VANDERBILT UNIVERSITY MEDICAL CENTER
DIVISION OF TRAUMA BURNS AND SURGICAL CRITICAL CARE

CLINICAL MANAGEMENT GUIDELINES: CENTRAL VENOUS ACCESS

RATIONALE:

Central lines are a significant cause of hospital acquired blood stream infections (BSI). Significant literature supports the adoption of several safety practices for the insertion and maintenance of these catheters in critically ill patients[1-3].

These practices are bulleted below and summarized in the table approved and VUMC institutional policy (http://www.mc.vanderbilt.edu/infectioncontrol).

GUIDELINE:

Catheters selection: When available, antibiotic impregnated catheters should be utilized for all central line insertions in the ICU.

Insertion site: The subclavian position is the preferred site for insertion as the infection risk is lowest for this site. Internal jugular is the second alternative with the femoral position being the least preferred due to both infection and thrombosis risk.

Ultrasound guidance: If the IJ position is selected, ultrasound guidance prior to or during the procedure should be employed. Ultrasound may be useful for other sites in certain circumstances.

Insertion technique:

- Full barrier precautions should be utilized for all invasive catheters.
  This includes:
  - Mask
  - Cap
  - Sterile Gown
  - Sterile Gloves
  - Large drape (not 4 "blue towels") that fully cover the head and torso of the patient

  If rewiring a line:
  - double glove then remove outer gloves after removal of first line
  - set old line aside and cover with sterile towel
  - cut old line to appropriate length for culture after covering new line with sterile dressing
- Skin should be free of debris and adequately and widely prepped with chlorhexidine or ChloraPrep and allowed to dry.
- Patients should be in "head-down" position to prevent air embolus unless contra-indication (particularly spontaneously breathing pts). A sufficient volume of air to cause mortality can travel through a 14-gauge needle in <<< 1 second.

Replacement of central venous catheters:

- Evidence of local catheter infection – purulence, erythema, tenderness, mandates a catheter change to a **new site**.
- New clinical evidence of possible catheter infection but without hemodynamic changes, sepsis, no signs of insertion site infection and catheter > 3days old – **change over guidewire** (see technique above) and **send > 5cm length of catheter of intracutaneous portion for quantitative culture.** If cultures indicate infection or colonization, line must be changed to a new site.
- ICU patients with persistent leukocytosis, fever after previous line changes that are culture negative – **change over wire when catheter in place for 5 days**.
- Patients with evidence of BSI with hemodynamic instability, sepsis – **change line to new site**.
- No clinical evidence of infection – **do not change line**.
- **Pulmonary artery catheters** – replace every 5 days and culture the introducer sheath. If PA catheter is being changed for signs of infection/sepsis, culture tip of PA catheter as well.

VUMC Standards for Non-emergent Insertion and Management of Central Venous Catheters (CVCs)

CVC Insertion		Insertion Site Care	CVC Access	CVC Discontinuation
Preparation	**Procedure**			
Educate Patient/Family about CLABSI prevention and obtain informed consent.	Prep site with chlorhexidine (CHG); allow to dry before procedure starts.	Assess insertion site and catheter each shift.	Minimize CVC access; bundle the collection of multiple lab tests to a single CVC access when possible.	Remove CVC when no longer medically necessary and when an alternative IV access (e.g. peripheral IV) can serve the patient's needs.
Obtain all supplies.	Place sterile full body drape over patient.	Report abnormal findings to physician or designee.	Perform hand hygiene before accessing CVC.	Daily evaluation by primary care team re: CVC necessity.
Perform hand hygiene before procedure.	After insertion, a transparent CHG-impregnated dressing is placed, maintaining sterility of the insertion site.	Daily evaluation by primary care team re: CVC necessity.	Scrub to disinfect access port with an alcohol or CHG prep pad using a twisting motion 5 times around the threads and scrubbing 5 times across the septum. Allow to dry before accessing.	Guidewire exchange of CVC follows same procedures as CVC insertion.
Perform time-out.	Confirm CVC placement radiographically, as appropriate.	Change dressings at regular intervals (Q7d for transparent, q24hrs if gauze).		Trained providers discontinue CVCs.
Proceduralist(s) wears cap, mask, sterile gloves, sterile gown.	When adherence to aseptic technique cannot be ensured (i.e., when catheters are inserted during a medical emergency), replace all catheters as soon as possible and after no longer than 48 hours. Lines placed at outside facilities are considered for replacement.	Change dressing if damp, soiled or non-occlusive.	Only draw blood cultures from CVC with physician order for collection from CVC.	Routine CVC replacement is not recommended for prevention of CLABSI.
Nursing personnel is present in room; wears cap and mask if not in contact with sterile field.		Perform dressing changes as a sterile procedure.	Collect blood cultures from CVC only to determine if CVC is source of bacteremia.	Avoid guidewire exchange to replace CVCs in patients suspected of having catheter-related infection.
Site selection is based on patient needs and condition. Subclavian site is preferred; femoral placement in adults is avoided.	After 3 attempts at placement or before changing sites, a second proceduralist is consulted.		Change soiled, leaking, potentially contaminated hub caps.	
Ultrasound should be used for guidance prior to or during IJ placement, and may be useful to evaluate other vessels prior to line placement.			Change tubing, needleless devices, and fluid as specified by policy (CL 30-07.01).	
Monitor compliance with elements of insertion, care, access, and discontinuation. Any member of the team is obligated to identify and ensure correction of any deviation or potential deviation from these standards.				

CLABSI = Central line-associated bloodstream infection; CVC = central venous catheter (includes temporary central lines, PICCs, tunneled catheters, etc)

For more detail see CL 30-07.02 CVC Care and Maintenance
CL 30-07.11 CVC Insertion

REFERENCES:

1. Guideline for prevention of intravascular device-related infections. Part II. Recommendations for the prevention of nosocomial intravascular device-related infections. Hospital Infection Control Practices Advisory Committee. Am J Infect Control 1996; 24:277-293.
2. Marschall J, Mermel LA, Classen D et al. Strategies to prevent central line-associated bloodstream infections in acute care hospitals. Infect Control Hosp Epidemiol 2008; 29 Suppl 1: S22-S30.
3. Pearson ML. Guideline for prevention of intravascular device-related infections. Part I. Intravascular device-related infections: an overview. The Hospital Infection Control Practices Advisory Committee. Am J Infect Control 1996; 24:262-277.

*Clinical Management Guidelines (CMG) have been developed by the Section of Trauma, Burns and Surgical Critical Care to standardize and optimize care. They are based on a combination of accepted surgical practice and recent contributions to the medical literature CMGs are intended to provide guidelines for the management of most patients, and are not proposed as rules, policies or as a substitute for clinical judgment. Deviations from the CMGs are necessary and expected; all exceptions should be documented in the medical record and discussed with the attending physician.

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Joey Curtis, RN
Buddy Kopp, RN
Brad Dennis, MD