Methods to Prevent Health Care Acquired Intravascular Device Associated Infections

Purpose: To provide health care practitioners who insert and maintain intravascular catheters with recommendations to reduce the incidence of intravascular device associated infections.

I. Health Care Worker Education and Training

A. Ongoing education and training of health care workers regarding indications for the use intravascular devices, procedures for the insertion and maintenance of intravascular devices, and appropriate infection control measures to prevent intravascular device associated infections is provided through MED, CED, unit competency training, or other methods determined by the unit supervisor.

B. Only practitioners who have been trained and exhibit competency in the insertion of intravascular devices shall insert or supervise trainees who perform intravascular line insertions. Personnel inserting, assisting or managing patients with intravascular lines shall be trained and exhibit competency in University Health Shreveport guidelines regarding all intravascular line insertion and maintenance.

II. Hand Hygiene

A. Hands shall be cleaned using an antiseptic-containing product (chlorhexidine or a waterless alcohol based product) before palpating, inserting, changing, or dressing any intravascular catheter.

B. Prior to central venous line (CVL) insertion the physician shall perform a surgical hand scrub in accordance with Infection Control Guideline IC 2.0, Hand Hygiene, using chlorhexidine for 6 minutes, Iodophor for 5 minutes, or Avagard surgical scrub in accordance with manufacturer’s instructions. Reference: http://www.sh.lsuhsc.edu/policies/policy_manuals_vis_ms_word/infection/IC%20%202.0.pdf

III. Skin Prep

A. For central venous and arterial line insertion, the patient’s skin shall be prepped with Chloraprep or CHG (Chlorhexidine gluconate) unless contraindicated (allergy). Any other contraindication shall be documented by the attending physician on the Invasive Procedure Progress Note. A mask and sterile gloves shall be worn while performing the skin prep. Follow Infection Control Guideline 22.0: Skin Preparation for Invasive Procedure: http://www.sh.lsuhsc.edu/policies/policy_manuals_vis_ms_word/infection/IC%2022.0.pdf

B. Chloraprep or 70% alcohol shall be used to prep skin for peripheral venous line insertion.
C. Do not palpate the insertion site after the skin has been cleansed with the antiseptic. (This does not apply to maximum barrier precautions during which the operator is working in the sterile field).

D. Do not apply topical antimicrobial ointment to the insertion site.

IV. Barrier Precautions during Catheter Insertion and Care.

A. Clean gloves shall be worn when inserting a peripheral venous catheter.

B. Maximum sterile barrier precautions shall be used during all central venous line insertions. Maximum sterile barrier precautions include using aseptic technique and:
   1. Inserting physician and those assisting must wear a cap, mask, sterile gown, and sterile gloves.
   2. All personnel present for the procedure, but not scrubbed in, shall wear a hat and mask.
   3. The patient shall be draped from head to toe with a large sterile drape.
   4. A sterile plastic sleeve shall be used to protect pulmonary artery catheters during insertion.
   5. If ultrasound is used, a sterile protective sleeve shall be placed on the probe.

V. Selection of Catheter Insertion Site

A. Peripheral Catheters:
   1. In adults, use an upper-extremity site rather than lower-extremity site for peripheral catheter insertion, whenever possible.
   2. Replace a peripheral catheter inserted in a lower-extremity site to an upper-extremity site as soon as possible.
   3. In pediatric patients, the hand, the dorsum of the foot, or scalp can be used as the peripheral catheter insertion site, in preference to a leg, arm, or antecubital fossa site.

B. Central Venous Line (CVL): The inserting practitioner shall weigh the risks and benefits of placing a CVL at a recommended site to reduce infectious complications against the risk of mechanical complications (e.g. pneumothorax, subclavian artery puncture, air embolism, catheter misplacement). The inserting practitioner shall choose the location for the catheter which is most appropriate for the patient.
   1. The CDC recommends the subclavian site rather than a jugular or a femoral site in adult patients to minimize infection risk for non-tunneled central line placements. If a femoral site is used, the inserting practitioner shall document their rationale for this selection in the Procedure Progress Note.
   2. The CDC recommends placing catheters used for hemodialysis and pheresis in a jugular or femoral vein rather than a subclavian vein to avoid stenosis if catheter access is needed.
   3. Cut-down procedures shall not be routinely used as a method to insert a catheter.
VI. Catheter Selection

A. Select a device with the lowest relative risk of complications (infectious versus non-infectious) for the anticipated type and duration of intravenous (IV) therapy.
B. Decisions regarding the type of device should be determined on an individual patient basis.
C. When possible, use a single-lumen central venous line unless multiple ports are essential for the management of the patient.
D. Use either a peripherally inserted central venous line or a tunneled catheter (e.g., Hickman or Broviac) or implantable access devices for younger pediatric patients (age≤4) who require long-term vascular access.
E. Where available, the use of an antimicrobial-impregnated central venous line is recommended.

