

Guideline

Antibiotic Lock Therapy for Catheter Related Blood Stream Infections

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Applicable to	All Children's Health Queensland Staff				
Authorisation	Executive Director Clinical Services (QCH)				

Purpose

This guideline provides best practice recommendations for the management of catheter-related infections, using Antibiotic lock therapy, especially in high risk patients.

Scope

This guideline provides information for all Children's Health Queensland (CHQ) Clinical Staff.

Related documents

- [CHQ-PROC-03450 Venous Access Device \(VAD\) - Insertion and Management of Peripheral and Central Venous Access Devices](#)
- [CHQ-PROC-01001 Medication – Prescribing](#)
- [CHQ-PROC-01039 Medication - Administration](#)
- [CHQ-GDL-01060 Use of Taurolidine/ Citrate Lock Solution in the Prevention of Central Venous Catheter Related Bacteraemia](#)
- [CHQ-PROC-01035 Antimicrobial Restriction Procedure](#)
- [CHQ Antimicrobial Restriction List](#)

Guideline for use of antibiotic lock therapy in the treatment of catheter related blood stream infections

Antibiotic Lock therapy is indicated for patients with catheter related blood stream infections involving long-term catheters with no signs of exit site or tunnel infection, where catheter salvage is the goal. The paediatric patient group requiring antibiotic locks are likely to receive parenteral nutrition, haemodialysis or chemotherapy.

The optimal duration for antibiotic lock therapy is 7 to 14 days.¹ Antibiotic lock solutions contain antimicrobial (for example: vancomycin, cefazolin, ciprofloxacin, linezolid, teicoplanin, gentamicin or ampicillin) mixed with 0.9% sodium chloride or trisodium citrate, in sufficient volume to fill the catheter lumen (Table 1).^{2, 3, 15-20}

Once the causative organism is identified, the decision to use antibiotic lock therapy, usually simultaneously with systemic antibiotic therapy, must always be made in consultation with the Infectious diseases team (IMPS).¹⁻⁵



ALERT

Antibiotic Lock Therapy requires prior approval from Infection Management Consultant/Fellow.

For antibiotics that are not listed on the [List of Approved Medicines \(LAM\)](#), Infectious Management and Prevention Service (IMPS) and [Individual Patient Approval](#) by Executive Director of Medical Services is required, prior to initiation of therapy.

Table 1: Specific catheter lock volumes associated with each device

Device	Approximate volume of lumen
Tunnelled Cuffed Central Venous Catheter	2 mL
Peripherally inserted central venous catheter (PICC)	1 mL
Totally implantable Venous Port Device	2 mL
Haemodialysis catheter	To the length of the individual lumen



ALERT

Contraindication: Previous serious allergic reaction to the antibiotic.

Contact the Infectious Diseases unit or clinical microbiology for appropriate advice regarding alternative antimicrobial selection.

1 Vancomycin Lock

Vancomycin antibiotic lock concentration of 5 mg/mL is recommended.^{2,6,14} Compatibility and stability information for the vancomycin and heparin solution is brand specific. Vancomycin 5 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9% only.

1.1 Non-Haemodialysis patients: Vancomycin (5 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Reconstitute 500mg vial of Vancomycin with 10mL water for injection (to give concentration of 50 mg/mL) – **draw up 1 mL (50 mg).**
2. Add 1 mL (50 mg) of Vancomycin to 9 mL of sodium chloride 0.9% to give a final concentration of 5mg/mL Vancomycin and a total volume of 10 mL. Prepare fresh for each lumen.
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor.**
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

1.2 Haemodialysis patients only: Vancomycin (5 mg/mL) and Citrate (4.67 %) antibiotic locks¹⁵⁻¹⁸

Method for preparation and administration

1. Reconstitute 500mg vial of Vancomycin with 10mL water for injection (to give concentration of 50mg/mL) – **draw up 1 mL (50 mg).**
2. Draw up **1 mL** of Trisodium Citrate 46.7 % and add to **1 mL** of Vancomycin 50 mg/mL and **8 mL** of Sodium Chloride 0.9% to give a total volume of 10 mL. **This gives a final concentration of 5 mg/mL Vancomycin and 4.67 % Citrate in a total volume of 10 mL.**
3. Prepare fresh for each lumen.
4. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 48 hours as prescribed by doctor.**
5. ****Make sure that the line is not flushed during this time by labelling appropriately****
6. Withdraw the volume added to each lumen (to the length of the individual lumen) after dwelling for up to maximum of 48 hours.
7. Document in patient's medical notes & contact Medical officer if unable to aspirate.

