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NEPHROLOGY PROGRAM
DEPARTMENT POLICIES AND PROCEDURES

Hemodialysis - Section 07 - Medication - Neph 7-02
Alteplase Instillations-Infusions Guidelines into Tunneled Hemodialysis Catheters

No.: 01156 (TOH Standardized Policy Number)

ISSUED BY:
Hemodialysis Clinical Practice/Pharmacy

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2001/12

APPROVED BY:
Nephrology Steering Committee

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CATEGORY:
Medication

IMPLEMENTATION DATE:
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PURPOSE:

- To re-establish or optimize patency of a tunneled hemodialysis catheter by dissolving clot formation, using the fibrinolytic agent Alteplase
- This product may be used in exceptional cases for temporary hemodialysis catheters when adequate blood flow cannot be achieved

BACKGROUND STATEMENTS:

- Alteplase is a High Alert Medication. Before administering Alteplase an independent double check is required as per Corporate Policy #01636 High Alert Medications.
- Alteplase may be instilled/infused into a hemodialysis catheter after it has been determined that the catheter is blocked, or adequate blood flow cannot be achieved
- Alteplase may be administered according to Medical Directive Neph 2-22 - Alteplase Administration for Tunneled Dialysis Catheters, or a specific physician's order
- A Nephrologist/delegate may order a dose of Alteplase to be repeated, the administration of a larger dose, or alter the duration of administration
- The need for frequent use of Alteplase (e.g. > once per week or > 3 times in a month) is likely an indication of a catheter problem. Such occurrences should be discussed with the Dialysis Access RN and the Nephrologist/delegate at the earliest convenience
- Alteplase is supplied as Cathflo (2mg/2ml) vial
- Alteplase must be stored in the refrigerator

- Alteplase is reconstituted with 2.2 ml sterile water (not bacteriostatic water); giving a reconstituted strength of 2 mg/2 ml. Slight foaming is not unusual. Mix by gently swirling until the vial contents are completely dissolved. Do not shake. Once reconstituted, the solution is stable for 8 hours at room temperature
- Potential adverse effects include bleeding and systemic infection, due to the potential for release of localized infection into systemic circulation
- The half-life of Alteplase is approximately 5 minutes. Alteplase will affect INR results. Do not draw INR's after administering Alteplase
- If unable to aspirate the Alteplase post inter-dialytic instillation and an INR is required, instill the Alteplase and see section C of policy Neph 3-08 (#00731) - Blood specimen collection, and follow the procedure for drawing an INR for a catheter locked with Heparin
- Routine anticoagulation may be used post Alteplase administration

DEFINITION(S): N/A

NURSING ALERTS:

- Assess patient for any signs and symptoms of bleeding and report these symptoms to a Nephrologist/delegate prior to administering Alteplase. The Nephrologist/delegate and Dialysis Access RN needs to be notified of patients receiving frequent doses of Alteplase

Section A: Instillation procedure (2 lumens/ 30 minutes)

- The goal of the instillation procedure is to dissolve a clot within the hemodialysis catheter. The usual physician's order for an Alteplase instillation is 1 mg to be instilled into each catheter lumen for a total dose order of 2 mg

SUPPLIES:

- 2 mg of Alteplase, provided as 1 vial of Cathflo (2mg/2ml)
- 1- vial of sterile water
- 4- 3 mL syringes SPD# 140510
- 4- 18 gauge blunt fill needles SPD# 155645
- 2- 10 mL syringes SPD# 140515
- 2- tPA labels SPD# 730207
- 1- 0.9% NaCl vial
- Mask
- Supplies for on procedure

PROCEDURE:

1. Aspirate to remove the 4% Sodium citrate instillation(s) and flush each lumen as per policy Neph 6-01 #00748 Initiating Hemodialysis with a Hemodialysis Catheter.
2. Reconstitute the Alteplase with 2.2 mL sterile water. Draw up 1 mL (1 mg) of Alteplase into two 3 mL syringes and place tPA label on each syringe.
3. Using the remaining two 3 mL syringes, draw up 0.9% NaCl to the volume of each catheter lumen.
   Example: for a catheter with arterial lumen volume of 2.1 mL and a venous volume of 2.2 mL, draw up 2.1 mL in one syringe and 2.2 mL in the second syringe.