VII. Insertion Site Assessment

A. The insertion site will be assessed at least every shift by nursing for signs of infection (warmth, tenderness, redness, drainage at the insertion site) and to ensure that the dressing is clean, dry, and intact.
B. Large bulky dressings shall be removed to facilitate daily insertion site assessment. Wearing clean gloves, remove the old dressing and visually inspect the insertion site. Using sterile technique, clean the site and apply a new sterile dressing.
C. The physician shall assess central line insertion site daily. Physician assessment includes inspecting the presence and location of the CVL, continued need for CVL, and signs/symptoms of infection. Signs and symptoms of infection include increased WBC count or very low WBC count with no other known cause, fever, redness, swelling, tenderness, or purulent drainage from the insertion site.
D. Record the date and time of catheter insertion in obvious location on the dressing and on the documentation flowsheet (IV Assessment) in EPIC.

VII. Catheter Site Dressing

A. Use a semi-permeable transparent dressing to cover the catheter site. If a semi-permeable transparent dressing will not stay in place, then the use of a sterile gauze pad is acceptable.
B. Dressing changes will be performed using sterile technique.
C. Chloraprep, unless contraindicated, shall be used to prep the insertion site during dressing changes. Chloraprep shall be allowed to dry before dressing is applied. Refer to Nursing Policy C-30.
D. Transparent dressings will be changed every week, regardless of day of CVL insertion or previous dressing change. Dressings must be changed more often if damp, loosened, soiled or when removal for inspection of the site is necessary. In pediatric patients in whom the risk for dis-lodging the catheter outweighs the benefit of changing the dressing, the dressing may be changed less frequently than every week. If dressing changes are not performed every week, the benefit vs. risk must be documented.

E. Replace gauze dressing whenever damp, loosened, or soiled or when inspection of the site is necessary. Sterile gauze dressings will be changed at least every 2 days, except in those pediatric patients in which the risk for dislodging the catheter outweighs the benefit of changing the dressing. If dressing changes are not performed at least every 2 days, the benefit vs. risk must be documented.

F. A Biopatch chlorhexidine sponge dressing will be used at the insertion site unless contraindicated. Contraindications include allergy or birth weight less than 1000 grams.

G. Document dressing change on the documentation flowsheet (IV Assessment) in EPIC. Label the dressing with date of dressing change and the initials of the nurse changing the dressing.

IX. Replacement of Catheter

A. In adults replace short peripheral venous catheters and change peripheral venous sites every 96 hours to minimize the risk of phlebitis. Remove and change site of insertion when signs and symptoms of infection are present, (i.e. warmth, tenderness, erythema or tenderness at the insertion site).

B. Peripheral venous lines in children may be left in place until IV therapy is completed unless complications (e.g. phlebitis, infiltration) occur.

C. Do not routinely replace central venous lines, PICC, hemodialysis or pulmonary artery devices, midline catheters, nontunneled central venous catheters, or peripheral arterials catheters as a method to prevent catheter-associated infections.

D. The frequency of replacement of peripherally inserted central venous catheters and totally implantable devices are a physician decision.

E. If feasible, replace the arterial catheter introducer sheath every 7 days even if the catheter has been removed.

F. When adherence to aseptic technique cannot be ensured during insertion (i.e. when CVL is inserted during a medical emergency), the CVL shall be replaced as soon as possible, and no longer than 24 hours. Exceptions must be documented for cause, such as medical instability or lack of alternative site.

G. The catheter tip shall only be sent for culture and sensitivity when ordered by the attending physician and only personnel specifically trained in obtaining a sterile CVL tip culture shall perform the procedure.

H. Catheter exchange over guide wire:
   1. Use guide wire assisted catheter exchange to replace a malfunctioning catheter
or convert an existing catheter if there is no evidence of infection at the catheter site.

2. Do not use guide wire-assisted catheter exchange whenever catheter associated infection is suspected or known, unless the attending physician documents on the daily progress note medical necessity for continuing use of the site. It is recommended that a new insertion site and a new catheter be used when central line associated infection is suspected or known.

X. Replacement of Administration Sets and Intravenous Fluids Administration Sets: Administration sets include the area from the spike of the tubing entering the fluid container to the hub of the vascular device.

A. Replace IV tubing, including piggyback/secondary tubing, stopcocks, and needless connectors (ports) every week or when contamination occurs. EXCEPTION:
   1. NICU will change administration sets/tubing every 72 hours.
   2. Administration set/tubing for any medication with lipid product (i.e. TPN, lipids, propofol) and blood products will be changed as per specific policy or medication package insert.
      See Nursing Policy C-30, H-35, and P-35.

B. All tubing will be primed using aseptic technique.
C. Scrub the Hub: Scrub the catheter ports vigorously with Chloraprep SEPP or sterile 70% alcohol pad and allow the solution to dry before accessing the port with IV tubing or a syringe.
D. When administration set/tubing has been replaced, it should be labeled with date, time, and nurse’s initials.
E. IV administration sets and needless devices are aseptically maintained between medication doses. When the technique of looping the end of the IV tubing to a side port is used, ensure that before the end is inserted into the side port, the side port is cleansed with Chloraprep SEPP or 70% alcohol and the solution is allowed to dry before accessing the port.
F. A new sterile end cap should be placed on all piggyback/secondary IV tubing when not connected to the catheter.
G. Do not use filters routinely for infection control purposes.
H. A designated port should be used for hyperalimentation only. Do not use the designated hyperalimentation port for other purposes such as administration of fluids, blood, or blood products.

