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Introduction

Description

Groshong® NXT Peripherally Inserted Central Venous Catheters (PICC) consist of soft, medical grade silicone rubber tubing with a closed, rounded tip. Unlike open-ended catheters, the closed end has a patented three-position valve (or valves) to allow fluids to flow in or out but remains closed when not in use.

Groshong NXT  PICC’s have the following features:

Dual-lumen

• Soft, medical grade silicone rubber tubing
• Patented three-position valve(s)
• Radiopaque tip
• Radiopaque catheter body
• Depth markings
• StatLock® compatible attachable suture wing
• 2 - 19 Ga. lumens

Single-lumen

• Soft, medical grade silicone rubber tubing
• Patented three-position valve(s)
• Radiopaque tip
• Radiopaque catheter body
• Depth markings
• StatLock® compatible connector with integrated extension leg.
Dual-Lumen Groshong® NXT PICC

- Winged Connectors
- Connector Oversleeve
- Bifurcation
- Suture Wing
- Reverse Taper
- Three-way Groshong Valves
- Radiopaque Rounded Atraumatic Tip
Single-Lumen Groshong® NXT PICC

- Winged Connector
- Connector Oversleeve
- Reverse Taper
- Three-way Groshong® Valves
- Radiopaque Rounded Atraumatic Tip

NXT
Placement:

The catheter is placed into one of the large antecubital veins and threaded into the superior vena cava above the right atrium.
Groshong® Valve Function

The Groshong NXT PICC catheter incorporates the patented, 3-position, pressure sensitive Groshong valve. The valve is located near the rounded, closed, radiopaque catheter tip and allows fluid infusion and blood aspiration. When not in use, the valve restricts blood backflow and air embolism by remaining closed.

Negative pressure in the catheter will cause the valve to open inward, allowing blood aspiration. When the catheter luminal pressure returns to normal, the valve closes.

Positive pressure into the catheter from gravity, pump or syringe will open the valve outward, allowing fluid infusion. When the catheter luminal pressure returns to normal, the valve closes.

When not in use, the Groshong valve restricts blood backflow or bleedback and air embolism by remaining closed, maintaining catheter patency and reducing the need for clamping or heparinization. This increases patient safety and greatly reduces the cost of ongoing maintenance.
Groshong NXT dual lumen PICC’s have Groshong valves which are staggered and rotated, allowing the concurrent infusion of incompatible drugs. Refer to the appropriate drug labeling for indications, contraindications, warnings, precautions, dosage, and administrative information. Each lumen of a dual lumen PICC is treated separately for maintenance and irrigation purposes.

Groshong NXT PICC catheters have the following benefits:

1. Increased patient safety due to reduced risk of air embolism or bleedback.

2. Virtual elimination of heparin flushing to maintain catheter patency.

3. Reduced need for catheter clamping.

4. Reduced need for flushing when the catheter is not in use (only flushed every seven days with normal saline when not in use).

**Indications for Use**

The Groshong NXT PICC provides short (less than 30 days) or long (greater than 30 days) term peripheral access to the central venous system for intravenous therapy or blood sampling.

**Warnings**

Infusion pressures should never exceed 25 psi. Smaller syringes generate more pressure than large syringes. A
two pound weight equivalent force on the barrel of a 3 cc syringe generates pressure in excess of 25 psi. The same two pound weight equivalent force on the barrel of a 10cc syringe generates less than 8 psi of pressure. It is recommended that no smaller than a 10cc syringe be used for infusion into a Groshong NXT catheter.

If catheter damage or connector separation occurs, the catheter should be immediately clamped or kinked closed to prevent any possibility of air embolism or loss of blood.

Universal precautions should be observed by all health care professionals when performing the procedures included in this manual.
Catheter Irrigation Procedure

Purpose:
To maintain catheter patency.

Routine Maintenance (every 7 days; after IV administration of TPN, IV fluid or medications)

Supplies:
- Isopropyl alcohol and/or povidone-iodine wipes
- 10cc syringe filled with 5cc of sterile 0.9% Sodium Chloride (normal saline)

Procedure:
1. Swab the top of the injection cap with an alcohol pad for at least three seconds or according to facility protocol.
2. Discard the alcohol pad. Be careful not to touch the opening of the injection cap after swabbing.
3. Insert the syringe directly into the injection cap and turn clockwise.
4. Inject saline, infusing last 0.5cc as the syringe is withdrawn from the injection cap. (Helps prevent a vacuum which can pull a small amount of blood into tip of catheter.)