4. Instill 1 mL of Alteplase into one lumen. Attach the syringe of 0.9% NaCl with the same lumen volume and instill the remaining volume of the lumen. **Leave the 3 mL syringe with the remaining 1 mL of 0.9% NaCl attached.**
   Example: for a catheter with 2.1 mL lumen volume, instill 1 mL of Alteplase followed by 1.1 mL of 0.9% NaCL. There will be 1 mL left in the 3 mL syringe.
5. Repeat the process for the other lumen. It is recommended that even if only one lumen is blocked that both lumens be treated with Alteplase.
6. Wait 8 min for the Alteplase to have contact time with the clot
7. Instill 0.25 mL of 0.9% NaCl.. Repeat for the second lumen.
8. Repeat step #6 & #7 for a total of 3 instillations. 0.25 mL of Alteplase will remain in the tip of the catheter and **0.25 mL of NaCl will remain in the syringe** prior to the attempt to aspirate. This process will take approximately 30 minutes.
9. Aspirate and flush each lumen as per policy Neph 6-01 #00748 Initiating Hemodialysis with a Hemodialysis Catheter. Assess for restoration of patency. Inform the physician and Dialysis Access RN if flows are still not adequate for hemodialysis.

Section B: Pre-dialysis infusion procedure (2 lumens/ 4 hours)

- The goal of the infusion procedure is to dissolve a suspected clot or fibrin sheath around the outside of the hemodialysis catheter. This procedure should be performed if unable to sustain any blood flow on dialysis

SUPPLIES:

- 10 mg Alteplase provided as 5 vials of Cathflo (2mg/2mL)
- 2- vials of sterile water (not bacteriostatic water)
- 2- 10 mL syringes SPD# 140515
- 2- 50 mL mini-bags 0.9% NaCl SPD#101750
- 4- 20 mL syringes SPD#140150
- 6-18 g blunt fill needles SPD# 155645
- 4- alcohol swabs SPD# 230660
- 2- infusion pump lines SPD# 124125
- 2- infusion pumps
- 2- One-link connectors SPD#120617
- Mask
- Supplies for on procedure
- Medication labels

PROCEDURE

1. Remove 30 mL of 0.9% NaCl from a 50 mL 0.9% NaCl mini-bag. Repeat with second 0.9% NaCl mini-bag.
2. Reconstitute each Alteplase vial with 2.2 mL sterile water. Draw up 5 mL (5 mg) Alteplase into each 10 mL syringe.
3. Add 5 mL (5 mg) of Alteplase into each of the mini-bags. Attach medication label. Prime the infusion lines with the Alteplase & 0.9% NaCl solution. Do NOT prime the line before adding the Alteplase.
4. Aspirate and flush each lumen as per policy Neph 6-01 #00748 Initiating Hemodialysis with a Hemodialysis Catheter. Attach primed One-link connectors to both lumens.

5. Attach the infusion lines to One-link connectors on each lumen of the Hemodialysis catheter. Infuse both Alteplase infusions using the pre-programmed parameters "Pre-hemodialysis" with a concentration of 5 mg/30 mL over a 4 hour infusion time. The concentration includes the reconstituted drug volume and the volume of mini-bag overfill.
6. The mini-bag will empty after approximately 2 hours, but there is still Alteplase in the IV tubing. To ensure that the patient receives the full amount of Alteplase, add 20 mL of 0.9% NaCl to each of the empty mini-bags and continue the infusion at the same rate. There may still be some 0.9% NaCl in the mini-bag, but the Alteplase will have infused after the 4 hours.
7. Aspirate and flush each lumen as per policy Neph 6-01 #00748 Initiating Hemodialysis with a Hemodialysis Catheter. Assess for restoration of patency. Inform the physician if flows are still not adequate for hemodialysis.

