**Catheter Exchange**

1. Any damaged, ruptured, or leaking catheter must be replaced immediately to prevent blood loss and/or air embolus. The catheter should be clamped proximal to the damaged area close to the chest wall.

2. Place the patient in the Trendelenburg position. Prep the insertion site using standard surgical technique.

3. Enter the vein chosen for insertion of the catheter using the introducer needle and open sheath. (Refer to figure 4).

4. Advance the new catheter over the wire as instructed in the previous section, and remove the guidewire. (Refer to figure 5).

5. Suture the new catheter in place through the eyes of the suture wing. Alternatively, the suture wing may be fixed to the skin with tape or other means. (Refer to figure 6).

6. Enter the vein chosen for insertion of the catheter using the introducer needle and open sheath. (Refer to figure 4).

7. Advance the dilator over the wire until the catheter is completely advanced into the vein. (Refer to figure 7).

8. Remove the dilator and insert the catheter over the guidewire. (Refer to figure 8).

9. When the catheter is advanced, slowly pull the guidewire back into the needle hub. (Refer to figure 9).

10. Withdraw the needle (or sheath) while holding the guidewire in place. Maintain slight pressure on the puncture site after the needle is withdrawn. (Refer to figure 6).

11. To help avoid possible severing of the guidewire, do not withdraw the guidewire while withdrawing the needle.

12. Failure to follow the above guidelines in forming a subcutaneous tunnel may result in smooth passage of the cuff into the subcutaneous tunnel. (Refer to figure 10).

13. Note:

   Caution: If the artery is entered, withdraw needle and observe patient for signs of pneumothorax. (Refer to figure 3).

14. For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to prevent blood loss. (Refer to figure 11).

15. Thread the catheter over the guidewire and advance the catheter to the insertion site. (Refer to figure 12).

16. Withdraw and remove needle (or sheath) while holding the guidewire in place. (Refer to figure 13).

17. To help prevent advancement of the wire into the right atrium during insertion, pause at the appropriate position, or position the wire as the VitaCuff is being advanced until the catheter is fully inserted. Gentle counter traction on the skin may facilitate smooth passage of the catheter. (Refer to figure 14).

18. When the catheter has been inserted, hold it firmly in position and slowly withdraw the guidewire. (Refer to figure 15).

19. Check for blood return. Then flush the lumen(s) with heparin solution or normal saline to prevent air embolism. (Refer to figure 16).

20. If the catheter is in a large vein, the lumen(s) may be flushed by obstructing (plugging) the catheter and injecting fluid through the sheath over the needle, insert the assembly and withdraw the needle and syringe against back resistance. (Refer to figure 17).

21. Caution: The PowerHohn catheter is designed for use in large veins. Use of this product in small veins may result in smooth passage of the cuff into the subcutaneous tunnel. (Refer to figure 18).

22. Obtain a chest x-ray to confirm correct catheter position and absence of pneumothorax. (Refer to figure 19).

**References**


3. References


**Tunneling Procedure (If Applicable)**

1. Measure catheter against central vein and be sure that patient does not have deformed breast or limited range of motion. The catheter should be clamped proximal to the damaged area close to the chest wall.

2. Tunneling procedure: The PowerHohn catheter should be positioned to be the last. The sheath for the dual lumen catheter is atraumatic and may be inserted through the PowerHohn catheter. (Refer to figure 10).

3. Guide wire should be located inside the tunnel and pulled back to the point of maximum resistance. (Refer to figure 11).

4. The catheter should be clamped proximal to the damaged area close to the chest wall.

5. When the catheter is advanced, slowly pull the guidewire back into the needle hub. (Refer to figure 12).

6. The catheter should be clamped proximal to the damaged area close to the chest wall.

7. The catheter should be clamped proximal to the damaged area close to the chest wall.
**New Important Information:**

- **Central Venous Catheters** are designed for single use and should never be reimplanted. Reuse carries with it the attendant concern of cross-infection regardless of the cleaning or sterilization method.

**Warnings:**

- **PowerHohn** catheter indication for power injection of contrast media indicates the catheter is intended for use in conjunction with equipment capable of delivering high-speed, low-volume injections. The catheter should be used in a setting where the health status of a patient as it pertains to a power injection procedure.

**Precautions:**

- **General:**
  - Do not use a syringe smaller than 10 ml!
  - The patient should be in a supine position with the head of the bed elevated approximately 30 degrees to avoid blood loss from the subclavian vein.
  - Do not cut the catheter before removal from the vein to avoid catheter embolism.
  - Do not grasp the catheter with any instrument that might sever or damage the catheter.
  - There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.