XI. Parenteral Fluids

A. Intravenous fluids other than parenteral nutrition should be changed at a maximum of 24 hours.
B. Complete infusions of lipid parenteral nutrition fluids (e.g. 3-in-1 solutions) within 24 hours of hanging the fluid.

C. Complete the infusion of lipid emulsions alone within 12 hours of hanging the emulsions. If volume considerations require more time, the infusion should be completed with 24 hours.

D. Do not use parental nutrition catheters for purposes other than hyperalimentation (e.g. administration of fluids, blood/blood products).

E. If a multi-lumen catheter is used to administer parenteral nutrition, designate one port for hyperalimentation. Do not use the designated hyperalimentation port for other purposes (e.g. administration of fluids, blood or blood products).

F. Complete infusions of blood or other blood products within 4 hours of hanging the blood.

XII. Additional Recommendations

A. Central Venous Hemodialysis Catheters
   1. Use cuffed central venous catheters for hemodialysis if the period of temporary access is anticipated to be greater than one month.
   2. Use hemodialysis catheters in compliance with Nursing Policy C-30 and Renal Special Care Unit Policy: Care of the Chronic Tunneled Central Venous Hemodialysis & Apheresis Catheters.
   3. Restrict manipulation of the hemodialysis catheter, including dressing changes, to trained dialysis personnel in accordance with Nursing Policy C-30 and Renal Special Care Unit Policy: Care of the Chronic Tunneled Central Venous Hemodialysis & Apheresis Catheters.

B. Pressure Monitoring Device
   1. Use disposable, rather than reusable, transducer assemblies when possible.
   2. Replace disposable or reusable transducers and other components of the system, including the tubing and continuous-flush device, during weekly dressing changes. Flush solutions should be changed at least every 96 hours.
   3. Keep all components of the pressure monitoring system (including calibration devices and flush solution) sterile.
      a. Minimize the number of manipulations and entries into the pressure monitoring system. Use a closed-flush system (i.e. continuous flush), rather than an open system (e.g. one that requires a syringe and a stopcock) to maintain the patency of the pressure monitoring catheters. If stopcocks are used, treat as a sterile field and cover them with a cap or syringe when not in use. Caps must be changed when contaminated.
      b. When the pressure monitoring system is accessed through a rubber diaphragm rather than a stopcock, wipe the diaphragm with 70% alcohol or Chloraprep SEPP and allow drying before the system.
c. Do not administer dextrose-containing solutions or parenteral nutrition fluids through the pressure monitoring circuit. Use only saline.
d. Do not use pressure-monitoring devices to obtain blood culture.

C. Blood Cultures
1. When ordered, blood cultures will be collected using strict aseptic technique in accordance with Nursing Policy B-20.
2. Specimen collection: Collect two to four blood draws from separate venipuncture site (i.e. right and left antecubital veins), not through a CVL or arterial line.
3. Collect blood draws simultaneously or over a short period of time (i.e. within a few hours).
4. If colonization of the CVL is suspected, in addition to the peripheral blood draws, a draw through the central line may be beneficial in establishing colonization of the line versus blood stream infection.

XIII. Power Injection Catheters

A. The choice of a power injection catheter is at the discretion of the physician based on the risks and benefits to the patient. Refer to the Radiology Department Proc 3.16. “The Use of Central Venous Catheters for Infection of Contrast”.

XIV. Central Line Bundle

A. The Central line bundle is group of evidence-based interventions for patients with intravascular central catheters that, when implemented together, result in better outcomes than when implement individually.
- Hand washing
- Maximum barrier precautions-sterile gown and gloves, mask, head cover, and a large sterile drape
- Chlorhexidine skin prep
- Subclavian site selection
- Daily assessment of necessity for continuing the central venous line.

B. Routine use of the Central Line Bundle is recommended by SHEA, APIC and CDC for all CVL insertion procedures.

XV. “Stop the Line” Safety Culture

A. When a break in sterile technique occurs during a non emergency CVL insertion, a nurse or other practitioner who observes the break is obligated and empowered to stop the procedure until remediation of contamination is achieved. Retaliation toward the staff member who calls attention to the break in technique and stops the procedure shall not be tolerated.
XVI. Patient Education

A. The patient (or next of kin) receiving the CVL will receive infection prevention information specific for CVL. One available resource is “Central Line Infection Prevention for Patients and Families” that can be obtained through the Print Shop. Education will be documented in the medical record prior to discharge.

XVII. Patients Discharged with CVL

A. Patients who are discharged with a CVL still in place should have an order for CVL dressing changes on the discharge orders. The order should reflect the same level of aseptic care as inpatient dressing changes, including the use of a Biopatch, occlusive dressing, and Chloraprep for skin preparation, unless contraindicated.

References:


Written: 9/96
Revised: 99, 01, 10/02, 1/05, 1/06, 1/07, 2/09, 1/11, 01/14

In accordance with La. R.S. 13:3715.3, this document is privileged and confidential and should not be duplicated or copied without express prior approval