

Bard Access Systems, Inc.

Hickman* Hemodialysis/Apheresis Long Term Central Venous Catheters

Instructions For Use

BARD



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Introduction

Description:

Hickman* Hemodialysis/Apheresis Central Venous Catheters are constructed of specially formulated and processed silicone. The catheters are radiopaque with female luer locking adapters and SureCuff* tissue ingrowth cuff for fixation of the catheters in a subcutaneous tunnel. Each catheter is provided in a double sterile package.

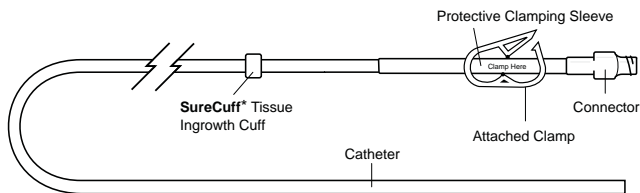
Catheter repair kits are available in sterile packages for the adapter legs.

Placement:

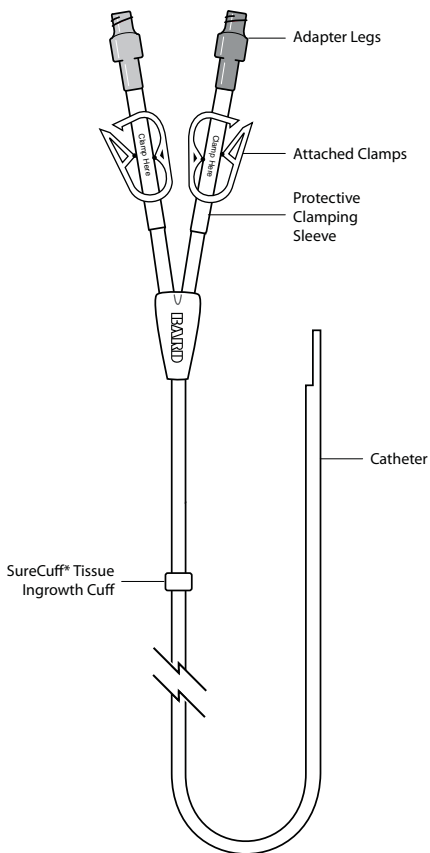
The catheter is placed into one of the large central veins so the tip lies in the superior vena cava above the right atrium. It is tunneled subcutaneously to the desired exit site. The SureCuff* Tissue Ingrowth Cuff, attached to the catheter, is positioned 3-5 cms below the skin exit site in the tunnel. The cuff promotes tissue ingrowth to secure the catheter in place.

Schematics:

Single Lumen



Dual Lumen



Indications For Use

Hickman* Hemodialysis/Apheresis Catheters are designed for long-term vascular access and for use in patients that lack adequate peripheral venous access. They are available in single lumen (10.8 and 14.4 Fr), and a dual lumen (13.5 Fr), catheter configurations in various lengths.

All Hickman* Hemodialysis/Apheresis central venous catheters are designed for hemodialysis, apheresis, and the administration of I.V. fluids, blood products, drugs, and parenteral nutrition solutions, as well as blood withdrawal. The Hickman* dual lumen hemodialysis / apheresis catheter incorporates two large, equal size lumens appropriate for hemodialysis and apheresis procedures.

Contraindications, Warnings, Cautions and Precautions

Contraindications

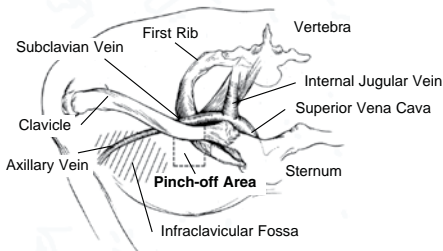
This device is contraindicated whenever:

- The presence of device related infection, bacteremia, or septicemia is known or suspected.
- The patient's body size is insufficient to accommodate the size of the implanted device.
- The patient is known or is suspected to be allergic to materials contained in the device.
- Severe chronic obstructive lung disease exists (percutaneous subclavian placement only.)
- Past irradiation of prospective insertion site.
- Previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
- Local tissue factors will prevent proper device stabilization and/or access.



