PURPOSE:
To repair a damaged central venous catheter (CVC) and prevent needle less catheter replacement, interruption of therapy and physical harm to the patient.

CONSIDERATIONS:
1. All types of catheter repair MUST be done using strict aseptic technique.
2. Damage less than 6 inches from the chest wall CANNOT be repaired. The catheter should be replaced.
3. With time and extended use, a CVC may:
   a. Rupture due to excessive pressure exerted upon the walls of the catheter.
   b. Develop cracks or splits in the silicone material due to age or use of drying agents, such as alcohol or acetone. [NOTE: Acetone is never to be used with a silicone catheter.]
   c. Leak from hole in the catheter caused by an accidental needle puncture.
   d. Break at the distal end due to excessive tension exerted during every day activities.
   e. Be accidentally cut or nicked with scissors. [NOTE: Scissors are never to be used around catheters.]
4. Three types of repair can be performed:
   a. Replacing broken catheter hub.
   b. Patching small holes in catheter body.
   c. Replacing one lumen of a double-lumen catheter.
5. Repair kits are available for each type of external CVC and are specific to the catheter type and size.
6. Upon admission for homecare, the nurse should:
   a. Measure external portion of catheter.
   b. Establish type of catheter being used.
   c. Establish type of repair kit needed. [NOTE: Documentation of a, b, and c should be in the patient's record at all times for reference.]
7. Registered nurses working for the homecare agency MUST meet the following criteria before being allowed to repair a CVC:
   a. Designated agency intravenous (IV) nurse.
   b. Demonstrated evidence of knowledge and competency in the care of central venous access devices.
   c. Observed competence in the care of central venous access devices.
8. When repairing one lumen of a double-lumen catheter, DO NOT damage the Y-connector portion of the catheter. The catheter would have to be replaced if the Y-connector is damaged.

REPAIRING TORN AREA OF CATHETER EQUIPMENT:
The following equipment is for repair of a tunneled catheter, e.g., Hickman, Broviac.
   Sterile gloves (2 pair)
   Alcohol applicator (wipe/swab/disk/ampule)
   Antimicrobial applicator (wipe/swab/disk/ampule)
   Sterile drape or towel
   Catheter Repair Kit - size appropriate for patient's catheter, HEMED REPAIR KIT (For Hickman, tunneled catheter)
   Non-serrated, smooth-edged clamp
   Heparin solution (100 units/mL or as prescribed)
   22-gauge needle or needle less adaptor
   10 mL syringe
   Puncture-proof container
   Impervious trash bag

PROCEDURE:
1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface close to patient.
4. Place patient in comfortable position, making sure that site is accessible.
5. Ensure adequate lighting.
6. Assess catheter damage and then clamp catheter with a smooth-edged clamp between damaged area and catheter exit site at least 2 1/2 inches from damaged area.
7. Open packages for easy access to supplies.
8. Don sterile gloves.
9. Use sterile drape or towel to create sterile field in work area.
11. Place sterile drape or towel underneath catheter.
12. Using the sterile knife in repair kit, carefully cut the catheter at a 90 degree angle just distal to the damaged area allowing at least 2 1/2 inches between cut end and catheter clamp. Discard damaged part of catheter.
13. Slide boot dilator assembly onto the remaining catheter, tapered end first.
14. Grasp dilator handle with one hand and the silicone boot and silicone tubing with the other hand. Remove dilator while holding the boot, leaving boot on the catheter. Hold the boot at the widest end.
15. Slide locking sleeve over catheter tubing with the notched end away from the boot.
16. Slip catheter tubing onto repair adapter connector on the catheter repair assembly. Tubing should be positioned approximately halfway up the adaptor.
17. Slide locking sleeve onto adapter until it is against flange. The locking sleeve will pull the catheter tubing over the flange (a slight twisting motion will assist in placement).
18. Slide boot over the sleeve and flange and adjust for snug fit (a slight twisting motion will aid in obtaining a snug fit).
19. Grasp repaired portion with one hand, silicone tubing close to chest wall with the other hand, and pull GENTLY to remove any kinks in the tubing under the boot.
20. Aspirate repaired catheter to remove any air, and assess for possible catheter occlusion. Flush catheter with heparin solution in prescribed volume, if necessary.
21. Discard soiled supplies in appropriate containers.

