

MEDICINE PROGRAM PROCEDURE


CATEGORY: System-Level Clinical

ISSUE DATE: September 2008

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SUBJECT: **CENTRAL VENOUS ACCESS DEVICE -
TREATMENT OF THROMBOTIC OCCLUSIONS**

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PURPOSE

To ensure a consistent approach to the management of central venous access device (CVAD) thrombotic occlusions in clinical areas where these devices are utilized.

PROCEDURE

Equipment

Reconstituting Alteplase

- 10 mL preservative-free sterile water
- Alteplase 2 mg / 2 mL (1 vial per lumen)
- 18 gauge blunt needle
- 10 mL empty syringe

Single Syringe Technique for Partial or Complete Occlusion

- Syringe with reconstituted Alteplase
- Alcohol or Chlorhexidine swabs
- Medication label
- Gloves
- 2 x 10 mL prefilled normal saline syringes (once blood returns freely)

Special Instructions

- Alteplase is only indicated for thrombotic occlusions and is obtained from Pharmacy on the order of a physician. The Northeast Cancer Centre (NECC) and the inpatient oncology unit can follow medical directive MD NECC 02 - Management of Thrombotic Occluded Central Venous Catheter.
- Alteplase should not be administered to patients with known hypersensitivity to Alteplase or any component of the formulation (i.e. L-arginine, phosphoric acid and polysorbate 80).
- The maximum dose of Alteplase is 4 mg per lumen.
- Alteplase should be used with caution in patients:
 - With active internal bleeding

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- Who have had surgery within the last 48 hours
- With recent pulmonary embolism
- Pregnant or nursing women
- Taking heparin
- With known or suspected infection in the catheter
- Hemostatic defects
- Thrombocytopenia
- With any condition in which bleeding constitutes a significant hazard
- Alteplase contains no antibacterial preservatives and should be reconstituted immediately before use. The solution may be used within eight hours following reconstitution when stored between 2°C to 30°C. No other medication should be added to solutions containing Alteplase.
- For multi-lumen CVAD, assess and treat all catheter lumens individually for partial or complete occlusions.
- Stop all infusions if possible (particularly if treating a suspected fibrin tail/sheath) for optimal thrombolysis during dwell time.

Method

Reconstituting Alteplase

1. Inject 2.2 mL of sterile water into the Alteplase vial. Direct the stream of sterile water against the side of the vial when reconstituting. Slight foam is not unusual. Let the vial stand undisturbed to allow large bubbles to dissipate.
2. Gently swirl the solution until the contents are completely dissolved. **DO NOT SHAKE.** The final concentration will be 1 mg/mL.
3. Withdraw 2 mL (2 mg) of reconstituted Alteplase into a 10 mL syringe.
4. Inspect the solution for particles or discoloration. A slight yellow tinge is not unusual.

Single Syringe Technique for Partial or Complete Occlusion

1. Wash hands and don gloves.
2. Ensure catheter lumen(s) are unclamped if present.
3. Scrub the needleless connector for a minimum of 30 seconds with alcohol or Chlorhexidine swab.
4. Attach the syringe with Alteplase to the connector.
 - If the catheter is **partially** occluded, slowly instill the Alteplase into the CVAD. **Go to Step 10.**
 - If the catheter is **completely** occluded, use the single syringe method as follows.
5. Hold the syringe vertically with the plunger end up.
6. Gently pull back on the plunger to the 8-9 mL mark and hold it for 5-10 seconds to create negative pressure in the catheter. Ensure that the syringe is upright so that the Alteplase solution is at the syringe tip, nearest the catheter hub.
7. Slowly release the plunger. This will allow the Alteplase to be drawn into the catheter to come in contact with the clot formation.
8. Repeat Steps 6 and 7 several times. This will allow the Alteplase to be pulled into the catheter as the clot dissolves. This may take up to 30 minutes before the Alteplase can be instilled into the catheter. Depending on the clot burden, the full dose will not be instilled and the method must be repeated more than once.
9. Once the Alteplase is instilled in the catheter, clamp the catheter (if present) and detach the syringe. You may leave the syringe attached, if applicable.
10. Label the catheter with a medication label (date, time, initials) and the words "**Alteplase instilled. Do not use**".
11. After 30 minutes of dwell time, open the catheter clamp (if present) and attempt to gently aspirate 5-10 mL of blood with an empty 10 mL syringe. If small amounts of clot are still noted after 10 mL of

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withdrawal, you may need to aspirate another 5-10 mL. Patency is restored when 3 mL of blood can be aspirated within approximately three seconds.

