

Scope of Guideline

- This guideline applies only to patients with central venous catheters in place

Scope of the Problem

- Approximately 30,000 central line infections occur each year nationally in the acute care setting.
- CLABSIs occur in patients hospitalized in the ICU outside the ICU and in outpatients
- A CLABSI is associated with increased length of hospital stay and increased cost
- On average, each CLABSI costs an institution \$45,814.

Definitions

- A central line is an intravascular catheter that terminates at or close to the heart or in one of the great vessels and is used for infusion, withdrawal of blood, or hemodynamic monitoring. Great vessels include:
 - Aorta
 - Pulmonary artery
 - Superior vena cava
 - Inferior vena cava
 - Brachiocephalic veins
 - Internal jugular veins
 - Subclavian veins
 - External iliac veins
 - Common iliac veins
 - Femoral veins
- The following devices are not considered central lines (per the NHSN Surveillance definition):
 - Extracorporeal membrane oxygenation (ECMO)
 - Arterial catheters
 - Intra-aortic balloon pump (IABP) devices.
 - Hemodialysis reliable outflow (HeRO) dialysis catheters
 - Impella heart devices
- Identification of CLABSI is made through laboratory results plus signs and symptoms (most often fever)
- For surveillance purposes, a CLABSI is a laboratory-confirmed bloodstream infection where central line is in place for more than two calendar days on the date of event, with day of device placement being Day 1 and the line was also in place on the date of event or the day before.
- A temporary central venous catheter is a short-term central venous catheter that is placed directly into central circulation.
- A tunneled central venous catheter is a long-term central venous catheter that is placed using a subcutaneous tunnel and entering central circulation. It is placed in Interventional Radiology.

Pathogenesis of CLABSI

- Mechanisms (Appendix A)
 - Pathogen migration along external surface
 - More common
 - Usually occurs early after insertion (<7 days)
 - Hub contamination with intraluminal colonization
 - More common
 - Usually occurs >10 days after insertion
 - Hematogenous seeding from another source
 - Contaminated infusates

Prevention

- CLABSIs can be prevented through proper insertion and management and early removal of a central line
- CLABSIs originate from the insertion site, hub of a lumen, or both

Prior to Central Line Insertion

- Decisions regarding the type of device, duration of use, and intended therapy and retention should be determined on an individual basis in consultation with the primary service, vascular access team, pharmacy, interventional radiology or surgery as needed. Refer to the [Venous Access Device Selection Clinical Practice Guideline](#).
- Preferred site for temporary central venous catheter (CVC) insertion is: internal jugular.
- Catheterization of the femoral vein is to be avoided.
- Complete informed consent
- Perform [Time Out](#)

During Central Line Insertion

- Utilize the all-inclusive catheter insertion kit.
- Use the [Central Venous Catheter \(CVC\) Insertion Checklist](#) with **EVERY** central line insertion.
- Insertion team should include both an
 - Operator (MD or LIP)
 - Assistant (RN, LIP, or MD)
- Use ultrasound guidance for internal jugular catheter insertions
- Perform hand hygiene with soap / water or alcohol-based hand rub prior to starting insertion procedure.
- All staff present in the room during insertion should don a hat and mask.
- Prep site, wearing sterile gloves, with ChlorPrep® for 30 seconds (if femoral, 2 minutes) using a back and forth friction scrub and allow the area to air dry prior to skin puncture.
- The inserter must utilize maximal sterile barrier precautions during the procedure: a cap, mask, sterile gown, sterile gloves, sterile full body drape.
- Maintain aseptic technique during the insertion procedure.

- If a guidewire exchange is being performed, use new sterile gloves before handling the new catheter. It may be easier for the inserter to don two pairs of gloves and the assistant can remove the second set of gloves as the inserter holds on to the wire.
- Apply a CHG impregnated disc or CHG impregnated sterile dressing immediately after insertion and prior to removing hats and masks.
- If a breach in aseptic technique is observed, any member of the healthcare team should stop the procedure immediately.