**Indications for Use:**

- **PowerHohn** catheters are intended for use in the central venous system. They are designed for administering contrast media or injectable contrast media and are intended for single use. **VitaGuard** is designed for single use and should never be reimplanted.

**VitaGuard Antimicrobial Cuff**

- The **VitaGuard** cuff is designed to help protect the patient against infection. **VitaGuard** is sterilized at the factory using ethylene oxide gas and is packaged in a polyethylene pouch. **VitaGuard** is intended for single use and should never be reimplanted.

- The internal surface of the **VitaGuard** cuff is designed to allow tissue ingrowth. The **VitaGuard** cuff is indicated to reduce the incidence of infection when comparing high risk patients to low risk patients. The **VitaGuard** cuff is contraindicated for patients with known septicaemia or those at high risk of developing it.

**Warnings:**

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**Precautions:**

- **General:**
  - Do not use a syringe smaller than 10 ml!
  - The patient should be in a supine position with the head of the bed elevated approximately 30 degrees to avoid blood loss from the subclavian vein.
  - Do not cut the catheter before removal from the vein to avoid catheter embolism.
  - Do not grasp the catheter with any instrument that might sever or damage the catheter.
  - There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.

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**Precautions:**

- **General:**
  - Do not use a syringe smaller than 10 ml!
  - The patient should be in a supine position with the head of the bed elevated approximately 30 degrees to avoid blood loss from the subclavian vein.
  - Do not cut the catheter before removal from the vein to avoid catheter embolism.
  - Do not grasp the catheter with any instrument that might sever or damage the catheter.
  - There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
When inserting the catheter via a subclavian approach, maintain a horizontal trajectory when introducing the needle beneath the skin. The device is designed to help protect from infections related to central venous catheter placement.

Exceeding the maximum flow rate of 5ml/sec may result in catheter failure and/or catheter tip displacement.

The fluid level in the catheter will drop if the catheter connector is held above the level of the patient's heart and opened to air. To ensure proper patency of the catheter, the catheter connector must be kept below the heart level.

Central Venous Catheters are constructed of specially formulated and processed polyurethane and are designed for use in the central venous system. PowerHohn catheters are over-the-wire insertion into the central venous system. PowerHohn catheters are completely absorbed by the tissue in four to six weeks. (Refer to figure 1)

The device is comprised of two concentric layers of material. The internal layer is constructed of specially formulated and processed polyurethane. The outer layer of the device, whether a polyurethane or a collagen matrix, is determined at the catheter core. The activity tests are conducted with the catheter in a catheter core state. The collagen matrix occurs in a few days, further securing the catheter in place.

PowerHohn catheters is provided in a sterile package. Catheters are available with or without VitaCuff.

Caution:
• When using alcohol or alcohol containing antiseptics with polyurethane catheters, care should be taken to avoid prolonged or continuous use.
• There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
• There has been past irradiation of prospective insertion site.
• The patient’s body size is insufficient to accommodate the size of the implanted device.
• The device is contraindicated whenever:
  • There are abnormalities of the skin, subcutaneous tissue, bone, or structures adjacent to the area of proposed entry.
  • There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
  • There has been past irradiation of prospective insertion site.
  • The patient’s body size is insufficient to accommodate the size of the implanted device.
• Follow Universal Precautions when inserting and maintaining the catheter.
• Contrast media should be warmed before power injection to ensure that the catheter is not being pinched by the first rib and clavicle. 1,2 Follow Universal Precautions when inserting the needle and guidewire. 1,2
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Possible Complications
- Allergic Reaction to Silver or Collagen
- Air Embolism
- Catheter or Cuff Erosion Through Skin
- Cardiac Tamponade
- Bleeding
- Myocardial Erosion
- Hemothorax
- Fibrin Sheath Formation
- Thromboembolism
- Spontaneous Catheter Tip Malposition or Retraction

Precautions:
- Any procedure that would interfere with the effectiveness of the procedure should be avoided. 3
- Bacterial or other infections related to the catheterization should be ruled out prior to placing the catheter. 3
- The patient’s body size is insufficient to accommodate the size of the implanted device.
- The device is contraindicated whenever:
  • There are abnormalities of the skin, subcutaneous tissue, bone, or structures adjacent to the area of proposed entry.
  • There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
  • There has been past irradiation of prospective insertion site.
  • The patient’s body size is insufficient to accommodate the size of the implanted device.

