

**VASCATH – INSTILLATION OF ANTICOAGULATION / ANTIBIOTIC LOCK**

<b>Cross references</b> (including NSW Health/ SESIAHS policy directives)	NSW Health Policy for Medication Handling in NSW Public Hospitals PD207_007 NSW Health User applied Labelling of Injectable Medicines, Fluids and Lines PD2012_007
<b>1. What it is</b>	A guideline and procedure for the safe administration of a anticoagulant / antibiotic lock is required.
<b>2. Risk rating</b>	Medium
<b>3. Employees it applies to</b>	<ul style="list-style-type: none"> <li>Registered Nurses (RN) trained in haemodialysis</li> <li>RN trained in accessing vascaths</li> <li>Medical Officers (MO) trained in accessing vascaths</li> </ul>
<b>4. When to use it</b>	<p>A heparin/antibiotic lock is required in the following situations:</p> <ul style="list-style-type: none"> <li>Post insertion of a new vascath</li> <li>Following haemodialysis</li> <li>Weekly when the vascath is not being used</li> <li>Following collection of blood specimens or cultures via the vascath</li> </ul> <p>The standard lock combination in the above situation is a heparin / gentamicin lock.</p> <p><b>EXCEPTIONS:</b></p> <ul style="list-style-type: none"> <li>Patients with or at risk of heparin induced thrombocytopenia and thrombosis syndrome (HITS) require a danaparoid / antibiotic lock.</li> <li>If danaparoid is unavailable, sodium chloride 0.9% may be used alone or in combination with the appropriate antibiotic as a lock.</li> <li>Patients with an active infection with methicillin resistant staph aureus (MRSA) or methicillin resistant staph epidermidis (MRSE) require a vancomycin lock.</li> </ul>
<b>5. Why the rule is necessary</b>	To reduce the risk of catheter related infection in vascaths used for haemodialysis whilst maintaining patency.
<p><b>6. Process</b></p> <p><b>Definitions</b></p> <ul style="list-style-type: none"> <li>A tunnelled vascath is tunnelled subcutaneously and has a Dacron cuff within the tunnel.</li> <li>A non-tunnelled vascath is inserted directly into a vein without a Dacron cuff.</li> </ul> <p><b>6.1 Selection</b></p> <ul style="list-style-type: none"> <li>The nephrologist decides whether a tunnelled or non-tunnelled vascath is used.</li> <li>The decision as to the length of vascath is made by the radiologist inserting the catheter.</li> <li>The dose of the lock is dependant on the vascath type and length.</li> </ul> <p><b>6.2 Contraindications to Anticoagulant / Antibiotic Lock</b></p>	

- History of anaphylaxis or other severe allergic reaction to any drug being used in the lock.

### 6.3 Precautions

- There should be little systemic absorption from a vascath lock, however caution is advised in the following situations  
Heparin and danaparoid - use with caution where there is a history of bleeding or coagulopathy.  
Gentamicin: muscular disorders eg myasthenia gravis, high systemic levels of gentamicin  
Vancomycin: high systemic levels of vancomycin

### 6.4 Procedure for Administration of Anticoagulant / Antibiotic Lock

#### Equipment

- Dressing trolley
- Protective gown and face shield or mask
- 1 x dressing pack
- 2 x 3ml syringes
- 2 x 10ml syringes
- 2 x 10ml normal saline ampoules
- 2 x packets of gauze
- 1 x 18G drawing up needle
- 2 x leur lock catheter bungs
- 1 x pair sterile gloves
- 1 x blue sheet
- Antiseptic solution (Betadine or Chlorhexidine. Dependant on unit practice)
- Heparin 25000 units/5ml = 5000 units/1ml
- Antibiotic for antibiotic lock (see patients medication chart)

If the patient has a **Gentamicin/Heparin Lock**, the following extra equipment will be required:

- Gentamicin 80mg/2mls ampoule

If the patient has a **Vancomycin/Heparin Lock**, the following extra equipment will be required:

- Vancomycin 500mg vial
- 10mls of water for injections
- 1 x 18G sharp needle
- 1 x normal saline ampoule
- 2 x 10ml syringes

#### Procedure

1. Attend a procedural hand wash for 60 seconds.
2. Clean trolley with detergent
3. Gather equipment
4. Attend a procedural hand wash for 60 seconds
5. Prepare equipment on a general aseptic field
6. Place blue sheet under patient's vascath lumens.
7. Don unsterile gloves.
8. Using the yellow forceps, soak 2-4 pieces of gauze in the antiseptic solution.
9. Wrap and rub in the antiseptic soaked gauze around the arterial and venous ends of the vascath and around each clamp. Leave to soak for a minimum of 3 minutes.
10. Position the trolley to be in close proximity for easy access.
11. Perform a surgical hand wash for 3 minutes with antimicrobial soap and don sterile gloves
12. Prepare saline flushes using the 2 x 10ml syringes.