Central Line Maintenance

- [Hand hygiene](#)
- See Figure 1. During Central Line Maintenance Remember C.L.A.B.S.I
- A CVC dressing change is a sterile procedure. For procedure, refer to Mosby's Nursing Skills: [Central Venous Catheter: Maintenance and Dressing Change](#)
- If a patient desires a soap and water shower
 - Do not submerge catheter or catheter site in water
 - An Aquaguard moisture barrier is required to be placed over any central line and dressing
 - Wrap all luerlock connections not covered by Aquaguard with Parafilm.

Figure 1. Central Line Maintenance Remember C.L.A.B.S.I.

C – Change Tubing

- Change and label all continuous infusion tubing every 96hr or immediately change when contamination is suspected or integrity of the product is compromised
 - IV solutions with lipid emulsion (ex. TPN) change tubing q24hrs
 - Propofol or Clevidipine change tubing q12hr
- Change and label all intermittent infusion tubing q24hr or immediately change when contamination is suspected or integrity of the product is compromised
- Change luer lock connectors, filters, and stopcocks with tubing change or immediately if integrity is compromised

L – Line Necessity Assessment Daily

- Leave catheters in place for as short a time as possible; remove CVCs as soon as it's use is no longer clinically indicated
- Discuss during multidisciplinary rounds daily and document in IHIS

A – Aseptic Access

- Maintain asepsis when accessing line
- Apply Curox Disinfecting Port Protector® **in all inpatients with central lines**
 - All open central line ports
 - All open peripheral IV ports
 - All open ports on IV tubing
- If Curox Disinfecting Port Protector® has not been in place for at least 1 minute, scrub hub for at least 15 seconds before accessing
- If the port is visibly soiled, scrub hub for at least 15 seconds

B – Bathing with Chlorhexidine Gluconate (CHG) Daily

- Daily CHG bathing **in all inpatients with central lines** using Sage® 2% CHG cloths (exception: Dodd to utilize 4% CHG and water)
- Follow [2% Chlorhexidine Gluconate Waterless Bath Protocol](#)
- Documentation of 'bath/scrub, chlorhexidine' in IHIS

S – Site Assessment

- Assess site daily for drainage, tenderness, pain, redness, and swelling

I – Intact, Dry, and Occlusive Dressing

- Change dressing immediately if loose, soiled, or damp
- Change transparent CHG dressing every 7 days (preferred dressing)
- Change gauze dressing every 48 hours
- Document date and time of dressing change on dressing and appropriate documentation in IHIS (see Appendix B)

Blood Culture Overview

- Patients with a CVC should be thoroughly evaluated for the source of signs and symptoms.
- Blood cultures should be performed when a patient develops clinical or laboratory criteria for systemic inflammatory response without an obvious nonvascular site of infection.
- Blood cultures should be performed when a catheter is removed for a suspected infection, not for routine removals.
- Obtain blood cultures prior to initiation of antibiotic therapy.
- Blood cultures should be obtained following [OSUWMC Patient Care Standards of Practice Guideline Blood Cultures, Obtaining](#)

When to Change Central Line Catheters

- Do not change catheters routinely for the purpose of preventing CLABSI
- Use guidewire-assisted catheter exchange to replace a malfunctioning catheter or to convert an existing catheter
 - Use new sterile gloves before handling the new catheter
- Do not use guidewire-assisted catheter exchange if catheter-related infection is documented or suspected
 - If the patient requires continued central access, remove the implicated catheter and insert a new catheter at a different insertion site

When to Remove Central Line Catheters

- Daily assessment of need for catheter should be performed daily
- Remove catheter when no longer clinically indicated
- If a catheter-related infection is documented or suspected and the patient requires continued central access, remove the implicated catheter and insert a new catheter at a different insertion site. Do not use guidewire-assisted catheter exchange.

Removal of Central Line Catheters

- Temporary percutaneous CVCs may be removed by a qualified RN upon MD/LIP order. Refer to OSUWMC Nursing Protocol – [Intravascular Access Devices, Peripheral and Central](#)
- Tunneled CVCs must be removed by an MD/LIP
- Following catheter removal a dressing should be applied. The site should be assessed and dressing changed every 24 hours until the site is epithelialized.