After Blood Aspiration for any reason or when blood is observed in the catheter:

Note: If blood is aspirated prior to infusion of medications (to verify venous placement), catheter should be irrigated with 10cc of normal saline prior to attaching medication syringe, IV or infusion pump tubing. Failure to do so may result in an occluded catheter, leading to difficulty in aspirating in the future.
Supplies:

- Isopropyl alcohol and/or povidone-iodine wipes
- 10cc syringe filled with 10cc of sterile 0.9% Sodium Chloride (normal saline).

Procedure:

1. Follow routine maintenance procedure, except use 10cc normal saline and flush to clear blood from catheter.

2. If unable to flush all blood residue out of the injection cap, replace it after blood sampling per injection cap change procedure (per agency policy).

Prior to blood sampling when infusing TPN:

1. Follow routine maintenance procedure, except use 20cc normal saline and flush to clear TPN from catheter.

Flushing guidelines for small patients:

Use the same procedure as used for adults with the following exceptions:

1. Use 2cc normal saline for routine maintenance (every 7 days; or after IV administration of TPN, IV fluids, or medications).

2. Use 3cc normal saline after blood aspiration for any reason, or when blood is observed in the catheter. **Note:** This amount is insufficient to clear blood from the injection cap. The injection cap should be changed following blood withdrawal.
Blood Withdrawal / Aspiration Procedure

Purpose:
To obtain blood samples for laboratory evaluation, eliminating the need for peripheral vein punctures.

To verify venous placement prior to administration of hypertonic or vesicant solutions.

Note: If you encounter difficulties with blood withdrawal, see Troubleshooting Guide-Aspiration Difficulties.

Hub-To-Hub Technique (Syringe):

Supplies:
- 3 - 10cc syringes
- Sterile 0.9% Sodium Chloride (normal saline)
- Isopropyl alcohol wipes/povidone-iodine wipes
- Blood specimen tubes
- Injection cap

Procedure:
1. Wash hands thoroughly.
2. Draw up 10cc of normal saline in syringe and set aside.
3. Stop any I.V. fluids infusing through the catheter, including another lumen of the catheter.
4. Remove injection cap/I.V. tubing from catheter hub.
5. Clean catheter hub with alcohol and/or povidone iodine wipe.
6. Attach an empty 10cc syringe to catheter hub.
7. Pull back syringe plunger 1-2cc, pausing for 2 seconds to allow catheter valve to open and blood to come into catheter. Slowly continue to aspirate 5cc of blood.

8. Disconnect syringe and discard (saline in catheter dilutes specimen and may alter lab values).

9. Attach an empty 10cc syringe and aspirate per step 7 to withdraw amount of blood needed for testing.

10. Disconnect syringe and attach saline-filled syringe.

11. Flush the catheter with 10cc normal saline.

12. Disconnect syringe and clean catheter hub with alcohol and/or povidone-iodine wipe.

13. Attach new injection cap per injection cap change procedure or attach sterile I.V. tubing to hub of catheter.

14. Attach 1 in. needle or needleless adapter to blood sample syringe to transfer to blood collection tubes.

Needleless adapter through injection cap
(Vacuum Blood Collection System or Syringe):

(May use 10cc syringe with attached needle or needleless adapter in place of vacuum blood collection system)

Supplies:
- Vacuum blood collection device
- 2 - 10cc syringes
- Sterile 0.9% Sodium Chloride (normal saline)
- Isopropyl alcohol wipes/povidone-iodine wipes
- Blood specimen tubes

Procedure:
1. Wash hands thoroughly.
2. Draw up 10cc of normal saline in syringe and set aside.

3. Stop any I.V. fluids infusing through the catheter, including another lumen of the catheter.

4. Clean injection cap with alcohol and/or povidone-iodine wipe.

5. Attach empty 10cc syringe to injection cap.

6. Pull back syringe plunger 1-2cc, pausing for 2 seconds to allow catheter valve to open and blood to come into catheter. Slowly continue to aspirate 5cc of blood. **Note:** A vacuum collection specimen tube may be used to withdraw the discard sample, but be sure to use one with at least a 5cc capacity.

7. Remove syringe from injection cap and discard.

8. Clean injection cap with alcohol and/or povidone iodine wipe.

9. Attach vacuum blood collection system to injection cap. Push blood specimen tube into vacuum collection device sleeve so that rubber stopper is pierced.