2 Gentamicin Lock

Gentamicin antibiotic lock concentration should be 1mg/mL for most gram negative organisms. Gentamicin in concentrations ≥ 10 mg/mL mixed with heparin results in immediate precipitation.^{8,9} Heparin can potentially antagonise the bactericidal properties of gentamicin^{11,12}. As there is limited compatibility literature with heparin, it is recommended NOT to use heparin, in gentamicin locks¹³. Gentamicin 1 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9% only.

2.1 Non-Haemodialysis patients: Gentamicin (1 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method of preparation and administration

1. Add **0.25 mL** (10 mg) of 80 mg/2 mL Gentamicin to **9.75 mL** of 0.9 % Sodium Chloride to give a final concentration of Gentamicin 1 mg/1 mL and a total volume of 10 mL. Prepare fresh for each lumen.
2. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**¹³.
3. ****Make sure that the line is not flushed during this time by labelling appropriately****
4. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
5. Document in patient's medical notes & contact Medical officer if unable to aspirate.

2.2 Haemodialysis patients only: Gentamicin (1 mg/mL) and Citrate (4.67 %) antibiotic locks^{15,16,17,19,20}

Method of preparation and administration

1. Draw up **0.25 mL** (10 mg) of Gentamicin 40 mg/mL.
2. Draw up **1 mL** of Trisodium Citrate 46.7 % and add to **0.25 mL** Gentamicin 40 mg/mL and **8.75 mL** of Sodium Chloride 0.9% to give a total volume of 10 mL. **This gives a final concentration of Gentamicin 1 mg/mL and Citrate 4.67% in a total volume of 10 mL.**
3. Prepare fresh for each lumen.
4. Instil the required volume for size and type of central venous access device and allow to dwell **up to 48 hours as prescribed by doctor.**
5. ****Make sure that the line is not flushed during this time by labelling appropriately****
6. Withdraw the volume added to each lumen (to the length of the individual lumen) after dwelling for up to maximum of 48 hours.
7. Document in patient's medical notes & contact Medical officer if unable to aspirate.

3 Amikacin Lock

Amikacin antibiotic lock concentration should be 2 mg/mL for most gram negative organisms. Heparin can potentially antagonise the bactericidal properties of amikacin^{11, 12}. As there is limited compatibility literature with heparin, it is recommended NOT to use heparin, in amikacin locks¹³.

3.1 Non-Haemodialysis patients: Amikacin (2 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method of preparation and administration

1. Add **0.2 mL** (50 mg) of Amikacin (500 mg/ 2 mL vial) to **24.8 mL** of 0.9 % Sodium Chloride to give final concentration of 2mg/mL of Amikacin and a total volume of 25 mL. Prepare fresh for each lumen.
2. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**¹³.
3. ****Make sure that the line is not flushed during this time by labelling appropriately****
4. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
5. Document in patient's medical notes & contact Medical officer if unable to aspirate.

4 Ampicillin Lock

Ampicillin antibiotic lock concentration of 10 mg/mL is recommended.^{2,6,14} Compatibility and stability information for the ampicillin and heparin solution is brand specific. Ampicillin 10 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9% only.

4.1 Non-Haemodialysis patients: Ampicillin (10 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Reconstitute 1000 mg vial of Ampicillin with 9.3 mL water for injection (powder volume 0.7 mL) (to give concentration of 100 mg/mL) – **draw up 1 mL (100 mg)**.
2. Add 1 mL (100 mg) of Ampicillin to 9 mL of sodium chloride 0.9 % to give a final concentration of 10 mg/mL Ampicillin and a total volume of 10 mL. Prepare fresh for each lumen.
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**.
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

5 Ciprofloxacin Lock

Ciprofloxacin antibiotic lock concentration of 0.125 mg/mL is recommended ^{2,6}. Compatibility and stability information for the ciprofloxacin and heparin solution is brand specific. Ciprofloxacin 0.125 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9 % only.