Warnings

- Intended for Single Patient Use. DO NOT REUSE. These products are single use devices and should never be reimplanted. Reuse carries with it the attendant concern of cross-infection regardless of the cleaning or sterilization method. Resterilization of incompletely cleaned devices may not be effective. Any device that has been contaminated by blood should not be reused or resterilized.
- After use, this product may be a potential biohazard. Handle and dispose in accordance with accepted medical practice and applicable local, state and federal laws and regulations.
- **Pinch-off Prevention:** Catheters placed percutaneously or through a cut-down, into the subclavian vein, should be inserted at the junction of the outer and middle thirds of the clavicle, lateral to the thoracic outlet. The catheter should not be inserted into the subclavian vein medially, because such placement can lead to compression of the catheter between the first rib and the clavicle, which can cause damage and even severance of the catheter. A radiographic confirmation of catheter placement should be made to ensure that the catheter is not being pinched by the first rib and clavicle.^{1,2}



Signs of Pinch-Off

Clinical:

- Difficulty with blood withdrawal.
- Resistance to infusion of fluids.
- Patient position changes required for infusion of fluids or blood withdrawal.

Radiologic:

- Grade 1 or 2 distortion on chest X-ray.
Pinch-off should be evaluated for degree of severity prior to explantation. Patients indicating any degree of catheter distortion at the clavicle/first rib area should be followed diligently. There are grades of pinch-off that should be recognized with appropriate chest x-ray as follows:^{3,4}

Grade	Severity	Recommended Action
Grade 0	No Distortion	No Action
Grade 1	Distortion present without luminal narrowing	Chest x-ray should be taken every one to three months to monitor progression of pinch off to grade 2 distortion. Shoulder positioning during chest xrays should be noted as it can contribute to changes in distortion grades.
Grade 2	Distortion present with luminal narrowing	Removal of the catheter should be considered.
Grade 3	Catheter transection or fracture	Prompt removal of the catheter.

Cautions

- Carefully read and follow all instructions prior to use.
- Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.
- Only qualified healthcare practitioners should insert, manipulate and remove these devices.

Precautions

- Follow Universal Precautions when inserting and maintaining the catheter.**
- Follow all contraindications, warnings, cautions, precautions and instructions for all infusates as specified by its manufacturer.**
- Use aseptic techniques** whenever the catheter lumen is opened or connected to other devices. Povidone-iodine is the suggested antiseptic to use with this device and components. Acetone and tincture of iodine should not be used because they could adversely



affect the performance of the catheter and connectors. 10% acetone/70% isopropyl alcohol swabsticks used for dressing changes should not adversely affect the catheter.

I. Prior to beginning placement procedure, do the following:

- Examine package carefully before opening to confirm its integrity and that the expiration date has not passed. The device is supplied in a double sterile package and is non-pyrogenic. **Do not use if package is damaged, opened or the expiration date has passed.** Sterilized by ethylene oxide. **Do not Resterilize.**
- Inspect kit for inclusion of all components.
- Fill (prime) the device with sterile heparinized saline or normal saline solution to help avoid air embolism.
- When using an introducer kit, verify that the catheter fits easily through the introducer sheath.

II. To avert device damage and/or patient injury during placement:

- **Avoid accidental device contact with sharp instruments and mechanical damage to the catheter material.** Use only smooth-edged atraumatic clamps or forceps.
- Avoid perforating, tearing or fracturing the catheter when using a guidewire.
- **Do not use the catheter if there is any evidence of mechanical damage or leaking.**
- **Avoid sharp or acute angles** during implantation which could compromise the patency of the catheter lumen(s).
- If sutures are used to secure the catheter, make sure they do not occlude or cut the catheter.
- When using percutaneous introducers:
 - Carefully insert the introducer and catheter to avoid inadvertent penetration to vital structures in the thorax.
 - To avoid blood vessel damage, **do not allow the percutaneous introducer sheath to remain indwelling in the blood vessel without the internal support of a catheter or dilator.**
 - **Simultaneously advance the sheath and dilator** with rotational motion to help prevent sheath damage.

