PURPOSE:

1. Alteplase is a thrombolytic agent used for the treatment of CVC-related thrombosis. CVC thrombosis should be suspected if there is a decrease in blood flow rate or an inability to withdraw blood or infuse fluid through the CVC. Once mechanical obstruction has been ruled out through visual inspection, patient re-positioning and manual irrigation of lumens, alteplase will be instilled as outlined in this procedure. The maximum dose used is 2 mg per lumen. There are minimal side effects at this dose but the patient should be monitored for signs of bleeding.

POLICY:

1. Registered Nurses and Licensed Practical Nurses in Hemodialysis who have received instruction and have demonstrated competency to the renal educator or delegate may instill alteplase into the CVC as indicated on the standing Chronic Hemodialysis Physician’s Order Sheet (#W-00109C).

2. Registered nurses in ICU at St Boniface Hospital who have received instruction and have demonstrated competency to their educator or delegate may instill alteplase into the CVC when ordered by a physician.

3. Registered Nurses and Licensed Practical Nurses in Hemodialysis are not required to obtain a physician order each time alteplase is instilled. The standing orders (as above) are intended for repetitive use.

4. Registered Nurses and Licensed Practical Nurses in Hemodialysis must notify the nephrologist by the following hemodialysis day if alteplase has been instilled 2 times within a 2-week period.

5. A Home Hemodialysis patient educator or delegate will teach Home Hemodialysis patients the procedure. The patient must demonstrate an understanding of the protocol.

EQUIPMENT:

- 4- 10ml syringes containing 0.9%NaCl
- 2 - 10 ml syringes for withdrawal
- 4 – 3 mL syringe
- 2 - vials alteplase (2 mg each)
- Sterile water for injection (without bacteriostat)
- 0.9% NaCl for injection
- Alcohol swabs
- Clean disposable gloves
- 4--Blunt fill needle

KEY POINTS:

- 4- 10ml syringes containing 0.9%NaCl
- 2 - 10 ml syringes for withdrawal
- 4 – 3 mL syringe
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- Clean disposable gloves
- 4--Blunt fill needle
PROCEDURE:

1. Check if patient has a history of active bleeding or platelets less than $135 \times 10^9$ /litre. If patient has a history of active bleeding, notify physician prior to instillation of Alteplase.

2. Check if patient has received Alteplase in the past 2 weeks.

3. Attach the blunt fill needle onto 3 mL syringe withdraw 2.2 mL of sterile water for injection and inject into a 2 mg alteplase vial.

4. Swirl vial until contents are completely dissolved. Do not shake.

5. Repeat Steps 3 and 4 for the second vial of alteplase.

6. Attach the blunt fill needle withdraw 2 mL (2 mg) of reconstituted solution from each vial into 2 separate 3 mL syringes.


8. Flush each CVC lumen with 10 mL 0.9% NaCl.

9. Slowly instill sufficient volume of alteplase solution to fill volume of CVC lumen plus 0.1 mL.

   a. For CVC with lumen volumes <2 mL:
   If the lumen volume is <2 mL, only alteplase is instilled (to a volume equal to the CVC lumen volume + 0.1 mL). See example under “Key Point”.

   b. For CVC with lumen volume ≥2 mL:
   If the lumen volume is ≥2 mL, a mixture of alteplase and sterile water for injection is instilled. This is because the maximum dose of alteplase is 2 mL (2 mg) per lumen. See example under “Key Point”.

10. Wait 10 minutes.

KEY POINTS:

- If patient has received Alteplase (x1) in the past 2 weeks, notify physician/Vascular Access Nurse prior to next dialysis treatment.

- Final concentration = 1 mg/mL (vial contains 2.2 mg alteplase).

- Reconstituted solution should be colorless or pale yellow and transparent.

- Inspect vial. Discard if particulates are present.

- Expiry of the solution is 24 hours after reconstitution when stored at 2 to 30 °C

- The extra 0.1 mL alteplase beyond the lumen volume will ensure alteplase gets to the tip of the CVC.

- Example:
  - For a 1.7 mL arterial lumen and a 1.8 mL venous lumen:
    - Instill 1.8 mL (1.7 mL + 0.1 mL) alteplase into the arterial lumen.
    - Instill 1.9 mL (1.8 mL + 0.1 mL) alteplase into the venous lumen.

- Example:
  - For a 2.1 mL arterial lumen and a 2.2 mL venous lumen:
    - Total volume needed for arterial lumen: 2.1 mL + 0.1 mL = 2.2 mL
      - Instill 2 mL (2 mg) of alteplase + 0.2 mL sterile water for injection.
    - Total volume needed for the venous lumen: 2.2 mL + 0.1 mL = 2.3 mL
      - Instill 2 mL (2 mg) alteplase + 0.3 mL sterile water for injection.

- Monitor patient for signs of allergic reactions (i.e. pruritus, edema). There is a very low risk of hypersensitivity reactions (<0.02%).
11. Attach a 3 mL syringe with at least 0.6 mL of 0.9% NaCl to each catheter hub.

12. Instill 0.3 mL 0.9% NaCl into EACH CVC lumen.

13. Wait 10 minutes.

14. Instill another 0.3 mL 0.9% NaCl into EACH CVC lumen.

15. Wait 10 minutes.

16. Attach 10ml syringe to each lumen; attempt to aspirate both lumens of CVC.

17. Flush both CVC lumens with 10mL 0.9% NaCl.

18. If CVC is clear, initiate hemodialysis. If unsuccessful, contact nephrologist.

DOCUMENTATION:

- PRN Medication Administration Record (MAR)
- Integrated Progress Notes:
  - Time of administration
  - Blood flow rate prior to alteplase administration (if applicable)
  - Blood flow rate after alteplase administration

REFERENCES:


POLICY & PROCEDURE DEVELOPERS

Lori Wazny, Pharm.D., Pharmaceutical Care Coordinator, Manitoba Renal Program
Lavern Vercaigne, Pharm.D., Professor, Faculty of Pharmacy, University of Manitoba