5.1 Non-Haemodialysis patients: Ciprofloxacin (0.125 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Use Ciprofloxacin infusion bag (concentration of 2 mg/mL) – **draw up 0.5 mL (1 mg)**
2. Add 0.5 mL (1 mg) of Ciprofloxacin to 7.5 mL of sodium chloride 0.9 % to give a final concentration of 0.125 mg/mL Ciprofloxacin and a total volume of 8 mL. Prepare fresh for each lumen.
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**.
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

6 Linezolid lock

Linezolid antibiotic lock concentration of 0.2 mg/mL to 1.92 mg/mL is recommended ^{2,14}. Compatibility and stability information for the linezolid and heparin solution is brand specific. Linezolid 2 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9% only.

6.1 Non-Haemodialysis patients: Linezolid (2 mg/mL) and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Use Linezolid infusion bag (concentration of 2 mg/mL) – **draw up 4 mL (8 mg)**
2. Add 4 mL (8 mg) of Linezolid to 4 mL of sodium chloride 0.9% to give a final concentration of 1 mg/mL Linezolid and a total volume of 8 mL. Prepare fresh for each lumen.
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**.
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

7 Teicoplanin Lock

Teicoplanin antibiotic lock concentration of 2 mg/mL is recommended^{2,6,14}. Compatibility and stability information for the teicoplanin and heparin solution is brand specific. Teicoplanin 2 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9 % only.

7.1 Non-Haemodialysis patients: Teicoplanin 2 mg/mL and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Reconstitute 400 mg vial of Teicoplanin with 3.14 mL water for injection (to give concentration of 400 mg/ 3 mL) – **draw up 0.3 mL (40 mg)**.
2. Add 0.3 mL (40 mg) of Teicoplanin to 19.7 mL of sodium chloride 0.9 % to give a final concentration of 2 mg/mL Teicoplanin and a total volume of 20 mL. Prepare fresh for each lumen.
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**.
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

8 Cefazolin Lock

Cefazolin antibiotic lock concentration of 10mg/mL is recommended. ^{2,6,14} Compatibility and stability information for the cefazolin and heparin solution is brand specific. Cefazolin 10 mg/mL antibiotic locks that do not exceed the dwell time of 24 hours are now prepared in sodium chloride 0.9 % only.

8.1 Non-Haemodialysis patients: Cefazolin 10 mg/mL and sodium chloride 0.9 % antibiotic locks:

Method for preparation and administration

1. Reconstitute 1000 mg vial of Cefazolin with 9.5 mL water for injection (to give concentration of 100 mg/mL) – **draw up 1 mL (100 mg)**
2. Add 1 mL (100 mg) of Cefazolin to 9 mL of sodium chloride 0.9 % to give a final concentration of 10 mg/mL Cefazolin and a total volume of 10 mL. Prepare fresh for each lumen
3. Instil the required volume for size and type of central venous access device and allow to dwell for **up to 24 hours as prescribed by doctor**.
4. ****Make sure that the line is not flushed during this time by labelling appropriately****
5. Withdraw the volume added to each lumen after dwelling for up to maximum of 24 hours.
6. Document in patient's medical notes & contact Medical officer if unable to aspirate.

Consultation

Key stakeholders who reviewed this version:

- Director (Infectious diseases, Immunology and Rheumatology) (CHQ)
- Paediatric Infection Specialist (CHQ)
- Nurse Practitioner, Paediatric Vascular Assessment and Management (CHQ)
- Clinical Pharmacist Lead - Antimicrobial Stewardship (CHQ)
- Senior Clinical Pharmacist – Renal (CHQ)

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Guideline revision and approval history

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1.0	Antibiotic Lock working group (CHQ) Antimicrobial pharmacist Stewardship	Medicines Committee (CHQ)	Advisory General Manager Operations
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