Section C: Intra-dialytic infusion procedure (1 lumen/ 1 hour)

- The goal of the infusion procedure is to dissolve a suspected clot or fibrin sheath around the outside of the hemodialysis catheter. This procedure requires the ability to perform hemodialysis at a lower than optimal flow rate

SUPPLIES:

- 4 mg Alteplase provided as 2 vials of Cathflo
- 1- vial of sterile water (not bacteriostatic water)
- 1- 10 mL syringe 10 ml syringes SPD# 140515
- 1- 50 mL minibag 0.9% NaCl SPD#101750
- 2- 20 mL syringes SPD#140150
- 4- 18 g blunt fill needles SPD# 155645
- 2- alcohol swabs SPD# 230660
- 1- infusion pump lines SPD# 120120
- 1- infusion pump
- Mask
- Supplies for initiation procedure
- Medication labels

PROCEDURE:

1. Reconstitute the Alteplase with 2.2 mL sterile water. Draw up 4 mL of Alteplase in a 10 mL syringe.
2. Add 4 mL (4 mg) of Alteplase into the mini-bag. Attach medication label. Prime the infusion lines with the Alteplase and 0.9% NaCl solution. Do NOT prime the line before adding the Alteplase.
3. Attach the IV line to the venous infusion line on the venous chamber. Infuse via infusion pump using the pre-programed parameters "Intra-dialysis" with a concentration of 4 mg/60 mL over 1-hour infusion time. The concentration includes the reconstituted drug volume and the volume of mini-bag overfill.
4. Attach the venous blood line to the lumen of the catheter with the most inadequate flow. If both arterial and venous lumens of catheter are sluggish, reverse the blood lines mid-way through the procedure.
5. The mini-bag will empty at approximately 45 minutes, but there is still Alteplase in the IV tubing. To ensure that the patient receives the full amount of Alteplase, add

20 mL of 0.9% NaCl to the empty mini-bag and continue the infusion at the same rate. There may still be some 0.9% NaCl in the mini-bag, but the Alteplase will have infused after the 1 hour.

6. Slowly increase blood flow while respecting maximum allowed arterial and venous pressure limits

Section D: Post-dialysis instillation of alteplase (as a catheter "lock")

- The goal of this procedure is to restore the patency of the Hemodialysis catheter between treatments by instilling Alteplase instead of 4% Sodium citrate post dialysis. It should primarily be used for tunneled cuffed catheters, but may be used for temporary catheters in special circumstances. It may be considered in those individuals who require numerous doses of Alteplase to restore patency of the catheter. Its use is not meant to replace 4% Sodium citrate instillations on a routine basis.

SUPPLIES:

- 2 mg of Alteplase provided as 1 vial of Cathflo
- 1- vial of sterile water (not bacteriostatic water)
- 4- 3 mL syringes SPD# 140510
- 2- 18 g blunt fill needles SPD# 155645
- 4- tPA labels SPD# 730207
- Usual supplies for discontinuation with a dialysis catheter, without 4% Sodium citrate

PROCEDURE:

1. Discontinue hemodialysis according to policy Neph 6-02 (#00749) Discontinuing Hemodialysis with a Hemodialysis Catheter and the Gambro Artis Hemodialysis Machine and omit the 4% sodium citrate
2. Add 4-3 mL syringes and 2 tPA labels to the supplies for discontinuation
3. Reconstitute the Alteplase with 2.2 mL sterile water. Draw up 1 mL of Alteplase into two 3 mL syringes and apply tPA labels
4. Using the remaining two 3 mL syringes, draw up 0.9% NaCl to the remaining volume of each catheter lumen
   Example: for a lumen with a volume of 2.1 mL- draw up 1.1 mL of 0.9% NaCl in syringe. The 1.0 mL of Alteplase + 1.1 mL of 0.9% NaCl equals 2.1 mL which is the length of the lumen
5. Flush lumen as per Neph 6-02 (#00749) Discontinuing Hemodialysis with a Hemodialysis Catheter and the Gambro Artis Hemodialysis Machine.
6. Instill the 1 mL (1 mg) Alteplase into the lumen of the catheter
7. Instill the required volume of 0.9 % NaCl into the catheter 'chasing' the Alteplase to the distal end of the catheter and cap the lumen
8. Repeat steps #5, #6 & #7 for the other lumen
9. Ensure a label is attached to the caps on the lumens indicating Alteplase instillation

