



Antibiotic Lock and Ethanol Lock Therapy Protocol

PURPOSE

To standardize the concentrations and ordering of antibiotic lock therapy (ALT) and ethanol lock therapy (ELT) in the treatment of catheter-related bloodstream infections (CRBSI) in adult and pediatric patients.

BACKGROUND

The use of central venous catheters (CVC) has increased dramatically in recent years. As use has increased, so has the rate of catheter-related infections.¹ CVCs are expensive and difficult to implant and remove, and vascular access sites may be limited, especially in the pediatric population.^{1,2} While data is limited, ALT and ELT have been utilized for the management of catheter-related infections.¹

Although limited and controversial, there is a growing body of evidence that ALT/ELT in conjunction with systemic antibiotics can be used successfully to treat CRBSI.^{1,3-6} The addition of heparin is commonly used in ALT due to the role of host proteins such as fibrin, fibrinogen, and fibronectin as adhesions to the catheter lumen.³ The main concern of the addition of heparin is stability and inadvertent heparinization of the patient, especially in the pediatric population. Therefore, nurse education plays a key role in ALT that includes heparin. Of note, ethanol is INCOMPATIBLE with heparin. Therefore heparin SHOULD NEVER be added to ELT.

EXCLUSION CRITERIA FOR ALT/ELT^{1,3,7}

All Lock Therapies

1. CRBSI associated with signs of exit site or tunnel infection
2. ALT/ELT is not recommended for CRBSI due to *S. aureus* and *Candida sp* (removal of catheter is recommended) unless there are unusual extenuating circumstances (no alternative catheter insertion sites)
3. Inability to withdraw lock solution from catheter
 - a. Nurse should make physician aware if this will be a problem

Antibiotic Lock Therapy ONLY

4. History of heparin-induced thrombocytopenia (HIT)
5. Hypocoagulable state
6. Documented allergy to requested antibiotic

Ethanol Lock Therapy ONLY

7. Patients with polyurethane catheters (reports of breaking and cracking when exposed to ethanol)⁸
8. Patient has received or is receiving the following medications:
 - a. Metronidazole (Flagyl[®]) within 48 hours
 - b. Disulfiram (Antabuse[®]) within 7 days

ANTIBIOTIC LOCK THERAPY PROCEDURE^{1,3,7}

- ALT/ELT should NEVER be used as monotherapy for CRBSI; should only be used as an adjunct to systemic antimicrobial therapy for 7-14 days
 - If suspected infected catheter with negative peripheral blood culture, may consider monotherapy ALT/ELT

- Dwell times range from 4-72 hours; 72 hour dwell times are typically used for dialysis pts with a 48 hr maximum dwell time on other patient population to minimize subtherapeutic concentrations of antibiotics^{7,9}
- If multiple daily accesses to the catheter is necessary or ALT/ELT cannot be used, then systemic antibiotics should be administered through the colonized catheter

NURSE EDUCATION

- **WITHDRAW SOLUTION BEFORE CATHETER USE AND DISCARD!!!!**
 - Antibiotic and ethanol lock solutions are NOT intended for systemic injection
 - They are instilled to “LOCK” the catheter for a specified time period and are to be withdrawn prior to using the catheter for other infusions
 - Alert the physician if the catheter will not allow withdrawal of lock solution
- Nursing procedure
 - Withdraw the lock solution and discard
 - Flush catheter with normal saline
 - Administer ordered medication through catheter
 - Flush catheter with normal saline
 - Instill required volume of antibiotic or ethanol lock solution into catheter
 - LABEL catheter to indicate that the lumen contains either an antibiotic or ethanol lock solution to prevent inadvertent systemic administration

Recommended ALT/ELT Concentrations^{1,10,11}

Antibiotic	Anticoagulant
Vancomycin (5 mg/mL)	Heparin (2500 U/mL)
Cefazolin (5 mg/mL)	Heparin (2500 U/mL)
Gentamicin (2mg/mL)	Heparin (2500 U/mL)
Vancomycin (2.5 mg/mL) + gentamicin (1 mg/mL)	Heparin (2500 U/mL)
Ethanol 70%	No Heparin

SEE SOP IV LAB NOTEBOOK FOR PHARMACY PREPARATION PROCEDURES OF LOCK SOLUTIONS

References

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