10. Blood needed for specimen will flow into specimen tube. Change tubes as needed for required tests.

11. Remove vacuum blood collection system and sleeve from injection cap.

12. Clean injection cap with alcohol and/or povidone-iodine wipe.

13. Attach saline-filled syringe and flush the catheter with 10cc of normal saline.

14. If unable to flush all of the blood residue out of the injection cap, attach a new sterile injection cap per injection cap change procedure (per agency policy).
Injection cap Change Procedure

Purpose:
To minimize potential for infection from overuse of injection cap.

Frequency:
- Every seven days (about 18 uses) or per agency policy.
- When the injection cap has been removed for any reason.
- Anytime the injection cap appears damaged, is leaking, blood is seen in the catheter without explanation or blood residue is observed in the injection cap.
- After blood withdrawal through the injection cap (per agency policy).

Supplies:
- New sterile injection cap
- Alcohol wipes
- 10cc syringe filled with 5cc of sterile 0.9% Sodium Chloride (normal saline)

Procedure:
1. Wash hands.
2. Using aseptic technique, open injection cap package and prefill injection cap with normal saline.
3. Hold the hub of the catheter below the level of the patient’s heart (prevents “manometer effect” or fluid drop in the catheter) and remove the old injection cap.
4. Clean the outside of the catheter hub with an alcohol wipe and/or povidone-iodine wipe.

5. Remove the tip protector from the new injection cap and twist clockwise onto the catheter hub.

6. Irrigate the catheter with 5cc normal saline following the Catheter Irrigation Procedure (per agency policy).
**PICC Dressing Change Procedure**

**Purpose:**
To prevent external infection of the central venous catheter.

**Frequency:**
Every seven days and PRN if dressing is loose or damp.

Chlorhexidine gluconate is the suggested antiseptic to use. Acetone and tincture of iodine should not be used. 2% Chlorhexidine gluconate/ 70% isopropyl alcohol swabs sticks may be used for dressing changes. Povidone-iodine may also be used as an antiseptic.

**Supplies:**
- 1 Each - ChloraPrep® One-Step Applicator
- 2 Each - 2 in. x 2 in. gauze - optional
- 1 Each - 10 x 12 cm transparent dressing
- 1 Pair - Sterile gloves

**Procedure:**
1. Wash hands thoroughly.
2. Carefully remove old dressing and discard. Avoid tugging on the catheter, use of scissors or other sharp objects near the catheter.
3. Inspect the catheter exit site for swelling, redness, or exudate. Notify physician if problem observed.
4. Wash hands thoroughly.
5. Put on sterile gloves.
6. Clean the catheter exit site with the ChloraPrep One-Step Applicator.
- Pinch the wings on the ChloraPrep One-Step Applicator to break the ampule and release the antiseptic. **Do not touch the sponge.**
- Wet the sponge by repeatedly pressing and releasing the sponge against the treatment area until fluid is visible on the skin.
- Use repeated back-and-forth strokes of the sponge for approximately 30 seconds. Completely wet the treatment area with antiseptic. Allow the area to dry for approximately 30 seconds. **Do not blot or wipe away.**
- Maximum treatment area for one applicator is approximately 130 cm² (approximately 4 x 5 in.). Discard the applicator after a single use.
- Remove and discard gloves.

7. Fold a 2 in. x 2 in. gauze in half and place it under the catheter hub (if desired).

8. Apply the transparent dressing, over the exit site, and catheter tubing.

9. Attach additional securement per institutional policy avoiding the placement of tape directly on the silicone catheter material.
References:


Clearing Occluded Catheters

Purpose:
To restore patency to a catheter with an occlusion.

Supplies:
- 1 - Sterile injection cap
- Thrombolytic solution
- 1 - 10cc syringe
- 1 - 10cc sterile normal saline-filled syringe
- Isopropyl alcohol wipes