III. After placement, observe the following precautions to avoid device damage and/or patient injury:

- **Do not use the catheter if there is any evidence of mechanical damage or leaking. Damage to the catheter may lead to rupture, fragmentation and possible embolism and surgical removal.**
- Accessories and components used in conjunction with this device should incorporate Luer lock connections.
- If signs of extravasation exist, **discontinue injections.** Begin appropriate medical intervention **immediately.**
- Infusion pressure greater than 25 psi (172 kPa) may damage blood vessels and viscus and is not recommended. **DO NOT USE A SYRINGE SMALLER THAN 10 mL!**

Possible Complications

The use of an indwelling central venous catheter provides an important means of venous access for critically ill patients; however, the potential exists for serious complications including the following:

- Air Embolism
- Bleeding
- Brachial Plexus Injury
- Cardiac Arrhythmia
- Cardiac Tamponade
- Catheter or Cuff Erosion Through Skin
- Catheter Embolism
- Catheter or Cuff Occlusion
- Catheter Occlusion, Damage or Breakage due to Compression Between the Clavicle and First Rib
- Catheter-related Sepsis
- Endocarditis
- Exit Site Infection
- Exit Site Necrosis
- Extravasation
- Fibrin Sheath Formation
- Hematoma
- Hemothorax
- Hydrothorax
- Intolerance Reaction to Implanted Device
- Laceration of Vessels or Viscus
- Perforation of Vessels or Viscus
- Pneumothorax
- Spontaneous Catheter Tip Malposition or Retraction
- Thoracic Duct Injury
- Thromboembolism
- Venous Thrombosis
- Ventricular Thrombosis
- Vessel Erosion
- Risks Normally Associated with Local and General Anesthesia, Surgery, and Post-Operative Recovery

These and other complications are well documented in medical literature and should be carefully considered before placing the catheter.

Hickman* Hemodialysis /Apheresis Long-Term Central Venous Catheter Placement Procedures

Section A: Prepping Procedure

Before beginning procedure, read the “Contraindications, Warnings, Cautions and Precautions” and “Possible Complications” sections of this manual.

1. Create sterile field and open tray.
2. Prep venipuncture/cutdown area, tunnel and tunnel exit areas.
3. Perform local anesthetic infiltration in venipuncture/cutdown, tunnel and tunnel exit site areas.
4. Irrigate the catheter with sterile heparinized saline (100 u/mL) and inspect for leakage. Clamp the catheter over the clamping sleeve(s).
5. Place patient in the Trendelenburg position with head turned away from the intended venipuncture site.

Note: Refer to Section C or D Prior to Tunneling Procedure.

Section B: Tunneling Procedure

1. Measure catheter against chest wall of patient to determine desired location of SureCuff* Tissue Ingrowth Cuff and exit site. Mark locations.
2. Tunneling procedure.

Note: The subcutaneous tunnel should be approximately 10 to 15 cm long with the SureCuff* Tissue Ingrowth Cuff positioned in the tunnel. The cuff will be less prominent if positioned over an intercostal space.

Single-Lumen Catheters:

Create subcutaneous tunnel from venous entrance to skin exit site using tunneler or long forceps.

- a. Advance the tip of the tunneler from the venous entry site down to the desired catheter exit site.
- b. Thread suture material through the suture eye and tie it around the catheter tip when the tip of the tunneler emerges through the exit site.
- c. Pull the catheter up through the tunnel to the venous entry site. (Initial resistance may be felt as the SureCuff* Tissue Ingrowth Cuff first enters the tunnel.) Gently holding the catheter proximal to the cuff while pulling the tunneler and catheter through the subcutaneous tunnel should result in smooth passage of the cuff into the tunnel.
Caution: The catheter must not be forced.



- d. Cut off the end of the catheter tied by suture.
- e. Estimate the catheter length required for the tip placement at the junction of the superior vena cava and right atrium by placing the catheter on the chest along the venous path to the right atrium. Cut catheter to length at a 45° angle.

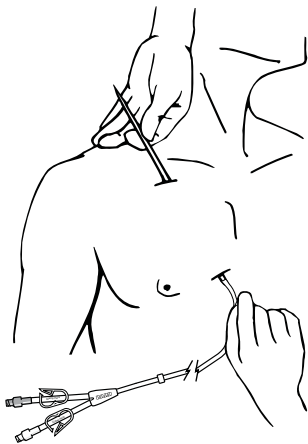
Dual-Lumen Catheters:

Create subcutaneous tunnel from skin exit site to venous entrance site using tunneler or long forceps.

- a. Grasp the tunneler at the end with protective cover.
- b. Insert the rounded tip of the tunneler into a small incision at the desired catheter exit site.
- c. Form tunnel by advancing the tip of the tunneler from the skin exit site up to the venous entry site.

