



Fundamentals of Flushing and Locking

Purpose, Product, and Process

The following is for informational use and not intended to set or be a replacement of your hospital protocols or procedures.



Purpose

The **Purpose** lesson provides an overview of:

- Flushing and locking
- The ACLs of flushing and locking
 - Assess
 - Clear
 - Lock
- Vascular Access Devices (VAD) complications
 - Types and causes
 - Prevention and detection of complications
 - Flushing and locking



Flushing and Locking

Flushing

The Infusion Nurses Society (INS) defines flushing as the act of moving fluids, medications, blood and blood products out of a VAD and into the bloodstream to assess and maintain patency and prevent precipitation due to solution/medication incompatibility.¹



Locking

Is the instillation of a solution into a VAD to maintain device patency¹

INS advises, “Do not use pre-filled flush syringes for dilution of medications. Differences in gradation markings, an unchangeable label on pre-filled syringes, partial loss of the drug dose, and possible contamination increase the risk of serious medication errors.”¹

ACLs of Flushing and Locking²

A



Assess the status and function of the vascular access device to confirm location and patency

C



Clear medications and solutions from the vascular access device to avoid any incompatibilities

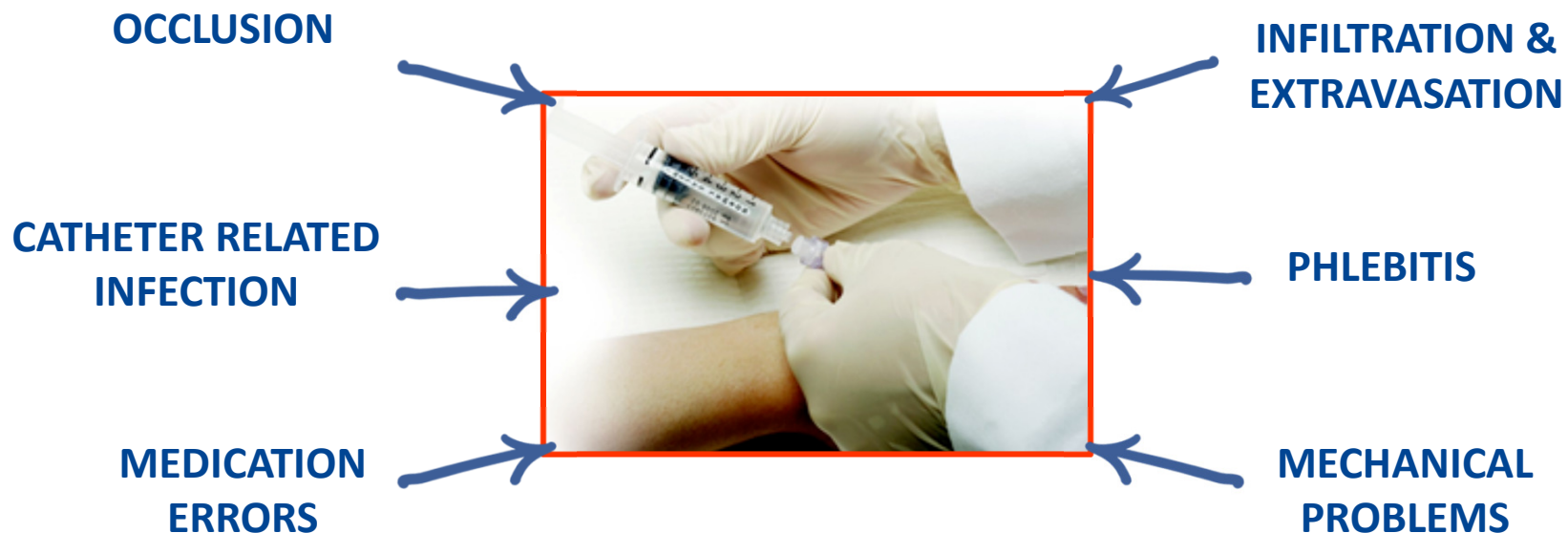
L



Lock the VAD during periods of nonuse to ensure patency

VAD Complications³

The use of VADs is associated with a variety of **complications**. Flushing and locking VADs can help prevent and detect VAD-related complications, including:



Complications related to VADs may lead to increased:

- *Risks to the patient*
- *Patient care hours for nurses and physicians*
- *Costs to the patient and healthcare facility*

Process

Before flushing and locking a VAD, the following must be carefully **selected**:

- Method of infusion
 - Continuous infusions are administered at a consistent rate over a specific period
 - Intermittent infusions are prescribed when continuous fluids are not required and are administered at over a specific period
- Type of VAD
- Infusion line connectors and adapters
- Flushing and locking solutions
 - Solution volumes
 - Solution containers
- Syringe size
- Catheter pressure

Know and follow facility procedures. Each facility may have different policies and procedures for flushing and locking VADS.



