



Guideline:	Administration of Alteplase via a Peripherally Inserted Central Catheter (PICC) or Umbilical Venous Catheter (UVC)
Effective Date:	APRIL 2019

Keywords: TPA, Occluded line, Alteplase, central line occlusion, Curoc, Alcohol Port Protector, Alcohol cap

I. Purpose

To restore patency of clotted peripherally inserted central catheter (PICC) or Umbilical Venous Catheter (UVC) via installation of a thrombolytic agent (e.g. t-PA, Alteplase®). Alteplase is a commercially available thrombolytic agent that is approved for the use of blood clot breakdown.

II. Supportive Data

- The usual cause of catheter occlusion is a thrombus in or surrounding the catheter with the catheter tip as the most common site. The thrombus can cause either a partial or complete obstruction. The following signs may identify the type of occlusion.
 - Partial thrombotic occlusion: Sluggish flow and/or impaired ability to withdraw fluid or blood through the catheter.
 - Complete thrombotic occlusion: Inability to infuse fluid or withdraw fluid or blood through the catheter.

III. Presumes Knowledge

[WNH Standards Statements](#)

[NICU Medication Manual](#)

[NICU C.4 Use and Care of Central Venous Catheter \(CVC\) and Peripherally Inserted Central Catheters \(PICC\)](#)

[NICU C.6 Changing Central Line Solutions and Tubing](#)

[WNH M.1 Medication Administration](#)

[NICU P.1 PICC Insertion](#)

IV. Policies

- A licensed independent practitioner's (LIP) order is required to instill t-PA in an occluded central venous catheter where blood is unable to be withdrawn.
- All needleless connectors must be scrubbed with chlorhexidine (CHG) for 15 seconds and allowed to air dry for 30 seconds prior to accessing.
- Only a PICC trained RN or LIP may administer TPA.
- Dose is per lumen: for multi-lumen catheters, treat one lumen at a time.
- Do not infuse into the patient.
- Dose should always be aspirated out of catheter after dwell time.



EXPOSURE: Blood

PROTECTIVE EQUIPMENT: Non sterile gloves

V. Guidelines

- Do not exceed 2mg in 2mL.
- Add 2.2 mL sterile water for injection in the vial. Mix gently until contents are dissolved. Do NOT shake. Final concentration: 1mg/mL
- Recommended dwell time is 30 minutes-2 hours. Do not exceed 2 hours per dose. Then aspirate out of catheter.
- May instill a second dose if catheter remains occluded after 2-hr dwell time.
- Priming Volumes (PICCs):
 - a. Vygon Premicath 1.1 Fr single lumen: 0.09mL @ 20cm in length (0.0045 mL per cm)
 - b. Footprint Medical 1.4 Fr single lumen: 0.14mL @ 30 cm in length (0.0047 mL per cm)
 - c. Vygon Nutriline 2Fr single lumen: 0.12 mL @ 30 cm in length (0.004 mL per cm)
 - d. Vygon Nutriline twinflo 2 Fr double lumen: 0.2 mL per lumen @ 30 cm in length (0.006 mL per cm)
 - e. Argon 1.9Fr single lumen: 0.2 mL @ 50 cm in length (0.004 mL per cm)
 - f. Medcomp 2.6fr dual lumen: 0.2 mL x 50cm in length per lumen (0.004 mL per cm)
- Priming Volumes (UVCs):
 - a. Covidien Argyle 2.5 Fr single lumen: 0.08mL in 25cm length
 - b. Covidien Argyle 3.5 Fr single lumen: 0.15 mL in 25cm length
 - c. Covidien Argyle 3.5 Fr dual lumen:
 - i. 20G Lumen (Primary/clear lumen): 0.21mL
 - ii. 23G Lumen (Secondary/blue lumen): 0.16mL
 - d. Covidien Argyle 5 Fr single lumen: 0.33mL in 25cm length
 - e. Covidien Argyle 5 Fr dual lumen:
 - i. 18G Lumen (Primary/clear lumen): 0.32 mL
 - ii. 21G Lumen (Secondary/blue lumen): 0.22mL
- Patient Education Materials: N/A

VI. Equipment and supplies

- 10 mL syringes
- 1 mL syringe
- Safety needles/ needleless connector
- Normal saline
- Three-way stopcock
- 10 mL 0.9% sodium chloride pre-filled syringes
- Chlorhexadine gluconate (Chlorascrub®) wipes
- Thrombolytic agent (t-PA, Alteplase®)