Caution: Avoid inadvertent puncture of the skin or fascia with the tip of the tunneler.

- d. Remove the protective cover and attach one of the lumen tips onto the tunneler barb with a twisting motion. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel.



- e. Pull the catheter up through the tunnel to the venous entry site. (Initial resistance may be met as the SureCuff* Tissue Ingrowth Cuff first enters the tunnel.) Gently holding the catheter proximal to the cuff while pulling the tunneler and catheter through the subcutaneous tunnel should result in smooth passage of the cuff into the subcutaneous tunnel.

Caution: When tunneling, the catheter must not be forced.

- f. Gently remove the catheter tip from the tunneler barb.

Note: Do not trim the end of the dual lumen catheter.

- g. Estimate the catheter length required for tip placement at the junction of the superior vena cava and right atrium by placing the catheter on the chest along the venous path to the right atrium.

Section C: Cutdown Technique

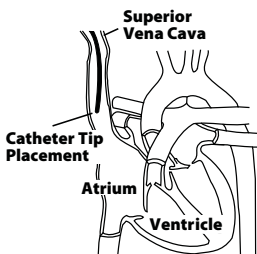
1. Surgically isolate the desired vessel through a small skin incision.

Note: The external jugular vein, the cephalic vein at the deltopectoral groove, and the axillary subclavian vein are the most common vessels used for catheter insertion. It may be necessary to use the internal jugular vein for insertion of larger catheters.

2. **Refer to section B for catheter measurement and tunneling procedure.**
3. Insert the catheter through a small venotomy into the isolated vein and advance to desired position in vessel.
4. Verify catheter tip location radiographically. The preferred location of the catheter tip is at the junction of the superior vena cava and the right atrium.

Warning: Avoid positioning the catheter tip in the right atrium.

5. Unclamp catheter and draw blood through the lumen(s) of the catheter to insure patency after placement is complete, but before closing the skin at the venipuncture site. If catheter is not patent, adjust catheter at curvature point to relieve possible restriction. Irrigate catheter lumen(s) with 10 mL of normal saline to clear catheter of blood. Instill sterile heparinized saline per lumen to create a heparin lock. Clamp catheter.



6. Attach injection cap(s) or connect to intravenous fluid source.
7. Suture catheter at exit site.

Note: For dual lumen catheters, the attachable suture wing may be used to secure the catheter.

 - A. Using your fingers, squeeze the suture wing together so that it splits open and place the wing around the catheter near the venipuncture site.
 - B. Secure wing in place using sutures or adhesive wound closures.
8. Secure catheter at exit site with a sterile dressing. The external segment of the catheter should be coiled and taped. **Avoid tension on the catheter segment to prevent dislodging the catheter.**

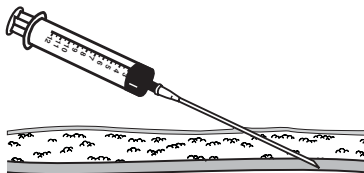


Section D: Percutaneous Technique

Before beginning procedure, read the “Contraindications, Warnings, Cautions and Precautions” and “Possible Complications” sections of this manual.

1. Locate desired vessel using a small needle attached to a syringe.

Note: The subclavian vein is entered percutaneously at the point that identifies the junction of the outer and middle thirds of the clavicle using the needle and syringe.

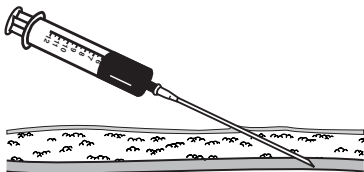


Refer to the “Warnings” section concerning Catheter Pinch-off.

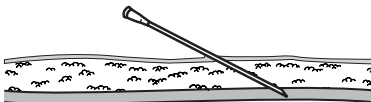
2. Attach introducer needle to the syringe and insert into vessel alongside the small needle. Remove small needle.

3. Aspirate gently as the insertion is made.

Warning: If the artery is entered, withdraw the needle and apply manual pressure for several minutes. If the pleural space is entered, withdraw the needle and evaluate patient for possible pneumothorax.

