PowerPort* IMPLANTABLE PORT

PowerLoc* Safety Infusion Set

Guidelines for Nurses

1 IDENTIFYING A PATIENT WITH THE POWERPORT* IMPLANTABLE PORT

Check patient's chart for a PowerPort* device **patient record sticker**.

For all PowerPort* devices:

- **Ask the patient.** Patients with a PowerPort* Implantable Port should have a patient identification card, ID bracelet or key ring to help remind them they have a PowerPort* device.
- **Always verify** the patient has a PowerPort* device by at least two means, and ensure it is accessed with a PowerLoc* Safety Infusion Set Family† device, prior to power injection.

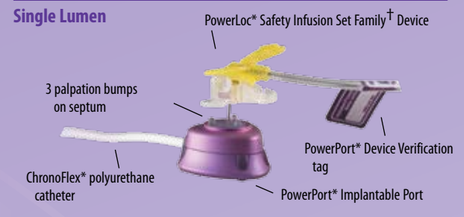
For single lumen PowerPort* devices:

- Palpate top of port to identify **three palpation bumps** on the septum, arranged in a triangle.
- Palpate the sides of the port to identify **triangular** port housing.

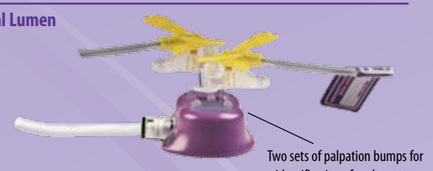
For dual lumen PowerPort* devices:

- Palpate top of each septum to identify **three palpation bumps** arranged in a triangle.

Single Lumen



Dual Lumen



Check patient chart

Ask your patient

Feel for triangle shape

Feel for bumps on septum

Double Check

*Feel the NEW Standard of Care**

The PowerPort* Implantable Port is an implantable access device designed to provide repeated access to the vascular system. Port access is performed by percutaneous needle insertion using a non-coring needle. Power injection is performed using a PowerLoc* Safety Infusion Set Family† device only.

The PowerPort* system can be used for infusion of medications, I.V. fluids, parenteral nutrition solutions, blood products, and for the withdrawal of blood samples. All materials are biocompatible, can be used with virtually all injectable solutions and are safe with CECT.

For implantable ports with Groshong* catheters, heparin lock procedures are not necessary. Sterile normal saline may be used.

What's Different About The PowerPort Implantable Port?*

The PowerPort* Implantable Port is the FIRST implantable access device indicated for power injection of contrast media during CECT scans.

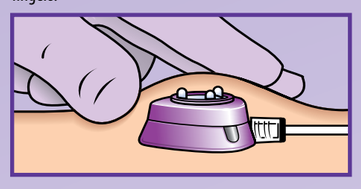
- Contrast enhanced computed tomography (CECT) produces quick, accurate visualizations used to track tumor markers or pulmonary embolisms.
- During power injection, the CT Team injects a contrast agent at a high-rate into the bloodstream in order to achieve the most detailed images of the area being scanned.
- Power injection produces superior images that can reveal small details in soft tissue.
- Like all implantable ports, the PowerPort* device eliminates repeated needle sticks in the arm or wrist.

2 USE AND MAINTENANCE

Accessing Implantable Ports

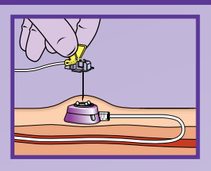
Procedure:

1. Perform aseptic site preparation.
2. Locate port septum by palpation.
   a. Locate base of port with non-dominant hand.
   b. Triangulate port between thumb and first two fingers of non-dominant hand. Aim for center point of these three fingers.



Note: For dual lumen PowerPort* devices: locate center by palpating Septum-Finder* Ridge on top of port and place index finger of dominant hand to mark.

3. Insert PowerLoc* Safety Infusion Set Family† device perpendicular to port septum. Advance needle through the skin and septum until reaching bottom of reservoir.