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- Thromboembolism
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Precautions:
- Any procedure that would interfere with the effectiveness of the procedure should be avoided. 3
- Bacterial or other infections related to the catheterization should be ruled out prior to placing the catheter. 3
- The patient’s body size is insufficient to accommodate the size of the implanted device.
- The device is contraindicated whenever:
  • There are abnormalities of the skin, subcutaneous tissue, bone, or structures adjacent to the area of proposed entry.
  • There have been previous episodes of venous thrombosis or vascular surgical procedures at the prospective placement site.
  • There has been past irradiation of prospective insertion site.
  • The patient’s body size is insufficient to accommodate the size of the implanted device.
Warning:

Do not use the catheter if there is any evidence of mechanical damage or leaking. Damage to the catheter may lead to rupture, catheter failure.

VitaCuff Antimicrobial Cuff

Description

The VitaCuff* is a closed system designed to help prevent pressure against the skin at the site. The cuff is created from a porous collagen matrix. Tissue ingrowth into the VitaGuard porous collagen matrix occurs in a few days, further securing the seal. The VitaCuff Cuff is compatible with all products in the complete Bard Access Systems product line. The VitaCuff* Antimicrobial Cuff is indicated for short or long term access to the central venous system. They are designed for administration of fluids, blood, and medications. The VitaCuff is a closed system designed to help prevent pressure against the skin at the site. The cuff is created from a porous collagen matrix. Tissue ingrowth into the VitaGuard porous collagen matrix occurs in a few days, further securing the seal.

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New Important Information:

Warning:

Do not use the catheter if there is any evidence of mechanical damage or leaking. Damage to the catheter may lead to rupture, catheter failure.

Power injector machine pressure limiting feature may not prevent over pressurization of an injection site. Therefore, proper technique is necessary to avoid injury to the patient. Proper technique includes:

• Prior to placement:

- Catheter or Cuff Erosion Through Skin
- Hydrothorax
- Catheter-related Sepsis
- Risks Normally Associated with Local Anesthesia
- Phlebitis
- Venous Thrombosis
- Thromboembolism
- Pneumothorax

• When using percutaneous introducers:

- Catheter or Cuff Erosion Through Skin
- Hydrothorax
- Catheter-related Sepsis
- Risks Normally Associated with Local Anesthesia
- Phlebitis
- Venous Thrombosis
- Thromboembolism
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New Important Information:

Warning:

Do not use the catheter if there is any evidence of mechanical damage or leaking. Damage to the catheter may lead to rupture, catheter failure.
VitaCuff Antimicrobial Collar

**Indications for Use:**

The VitaCuff device is designed to help provide protection against infection related to catheter insertion. When inserted, the catheter is surrounded by a collar that contains an antimicrobial material which is attributable to the silver ions bound to the collagen matrix. The activity lasts over time with repeated and prolonged exposure.

- **Contraindications:**
  - Patients with thick muscular chest walls or extensive scar tissue may require the use of a percutaneous introducer for catheter placement.
  - Patients at increased risk of catheter insertion complications or infectious endovascular events.
  - Patients with any contraindication to the use of antibiotics.

- **Precautions:**
  - Consult the product label for complete information on recommended dosages.
  - Do not use the catheter if there is any evidence of mechanical damage or leaking.
  - Avoid accidental device contact with sharp instruments and mechanical damage to the catheter material. Use only smooth-touch, non-slip entry devices.
  - Fill (prime) the device with sterile heparinized saline or normal saline solution to help avoid air embolism.
  - Use only medical practitioners licensed by law, trained and experienced in proper positioning of catheters in the central venous system.

**Product Specifications:**

- Material: Polyurethane with a sterilized, hypoallergenic and non-pyrogenic antimicrobial collar.
- Catheter: Single-use, non-reusable, non-sterile, non-tapered, non-slip entry, non-metal catheter.
- Sterile: Supplied in a double sterile package and is non-pyrogenic. Do not use if package is damaged, opened or the expiration date has been exceeded.
- Sterile: Supplied in a double sterile package and is non-pyrogenic. Do not use if package is damaged, opened or the expiration date has been exceeded.
- **Note:**
  - This information does not imply appropriateness of the procedure for a particular patient. A suitably trained clinician is responsible for evaluating the need for and appropriateness of the procedure based on the patient's medical condition.
1. The procedure is performed using sterile surgical technique including the use of gloves, masks, gowns, and sterile drapes and equipment throughout all steps listed below.