Quality Measures*

Process Measures

- Percentage of patients who have a CVC and:
 - Who receive a CHG bath daily
 - Have a dry, intact, and occlusive dressing in place
 - Who have a Curore caps covering all open IV ports
 - Documentation of necessity of CVC by the provider

Outcome Measures

- **NHSN CLABSI rate:** number of CLABSIs per 1,000 catheter-days.
- **Standardized Infection Ratio (SIR):** observed number of CLABSIs / predicted number of CLABSIs
- **Device utilization ratio:** number of catheter-days / number patient-days.
- **Standardized utilization ratio:** observed number catheter-days / predicted # catheter-days.
- **Duration of catheterization:** mean duration in days

*System-wide and stratified by hospital, unit, and location-type (e.g. ED, ICU, Med/Surg)

References

- Center for Disease Control and Prevention (CDC) Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-Central Line-Associated Bloodstream Infection), published January 2016, available at http://www.cdc.gov/nhsn/pdfs/pscmanual/4psc_clabscurrent.pdf
- Center for Disease Control and Prevention (CDC) National and State Healthcare-Associated Infections Progress Report, published March 2014, available at <http://www.cdc.gov/HAI/pdfs/progress-report/hai-progress-report.pdf>
- Infusion Nurses Society. (2016). Infusion therapy standards of practice. *Journal of Infusion Nursing*, 39(1S), S1-S159.
- Marschall J, Mermel LA, Fakhri M et al. Strategies to prevent central line-associated bloodstream infections in acute care hospitals: 2014 update. *Infection Control and Hospital Epidemiology*. 2014; 35(7):753-771.
- The Joint Commission. CLABSI Toolkit, published 2013, available at https://www.jointcommission.org/topics/clabsi_toolkit.aspx
- Zimlichman E, Henderson D, Tamir O et al. Health care-associated infections: A meta-analysis of costs and financial impact on the US health care system. *JAMA*. 2013; 173(22):2039-46.

OSUWMC Resources

- Mosby's Nursing Skills: [Central Venous Catheter: Maintenance and Dressing Change](#)
- OSUWMC Nursing Protocol – [Intravascular Access Devices, Peripheral and Central](#)
- OSUWMC Nursing Guideline – [Intravenous Therapy \(IV\)](#)
- OSUWMC Clinical Practice Guideline - [Venous Access Device Selection / CVC Protocols / Venous Access in Chronic Kidney Disease](#)
- OSUWMC Nursing Guideline – [Blood Cultures, Obtaining](#)
- [OSUWMC Central Venous Catheter \(CVC\) Insertion Checklist](#)
- [OSUWMC 2% Chlorhexidine Gluconate Waterless Bath Protocol](#)