13. Prepare 2 x 3ml syringes with the antibiotic/heparin lock, according to the following:

**For Vancomycin**

- Draw up 10mls of water for injection and insert into 500mg vial of Vancomycin.
- Allow the Vancomycin to dissolve (strength now 50mg/ml).
- Draw up 1ml of the dissolved Vancomycin and then add 9mls of NaCl (strength now 5mg/ml)
- Draw up 0.5ml in each 3ml syringe (= 2.5mg in each syringe)
- Slowly add heparin 5000units/ml to the desired volume of each lumen (volume will be written on lumens clamp (i.e. 2.1mls and 2.2mls)
- Slow mixing of vancomycin and heparin in a forward and backward motion is required to avoid precipitation

**For Gentamicin**

- Draw up 0.25mls of gentamicin 80mg/2mls into each of the 2 x 3ml syringes (= 10mg/0.25mls for each lumen)
- Slowly add heparin 5000units/ml to the desired volume of each lumen (volume will be written on lumens clamp i.e. 2.1mls and 2.2mls)

**11.** Using a non touch technique, lift the vascath lumens with one blue forcep and then use the second forcep to remove the antiseptic soaked gauze from the lumens. Discard the second forcep. Place the sterile towel on the patient's chest, then place vascath lumens onto the sterile towel and discard the remaining forcep. Allow the antiseptic to dry for 30 seconds.

**12.** Using sterile gauze, disconnect and discard the arterial line from the arterial lumen and attach the 10ml saline syringe. Use sterile gauze to unclamp the lumen, hold the 10ml syringe plunger side up (this allows air to rise to the back of the syringe and prevents it being given), draw back slightly to remove air and then flush using turbulent flow. Clamp lumen using sterile gauze, remove and discard 10ml syringe and attach 3ml syringe with appropriate heparin/antibiotic lock.

**13.** Using a piece of gauze, open the arterial clamp and instil the antibiotic/heparin using 'positive pressure'.

**14.** Using sterile gauze, re-clamp the arterial lumen. Disconnect and discard the 3ml syringe

**15.** Securely attach a leur lock catheter bung to the arterial lumen.

**16.** Repeat steps 12-15 for the venous lumen.

**17.** Ensure that another nurse has witnessed both lumens are clamped and securely capped and sign the patients haemodialysis chart accordingly.

**18.** Complete post dialysis observations. Record same in dialysis notes and on ward charts if patient

is an inpatient.

**19.** Two RN's must sign for vascath antibiotic/heparin lock on the nurse initiated medication chart, as per unit policy.

<b>TUNNELED CATHETERS</b>		
<b>Catheter lumen volume</b>	<b>Lock</b>	<b>Method</b>
2.1mL to 2.2mL	Gentamicin 21.5mg and heparin 19,000 units / catheter	21.5mg of gentamicin (80mg/2mL) is required for the lock (5mg/L per lumen).  <ol style="list-style-type: none"> <li>1. Draw up a total of 0.5mLs of gentamicin in a 1mL syringe.</li> <li>2. Divide the solution into two 3mL syringes.</li> <li>3. Slowly add heparin 5000units/mL to the total volume of the lumen</li> </ol>
2.4mL to 2.5mL	Gentamicin 24.5mg and heparin 21,500 units / catheter	24.5mg of gentamicin is required for the lock (5mg/mL per lumen).  <ol style="list-style-type: none"> <li>1. Draw up a total of 0.6mLs of gentamicin in a 1ml syringe.</li> <li>2. Divide the solution into two 3mL syringes.</li> <li>3. Slowly add heparin 5000units/mL to the total volume of the lumen</li> </ol>
All lumen volumes	Gentamicin 20mg and danaparoid 750 units / catheter	750 units of danaparoid combined with 20mg of gentamicin for the lock.  <ol style="list-style-type: none"> <li>1. Draw up a total of 0.5mLs of g in a 1mL syringe, add 0.6mLs of danaparoid in the same syringe.</li> <li>2. Divide the solution into two 3mL syringes.</li> <li>3. Add sodium chloride 0.9% to make up the lumen volume.</li> </ol>
	Vancomycin 5mg and heparin 17,500 units / catheter	5mg of vancomycin is required for the lock  <ol style="list-style-type: none"> <li>1. Reconstitute vancomycin 500mg with 10mL water for injection resulting in a concentration of 50mg/mL.</li> <li>2. Inject 1mL of solution into a 10mL syringe and add 9ml of sodium chloride 0.9%, resulting in a concentration of 5mg/mL.</li> <li>3. Inject 1mL of solution into a 5mL syringe and add heparin 5000units/mL to a total of 4.5mL.</li> <li>4. Divide the solution into the 3mL syringes for each lumen (2.1mL and 2.2mL).</li> </ol>

