above

7. The perioperative RN should do which of the following when draping a patient for a laparotomy?
   a. Stand on the opposite side of the OR bed when handing sterile towels to the surgeon
   b. Secure sterile towels with pointed, penetrating clips
   c. Place the opening of the laparotomy sheet directly over the surgical site
   d. Unfold the drapes toward the bottom and top of the patient before unfolding to the side
   e. All of the above

8. Which of the following is an important consideration when draping patients for procedures on the eye?
   a. It is important to repel water.
   b. The environment must be free of lint.
   c. Cataract procedures are often performed without sedation.
   d. Adequate air exchange for the patient must be maintained.
   e. All of the above

9. The perioperative RN should follow which of these procedures when draping equipment?
   a. Drape equipment that will be positioned over the sterile field.
   b. Drape equipment that will be positioned immediately adjacent to the sterile field.
   c. Drape large pieces of equipment as close to the time of use as possible.
   d. Follow the manufacturer's instructions for use.
   e. All of the above

10. Which of the following is an acceptable position for the hands and arms of a scrubbed person for maintaining the integrity of the sterile field?
    a. Straight down at the sides
    b. Above waist level
    c. Folded with hands in the axillary area
    d. Resting against another scrubbed person's back
    e. All of the above

POST-TEST ANSWERS
SURGICAL DRAPING: EVIDENCE-BASED PRACTICES

1. b
2. d
3. c
4. b
5. a
6. e
7. c
8. e
9. e
10. b