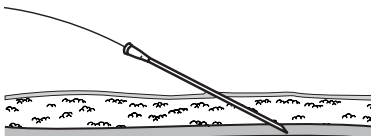


4. When the subclavian vein has been entered, remove the syringe leaving the needle in place. **Place a finger over the hub of the needle to minimize blood loss and the risk of air aspiration. The risk of air aspiration is reduced by performing this part of the procedure with the patient performing the Valsalva maneuver.**



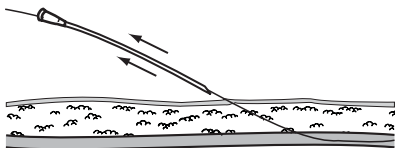
5. Straighten "J" tip of guidewire with tip straightener and insert tapered end of tip straightener into the needle. Tip straightener should not be advanced over the guidewire beyond the guidewire tip.

Caution: Do not insert guidewire beyond the bevel of the needle while removing straightener from the needle hub in order to prevent guidewire damage or shearing. Remove the tip straightener and advance the guidewire into the superior vena cava. Advance the guidewire as far as appropriate for the procedure. **Verify correct positioning radiographically.**



- Gently withdraw and remove needle.

Caution: If the guidewire must be withdrawn while the needle is inserted, remove both the needle and guidewire as a unit to help prevent the needle from damaging or shearing the guidewire.

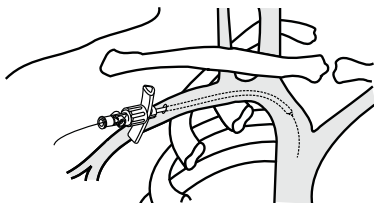


- Refer to section B for catheter measurement and tunneling procedure.
- Make a small (approx. 1 cm wide) incision parallel to the clavicle, positioning the guidewire at the center of the incision to permit proper entry of vessel dilator and sheath introducer.

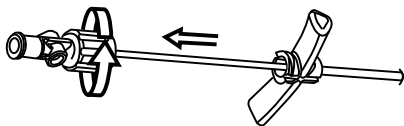
Peel-Apart Sheath Introducer Instructions:

- Advance the vessel dilator and sheath introducer as a unit over the exposed guidewire using a rotational motion. Advance it into the subclavian vein as a unit, leaving at least 2 cms of sheath exposed.

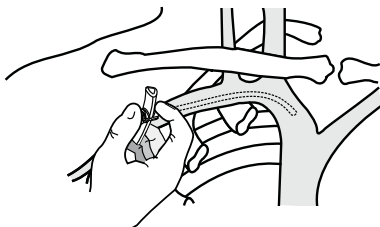
Warning: Avoid vessel perforation.



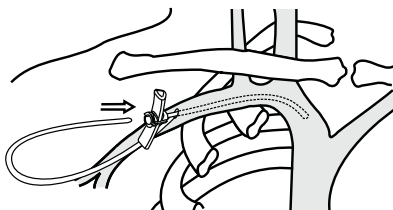
10. Release the locking mechanism and gently withdraw the vessel dilator and "J" guidewire, leaving the sheath in place.



11. **Warning: Hold thumb over exposed orifice of sheath to prevent air aspiration. The risk of air aspiration is reduced by performing this part of the procedure with the patient performing the Valsalva maneuver.**

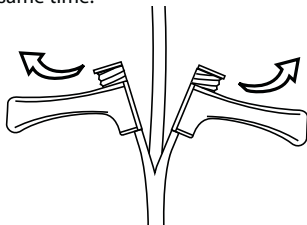


12. Insert catheter into lumen of sheath and advance to desired position in vessel.



13. Verify catheter tip location radiographically.
Warning: Avoid positioning the catheter tip in the right atrium.
 Preferred location of the catheter tip is at the junction of the superior vena cava and the right atrium.

14. Grasp the two handles of the peel-apart sheath and pull outward and upward at the same time.



15. Peel the sheath away from the catheter completely. Make sure the catheter is not dislodged from vessel as sheath is removed.

16. Unclamp catheter and withdraw blood through the lumen(s) to insure patency before closing the skin at the venipuncture site. If catheter is not patent, adjust catheter at curvature point to relieve possible restriction. Irrigate catheter lumen(s) with 10 mL of sterile normal saline to clear catheter of blood. Instill sterile heparinized saline per lumen to create heparin lock. Clamp catheter.

17. Attach injection cap(s) or connect to intravenous fluid source.

18. Suture catheter at exit site. Note: For dual lumen catheters, the attachable suture wing may be used to secure the catheter.

