

Central Line Flush

PURPOSE

To outline the principles for maintaining the patency of central line catheters.

POLICY

1. A physician's (or other appropriate provider) order shall be obtained, specifying the type of flush solution, as well as the amount, concentration and frequency.
2. When appropriate, an RN may instruct the patient or caregiver in the flush procedure.
3. When heparin is indicated (for open-end devices), the lowest concentration shall be used to maintain catheter patency. This reduces the incidence of systemic anticoagulation, as well as the risk of heparin-induced thrombocytopenia. The standard for adults is 10 unit/ml. Pediatric concentrations range from 1-10 unit/ml. The flush solution should be preservative-free in neonates, as the benzyl alcohol cannot be metabolized by the immature liver.
4. The volume of the flush solution should be at least twice the volume of the catheter and any add-on devices.
5. Flushing with 0.9% Sodium Chloride is indicated for valved devices, as well as before and after medications that are not compatible with heparin. If using preserved 0.9% Sodium Chloride, no more than 30ml should be administered within a 24-hour period. For neonates and pediatric patients, preservative-free 0.9% Sodium Chloride should be used.
6. The central line catheter should be flushed to "lock" the catheter; before and after each infusion; before and after blood draws; between medication cassette or bag changes if indicated; or as ordered by physician. Flushing between medication cassette or bag changes may be inappropriate with certain medications, such as narcotics, inotropes and chemotherapy, as this can create a "bolus" situation.
7. While it is not necessary to use a 0.9% Sodium Chloride flush before and after medications compatible with heparin, it is recommended to do so in catheters that are 3 French or smaller, to decrease the chance of occlusion.
8. Valved catheters may require less frequent maintenance flushing with 0.9% Sodium Chloride, per manufacturer's guidelines. If sluggish activity is noted, the frequency may be increased to daily, or as ordered by the physician. As with open-end devices, the catheter should be flushed before and after each infusion; before and after lab draws; and between medication cassette and bag changes.

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9. Prior to administering medications (especially chemotherapy), the nurse should aspirate for a positive blood return to confirm patency. If flushing resistance is met, or no blood return is noted, additional steps should be taken to assess catheter patency. The catheter should NEVER be forcibly flushed.

10. Flushing technique is based on manufacturer's instructions related to the type of needleless connector being used. For the positive pressure caps, a "push-pause" technique should be used, stopping prior to the last 1/2ml of solution being administered. This prevents the syringe from creating negative pressure, which would draw blood back into the catheter.

Flushing Guidelines – Adult Central Lines			
Device	Solution	Volume	Frequency
PICC – open end	Heparin 10 unit/ml	3-5ml	As final flush after each use or every 24 hours when not in use
	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration
PICC - valved	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration; daily to weekly when not in use
Non-tunnelled	Heparin 10 unit/ml	3-5ml	As final flush after each use or every 24 hours when not in use
	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration
Non-tunnelled – valved	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration; daily to weekly when not in use
Tunnelled	Heparin 10 unit/ml	3-5ml	As final flush after each use or at least 1-2 times per week when not in use

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	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration
Flushing Guidelines – Adult Central Lines (Cont'd)			
Device	Solution	Volume	Frequency
Tunnelled – valved	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration; at least weekly when not in use
Implanted Port	Heparin 10 unit/ml	5ml	As final flush after multiple medication or solution administrations per day
	Heparin 100 unit/ml	5ml	As final flush before de-accessing and at least monthly
	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration; prior to de-accessing & to confirm needle placement with port access
Implanted Port - valved	0.9% Sodium Chloride	10ml (20ml after TPN & chemotherapy administration)	Before and after each medication/solution administration; prior to de-accessing & to confirm needle placement with port access
<p>Note:</p> <ol style="list-style-type: none"> 1. All vascular access devices require a minimum of a 10ml syringe size for flushing and maintenance. 2. It is best practice to use preservative-free 0.9% Sodium Chloride. If preserved 0.9% Sodium Chloride must be used, the daily amount should not exceed 30ml. 3. While in design theory a valved catheter does not require the use of heparin as a final flush, it may be necessary to use heparin if the valve becomes ineffective. 4. Unused lumens shall be flushed as ordered, using the above maintenance guidelines. 			

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EQUIPMENT

Liquid soap or hand sanitizing gel

10ml syringe with 3-5ml heparin (10 unit/ml or 100unit/ml as ordered/applicable)

10ml syringe with 10ml of 0.9% Sodium Chloride (preferably preservative-free)

Alcohol swabs

Swab Caps

PROCEDURE

1. Confirm physician orders. Explain procedure to patient.
2. Wash hands thoroughly with soap and water. Dry with clean paper towel.
3. Arrange supplies on a clean surface.
4. Cleanse the needleless connector with alcohol, using friction for at least 15 seconds, and optimally for 60 seconds. Allow alcohol to dry.
5. If administering a medication or solution, flush catheter with 10ml of 0.9% Sodium Chloride, using the push-pause method. Stop at the last 0.5ml of solution.
6. Administer medication or solution as directed. Cleanse needleless connector with alcohol, using friction for at least 15 seconds, and optimally for 60 seconds. Allow alcohol to dry. Flush catheter with 10ml (20ml for TPN and chemotherapy) of 0.9% Sodium Chloride, using the push-pause method. Stop at the last 0.5ml of solution. Attach new Swab Cap when flushing completed.
7. If catheter is open-ended, flush with 3-5ml of heparin solution (10 unit/ml or 100 unit/ml as ordered). Unused lumens (if applicable) to be flushed as ordered with either heparin or 0.9% Sodium Chloride, based on catheter type.
8. If performing catheter maintenance only, cleanse cap with alcohol, using friction for at least 15 seconds, and optimally 60 seconds. Allow alcohol to dry. Flush with ordered amount of 0.9% Sodium Chloride or heparin (10 unit/ml or 100 unit/ml) with frequency and type of solution based on catheter type. Repeat with other lumens, if applicable. Attach new Swab Cap when flushing completed.
9. Document procedure in the patient's medical record.

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RESPONSIBILITY

The Clinical Director and Clinical Specialist have responsibility for approval of, compliance with, and revisions to this policy.

MODIFICATION/REVISION

This policy is subject to modification or revision in part or its entirety to reflect changes in conditions subsequent to the effective date of this policy.

REFERENCES

1. Infusion Nursing Standards of Practice – Revised 2016; Journal of Infusion Nursing, Supplement to January/February 2016, Volume 39, Number 1S.
2. Infusion Nursing: An Evidence-Based Approach, Third Edition edited by Mary Alexander, Ann Corrigan, Lisa Gorski, Judy Hankins, and Roxanne Perucca.
3. INS (Infusion Nurses Society) Policies and Procedures for Infusion Nursing, 3rd Edition.