REPLACING THE CATHETER HUB

EQUIPMENT:
- Sterile gloves (2 pair)
- Sterile towel or drape
- Alcohol applicator (wipe/swab/disk/ampule)
- Antimicrobial applicator (wipe/swab/disk/ampule)
- Non-serrated, smooth-edged clamp
- Sterile hub
- Injection port
- 22-gauge needle or needle less adaptor
- 5 mL syringe
- Heparin solution (100 units/mL or as prescribed)
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface close to the patient.
4. Place patient in comfortable position, making sure site is accessible.
5. Ensure adequate lighting.
6. Assess catheter damage, and clamp catheter with a smooth-edged clamp between damaged area and catheter exit site at least 2 1/2 inches from damaged area.
7. Open packages for easy access to supplies.
8. Don sterile gloves.
9. Use sterile drape or towel to create sterile field in work area.
11. Place sterile drape or towel under catheter. 
13. Remove the old catheter hub and injection port by GENTLY twisting and pulling while holding the catheter firmly.
14. Twist the new hub and injection port into the distal end of the catheter.
15. Unclamp the catheter and flush with heparin solution in the prescribed amount. Check for leaks while flushing.
16. Discard soiled supplies in appropriate containers.

REPAIRING SMALL HOLES IN CATHETER

EQUIPMENT:
- Sterile gloves
- Sterile towel or drape
- Alcohol applicator (wipe/swab/disk/ampule)
- Antimicrobial applicator (wipe/swab/disk/ampule)
- Silicone type A adhesive
- 1-inch piece vinyl tubing (2)
- Non-serrated, smooth-edged clamp
- Heparin solution (100 units/mL or as prescribed)
- 22-gauge needle or needle less adaptor
- 5 mL syringe
- Puncture-proof container
- Impervious trash bag

PROCEDURE:
1. Adhere to Standard Precautions.
2. Explain the procedure and purpose to the patient/caregiver.
3. Assemble the equipment on a clean surface close to the patient.
4. Place patient in comfortable position, making sure site is accessible.
5. Ensure adequate lighting.
6. Assess catheter damage, and clamp catheter with a smooth-edged clamp between damaged area and catheter exit site at least 2 1/2 inches from damaged area.
7. Open packages for easy access to supplies.
8. Don sterile gloves.
9. Use sterile drape or towel to create sterile field in work area.
11. Place sterile drape or towel underneath catheter.
12. Open one piece of vinyl tubing lengthwise.
14. Place sterile drape or towel underneath catheter.
15. Attach new injection port to the new hub. Prime hub with heparin solution.
16. Remove the old catheter hub and injection port by GENTLY twisting and pulling while holding the catheter firmly.
17. Discard soiled supplies in appropriate containers.

[Note: Pressure from the vinyl tubing sleeves will distribute the adhesive evenly and prevent it from touching the patient’s skin. Once the adhesive is dry, the sleeves can be left in place or removed. The adhesive will not bond to the vinyl and removal is effortless.]
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16. Place tubing over first piece of tubing, covering the split. This will seal and reinforce the repaired area while the adhesive is drying.

17. Unclamp the catheter and GENTLY try to aspirate and then flush with heparin solution in the prescribed amount. If resistance is met, STOP. Forcing the solution can damage the repair. If the catheter is clotted, wait at least 4 hours until the adhesive sets before using a declotting or fibrinolytic agent.

[Note: Manipulate and instill the fibrinolytic agent GENTLY after 4 hours to prevent the repair from separating.]

18. Discard soiled supplies in appropriate containers.

AFTER CARE:

1. Order a replacement repair kit for the home.

2. Document in the patient’s record:
   a. Date, time, procedure and observations.
   b. Type of repair kit used.
   c. Amount and strength of heparin flush.
   d. Patient’s response to procedure.
   e. Instructions given to patient/caregiver.
   f. Communication with physician.

REFERENCES:

Centers for Disease Control and Prevention (CDC), Guidelines for the Prevention of Intravascular Catheter-Related Infections