- A. Using your fingers, squeeze the suture wing together so that it splits open and place the wing around the catheter near the venipuncture site.
- B. Secure wing in place using sutures or adhesive wound closures.



19. Secure catheter at exit site with a sterile dressing.

The external segment of the catheter should be coiled and taped. **Avoid tension on the external segment to prevent dislodging the catheter.**

Catheter Removal

After tissue grows into the SureCuff* Tissue Ingrowth Cuff (2 to 3 weeks), catheters can be removed from the subcutaneous tunnel using one of several methods. The method used will depend upon physician preference and the amount of tissue/cuff ingrowth that is present. The catheter can usually be removed by traction on the external segment (see #1 below) if it is not sutured internally at the cuff or vessel insertion site. Surgical removal (see #2 below) may be necessary to prevent breaking the catheter if the catheter does not dislodge easily with traction or if there is no definite suture site information.

Warning: You should not feel any resistance when withdrawing the catheter from the vein. If you do encounter resistance, this may indicate that the catheter is being pinched between the clavicle and first rib (the “pinch-off” sign). Do not continue pulling against resistance as this may cause catheter breakage and embolism. Free up the resistance (e.g. by repositioning the patient) before proceeding further.

1. **Traction Removal**

Pull the catheter external segment downward in a straight line away from the exit site with a series of gentle tugs. When separation of the cuff from the surrounding tissue and/or catheter occurs, there will be a “break-away” feeling. Continue to pull gently on the catheter to complete the removal. Apply pressure to the catheter/vein insertion site as needed to control bleeding. If the cuff remains in the subcutaneous tissue, dissect it out through a small incision utilizing local anesthesia.

2. **Surgical Removal (using aseptic technique)**

- a. Locate the position of the cuff either by palpation or by observing the position of “dimpling” when traction is applied to the catheter’s external segment.
- b. Make a short transverse incision at or below the external side of the cuff taking care not to transect the catheter. Reach under the catheter with a curved, smooth-jawed clamp and pull up on the catheter to remove the catheter tip from the vein.



Caution: Do not grasp the catheter with any instrument that might sever or damage the catheter.

- c. Dissect out the cuff. Transect the catheter on the exterior side of the cuff and remove the interior portion of the catheter and cuff through the incision.

Caution: Do not cut the catheter before removal from vein to avoid catheter embolism.

- d. Remove the exterior segment of the catheter by pulling it from the skin exit site.
- e. Apply pressure to the catheter/vein insertion site as needed to control bleeding.
- f. Close the incision with a suture as needed. Apply antibiotic ointment to incision and skin exit sites and an occlusive dressing to prevent air embolism through the tract.

Catheter care and maintenance procedures are included in the Hickman*, Leonard* and Broviac* Catheters Nursing Procedure Manual available through Bard Access Systems Customer Service, 1-800-545-0890. For outside the U.S., contact your local sales representative or distributor.

References

1. Aitken, D.R. and Minton, J.P. "The Pinch-Off Sign: A Subclavian Catheters", American Journal of Surgery, Vol. 148, Nov. 1984, pp. 633-636.
2. Rubenstein, R.B., Alberty, R.E., et al. "Hickman* Catheter Separation", JPEN, Vol. 9, No. 6, Nov./Dec. 1985, pp. 754-757.
3. Hinke, D.H.; Zandt-Stastny, D.A.; Goodman, L.R.; et al. Pinch-off syndrome: A complication of implantable subclavian venous access devices. Radiology 177: 353-356, 1990.
4. Ingle, Rebecca,; Nace, Corinne, Venous Access Devices: Catheter Pinch-off and Fracture, 1993, Bard Access Systems

Patient Information - Catheter Care and Maintenance

Catheter Damage

If the catheter or connection is damaged or dislodged during or after surgery, immediately clamp the catheter with an atraumatic catheter clamp or kink and tape it. The catheter should be repaired as soon as possible using the designated Hickman* repair kit. Instructions are enclosed in the repair kit package and are also available in the Hickman*, Leonard* and Broviac* Catheters Nursing Procedure Manual.