VII. Procedures

1. Ascertain that the catheter is obstructed by suspected blood clot
 - Pump alarming high pressure or occluded.
 - Inability to infuse fluid or withdraw fluid or blood through the catheter.
2. Correct any mechanical obstruction of external catheter. Consider CXR to evaluate for internal kinks/abnormal position
 - Evaluate for external kinks
3. Check for precipitate in external IV tubing to eliminate drug precipitate as the cause of obstruction
 - Thrombolytic agents are NOT effective in removing drug precipitate and may result in expulsion of the precipitate into the vascular system.
4. A LIP’s order for thrombolytic agent (t-PA) is sent to pharmacy.
 - Use dosing table below
5. Obtain vial from the Pharmacy and reconstitute with 2.2 mL of sterile water for injection to a final concentration of 1 mg/mL.
 - Alteplase binds strongly and specifically to fibrin in the thrombus and converts the entrapped plasminogen to plasmin, thereby initiating local fibrinolysis.
6. The dose of t-PA equals 110% of the internal lumen volume of the catheter. Add 0.02mL for the clave and 0.2mL for stopcock volume. PICC dosing is based upon the cut length of the catheter. Catheter length is documented in the Procedure note and IV Flowsheet in EPIC. Standard UVC length is 25cm and not cut – dosing reflects the 25cm length.

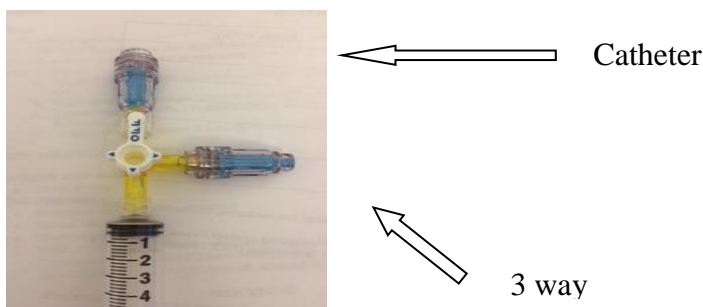
PICC Line	Dose
Vygon Premicath 1.1 Fr single lumen	Dose =(cm of catheter x 0.0045) x 1.1 + 0.22mL
Footprint Medical 1.4 Fr single lumen	Dose = (cm of catheter x 0.0047) x 1.1 + 0.22mL
Vygon Nutriline 2Fr single lumen	Dose = (cm of catheter x 0.004) x 1.1 + 0.22mL
Vygon Nutriline twinflo 2 Fr double lumen	Dose = (cm of catheter x 0.006) x 1.1 + 0.22mL
Argon 1.9Fr single lumen	Dose = (cm of catheter x 0.004) x 1.1 + 0.22mL
Medcomp Vascu-PICC 2.6Fr double lumen	Dose= (cm of catheter X 0.004) x 1.1 + 0.22mL

UVC	Dose
Covidien Argyle 2.5 Fr single lumen	Dose = 0.08mL x 1.1 + 0.22mL
Covidien Argyle 3.5 Fr single lumen	Dose = 0.15mL x 1.1 + 0.22mL
Covidien Argyle 3.5 Fr dual lumen: 20G lumen	Dose = 0.21mL x 1.1 + 0.22mL
Covidien Argyle 3.5 Fr dual lumen: 23G lumen	Dose = 0.16mL x 1.1 + 0.22mL
Covidien Argyle 5 Fr single lumen	Dose = 0.33mL x 1.1 + 0.22mL
Covidien Argyle 5 Fr dual lumen: 18G lumen	Dose= 0.32mL x 1.1 + 0.22mL
Covidien Argyle 5 Fr dual lumen: 21G lumen	Dose = 0.22mL x 1.1 + 0.22mL

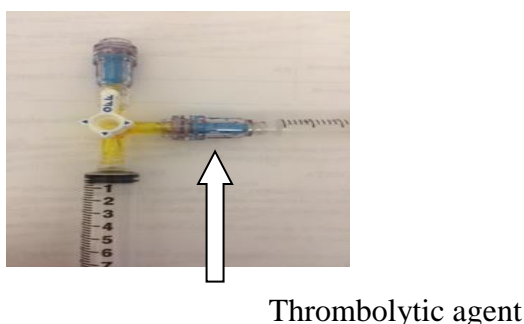
7. Instill into the occluded catheter using the following procedure at a concentration of 1mg/mL.