Selection: Flush and Lock Solutions

VADs are indwelling catheters or cannulas used to obtain **venous access**. There are several types of VADs. The types of flushing solution and volumes used depend on the type of VAD being used.²

Solutions used for flushing include:

- 0.9% sodium chloride
 - Not made with made with preservatives
- Diluted heparin solutions
 - Heparinized saline

Volume of saline used for flushing depends upon:

- The purpose of the flush
- The type of VAD
- Patient-specific considerations
 - Fluid restriction, etc.



The type of VAD used should be carefully matched to the infusion method/requirements for each individual patient.¹

Selection: Syringe

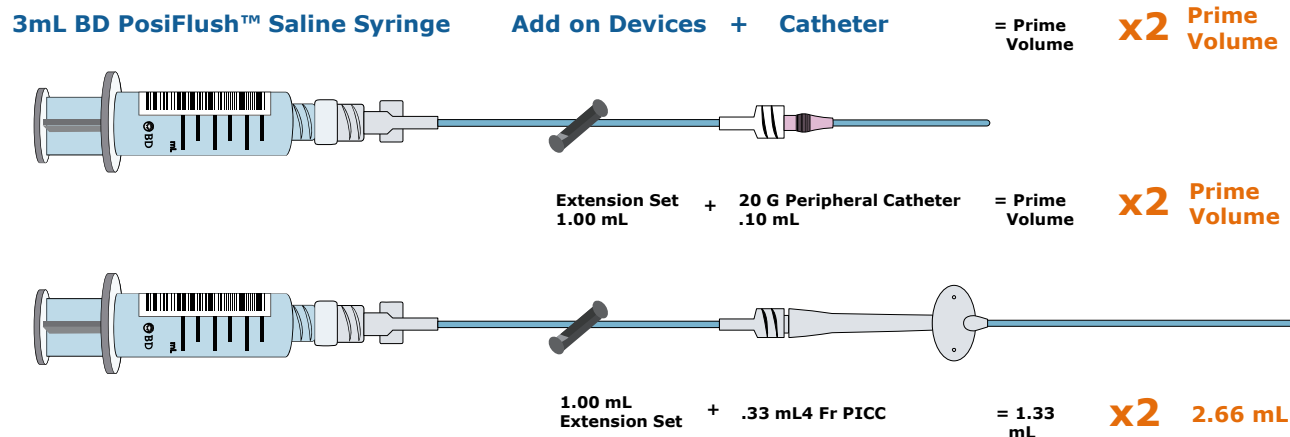
Syringe **size** and **catheter pressure**⁴

- Intraluminal pressure rises when the force applied to the syringe plunger meets resistance inside the catheter lumen or vessel⁴
 - This pressure can reach a level that causes catheter rupture
- Infusion Nurses Society, *2016 Infusion Therapy Standards of Practice*, recommends to assess VAD functionality by using a 10 mL syringe or a syringe specifically designed to generate lower injection pressure (ie, 10 mL diameter syringe barrel), taking note of any resistance¹
- BD PosiFlush™ Pre-Filled Syringes have a consistent 10 mL syringe barrel diameter which may help lower the risk of catheter damage caused by injection pressure.

Large-diameter syringe barrels generate smaller amounts of pressure compared to small-diameter syringe barrels assuming the same force is applied to the plunger.⁴

Selection: Flush Volume

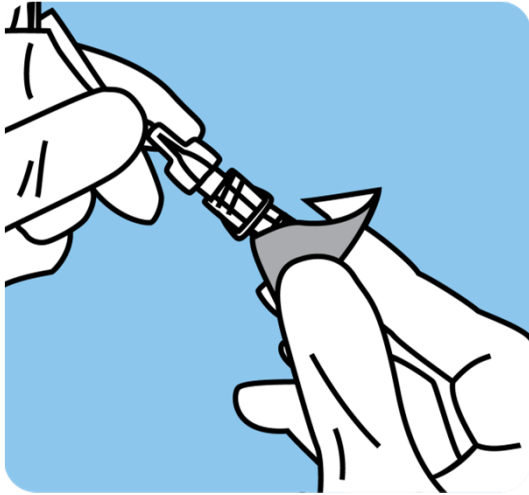
Use a minimum **volume** equal to twice the internal volume of the catheter system, (e.g. catheter plus add-on devices) to **flush** the catheter system.¹



A 3mL BD PosiFlush™ Saline Syringe provides more than twice the priming volume as recommended by industry guidelines when flushing a short peripheral IV catheter (PIVC).