Procedures:
1. Wash hands.
2. Remove injection cap, attach an empty 10cc syringe and attempt to aspirate. If aspiration is successful, withdraw clots and flush catheter with 10 ml normal saline. Replace cap. If aspiration is unsuccessful, proceed to step 3.
3. Obtain physician’s order for the use of thrombolytic solution to declot the catheter. Note: Cautions contained in medication package insert should be observed.
4. Draw up enough thrombolytic solution into a 10cc syringe to equal the internal volume of the catheter (volume may be reduced if catheter length has been cut).
5. Aseptically attach the thrombolytic solution filled syringe to the catheter hub. Slowly and gently inject the thrombolytic solution into the catheter using a push-pull motion to achieve maximum mixing. To avoid catheter rupture, do not force entire amount into catheter if strong resistance is felt.
6. Leave 10 ml syringe attached to catheter. Do not attempt to aspirate for 30-60 minutes.
7. After 30 minutes, attempt to aspirate the drug and residual clot. If unsuccessful, repeat thrombolytic instillation.
8. When patency is restored, aspirate 5 ml of blood to assure removal of all drug and clots.
9. Remove blood-filled syringe and replace it with a 10cc syringe filled with normal saline. Flush catheter to verify patency.
10. Attach sterile, saline-filled injection cap.
11. Attach additional securement per institutional policy avoiding the placement of tape directly on the silicone catheter material.

Note:
- For suspected lipid deposition occlusion when thrombolytic solution does not clear the blockage, a sterile ethanol 70% solution may be instilled and left in place for one hour. Follow procedure for thrombolytic instillation.
- For suspected calcium and phosphate precipitation when thrombolytic solution does not clear blockage, a sterile 0.1% N hydrochloric acid solution may be instilled in the catheter and left in place for one hour. The solution is then aspirated and the catheter flushed with normal saline. This may help to clear the catheter of calcium-phosphate or other drug precipitates. Sodium bicarbonate may also be used for precipitates that are soluble in a basic solution.
References:


Purpose:
To repair a damaged or loose connector.

Note: Catheter should have been clamped with an atraumatic non-toothed clamp or kinked and taped between the catheter exit site and the damaged area when damage or connector separation occurred and must remain clamped or kinked and taped during repair.

Supplies:
- 1 Each - Replacement connector
  (5 Fr. - #7812500 - Red, 5 Fr. - #7812510 - White)
- 1 Each - ChloraPrep One-Step Applicator
- 1 Each - Sterile scissors
- 1 Pair - Sterile gloves
- 1 Each - 10cc syringe filled with 5cc sterile 0.9% Sodium Chloride (normal saline)

Procedure Dual Lumen Repair:
1. Obtain a new sterile replacement connector of the correct size.
2. Determine where the damaged extension leg is to be cut off. Be sure to retain as much of the original external segment as possible. At least 2 in. of intact catheter beyond the Y-site joint is needed to be able to repair the catheter.
3. Thoroughly clean the catheter with ChloraPrep One-Step Applicator at the point where it is to be cut.
4. Wearing sterile gloves and using sterile scissors, cut the extension leg off at a 90° angle, ½ in. distal to the
location of the previous connector to remove any damaged catheter material.

5. Transfer the white sleeve (A) onto the catheter from connector.

6. Firmly push catheter onto adapter to Position B, using the pre-inserted hub stylet as a guide. **Do Not Twist.**

7. Slide the white oversleeve over the catheter and hub to position B. If catheter starts to bunch up, remove the oversleeve and swab the catheter with an alcohol wipe before sliding sleeve over it.

8. Remove and discard stylet.

9. Attach injection cap and flush catheter with normal saline, or flush catheter with normal saline and attach IV tubing.

10. Attach additional securement per institutional policy avoiding the placement of tape directly on the silicone catheter material.
Procedure Single Lumen Repair:

1. Obtain a new sterile replacement connector of the correct size.

2. Determine where the damaged catheter is to be cut off. Be sure to retain as much of the original external segment as possible. At least 2 in. of intact catheter is needed to be able to repair the catheter.

3. Thoroughly clean the catheter with Chloraprep One-Step Applicator at the point where it is to be cut.

4. Wearing sterile gloves and using sterile scissors, cut the catheter off at a 90° angle, 1/2 in. distal to the location of the damaged site to remove any damaged catheter material.

5. Retrieve the oversleeve portion of the connector and
7. With a straight motion, slide the oversleeve portion of the connector and the StatLock® compatible connector with extension leg together, aligning the grooves on the oversleeve portion of the connector with the barbs on the StatLock® compatible connector and extension leg. Do not twist. 
   **Note:** Connector portions must be gripped on plastic areas for proper assembly. Do not grip on distal portion of oversleeve.

8. Advance completely until the connector barbs are fully attached. A tactile, locking sensation will confirm that the two pieces are properly engaged. There may be a small gap between the oversleeve and the StatLock® compatible connector with extension leg.

9. Attach injection cap and flush catheter with normal saline, or flush catheter with normal saline and attach IV tubing.