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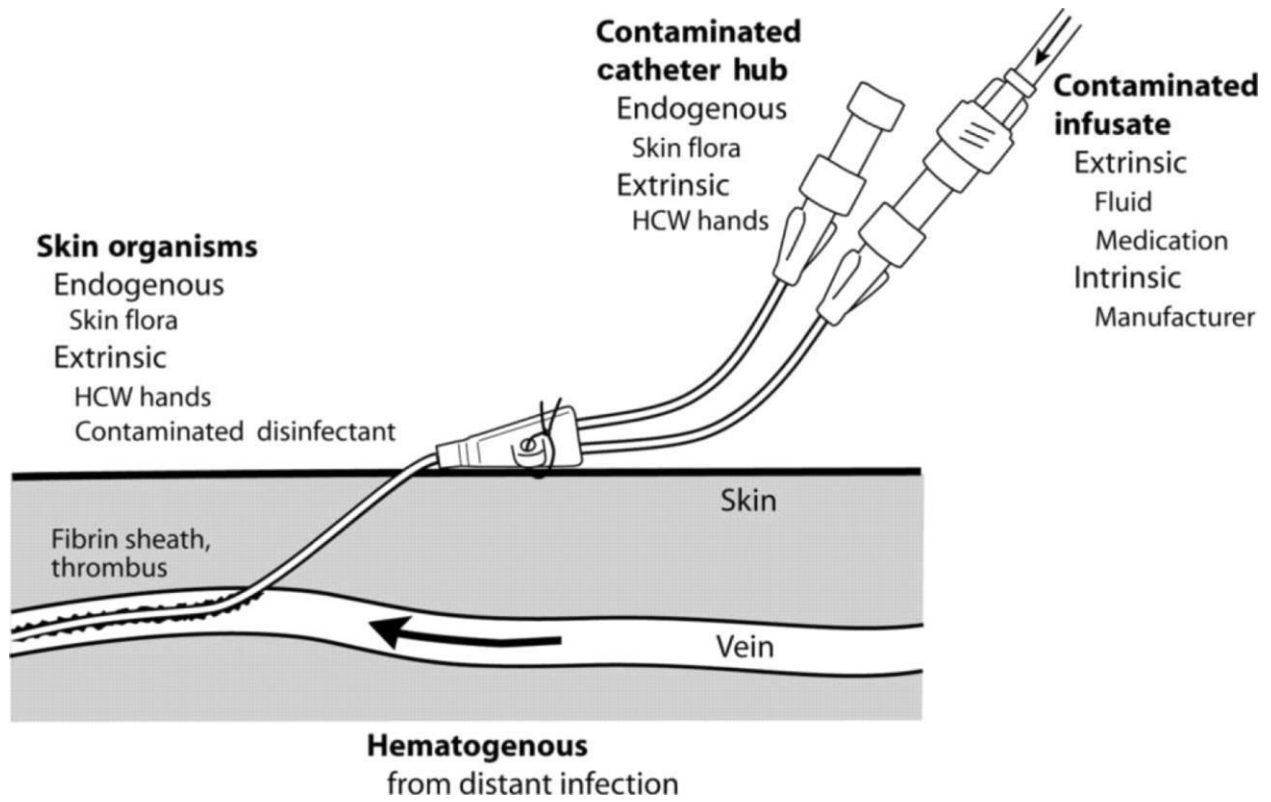
Guideline Approved

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Appendix A. Pathogenesis of CLABSI



Source: Cmich CJ, Maki DG. The promise of novel technology for the prevention of intravascular device-related bloodstream infection. I. Pathogenesis and short-term devices. *Clinical Infectious Disease*. 2002; 34(9):1232-1242.

Appendix B. Central Line Dressing Change Documentation in IHIS

Flowsheets

File Add Rows Add LDA Cascade Add Col Insert Col Show Device Data Last Filed Reg Doc Graph Gg to Date Values By Refresh Legend Cosign Link Lines Sidebar Pat Sum

Adult Patient Care Su... Vitals Simple Intake & Output (No... IV Infusions & IV FL... Adult Patient Profile Adult Patient Care Sur

Mode: Accordion Expanded View All 1m 5m 10m 15m 30m 1h 2h 4h 8h 24h Based On: 0700 Reset Now 07/18/16 1515

UHE PERIOD
7/18/16
1515

PICC - Double Lumen (Adult, Obstetrics) 8/12/2005 1352 Left brachial vein 6 Fr

PICC - Properties Group Placement Date/Time: 8/12/2005 1352 Side: Left Location:

Dressing dressing changed;trans

Date Dressing Changed 7/18/2016

Securement

Daily Review of Necessity

Phlebitis

Infiltration

Extremity Circumference, Mid-Upper

Extravasation Type

Extravasation Site Signs

Line Interventions

Extravasation Interventions

Distal Lumen Patency/Care

Proximal Lumen Patency/Care

Respiratory (Adult)

Respiratory WDI

Dressing

dressing changed;transparent semipermeable dressin

Select Multiple Options: (F5)

dressing dry and intact

dressing changed

dressing reinforced

transparent semipermeable dressing applied

antimicrobial dressing applied

gauze applied

other (see comments)

Comment (F6)

1. Document 'dressing changed'
2. Document type of dressing applied
3. Document date dressing changed