DOCUMENTATION:

Process the Alteplase order as:

- **Instillation Procedure**: 2 mg, IV, once, pre-dialysis, with comments: 1 mg t-PA per lumen, 30 minute t-Pa Instillation
- **Pre-Dialysis Infusion Procedure**: 10 mg, IV, once, pre-dialysis with comments: 5mg t-PA per lumen, 4 hour t-PA infusion
- **Intra-Dialytic Infusion Procedure**: 4mg, IV, once, intra dialysis, with comments: 4 mg t-PA via intra-dialytic infusion
- **Post-Dialysis Instillation of Alteplase** (as a catheter "lock"): 2 mg, IV, once, post dialysis, with comments: 1 mg t-PA per lumen, t-PA locks

Document in NephroCare:

- Incident selections such as CVC Arterial Flow Sluggish, etc
- Document troubleshooting CVC line in the progress notes prior to t-PA administration using the title: HEMO ACCESS
- Document the results of the t-PA in the progress notes using the title: HEMO ACCESS
- Patient teaching in a Progress Note with the title **Patient Teaching**
- To administer Alteplase select the corresponding medication in the session related medication screen and select the nurse that performed the independent double check from the catalogue menu. NephroCare will prompt for the nurse verifying to enter his/her password.

PATIENT TEACHING:

Tell the patient:

- Alteplase is a drug that works by targeting fibrin, (the substance that causes blood to clot) dissolving the thrombus (blood clot) and restoring function to the central venous catheter
- Studies indicate there is a very low incidence of side effects, examples being, infection from opening the central venous catheter (0.4%), major hemorrhage (0.4%), gastrointestinal bleeding (0.3%) and venous thrombosis (0.3%). There was no incidence of intracranial hemorrhage or embolic events

RELATED POLICIES / LEGISLATION:

1. Corporate Policy #01636 High Alert Medications

2. Nephrology Policies and Procedures - Hemodialysis - Section 02 - Medical Directives - Neph 2-22 Alteplase Administration for Tunneled Dialysis Catheter

3. Nephrology Policies and Procedures - Hemodialysis - Section 03 - Patient Assessment and Management - Neph 3-08 (#00731) Blood Specimen Collection

4. Nephrology Policies and Procedures – Hemodialysis – Section 06 – Hemodialysis Catheters - Neph 6-01 (#00748) Initiating Hemodialysis with a Hemodialysis Catheter and the Gambro Artis Hemodialysis Machine

5. Nephrology Policies and Procedures – Hemodialysis – Section 06 – Hemodialysis Catheters - Neph 6-02 (#00749) Discontinuing Hemodialysis with a Hemodialysis Catheter and the Gambro Artis Hemodialysis Machine

6. Nephrology Practice Alert #150 – Hemodialysis – High Alert Medication Process

REFERENCES:

1. Ottawa Hospital Parenteral Drug Therapy Manual 33nd edition. (2012). Mario Bédard, Pharm.D., M.Sc., Anne Massicotte, B.Pharm. M.Sc., Sangeeta Prasad, B.Sc.Pharm., editors

2. Ariyachaipanich, A., Oyejola, O., Melhem, A., Soundararajan, V., Lerma, E., Atassi, W., & Soundararajan, R. (2010). Tissue plasminogen activator infusions as a treatment for hemdoailysis catheter dysfunction. Dialysis & Transplantation 39(3):97-9

3. Dowling, K., Sansivero, G., Stainken, B., Siskin, G, Dolen, E., Ahn, J., & Mitchell, N. (2004). The use of tissue plasminogen activator infusion to re-establish function of tunneled hemodialysis catheters. Nephrology Nursing Journal, 31(2) p. 199-200

4. National Kidney Foundation Dialysis Outcomes Quality Initiative (2006). Clinical Practice Guidelines for Vascular Access,Guideline 7: Prevention and treatment of catheter and port complications

5. Cathflo Product Monogram and Cathflo Web Site of Frequently Asked Questions

COMMENTS / SIGNIFICANT REVISIONS: N/A