4. Confirm correct positioning of the needle within the port reservoir by aspiration of blood ("flashback"). If there is doubt regarding proper needle placement, have a radiographic dye procedure done to confirm placement.
5. Always flush the port following injection.
6. Perform heparin lock procedure for open-ended catheters. For implantable ports with Groshong* catheters, a sterile normal saline lock may be used. For dual lumen PowerPort* devices, perform locking procedures on each septum.
   Caution: Remember that some patients may be hypersensitive to heparin or suffer from heparin induced thrombocytopenia (HIT) and these patients must not have their port locked with heparinized saline.
7. After therapy completion, flush port per institutional protocol. Close clamp while injecting the last 0.5 mL of flush solution. Use positive pressure technique.

Lock Procedures for Catheters

To help prevent clot formation and catheter blockage, implantable ports should be flushed per institutional protocol using a turbulent push-pause flushing method after each use. Clamp the tubing while infusing the last 0.5 mL of fluid to reduce potential for blood back-flow into the catheter tip, which could encourage catheter clotting. If the port remains unused for long periods of time, the 5 mL heparin solution or normal saline should be changed at least every four weeks for each septum. **Caution:** Remember that some patients may be hypersensitive to heparin or suffer from heparin induced thrombocytopenia (HIT) and these patients must not have their port locked with heparinized saline.

Determine Port Volume

To calculate a close approximation of port system volume for each lumen, you will need to check the patient's chart to determine the length of the catheter used for each individual patient. For PowerPort* implantable port catheters, use formula and tables below:

Port System Volume: Catheter length: _____cm x $\frac{\text{catheter volume}}{\text{cm}}$ + reservoir volume.

CATHETER VOLUMES	
Procedure	$\frac{\text{volume}}{\text{cm}}$ (per lumen)
6F ChronoFlex* catheter	0.014 mL
8F ChronoFlex* catheter	0.02 mL
9.6F Silicone catheter	0.02 mL
8F Groshong* catheter	0.02 mL
9.5F ChronoFlex* (dual lumen)	0.02 mL

RESERVOIR VOLUMES	
Port	Reservoir Volume (per lumen)
PowerPort*, PowerPort* isp, PowerPort* Duo Implantable Port	0.6 mL
PowerPort* Slim Implantable Port	0.5 mL

Note: This calculated volume represents the port system volume for each port reservoir.

Recommended Flushing Volumes:

Open-Ended Catheter Flushing Volumes (per lumen)

FLUSHING VOLUMES	
Procedure	**Volume (100 U/mL)**
When port is not in use	5 mL heparinized saline every 4 weeks
After each infusion of medication or TPN	10 mL sterile normal saline, then 5 mL heparinized saline
After blood withdrawal	20 mL sterile normal saline, then 5 mL heparinized saline
After power injection of contrast media	10 mL sterile normal saline, then 5 mL heparinized saline

Groshong* Catheter Flushing Volumes (per lumen)

FLUSHING VOLUMES	
Procedure	**Volume (100 U/mL)**
When port is not in use	5 mL sterile normal saline every 4 weeks
After each infusion of medication or TPN	10 mL sterile normal saline
After blood withdrawal	20 mL sterile normal saline
After power injection of contrast media	10 mL sterile normal saline

Procedure:

Review Site Preparation in the PowerPort* Nursing Guide, and Accessing Implantable Ports section before proceeding with the following:

1. Explain procedure to patient and prepare injection site.
2. Attach a 10 mL syringe filled with sterile normal saline to needle.
3. Aseptically locate and access port with PowerLoc* Safety Infusion Set Family† device, or other non-coring safety needle. Confirm correct positioning of the needle within the port reservoir by aspiration of blood ("flashback"). If there is doubt regarding proper needle placement, have a radiographic dye procedure done to confirm placement.
4. After therapy completion, flush each lumen per institutional protocol. Close clamp while injecting last 0.5 mL of flush solution.

Note: Alcohol should not be used to soak or declot polyurethane catheters because alcohol is known to degrade the polyurethane catheters over time with repeated and prolonged exposure.

Check for patency prior to power injection
Aspirate for adequate blood return and vigorously flush the port with at least 10 mL of sterile normal saline.

Warning:
Failure to ensure patency prior to power injection studies may result in port system failure.