10. Attach additional securement per institutional policy avoiding the placement of tape directly on the silicone catheter material.
I. Aspiration Difficulties

A. Possible Causes

1. Failure to flush according to Catheter Irrigation Procedure, resulting in lumen obstruction.

2. Catheter opening may suck up against vein wall with aspiration.

3. Blood clot, fibrin sheath, or particulate matter obstructing valve when catheter is aspirated.
   - A clot or other obstruction in the catheter lumen can produce a one-way valve effect. During infusion, the catheter wall expands slightly and allows fluid to flow around the obstruction. During aspiration, the catheter wall contracts slightly, tightening down around the obstruction and preventing aspiration.
   - Fibrin sheaths usually begin to form within a few days after the insertion of a central venous catheter. When it has grown enough to extend to the tip of the catheter, it may be pulled into and obstruct the catheter valve when aspiration is attempted, but offer no resistance to infusion.

4. Kinked catheter outside or inside the body.
   - Suture constriction at the catheter skin exit site.
   - Catheter may be curled or kinked within the vessel, or under the dressing.

5. Malposition of catheter tip (i.e. jugular vein, outside of vein).
B. Possible Solutions

1. Visually check catheter for any exterior kinks, or constricting sutures. If sutures are present, their removal may release the constriction and allow aspiration. A removable suture wing is supplied with the insertion tray to prevent suture constriction at the exit site.

2. Move patient’s arm, shoulder and head to see if a change in position will allow aspiration.

3. If no resistance to infusion is felt, attempt to flush with 10cc normal saline. Then pull back gently on syringe plunger 2-3cc, pause and proceed with aspiration.

4. If resistance to infusion is felt, check for signs of extravasation. If present, notify physician of possibility of catheter leakage. If not present, see step 5.

5. Attempt to aspirate with a 20cc syringe (creates greater vacuum).

6. If resistance to aspiration is still present, obtain physician’s order for a chest x-ray or dye study to determine catheter position and status.

7. If studies indicate occlusion is due to a blood clot or drug precipitate, obtain physician’s order regarding the use of thrombolytic or other solution to clear catheter.
   - If the catheter tip is not in the superior vena cava, it should be repositioned.
   - If the catheter tip is out of the vein, it should be replaced.

II. Bleedback in Catheter

A. Possible Causes

1. A blood clot or particulate matter may be holding the valve open.
2. Migration or placement of the catheter tip in the internal jugular vein, or vessel other than the superior vena cava, or coiling of the catheter in a vein may position the catheter tip where the valve is pushed open.

3. Placement of the catheter in the right atrium or ventricle:
   - Contractions of the heart muscle can force open the catheter valve.
   - Impingement of the catheter tip on the tricuspid valve, heart wall, or apex of the heart can force the catheter valve open.

4. Catheter valve tip cut off in error during catheter placement.

B. Possible Solutions

1. Attempt to aspirate clot out of lumen.

2. If no resistance felt, flush with 10cc normal saline. If resistance is felt, see step 3.

3. Obtain physician’s order and instill thrombolytic solution or other solution per Clearing Occluded Catheters Procedure to clear lumen and valve of blood clots, or precipitates.

4. Obtain physician’s order for chest x-ray or dye study to determine catheter position.
   - Check for radiopaque tip to verify if it is still in place. If not, treat catheter as an open-ended catheter, using heparin and clamping with an atraumatic clamp when opening it to the air until it is repositioned.
   - If malpositioned, coiled or kinked, catheter should be repositioned with the tip in the superior vena cava. If unable to reposition for some reason, treat catheter as an open-ended catheter, using heparin and clamping with an atraumatic clamp when opening it to the air.
IV. Catheter Occlusion

A. Possible Causes
2. Drug precipitate or lipid deposition completely obstructing lumen.
3. May be kinked, coiled or damaged.
4. Catheter valve may not be within vein.
5. If sutures were used during the placement of the catheter, they can tighten and restrict flow.

B. Possible Solutions
1. Attempt to aspirate blood clot.
2. Inspect patient for presence of sutures around the catheter. If sutures are present, they should be removed. Removable suture wings are available in the insertion tray for holding PICC catheters in place.
3. Move patient’s arm, shoulder and head to see if position change affects ability to infuse.
4. Obtain physician’s order and instill thrombolytic solution or other solution per Clearing Occluded Catheters Procedure.
5. Obtain physician’s order for a chest x-ray or dye study to determine the position of the catheter.
V. Catheter Damage

A. Possible Causes

1. Repeated clamping.
2. Contact with a sharp object.
3. Rupture from attempt to irrigate an occluded catheter with a small syringe (i.e. 1 or 3cc syringe)
   - Small syringes can generate very high internal pressures with very little force. The back pressure from an occlusion may not be felt when using a small syringe until damage to the catheter has occurred.