Site Care

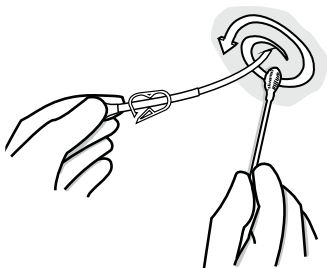
Supplies you will need:

- Sterile gloves (if required)
 - 3 Alcohol swabsticks
 - Hydrogen peroxide
 - Sterile cotton-tipped applicators
 - 3 Povidone iodine swabsticks
 - Povidone iodine ointment packet
 - Tape
 - 1 Sterile cover dressing (transparent or tape)
 - 1 Alcohol wipe
 - 1 Sterile 2 in. x 2 in. (5 cm x 5 cm) gauze dressings
 - 1 Sterile pre-cut 2 in. x 2 in. (5 cm x 5 cm) gauze dressings
1. Clean the work surface by wiping with a paper towel that has been moistened with alcohol. Wipe dry or allow to air dry. Then place supplies on the cleaned surface.
 2. Wash your hands thoroughly using warm soapy water. Rinse completely and dry using a clean towel or fresh paper towels.
 3. Carefully open the dressing kit, or unwrap supplies, without touching the inside surfaces of the kits or wrappers.



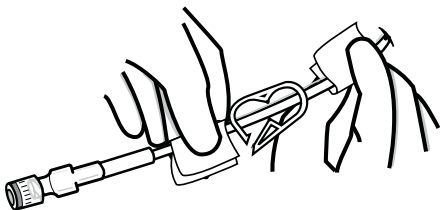
- Carefully remove the old dressing, starting from the top of the dressing and working downward. Remove the tape or dressing carefully to avoid irritating your skin or pulling on the catheter.
Caution: Do not use scissors or any sharp-edged instruments as they could damage the catheter.
- Wash your hands again.
- Do a careful observation of the exit site and the skin around it. If you notice anything unusual, **finish** the dressing procedure and then call your doctor.
- If you are instructed to use gloves, put on the pair of sterile gloves following the procedure you were taught.
Be careful to not touch anything except the supplies being used for site care.

- Carefully clean the catheter exit site with an alcohol swabstick or sterile cottontipped applicator, soaked in hydrogen peroxide, starting at the exit site and spiraling outward until a circle at least 8 cm in diameter, has been cleaned. Do not return to the catheter exit site with a swabstick that has touched any skin away from the exit site.

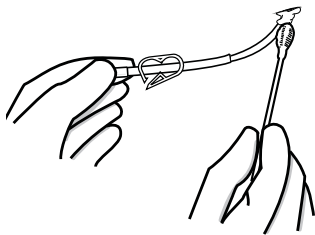


- Repeat this step twice using the other two swabsticks. Look at the color of the swabsticks after you have used them for signs of drainage.

- Repeat step 8 using three of the povidone iodine swabsticks to clean the same skin area again as well as the part of the catheter that will be lying on the cleaned skin.
- Gently clean the outside of the catheter with the inside surface of an alcohol wipe, starting from the exit site to the catheter connector. You may hold the catheter at the exit site with another alcohol wipe to prevent pulling on the catheter. **Do Not Pull On The Catheter.**

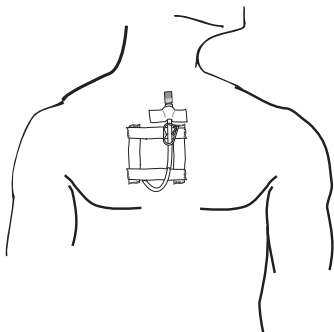


- Allow the povidone iodine on the skin to air dry at least two minutes.
- Apply a small amount of povidone iodine ointment to the exit site (optional).



- Place the pre-cut gauze dressing over the ointment at the exit site, fitting it snugly around the catheter. Place the 2 in. x 2 in. (5 cm x 5 cm) gauze over the pre-cut gauze and catheter.
- Apply the cover dressing (tape or transparent dressing) following the directions in the package as well as instructions from your doctor or nurse.
- Coil the catheter, check to see that it is not kinked or pinched, and secure it to the chest or dressing with tape. This will prevent pulling of the catheter at the exit site and decrease irritation.

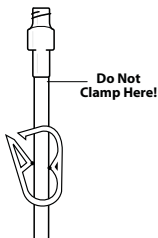
17. Always secure the catheter in such a way that you can easily see the cap end. Your doctor or nurse will help you select the best method to secure the catheter. The type of clothing and normal activity will need to be considered in this selection. You should periodically look at the capped end to be sure it is intact.