VIII. Instillation Procedure

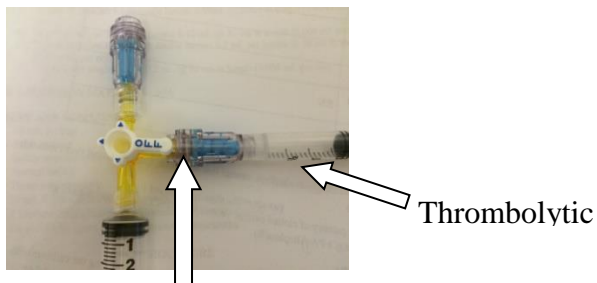
1. Scrub the connection site of the PICC line or UVC with chlorhexidine (CHG) for 15 seconds and allow to air dry for 30 seconds.
2. Connect single 3-way stopcock directly to hub with stopcock “off” to the patients.
3. Visualize a clock with the catheter in the 12 o’clock position.
4. Attach an empty 10 mL syringe at the 6 o’clock position



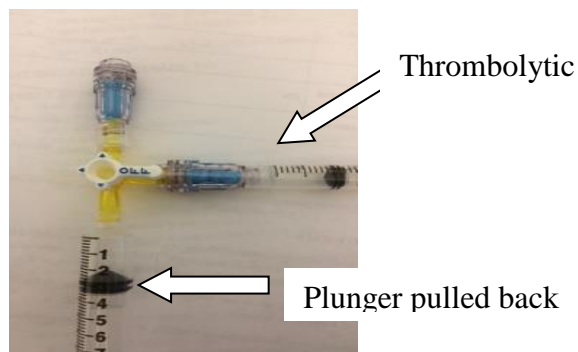
2. Attach the syringe containing the appropriate volume of thrombolytic agent at the 3 o’clock position



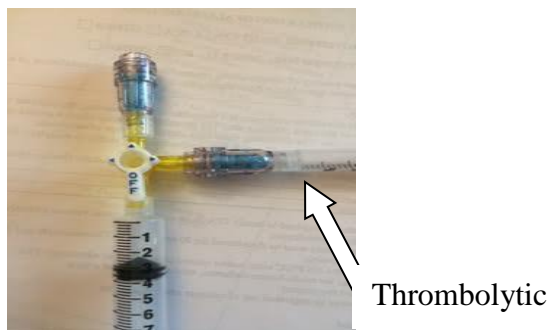
3. Turn the stopcock off towards the thrombolytic agent (3 o'clock position)



4. Pull the plunger in the 10 mL syringe (6 o'clock position) back as far as possible (generally to the 8-9 mL mark), causing a negative pressure in the catheter.



5. While maintaining negative pressure on the 10 mL syringe, turn the stopcock to the 6 o'clock position closing off access to the 10 mL syringe. This will allow a vacuum in the catheter to draw in the thrombolytic agent. DO NOT manually push thrombolytic agent into the catheter.



6. Turn the stopcock off to the patient (12 o'clock position). Label the site "DO NOT USE. ALTEPLASE in situ."



7. Wait recommended dwell time: initial dwell time 30 minutes up to 2 hours. Forceful injection may dislodge thrombus into the circulation or damage the catheter.
8. Following dwell time, open the stopcock to the 10 mL syringe. Aspirate the clot and drug into the syringe.
 - Once mixed, Alteplase is good for 8 hours at room temperature
9. If catheter remains occluded, obtain a second dose of t-PA, Alteplase® and repeat instillation procedure steps once more.
10. If a second attempt is unsuccessful, aspirate instilled drug and notify MD.
 - Catheter will need to be removed by RN PICC Team or MD.
11. If patency is restored, now using a 10 mL syringe, aspirate 0.5 mL to remove all drug and thrombus fragments.
 - Transient hypo/hypertension may occur if thrombolytic is not entirely removed and is infused into the circulation
12. Gently "push-flush" (using gentle, intermittent flushes with a 10 mL syringe to create turbulence in the catheter lumen) with 1-2 mL of normal saline flush and restart IV infusion.
13. Document medication administration in EPIC

IX. Documentation

- Patient's Electronic Health Record (Epic)



X. References

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