2. Tunneling procedure.

3. Antimicrobial Cuff first enters the tunnel. (Refer to figure 9) Caution: Correct placement of this cuff should result in smooth passage of the cuff into the subcutaneous tunnel. Be certain that the VitaCuff is properly secured around the catheter between the tunneler body and large barb to hold it more securely. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large barb with a twisting motion.


5. Suture the new catheter in place through the eyes of the suture wing. Alternatively, the suture wing may be fixed to the catheter and wire assembly together as a unit until the catheter is completely inserted.

6. The subclavian veins and the internal and external jugular veins are the most common vessels used for central venous catheterization. When inserting the catheter via a subclavian approach, maintain a horizontal trajectory when introducing the needle beneath the clavicle. Vertical needle passage may make it more difficult to pass the catheter and wire assembly through the vessel.

7. Caution: This part of the procedure with the patient performing the Valsalva maneuver. (Refer to figure 5) To help prevent advancement of the wire into the right atrium during insertion, pause at least twice and pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.

8. To avoid advancement of the wire into the right atrium during insertion, pause at least twice and pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.

9. Insert tapered end of the tip straightener into the needle (or sheath). Advance the guidewire to the superior vena cava. (Refer to figure 5) Caution: If the guidewire is not advanced quickly, it may also facilitate smooth catheter passage. (Refer to figure 9)

10. If the guidewire is not advanced quickly, it may also facilitate smooth catheter passage. (Refer to figure 9) Caution: The guidewire should not result in smooth passage of the cuff into the subcutaneous tunnel. Be certain that the VitaCuff is properly secured around the catheter between the tunneler body and large barb to hold it more securely. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large barb with a twisting motion.

11. A skin nick may be made adjacent to the insertion site to facilitate tip insertion.

12. The guidewire should not result in smooth passage of the cuff into the subcutaneous tunnel. Be certain that the VitaCuff is properly secured around the catheter between the tunneler body and large barb to hold it more securely. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large barb with a twisting motion.

13. The Power of Purple* Central Venous Catheter Placement Procedure

14. Administer local anesthesia at the venous entry site, the underlying subcutaneous tissue, and where the needle will pierce the skin. (Refer to figure 7) Caution: Do not enter the pleural space during the injection of local anesthetic as this may cause pneumothorax. (Refer to figure 7)

15. The catheter is advanced a short length beyond the point of the tip straightener. Hold the catheter and guidewire together as a unit and advance until the catheter tip emerges from the subcutaneous tunnel. Caution: Be certain that the VitaCuff is properly secured around the catheter between the tunneler body and large barb to hold it more securely. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large barb with a twisting motion.

16. The catheter is advanced a short length beyond the point of the tip straightener. Hold the catheter and guidewire together as a unit and advance until the catheter tip emerges from the subcutaneous tunnel. Caution: Be certain that the VitaCuff is properly secured around the catheter between the tunneler body and large barb to hold it more securely. Barb threads must be completely covered by the catheter tip to adequately secure the catheter as it is pulled through the tunnel. A suture may be tied around the catheter between the tunneler body and large 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. A suture may be tied around the catheter between the tunneler body and large barb with a twisting motion.

17. To help prevent advancement of the wire into the right atrium during insertion, pause at least twice and pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.

18. To help prevent advancement of the wire into the right atrium during insertion, pause at least twice and pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.

19. Pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.

20. Suture the catheter in place by passing the suture through the eyes of the catheter and wire assembly. (Refer to figure 9) Caution: This part of the procedure with the patient performing the Valsalva maneuver. (Refer to figure 5) To help prevent advancement of the wire into the right atrium during insertion, pause at least twice and pull the wire back while stabilizing the catheter. Then continue to advance the catheter and wire assembly together as a unit until the catheter is completely inserted.
1. Place the patient in the Trendelenburg position. Position the monitor close to the patient. The monitor should be in sight of the nursing team and the family.

2. Prepare the site for insertion using sterile surgical techniques. The patient should be draped to expose the chest and underarms. The site should be cleansed with chlorhexidine gluconate or povidone-iodine solution. The skin should be dried and draped to expose the site for insertion.

3. After the skin is prepared and draped, the area is sterilized with alcohol. The catheter is inserted using aseptic technique. The catheter is introduced through the skin and into the vein. The needle is withdrawn, and the catheter is advanced into the vein. The catheter is secured in place with tape or sutures. The patient is monitored for any signs of infection or complications.