3 TROUBLESHOOTING GUIDE

I. Aspiration Difficulties: DO NOT POWER INJECT IF YOU CANNOT ASPIRATE AS PATIENT INJURY MAY RESULT

A. Possible Causes:

1. Failure to flush adequately, resulting in lumen obstruction.
2. Catheter tip sucking up to vein wall with aspiration.
3. Blood clot, fibrin sheath, or particulate matter obstructing lumen when catheter is aspirated.
   - A clot or other obstruction in the catheter lumen can produce a one-way valve effect. During infusion, the catheter wall expands slightly and allows fluid to flow around the plug. During aspiration, the catheter wall contracts slightly, tightening down around the obstruction and preventing aspiration.
   - Fibrin sheaths usually begin to form within a few days after the insertion of a central venous catheter. If it has grown enough to extend to the tip of the catheter, it may be pulled into and obstruct the catheter opening when aspiration is attempted, but there will be no resistance to infusion.
4. Compression or transection of the catheter between the clavicle and first rib ("pinch-off area").
5. Kinked catheter.
   - Catheter may be pulled too tightly through skin tunnel, causing kink at vessel insertion site, or where it curves into the subcutaneous tunnel.
   - Catheter may be curled or kinked within the vessel, or under the dressing.
6. Malposition of catheter tip (i.e. jugular vein, outside of vein).
7. Improper catheter length selection for patient size.

B. Possible Solutions:

1. If no resistance to infusion is felt, attempt to flush with 10 mL normal saline. Then pull back gently on syringe plunger 2-3 mL, pause and proceed with aspiration.
2. If resistance to infusion is felt, check for signs of extravasation. If present, notify physician of possible catheter leakage or transection and embolization. If not present, see step 4.
3. Attempt to aspirate with a 20 mL syringe.
4. Move patient's arm, shoulder and head to see if a change in position will allow aspiration. If aspiration can only be accomplished with the patient in a certain position, the patient should be examined to see if the catheter has been placed in the "pinch-off" area.
5. Obtain physician's order for a chest x-ray to determine the position of the catheter.
   - If the catheter tip is not in the superior vena cava, the catheter should be repositioned.
   - If the catheter tip is not in a vein, the catheter should be replaced.
   - If the catheter has been placed through the "pinch-off" area, between the clavicle and the first rib, and is being compressed enough to interfere with infusion or aspiration, it is at risk for catheter transection and embolization. The physician should evaluate the patient for catheter replacement.

II. Patient with Fever and/or Infection:

Symptoms:

- Inflammation at incision site
- Fever
- Positive site culture / or blood cultures

If signs of fever and/or infection are present:

- Notify physician

III. Insufficient Flow: DO NOT POWER INJECT IF RESISTANCE TO FLUSHING SEEMS EXCESSIVE

Excessive force must not be used to flush an obstructed lumen. Insufficient blood flow may be caused by the catheter contacting the wall of the vein. The physician may attempt to dissolve the clot with a fibrinolytic agent before power injecting. Physician discretion advised.

Equipment:

- PowerLoc* Safety Infusion Set Family† device, or other non-coring safety needle. Choose a needle length based on reservoir depth, tissue thickness and the thickness of any dressing beneath the bend of the needle.
- Syringe containing port priming volume of a fibrinolytic agent.
- Syringe filled with sterile normal saline.

Procedure:

Review Site Preparation in the PowerPort* Nursing Guide and Accessing Implantable Ports section before proceeding with the following:

