CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

ANTIMICROBIAL LOCK THERAPY FOR CENTRAL VENOUS ACCESS DEVICE

Section: Nursing
Compliance: ACHC Infusion Pharmacy
ACHC Standards: N/A
URAC Standards: N/A
TJC Standards: N/A
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I. POLICY

Catheter-related bloodstream infections occur frequently in patients with indwelling central venous catheters. Infections can occur with nearly any bacterial or fungal organism and usually require long term anti-infective therapy. However, because of the presence of biofilms that protect microorganisms from IV-administered anti-infectives, sterilization of the catheter sometimes is not achieved. Antimicrobial locking solutions may be prescribed for therapeutic and prophylactic purposes in patients with long-term Central Vascular Access Devices (CVAD)s who are at high risk for Catheter Associated Blood Stream Infection (CABSI) or have a history of multiple CABSIs,

To prevent CRBSI, a wide variety of antibiotic and antiseptic solutions have been used to flush or lock catheter lumens. Catheter lock is a technique by which an antimicrobial solution is used to fill a catheter lumen and then allowed to dwell for a period while the catheter is idle, to eradicate microorganisms and improve sterilization of catheters. Antibiotics of various concentrations are used either alone (when directed at a specific infecting organism) or in combination (to achieve broad empiric coverage) to prophylactically flush or lock CVAD's.

II. NURSING OVERVIEW

A. Antimicrobial lock therapy may be used, to reduce the risk of CABSI or in the presence of an active infection, as a single agent or in combination with systemic IV anti-infective therapy. Antimicrobial lock therapy provider orders may include locking solutions used alone or in combination to include ethanol, taurolidine, citrate, concentrated sodium chloride, ethyl-enediaminetetraacetic acid (EDTA), antibiotics, and antifungals.

B. Catheter material must be evaluated for compatibility with lock solution. Ethanol has been associated with altered catheter integrity, systemic symptoms, and plasma precipitation with potential for catheter occlusion. The impact on catheter integrity is related to the concentration of ethanol lock

solution used and the duration of exposure to the catheter inner lumen. Concentrated ethanol lock solution is not recommended for CVADs made of polyurethane material.

C. The use of antimicrobial lock therapy is recommended for therapeutic and prophylactic purposes in patients with long-term CVADs as ordered by the physician. Prophylactic antimicrobial lock therapy indicated for:

1. Patients with a history of multiple CABSIs
2. High-risk patient populations
3. Patients with increased risk of CVAD complications, including:

    a. Occlusion
    b. Infection
    c. Altered catheter integrity
    d. CVAD with more than 1 lumen
    e. Female gender
    f. Administration of PN

D. For therapeutic use, start the antibiotic lock solutions within 48-72 hours of diagnosis.

E. Antibiotic Locks being used for treatment of CABSI are generally continued for 10-14 days. The duration of therapy for prophylaxis is often prolonged and dependent on a series of patient specific factors.

F. Use standardized formulations and licensed independent practitioner-approved protocols for all antimicrobial lock solutions to enhance patient safety. Antimicrobial lock solutions contain supratherapeutic concentrations of antibiotics, chosen based on the specific infecting organism or on prevalent organisms when prophylaxis is the goal.

G. The length of time that antimicrobial lock solution should reside inside the CVAD lumen as ordered by the provider. This will limit use in patients receiving continuous or frequent intermittent infusions.

H. Antibiotic or antifungal solution is instilled into the catheter in a volume equal to the catheter, typically, 0.5 mL to 3 mL

I. Aspirate all antimicrobial locking solution from the CVAD lumen at the end of the locking period, prior to catheter use. DO NOT FLUSH the lock solution into the patient's bloodstream.

J. Follow manufacturers' instructions for intraluminal locking for all agents.

K. See Appendix A, for Outpatient Antibiotic Line Lock Guidelines for Non-Dialysis Catheters.

III. PROCEDURE

A. Supplies

1. Syringes of normal saline (see below).
2. Syringe of heparin (*10 units/mL - 100 units/mL*).
3. 10 mL Syringe with luer lock

4. Alcohol swabs
5. Anti-infective/antifungal lock to be instilled.

B. Wash hands thoroughly, for at least 20 seconds. Assemble equipment on clean, dry surface.

C. Clean the injection cap on the end of your IV catheter with an antiseptic wipe vigorously for 30 seconds and allow to air dry for 60 seconds.

D. Inject normal saline (or other flush solution prescribed), refer to CarepathRx policy on *Flushing and Locking Catheters*. Discard syringe in appropriate container.

E. Clean the injection cap at the end of your IV catheter with an antiseptic wipe vigorously for 30 seconds and air dry for 60 seconds. Instill antimicrobial locking solution per policy and physician orders. When instillation is complete, discard syringe in appropriate container.