A. If blood returns freely:

- i. Clamp the catheter (if present) and discard the syringe.
- ii. Clean the needless connector with alcohol or Chlorhexidine swab.
- iii. Flush the catheter with 20 mL normal saline using a push/pause turbulent method.

B. If nil or sluggish blood return:

- i. Allow Alteplase to remain in the catheter for another 90 minutes.
- ii. Repeat Step 11. If you are still unable to obtain blood, repeat the procedure if you have any remaining Alteplase from the first attempt. If not, notify the physician and obtain an order for a second dose.
- iii. Consider extending the dwell time to 24-72 hours to permit longer contact time of thrombolytic.
- iv. If the catheter remains occluded after a second dose of Alteplase, a chest x-ray, catheter venous dye study or catheter replacement may be required. There is no efficacy shown in clinical trials that supports using subsequent doses.

Stopcock Technique for Complete Occlusion (Appendix A)

In some treatment areas (such as ICU), a stopcock will be used on percutaneous sheath introducers (Cordis). In this case, the stopcock can be maintained and the Alteplase treatment can be performed through the device.

EDUCATION AND TRAINING

Definitions

1. Alteplase: An injectable drug (thrombolytic agent) that causes blood clots to dissolve.
2. Central Vascular Access Device (CVAD): A device that permits access to the central vascular system. A catheter is inserted with the tip residing in the lower one-third of the superior vena cava, or above the level of the diaphragm in the inferior vena cava.
3. Complete Occlusion: Inability to infuse fluid into, or withdraw blood from, the CVAD lumen.
4. Partial Occlusion: Decreased ability to infuse fluid into, or withdraw blood from, the CVAD lumen.

References and Related Documents

Blaney, M., Shen, V., Kerner, J.A., Jacobs, B.R., Gray, S., Armfield, J. and Semba, C.P. (2006). Alteplase for the Treatment of Central Venous Catheter Occlusion in Children: Results of a Prospective, Open-Label, Single-Arm Study (The Cathflo Activase Pediatric Study) *J Vasc Interv Radiol*; 17:1745–1751.

Broadhurst, D., Infusion Clinical Specialist Desjardins Healthcare Group. (July 2010). Declotting of Central Venous Access Devices Using Cathflo.

Cathflo (Alteplase) Product Monograph, September 2003.

Cross Cancer Institute Northern Alberta Cancer Program, Nursing Procedure Manual, Opening a Sluggish or Blocked Central Line Using Alteplase, June 2005.

Cummings-Winfield, C. & Mushani-Kanji, T. (2008) Restoring Patency to Central Venous Access Devices. *Clinical Journal of Oncology Nursing*, 12(4), 925-933.

Deitcher, S.R., Fesen, M.R., Kiproff, P.M., Hill, P.A., Li, X., McCluskey, E.R., and Semba, C.P. (2002). Safety and Efficacy of Alteplase for Restoring Function in Occluded Central Venous Catheters: Results of

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the Cardiovascular Thrombolytic to Open Occluded Lines Trial. *Journal of Clinical Oncology*, Vol 20, No 1 (Jan): pp 317-324.

Occlusion Management Guideline for Central Venous Access Devices. *Vascular Access: Journal of Canadian Vascular Access Association*. Volume 7, Supplement 1 – 2013.

Ponec, D., Irwin, D., Haire, W., Hill, P.A., Li, X., and McCluskey E.R. (2001). Recombinant tissue plasminogen activator (Alteplase) for restoration of flow in occluded central venous access devices: A double-blind placebo-controlled trial - The cardiovascular thrombolytic to open occluded lines (COOL) efficacy trial. *Journal of Vascular Interventional Radiology*, 2001; 12: pp 951–955.

Registered Nurses' Association of Ontario. (2008) Care and Maintenance to Reduce Vascular Access Complications. RNAO Nursing Best Practice Guidelines Program.