Clamping the Catheter

Selection of the catheter clamp is very important since the catheter is vital to your care. The wrong clamp can damage the catheter. Follow these three rules for clamping:

1. Use only smooth-edged clamps.
2. Always clamp the catheter over the reinforced clamping sleeve or tape tab, as instructed by your nurse. Never clamp over the reinforced segment directly adjacent to the connector. (see diagram)
3. Follow the directions of your doctor or nurse regarding when to clamp.



Hickman* catheters come with pre-attached clamps and reinforced clamping sleeves.

When should you clamp?

Your doctor or nurse may instruct you to clamp your catheter whenever it is not being used. The catheter is filled with heparin and is capped and will protect you from having any problems, but the clamp can be another safety measure. You should always clamp your catheter whenever it is opened to the air, such as during catheter cap changes, or when connecting intravenous infusions to your catheter. **Always have a spare clamp available.**

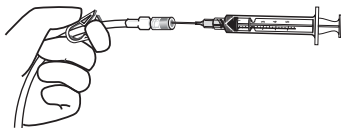
Flushing the Catheter and “Heparin Lock” Procedure

Supplies you will need:

- Alcohol or povidone iodine wipe.
- 10 mL syringe with attached 1 inch (2.5 cm) needle filled with 2.5 mL of heparin, prepared for use
- Tape

The steps in the procedure are:

1. Collect your supplies in a convenient place.
2. Wash your hands thoroughly.
3. Remove the tape that is around the injection cap.
4. Clean the cap with an alcohol or povidone iodine wipe. If you use the iodine wipe, allow the cap to air dry for two minutes -- be sure not to touch the cap during this time. Do not blow on the area or allow the clean cap to dangle since this increases the chance of contamination of the area with germs.
5. Remove the needle cover and carefully insert the needle into the center of the catheter injection cap.
6. Release the clamp.
7. Inject the heparin into the catheter. As you inject the last 0.5 mL of heparin solution, withdraw the needle from the injection cap. If you are flushing the catheter of a child, do not flush too rapidly because the child's circulatory system is small and sensitive to rapid changes in volume and pressure.
8. Remove the needle from the injection cap. Discard the syringe and needle in a biohazard container.
9. Retape the cap as outlined in the injection cap change procedure.



If you have a multi-lumen catheter, use a separate syringe to flush each lumen with sterile heparin solution. Your doctor or nurse will give you additional information for the care of multi-lumen catheters.

Changing the Injection Cap

Supplies you will need:

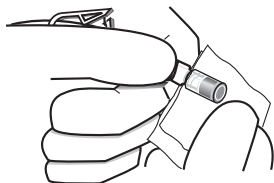
- Sterile injection cap.
- Alcohol or povidone iodine wipe.
- Catheter clamp
- Tape

The procedure to change the cap:

1. Wash your hands thoroughly.
2. **Be sure the catheter is securely clamped over the reinforced sleeve or tape tab.**
3. Open the package of the new injection cap and prepare according to your instructions. Be sure the cap does not touch the outer surface of the package.
NOTE: You may need to pre-fill the injection cap with heparin if it is a long cap with significant air space. Your doctor or nurse will teach you this additional procedure.

4. Remove the old tape from around the cap by unpeeling the tape. **NEVER** attempt to cut the tape with scissors as you may damage the catheter.

5. Using an alcohol or povidone iodine wipe, clean around the place where the cap is connected to the catheter. Allow to air dry.



6. While holding the catheter connector below the level of your heart, unscrew the old cap and discard. (The fluid level in the catheter will drop part-way into the catheter if the connector is held above the level of your heart.)

7. Pick up the new cap only by the top and remove the sterile tip protector. Attach the new cap by firmly screwing it onto the catheter connector.
8. Cut a 5 cm piece of tape and make tabs on each end by folding back 1 cm. Apply the sticky part of the tape around the connection of the cap and catheter and fasten securely. Press ends of the tape together. The tabs on the end of the tape will enable you to remove it very easily.
9. Follow the directions your doctor or nurse has given you regarding whether to leave the clamp in place.



An issued or revision date for these instructions is included for the user's information. In the event two years have elapsed between this date and product use, the user should contact Bard Access Systems to see if additional product information is available.

Revised Date: **March 2013**

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