4. Check the catheter placement by aspirating blood and flushing the catheter with normal saline. The catheter should be flushed with saline every 8 hours to prevent clot formation and to maintain patency. The catheter should also be flushed with heparin after IV administration of TPN, IV fluids, or after medications.

5. The catheter is removed when no longer needed or when the catheter becomes infected. The catheter is removed by withdrawing the catheter from the vein and applying pressure to the site. The site is cleansed and dressed with an antimicrobial agent.

6. To help avoid possible severing of the guidewire, do not withdraw the guidewire until the catheter is fully inserted. Gentle counter traction on the skin may facilitate smooth passage of the catheter into the vein. The guidewire must extend out from the luer adapter.

7. Caution: For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to prevent withdrawal. The catheter may become entangled in the guidewire if it is withdrawn from the vein without clamping the catheter.

8. Advance the catheter and wire assembly together as a unit with a rotational motion. This will help prevent advancement of the wire into the right atrium during insertion. To help prevent advancement of the wire into the right atrium during insertion, pause at the wire in the right atrium.) Gently holding the catheter and wire together, direct the catheter tip to the venous entrance. Catheter is directed to the correct venous entrance using system or long forceps. (Refer to figure 9)

9. To help prevent advancement of the wire into the right atrium during insertion, pause at the wire in the right atrium. The catheter is advanced until the catheter tip is in the correct venous entrance. The catheter is advanced to the correct venous entrance using system or long forceps. (Refer to figure 9)

10. Withdraw and remove needle (or sheath) while holding the guidewire in place. Maintain gentle traction on the guidewire during withdrawal. (Refer to figure 9)

11. Insert the catheter and guidewire into the vein. The guidewire is gently advanced to the venous entrance site. The guidewire is advanced into the vein until the guidewire is in the correct venous entrance. The guidewire is advanced to the venous entrance using system or long forceps. (Refer to figure 9)

12. Check for blood return. Then flush the lumen(s) with heparin solution or normal saline. The catheter is flushed with saline every 8 hours to prevent clot formation and to maintain patency. The catheter is flushed with heparin after IV administration of TPN, IV fluids, or after medications.

13. Place the patient in the Trendelenburg position. Position the monitor close to the patient. The monitor should be in sight of the nursing team and the family.

14. For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to prevent withdrawal. (Refer to figure 9)

15. Caution: For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to prevent withdrawal. The catheter may become entangled in the guidewire if it is withdrawn from the vein without clamping the catheter. (Refer to figure 9)

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18. Withdraw and remove needle (or sheath) while holding the guidewire in place. Maintain gentle traction on the guidewire during withdrawal. (Refer to figure 9)

19. Insert the catheter and guidewire into the vein. The guidewire is gently advanced to the venous entrance site. The guidewire is advanced into the vein until the guidewire is in the correct venous entrance. The guidewire is advanced to the venous entrance using system or long forceps. (Refer to figure 9)

20. Caution: For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to prevent withdrawal. The catheter may become entangled in the guidewire if it is withdrawn from the vein without clamping the catheter. (Refer to figure 9)

21. Cleanse and dress insertion site according to approved technique. (Refer to figure 10)
When device.

Do not attempt to slide the catheter over the wire separately into the vein. This antimicrobial cuff: use the supplied scalpel, if needed, to make Antimicrobial Cuff should be positioned in the tunnel. The cuff will be less promi-

For frequently accessed catheters (accessed at least every 8 hours), flushing with 5 ml of normal saline without heparin Catheter Separation", JPEN, Vol. 9, No. 6, Nov./Dec. 1985, pp. 754-757.

14. For the dual lumen catheter, clamp and attach an end cap to the one luer adapter to

16. Advance the catheter and wire assembly together as a unit with a rotational motion. This

15. Thread the catheter over the guidewire and advance the catheter to the insertion site. Caution: avoid advancement until the catheter is fully inserted. Gentle counter traction on the skin avoid possible air embolus.

17. To help prevent advancement of the wire into the right atrium during insertion, pause at

18. When the catheter has been inserted, hold it firmly in position and slowly withdraw the

19. Insert tapered end of the tip straightener into the needle (or sheath). Advance the

20. Suture the catheter in place by passing the suture through the eyes of the catheter

22. Obtain a chest x-ray to confirm correct catheter position and absence of pneumothorax.

References