COMMON COMPLICATIONS:
- Septicemia
- Thrombophlebitis
- Infections
- Pulmonary embolus
- Nerve damage
- Anaphylaxis
- Pericardiocentesis
- Aneurysm
- Allergic reactions
- Local infections
- Hypocomplementemia
- Flesh-eating bacteria

CATHETER PRECAUTIONS:
- Small syringes will generate excessive pressure and may damage the catheter.
- The use of 10cc or larger syringes is recommended.
- Do not use sharp instruments near the extension lines or catheter lumens.
- Do not use scissors to remove dressing.
- Examine catheter lumen and extension(s) before and after each infusion for damage.
- To prevent accidents, assure the security of all caps and connections prior to and between treatments.
- Use only Luer Lock (threaded) Connectors with this catheter.
- Repeated over tightening of Luer lock connections, syringes and accessories can cause fractures in the connector and can lead to potential embolism.
- Confirm catheter tip position by x-ray prior to use. Monitor tip placement routinely per institution policy.
- The presence of air is a barrier to infection. Strict aseptic technique must be utilized during all actuations and cap changes. A sterile end cap should be applied to the hub of the catheter to prevent contamination when not in use.

INSERTION SITES:
- The basilar, median cubital, or cephalic vein may be catheterized. The basilar vein is the preferred site.

POTENTIAL COMPLICATIONS:
- Bleeding
- Bruising
- Needle block
- Thrombophlebitis
- Intravascular air
- Venous access
- Thrombus formation
- Hematoma
- Cardiac Tamponade
- Air Embolism

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Flush the catheter after every use or at least weekly when not in use. Use a 10cc or larger syringe.

The catheter should be flushed with normal saline prior to drug administration to verify patency.

After drug administration each lumen should be flushed with a minimum of 10cc of normal saline, using a "pulse" or "stop/ start" technique to maintain patency. Use of heparinized saline to lock each lumen of the catheter is optimal.

Always remove syringes slowly while injecting the last 0.5 ml of saline.

Apply a sterile end cap on the catheter hub to prevent contamination when not in use.

To help prevent a drop in the fluid volume (allowing air entry) while changing injection caps, hold the connector below the level of the patient's heart before removing the injection cap.

**Caution:** When maintained in accordance with these instructions, the Vasu-PECC® with valve technology does not require the use of heparinized saline to lock the catheter lumen. However, use of heparinized saline will not be necessary based on patient status or use of alternative flushing and locking techniques.

**Injection Caps** - Injection caps or needless access ports should be changed per institutional policy. If using the supplied needless access ports, do not exceed 100 actuators.

### CATHETER PERFORMANCE

- Occluded/Partially Occluded Catheter - If resistance is encountered to aspirating or flushing, the lumen may be partially or completely occluded.

**Warning:** Do not flush against resistance.

- If the lumen will neither aspirate nor flush, and it has been determined that the catheter is occluded with blood, follow institutional declotting procedure.

### INFECTION

**Caution:** Due to risk of exposure to HIV or other blood borne pathogens, health care personnel should always use Universal Blood and Body Fluid Precautions in the care of all patients.

- Sterile technique should always be strictly adhered to.
- Clinically recognized infection should be treated promptly per institutional policy.

### CATHETER REMOVAL

**Warning:** Only a clinician familiar with the appropriate techniques should attempt the following procedures.

**Caution:** Always review facility protocol potential complications and their treatment, warnings, and precautions prior to catheter removal.

1. Wash hands, gather equipment.
2. Remove old dressing and inspect insertion site for redness, tenderness, and drainage.
3. Grasp catheter near insertion site and using a slow steady motion, remove catheter from vein.
4. If resistance is felt - STOP. Retape the catheter and apply a warm compress to the extremity for 20-30 minutes.
5. Remove residual procedure. If catheter remains "stuck" follow institutional policy for further intervention.
6. Apply pressure, if necessary, until bleeding stops and dress site following institutional policy.

**Note:** Inspect catheter and measure length. It must be equal to baseline measurement taken when the catheter was inserted.