<b>NON TUNNELED CATHETERS</b>		
<b>Catheter lumen volume</b>	<b>Lock</b>	<b>Method</b>
16cm	Gentamicin 13.5mg and heparin 12,000 units / catheter	<p>13.5mg of gentamicin is required for the lock</p> <ol style="list-style-type: none"> <li>1. Draw up a total of 0.3.mLs of gentamicin (80mg/2mL) in a 1ml syringe.</li> <li>2. Divide the solution into two 3ml syringes.</li> <li>3. Slowly add heparin 5000units/ml to the total volume of the catheter lumen (1.3ml and 1.4ml).</li> </ol>
20cm	Gentamicin 15.5mg and heparin 13,500 units / catheter	<p>15.5mg of gentamicin is required for the lock</p> <ol style="list-style-type: none"> <li>4. Draw up a total of 0.4mLs of gentamicin (80mg/2mL) in a 1ml syringe.</li> <li>5. Divide the solution into two 3ml syringes.</li> <li>6. Slowly add heparin 5000units/ml to the total volume of the catheter lumen (1.5ml and 1.6ml).</li> </ol>
25cm	Gentamicin 17mg and heparin 14,875 units / catheter	<p>17mg of gentamicin is required for the lock</p> <ol style="list-style-type: none"> <li>1. Draw up a total of 0.425mLs of gentamicin (80mg/2mL) in a 1mL syringe.</li> <li>2. Divide the solution into two 3mL syringes.</li> <li>3. Slowly add heparin 5000units/mL to the total volume of the catheter lumen (1.5mL and 1.9mL).</li> </ol>
25cm	Vancomycin 5mg and heparin 12,000 units / catheter	<p>5mg of vancomycin is required for the lock</p> <ol style="list-style-type: none"> <li>1. Reconstitute vancomycin 500mg with 10mLwater for injection. Therefore 50mg/mL.</li> <li>2. Inject 1mLinto a 10mL syringe and add 9mL of sodium chloride 0.9%. Therefore 5mg/mL.</li> <li>3. Inject 1mL into a 5ml syringe and add heparin 5000units/ml to a total of 3.4mL.</li> <li>4. Divide the solution into the 3mLsyringes for each lumen (1.5mL and 1.9mL)</li> </ol>
<b>7. Compliance evaluation</b>	<p>Q1: When is an antibiotic lock required in a vascath?</p> <p>A: 1. Post insertion of new vascath 2. Following haemodialysis 3. Weekly when the vascath is not being used 4. Following collection of blood specimens or cultures via the vascath</p> <p>Q2: Why do you instil an antibiotic / anticoagulant lock into a vascath?</p>	

	<p>A: As a prophylactic measure to reduce catheter related infections and to provide catheter patency.</p> <p>Q3: How is an antibiotic / anticoagulant lock instilled?</p> <p>A: According to the procedure for administration described in this clinical business rule.</p> <p>Audit Plan – Biyearly audit of the patients notes to confirm use of the antibiotic / anticoagulant lock.</p> <p>Monitoring of gentamicin levels to prevent toxicity. Performed within first or second week of insertion and every six months. Gentamicin level should be taken 30 minutes into dialysis.</p>
<b>8. Keywords</b>	<p>Vascath</p> <p>Antibiotic / anticoagulant lock</p> <p>Gentamicin lock</p>
<b>9. External references</b>	<p>Allon M, (2004). Dialysis Catheter-Related Bacteremia: Treatment and Prophylaxis, <i>American Journal of Kidney Diseases</i>, Vol 44(5), 779-791.</p> <p>Capdevila J.A, (1996). Antibiotic-lock Technique: Usefulness and Controversies, <i>Antimicrobics and infectious diseases newsletter</i>, Vol 15(2), 9-13.</p> <p>Krishnasami Z. et al (2002). Management of haemodialysis catheter-related bacteremia with an adjunctive antibiotic lock solution, <i>Kidney International</i>, Vol 61, 1136-1142.</p> <p>McIntyre W. et al (2004). Locking of tunneled haemodialysis catheters with gentamicin and heparin, <i>Kidney International</i>, Vol 66, 801-805</p> <p>Onder A.M. et al (2013). Antibiotic lock solutions allow less systemic antibiotic exposure and less catheter malfunction without adversely affecting antimicrobial resistance patterns, <i>Hemodialysis International</i>, Vol 17, 75-85.</p>
<b>10. Relevant committee approval</b>	<p>Renal Department Haemodialysis Protocol Committee</p> <p>Drug committee</p>
<b>11. Patient information brochure (or related material)</b>	<p>N/A</p>
<b>12. Who is responsible</b>	<p>Director of st George and Sutherland renal service.</p> <p>Nursing Unit Managers, Dialysis and Satellite Units.</p>

I, Dawn Fowler Clinical Group Manager Medicine and Critical Care SGSHHS attest that this clinical business rule is not in contravention of any legislation, industrial award or policy directive.

**Revision and approval history**

Date	Revision number	Contact Officer (Position)	Date for revision
October 2013	0	Yanella Martinez-Smith CNC Nephrology	October 2016