B. Possible Solutions

1. When repairing, always fold the catheter between the patient and the damaged area and tape it together, or clamp the catheter between the patient and the damaged area with a smooth-edged, atraumatic clamp.
2. Determine the site of damage and the size and type of catheter.
3. Refer to the appropriate Catheter Repair Procedure to repair the damage. At least 2 in. of intact catheter beyond the skin exit site is needed to be able to repair the catheter. Use the appropriate size repair kit to assure a good repair.
4. Always use a 10cc syringe or larger when infusing into the catheter.

VI. Air in Line

A. Possible Causes

1. Hole in catheter.
2. Injection cap not prefilled with normal saline.
3. Loose connections (injection cap, IV tubing).
   • If the oversleeve has not been put on the catheter connector, or if it or the catheter has not been slid all the way onto the hub, air and fluid leakage can occur.

4. “Manometer effect” - holding the catheter connector end above the level of the heart while it is open to the air creates a manometer effect, with fluid dropping to a level 8-10 cm above the Groshong valve at the tip of the catheter. Air will not enter the blood stream unless the valve has been propped open by a blood clot or drug precipitate, or the catheter tip has been placed where mechanical pressure forces the valve open.

5. Diffusion and evaporation of water through the external catheter segment due to silicone permeability. This may be noticed in the Groshong catheter because it is flushed less frequently than other silicone catheters.
   • Silicone has an open matrix which allows water vapor and gases to diffuse through the membrane.
   • The amount of diffusion that takes place is dependent on many factors. Therefore, not all patients with silicone catheters will demonstrate this phenomenon.
   • The air will stay in the catheter’s external segment. It does not extend below the level of the skin. The air can be aspirated once a week when routine flushing is done. There is no danger of air embolism from silicone permeability.

B. Possible Solutions

1. Check catheter for leakage by flushing well with normal saline.

2. Prefill injection cap with normal saline before attaching it to the catheter.
3. Check for loose connections (injection cap, IV tubing). Check for the presence of the oversleeve. If present, check for proper attachment of the catheter, the connector and oversleeve (see Connector Repair Procedure).

4. Perform procedures requiring the catheter to be opened to the air with the connector end below the level of the patient’s heart.

5. If the catheter is not damaged, aspirate the air and then irrigate the catheter with 10cc normal saline to flush out any aspirated blood. Air present in the catheter due to silicone permeability will only be present in the external catheter segment and will not migrate into the patient's bloodstream unless injected.

VII. Fluid Leakage from Catheter Exit Site

A. Possible Causes

1. Catheter punctured by sharp object (i.e. scalpel, suture needle, scissors) just prior to placement.

2. Catheter ruptured from attempt to irrigate an occluded catheter with a small syringe (i.e. 1cc or 3cc syringe).
   - Small syringes can generate very high internal pressures with very little manual force. The back pressure from an occlusion may not be felt when using a small syringe until the damage to the catheter has occurred.

3. Catheter may have become encapsulated by a fibrin sheath, which prevents infused fluid from entering the venous system. The fluid will then take the path of least resistance, flowing back along the outside of the catheter to the skin exit site.
4. Central vein thrombosis or tumor growth occluding the vein can cause infused fluid to flow back along the outside of the catheter to the skin exit site.

B. Possible Solutions

1. Slowly infuse 10cc of normal saline and observe for signs of fluid extravasation under the skin.

2. Obtain physician's order for a dye study through the catheter to determine path of fluid flow.

3. Remove the catheter if a leak is discovered inside the body. Please report such incidents to Bard Access Systems, Inc. (800-443-5505 - Field Assurance Dept.).

4. If a leak is discovered in the catheter outside the body, repair it following the Catheter Repair Procedure appropriate for the catheter type and the location of the damage.

References:

ChloraPrep One-Step Applicator Active Ingredients
- Chlorhexidine gluconate 2% w/v...antiseptic
- Isopropyl alcohol 70% w/w...antiseptic

Inactive Ingredients
- USP purified water

For further information or questions regarding ChloraPrep One-Step Applicator call: 1-800-523-0502 (8 a.m.-5 p.m. CST)

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

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GNXT1003


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