Royal College of Nursing, Standards for Infusion Therapy, Third Edition. January 2010.

Timoney, J.P., Malkin, M.G., Leone, D.M., Groeger, J.S., Heaney, M.L., Keefe, D.L., Klang, M., Lucarelli, C.D., Muller, R.J., Eng, S.L., Connor, M., Small, T.N., Brown, A.E., and Saltz, L.B.(2002) Safe and Cost Effective Use of Alteplase for the Clearance of Occluded Central Venous Access Devices *Journal of Clinical Oncology*, Vol 20, No 7 (April 1), 2002: pp 1918-1922.

Tom Baker Cancer Centre, Nursing Policy and Procedure Manual, Central Venous Catheter – Management of Occlusion, 2005.

University Health Network Policy & Procedure Manual, Clinical-Vascular Access, Clearing Occluded Catheter, Aug 2001.

Weinstein, S. (2006). *Plummer's Principles & Practice of Intravenous Therapy*, Eighth Edition, Lippincott, New York.

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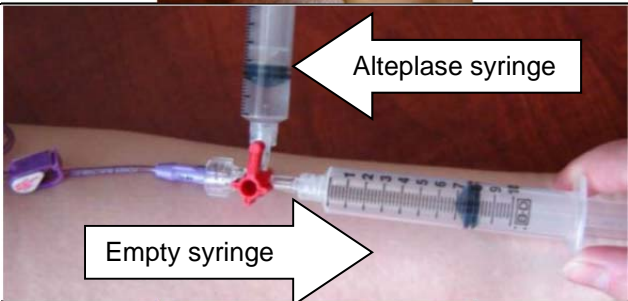

APPENDIX A

Stopcock Technique for Complete Occlusions

Equipment

- Syringe with reconstituted Alteplase
- 10 mL empty sterile syringe
- Alcohol or Chlorhexidine swabs
- Medication label
- Gloves
- 2 x 10 mL prefilled normal saline syringes (once blood returns freely)

Method

<ol style="list-style-type: none"> 1. Attach an empty 10mL syringe and the syringe with Alteplase to the stopcock. 2. Turn the stopcock off to the syringe containing Alteplase. 	
<ol style="list-style-type: none"> 3. Pull back the plunger of the empty syringe to the 8 mL mark and hold it for 10 seconds to create negative pressure. 	
<ol style="list-style-type: none"> 4. While holding the plunger back, point the turnkey "off" towards the empty syringe. This opens the Alteplase syringe to allow the drug to be "pulled" into the catheter. 	

5. Repeat Steps 2-4 to permit full instillation of the drug. Depending on the clot burden, the full dose will not be instilled and the method must be repeated more than once.
6. Once the Alteplase is drawn into the catheter, point the turnkey "off" and remove the syringes during a dwell time of 30-120 minutes.
7. Label the catheter with a medication label (date, time, initials) and the words "**Alteplase instilled. Do not use**".
8. After 30 minutes of dwell time, attach the empty syringe and open the catheter. Attempt to gently aspirate 5-10 mL of blood. If small amounts of clot are still noted after 10 mL of withdrawal, you may

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need to aspirate another 5-10 mL. Patency is restored when 3 mL of blood can be aspirated within approximately 3 seconds.

A. If blood returns freely:

- i. Clamp the catheter (if present) and discard the syringe.
- ii. Clean the needless connector with alcohol or Chlorhexidine swab.
- iii. Flush the catheter with 20 mL normal saline using a push/pause turbulent method.

B. If nil or sluggish blood return:

- i. Allow Alteplase to remain in the catheter for another 90 minutes.
- ii. Repeat Step 8. If you are still unable to obtain blood, repeat the procedure if you have any remaining Alteplase from the first attempt. If not, notify the physician and obtain an order for a second dose.
- iii. Consider extending the dwell time to 24-72 hours to permit longer contact time of thrombolytic.
- iv. If the catheter remains occluded after a second dose of Alteplase, a chest x-ray, catheter venous dye study or catheter replacement may be required. There is no efficacy shown in clinical trials that supports using subsequent doses.

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APPENDIX B

Algorithm for Troubleshooting Thrombotic Occlusions