### ALTERNATE INSERTION TECHNIQUE USING STIFFENING STYLET AND SIDEPORT ADAPTER

**PREPARE CATHETER**

1. Preflush catheter, sideport adapter, and needless access ports.
2. Carefully insert wire stylet through hole in blue cap of sideport adapter and down into catheter lumen.
3. Attach saline filled syringe to luer of sideport adapter and flush adapter and catheter. Clamp sideport extension and remove syringe. If using multi-lumen catheter, attach needless access port to remaining extension. Attach saline filled syringe to the needless access port and completely flush catheter lumen. Remove syringe from needless access port prior to clamping extension. Further remove needless access port and set aside.

**Caution:** The needless access port should not be used with needles, blunt canulae, or other non-luer connectors, or luer connectors with visible defects. If needle access is attempted, it may damage valve. Do not exceed 100 actuators.

**INSERTION**

2. Strict aseptic technique must be used during insertion, maintenance, and catheter removal procedures. Provide a sterile operative field. Use sterile drapes, instruments, and accessories. Perform surgical scrub. Wear gown, cap, gloves, and mask.
3. Apply tourniquet to arm above anticipated insertion site to distend the vein.
4. Insert the introducer needle with attached syringe into the target vein. Aspire to insure proper placement. Release tourniquet.
5. Remove the syringe and place thumb over the end of the needle to prevent blood loss or air embolism. Draw the flexible end of marked 018” guidewire back into advance so that only the end of the guideewire is visible. Insert the operator's distal end into the needle hub. Advance guidewire with forward motion into and past the needle hub into the target vein.

**Caution:** The length of the wire inserted is determined by the size of the patient. Monitor patient for arrhythmia throughout this procedure. The patient should be placed on a cardiac monitor during this procedure. Cardiac arrhythmias may result if guidewire is allowed to pass into the right atrium. The guidewire should be held securely during this procedure.

6. Remove needle, leaving guidewire in the target vein. Thread sheath/dilator over the proximal end of the guideewire into target vein.
7. Advance the guidewire until it reaches the caudal atrial junction. Once the guideewire is in place, measure the depth of the guidewire by reading the markings on the wire. Remove the guidewire leaving the sheath and dilator in the vein.
8. Reattach the needleless access port to remaining saline filled syringe. If using multi-lumen catheter, reattach needless access port to remaining extension.

**Caution:** Do NOT bend the sheath/dilator during insertion as bending will cause the sheath to prematurely tear. Hold sheath/dilator close to the tip (approximately 3cm from tip) when initially inserting through the skin surface. To progress the sheath/dilator towards the vein, regrasp the sheath/dilator a few centimeters (approximately 3cm) above the original grasp location and push down on the sheath/dilator. Repeat procedure until sheath/dilator is fully inserted.

**Caution:** Never leave sheath in place as an intervening catheter. Damage to the vein will occur.

9. Loosen locking collar of sideport and withdraw stylet back beyond the catheter is to be trimmed by at least 1¼ inch (3cm). Cut catheter to length determined by marked guidewire.

**Note:** Never attempt to cut stylet.

10. Always withdraw stylet back beyond tip of the catheter prior to insertion.
11. Once proper catheter length and stylet position has been achieved, tighten locking collar to keep stylet in place.
12. Remove dilator from sheath.
13. Insert distal tip of catheter into and through the sheath until catheter tip is correctly positioned in the target vein.
14. Remove the tear-away sheath by slowly pulling it out of the vessel while simultaneously sheathing the sheath by grasping the tabs and pulling them apart (a slight twisting motion may be helpful).

**Caution:** Do not pull apart the portion of the sheath that remains in the vessel. To avoid vessel damage, pull back the sheath as far as possible and remove the sheath only few centimeters at a time.

15. Make any adjustments to catheter under fluoroscopy.

**Note:** Do not clamp the lumen portion of the catheter.

16. Loosen locking collar of sideport. Remove the syringe by applying gentle pressure with one hand above the insertion site while grasping the stylet with the other hand and slowly pulling back with a constant motion. Remove sideport adapter and replace with needless access port. Attach saline filled syringe to needless access port, aspirate lumen and then irrigate with saline.

**Caution:** If difficulty and/or bunching of the catheter lumen are experienced while removing the stylet, additional flushing of the catheter may be helpful. The catheter may need to be repositioned to allow for removal of the stylet.

**Caution:** Do not attempt to reinsert stylet once it has been withdrawn.