1. Explain procedure to patient and prepare injection site.
2. Aseptically locate and access the desired septum with needle attached to syringe, void of air and filled with port priming volume of fibrinolytic agent.
   Warning: If accessing a PowerPort* device with a PowerLoc* Safety Infusion Set Family† device, do not affix the PowerLoc* Safety Infusion Set Family† device sticker that indicates the system can be power injected. Power injecting a blocked catheter could lead to catheter damage and patient injury.
3. Gently instill fibrinolytic solution. Use a gentle pull-push action on the syringe plunger to maximize solution mixing within port and catheter.
   Warning: Occluded catheter may not accept all of the solution. If strong resistance is felt, do not attempt to force into catheter.
4. Leave solution in place according to drug manufacturers recommendation and/or doctor's orders.
5. Attempt to aspirate solution and the clot(s).
6. If the clot(s) cannot be aspirated, repeat procedure.
7. Once the blockage has been aspirated and discarded, flush catheter with at least 20 mL of sterile normal saline.
8. Flush the catheter with 5 mL of heparinized saline for each lumen or normal saline for Groshong* catheters. **Caution:** Remember that some patients may be hypersensitive to heparin, or suffer from heparin induced thrombocytopenia (HIT). These patients must not have their ports flushed with heparinized saline.
9. After therapy completion, flush port per institutional protocol. Close clamp while injecting last 0.5 mL of flush solution. Use positive pressure technique.

IV. Catheter Occlusion: DO NOT POWER INJECT AN OCCLUDED DEVICE

A. Possible Causes:

1. Blood clot completely obstructing lumen.
2. May be kinked, coiled, damaged, or compressed between the clavicle and the first rib.
3. Catheter tip may not be within vein.
4. May be partially or completely transected. Transection can occur from the repeated pressure of the clavicle and the first rib on the catheter during normal movement if it is placed through the "pinch-off" area.
5. Improper catheter length for patient size.
6. Catheter can be blocked from lipid and/or protein deposition.

B. Possible Solutions:

1. Ask responsible nurse or physician to attempt to aspirate blood clot.
2. Move patient's arm, shoulder and head to see if position change affects ability to infuse.
3. Obtain physician's order for a chest x-ray to determine the position of the catheter to rule out "Pinch-off". The patient's arms should be down the patient's side to rule out "Pinch-Off" syndrome.
   - If the catheter tip is not in the superior vena cava, the catheter should be repositioned.
   - If the catheter tip is not in a vein, the catheter should be replaced.
   - If the catheter has been placed through the "pinch-off" area, between the clavicle and the first rib, and is being compressed enough to interfere with infusion or aspiration, it is at risk for catheter transection and embolization. The physician should evaluate the patient for catheter replacement.

V. Use of Fibrinolytic Agent for Catheter Blockage

Use of a fibrinolytic agent has successfully cleared clotted catheters when gentle irrigation and aspiration have failed. The instructions provided by the drug manufacturer should be followed. Alcohol should not be used to soak or declot polyurethane catheters because alcohol is known to degrade polyurethane catheters over time with repeated and prolonged exposure.

Signs of Pinch-off:

Clinical:

- Difficulty with blood withdrawal
- Resistance to infusion of fluids
- Patient position changes required for infusion of fluids or blood withdrawal

Radiologic:

- Grade 1 or 2 distortion on chest X-ray.

"Pinch-off" should be evaluated for degree of severity prior to explantation. Patients indicating any degree of catheter distortion at the clavicle/first rib area should be followed diligently. There are grades of "pinch-off" that should be recognized with appropriate chest x-ray as follows:

Grade	Severity	Recommended Action
Grade 0	No distortion	No action
Grade 1	Distortion present without luminal narrowing	Chest x-ray should be taken every one to three months to monitor progression of pinch off to grade 2 distortion. Shoulder position during chest x-rays should be noted as it can contribute to changes in distortion grades.
Grade 2	Distortion present with luminal narrowing	Removal of the catheter should be considered.
Grade 3	Catheter transection or fracture	Prompt removal of the catheter.

BARD ACCESS SYSTEMS

Bard Access Systems
Salt Lake City, UT USA
1-801-522-5000
Clinical Information: 1-800-443-3385
Ordering Information: 1-800-545-0890

www.bardaccess.com
www.portadvantage.com
www.powerportadvantage.com

This product and packaging do not contain natural rubber latex

This device does not contain DEHP

MR For MR Conditions, call: 1-800-443-3385

† PowerLoc*, PowerLoc* Clear, PowerLoc* MAX Safety Infusion Sets

Please consult product labels and inserts for any indications, contraindications, hazards, warnings, cautions, and instructions for use.

MC-0477-01 0909R