Disinfection

Disinfecting the surface of the connector before the connection of each syringe or IV set is a critical step in reducing the entrance of organisms into the VAD lumen.¹



Infusion Nurses Society recommends the following best practice protocols for the disinfection of needleless devices¹:

- Perform disinfection of connection surfaces (ie, needleless connectors, injection ports) before flushing and locking procedures.
- Use vigorous mechanical scrubbing methods even when disinfecting needleless connectors with antimicrobial properties.
- After disinfectant cap removal, multiple accesses of the VAD may be required to administer a medication and require additional disinfection before each entry.
- Consider using a vigorous 5- to 15-second scrub time with each subsequent entry into the VAD, depending upon the needleless connector design.
- Acceptable disinfecting agents include 70% isopropyl alcohol, iodophors, or >0.5% chlorhexidine in alcohol solution.
- Ensure that disinfecting supplies are readily available at the bedside to facilitate staff compliance with needleless connector disinfection.

BD PosiFlush™ SureSrcub™ Pre-Filled Syringe enables clinicians to follow best practices and guidelines for disinfection of needleless connectors.



Product

The **Product** lesson provides an overview of pre-filled flush syringes used to flush VADs, with a focus on the:

- BD PosiFlush™ Pre-Filled Syringe
 - Benefits Product Portfolio
 - Features
 - Instructions for Use



BD PosiFlush™ Pre-Filled Syringes Product Portfolio

BD PosiFlush™ Pre-Filled syringes are available in several options:



BD PosiFlush™ Pre-Filled Saline Syringe

3 mL, 5 mL, and 10 mL
have a consistent 10mL
syringe barrel diameter.



BD PosiFlush™ SF Normal Saline Syringe

May be used on sterile
fields and are provided in
sterile packages.



BD PosiFlush™ Heparin Lock Flush Syringe

Intended for maintenance
of patency of vascular
access devices.



BD PosiFlush™ SureScrub™ Pre-Filled Syringe

Enables clinicians to follow
best practices and guidelines
for disinfection of needless
connectors.



BD PosiFlush™ Pre-Filled Syringe Features

BD PosiFlush™ Pre-Filled Saline syringes are designed for flushing and locking of indwelling vascular access devices.

Features, by key step, include:

- **Selection**

- Bar code on each syringe
- Bold print for clarity
- Proper medication labeling requirements
- 3 mL, 5 mL and 10 mL syringe availability to accommodate flushing volume needs

- **Preparation**

- Improves clinician efficiency, as compared with manual preparation
- Terminally sterilized SAL 10^{-6}
- Designed to prevent solution from entering a non-sterile area of the syringe



The BD PosiFlush™ Pre-Filled Syringe supports efforts to reduce the risk of medication errors by meeting Joint Commission and ISMP medication labeling guidelines.



BD PosiFlush™ Pre-Filled Syringe Features

- **Administration**

- BD PosiFlush™ Pre-Filled Syringes have a consistent 10mL syringe barrel diameter which may help lower the risk of catheter damage caused by injection pressure.
- Latex and preservative free

- **Disposal**

- Utilizing smaller sized (3mL and 5mL) BD PosiFlush™ Pre-Filled Syringes helps to reduce disposal waste.
- BD PosiFlush™ Pre-Filled Syringes are packaged in 100% recyclable content.



The use of BD PosiFlush™ Pre-Filled Syringes complies with major PICC manufacturer recommendations for flushing with a 10 mL syringe.

BD PosiFlush™ Pre-Filled Saline Syringes

Instructions for Use

- Tear open package at either end and remove syringe
- Depress plunger with **tip cap on** to relieve the resistance between the stopper and the barrel. This step is known as “breaking the seal”
- Disinfect the connector, per facility policy
- Using an aseptic technique, remove the syringe tip cap from the FLUSH syringe by twisting it off
- Hold the syringe upright and expel the air and any excess solution in the syringe by positioning the front rib of the gray plunger tip at desired solution volume
- Attach the syringe to the injection site and flush, per facility policy
- Discard used syringe, including any unused solution, per facility policy
- DO NOT REUSE



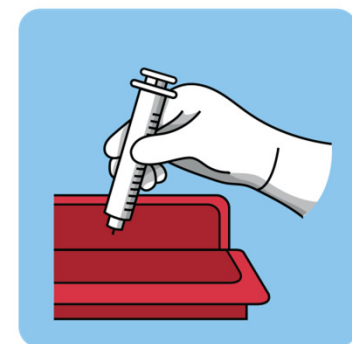
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References

1. Infusion Nurses Society. Infusion Nursing Standards of Practice. Journal of Infusion Nursing. 2016; S51,S68-69,S77-S79,S149-S151.
2. Hadaway, L. Principles of flushing vascular access devices. Franklin Lakes, NJ: Becton Dickinson, 2006: 6-8.
3. Helm R, Klausner J, Klemperer J, Flint L, Huang E. Accepted but unacceptable: peripheral IV catheter failure. J Infus Nurs. 2015 May-Jun;38(3):189-203
4. Macklin D. What's physics go to do with it? Journal of Vascular Access Devices. 1999;4(2):7-13.