F. Allow locking solution to dwell inside the CVAD lumen per provider's order. Refer to instructions on the pharmacy product label and plan of treatment.

G. After dwell time ordered, Clean the injection cap on the end of your IV catheter with an antiseptic wipe vigorously for 30 seconds and air dry for 60 seconds.

H. Attach empty 10 mL syringe. Aspirate all antimicrobial locking solution from the CVAD lumen. Discard syringe in an appropriate container.

I. Clean the injection cap on the end of your IV catheter with an antiseptic wipe vigorously for 30 seconds and air dry for 60 seconds. Inject normal saline (or other flush solution prescribed) per CarepathRx policy on *Flushing and Locking Catheters*. Discard syringe in an appropriate container.

J. Clean the injection cap on the end of your IV catheter with an antiseptic wipe vigorously for 30 seconds and allow to air dry for 60 seconds. Flush with heparin if ordered by provider. Discard syringe in an appropriate container.

IV. TRAINING

This policy will be posted on the Company shared drive.

V. REFERENCES

Infusion Nurses Society. 8th Edition (2021). Infusion Therapy Standards of Practice. Journal of Infusion Nursing, Volume 44.

APPENDIX A

Outpatient Antibiotic Line Lock Guidelines for Non-Dialysis Catheters

Unrestricted Antibiotic Locks

Drug and Concentration	Diluent	Beyond Use Date (BUD) and Storage	Maximum Dwell Time
Ambisome 4 mg/mL	Sterile Water for Injection	10 days refrigerated	Up to 72 hours
Cefazolin 5 mg/mL	Normal Saline	7 days refrigerated	Up to 72 hours
Ceftazidime 2 mg/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Daptomycin 5 mg/mL	Lactated Ringer's Solution	10 days refrigerated	Up to 72 hours
Gentamicin 1mg/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Vancomycin 5 mg/mL	Normal Saline	10 days refrigerated	Up to 72 hours

* Literature supports dwell times up to 72 hours, but due to the assigned beyond use date and operational considerations, a shorter maximum dwell time is recommended

Restricted Antibiotic Locks (Case-by-Case basis upon referral)

Drug and Concentration	Diluent	Beyond Use Date (BUD) and Storage	Maximum Dwell Time
Amikacin 2 mg/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Ampicillin 10 mg/mL	Normal Saline	2 days refrigerated	Up to 24 hours*
Piperacillin-Tazobactam 10 mg/mL	Normal Saline	7 days refrigerated	Up to 72 hours
Piperacillin-Tazobactam 40 mg/mL	Normal Saline	5 days refrigerated	Up to 72 hours
Tobramycin 5 mg/mL	Normal Saline	2 days room temperature	Up to 24 hours
Trimethoprim-Sulfamethoxazole 16mg/mL	Undiluted	2 days room temperature OR Home Mix	Up to 24 hours

* Literature supports dwell times up to 72 hours, but due to the assigned beyond use date and operational considerations, a shorter maximum dwell time is recommended

****Antibiotic Locks NOT suitable for home infusion: Ciprofloxacin, Levofloxacin, Linezolid, and Minocycline****

Heparin Combination Locks- RESTRICTED (Case-By-Case basis upon referral)

Drug and Concentrations	Diluent	Beyond Use Date (BUD) and Storage	Maximum Dwell Time
Cefazolin 5 mg/mL + Heparin 100 units/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Ceftazidime 2 mg/mL + Heparin 100 units/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Daptomycin 5 mg/mL + Heparin 100 units/mL	Lactated Ringer's Solution	10 days refrigerated	Up to 72 hours
Gentamicin 1 mg/mL + Heparin 2,500 units/mL	Normal Saline	3 days room temperature	Up to 48 hours*
Vancomycin 2 mg/mL + Heparin	Normal Saline	3 days room temperature	Up to 48 hours*

100 units/mL			
Vancomycin 2.5 mg/mL + Gentamicin 1 mg/mL + Heparin 2,500 units/mL	Normal Saline	3 days room temperature	Up to 48 hours*

* Literature supports dwell times up to 72 hours, but due to the assigned beyond use date and operational considerations, a shorter maximum dwell time is recommended

**Dwell times for non-HD patients should likely not exceed 24-hours (i.e. to dwell intra-luminally during antimicrobial administration). The Infection Disease Society of America states, "Dwell times for antibiotic lock solutions should generally not exceed 48 h before reinstallation of lock solution. However, for patients who are undergoing hemodialysis, the lock solution can be renewed after every dialysis session."

References:

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2. Bookstaver PB, Rokas KE, Norris LB, Edwards JM, Sherertz RJ. Stability and compatibility of antimicrobial lock solutions. *Am J Health Syst Pharm*. 2013 Dec 15;70(24):2185-98.
3. Simpson M and Schaefer E. Extended Stability for Parenteral Drugs 7th Edition. American Society of Health-System Pharmacists; 2022.
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