The Use of Central Venous Lines, PICC Lines, Ports for the Power Injection of Contrast

Purpose:

Contrast may be power injected into CV, PICC and Ports that are approved for this use. This policy will provide guidance for identifying and using these products.

Central Venous Catheters

Policy:

For the purpose of this policy central venous catheters (CVC) will be divided into 2 categories:

- Standard CVC
- Power injector compatible CVC – Catheters designed and FDA approved for high flow power injection of rates up to 5cc/mm and rated to 300 psi.

Central Medical Supply will stock the **Arrow Power injector compatible CVC**. The catheter can be identified by labeling on the hubs. The catheter is labeled on the extension leg, junction and clamp ID tag. The catheter has three separate hubs that can be utilized. The violet hub on the catheter has a maximum infusion rate of 10ml/sec and a maximum pressure rating of 300 psi. The blue and white hub has a maximum infusion rate of 5mls/sec and a maximum pressure rating of 300 psi. When these catheters are used on a contrast power injector, the injector limits must be set to prevent the flow or pressure from exceeding the products maximum ratings.

**Other Brands of Power Injectable CVC** - If a catheter other than this type is encountered that is labeled as power injectable compatible, it should not be used until the psi and flow rating have been verified. If the product manufacturer and model can be determined, this information may be available on the manufacturer’s website. If the information can be accessed, contact the radiologist for approval to use the CVC for power injection.

**Exceptions for Use of Standard CVC for Power Injection** – The standard CVC is not to be used for the injection of contrast unless approved by the radiologist. The radiologist may determine that the need for the contrast study is critical and that the CVC is the only route available for injection. A resident may approve the standard CVC for hand injection but a **staff radiologist** must approve its use with a power injector. For use with a power injector the staff radiologist will provide the technologist an order for the flow settings and limits to be set on the injector.

**Infection Control** - The power injection catheter should be removed immediately when it is no longer needed for radiological testing or if the patient develops signs or symptoms of infection. Otherwise, if the catheter is antimicrobials it can remind in place for 30 days. Refer to Infection Control Policy 16.0.
Procedure

1. Before the patient is sent to Radiology, the RN will aspirate the catheter port and flush it with normal saline. The RN will then label the port with date, time and initials to ensure the correct port is used.

2. The technologist will identify the CVC as power injector compatible prior to connecting it to the power injector. Note: If the CVC is not power injector compatible, peripheral access will be used unless otherwise instructed by the staff radiologist.

3. The technologist will flush the port with 10ml of normal saline before exam.

4. The technologist will set the injector per exam protocol and set the limits appropriately (not to exceed 5ml/min).

5. After the exam, the technologist will flush the catheter with 10ml normal saline to ensure that the contrast is flushed from the port.

PICC Lines

Policy:

In order for a PICC line to be used for the power injection of contrast it must be approved for use with a power injector. The AngioDynamics Morpheus CT PICC is stocked by Central Medical Supply.

Catheter Placement – After placement of the catheter, the implant record in the EHR must be completed. In addition the procedure report must include the PSI rating and flow rate setting of the PICC line implanted. The following information will be on the progress note:

☐ Type of catheter placed
☐ PSI rating for power injection
☐ Flow rate setting for power injection

Procedure for AngioDynamics Morpheus CT PICC:

1. Prior to power injecting the catheter it must be identified as power injectable. This catheter can be identified by the tag at the hub labeled “CT” and the AngioDynamics brand name.
The catheter may be a single or dual lumen but in either case, it is clearly labeled. The size of the catheter is also labeled and is important in determining the maximum flow rate. The table below shows the flow rates.

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Maximum Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Lumen</td>
<td>3F*</td>
<td>0.5cc/sec*</td>
</tr>
<tr>
<td>Single Lumen</td>
<td>4F</td>
<td>4cc/sec</td>
</tr>
<tr>
<td>Single Lumen</td>
<td>5F</td>
<td>6cc/sec</td>
</tr>
<tr>
<td>Dual Lumen</td>
<td>5F</td>
<td>4cc/sec</td>
</tr>
<tr>
<td>Dual Lumen</td>
<td>6F</td>
<td>6cc/sec</td>
</tr>
<tr>
<td>Dual Lumen</td>
<td>7F</td>
<td>7cc/sec</td>
</tr>
</tbody>
</table>

*The maximum psi for the 3F is **250 psi**. This catheter is stocked only in Interventional Radiology.

The maximum pressure for the 4F, 5F, 6F and 7F is **300 psi**. When these catheters are used on a contrast power injector, the injector limits must be set to prevent the flow or pressure from exceeding the product maximum rating. If there is any uncertainty about the use of the catheter or settings contact the radiologist for clarification.

**Other Brands of Power Injectable PICC** - If a PICC other than the AngioDynamics product is encountered that is labeled as power injectable compatible, it should not be used until the psi and flow rating have been verified. If the product manufacturer and model can be determined, this information may be available on the manufacturer’s website. If the information can be accessed, contact the radiologist for approval to use for power injection.

**PORTS**

**Policy:**

A physician’s or authorized prescriber’s order is required for accessing a power injectable port. A nurse will access the port and prepare it for use by the technologist. The technologist is **responsible** for verifying identification of the port and following correct procedure for use of the port. The port must **always** be identified by the methods and criteria described in this policy. **If the technologist is unable to clearly identify the port as power injectable, peripheral access will be used unless directed otherwise by a staff radiologist.**

Central Medical Supply stocks the **AngioDynamics Smart Port** but other types of power injectable ports will be encountered.

**Procedure Specific to the AngioDynamics Smart Port:**
1. Prior to injecting contrast media via a power injector confirm the patient has a Smart Port. This port cannot be identified by palpation. Refer to port identification section of this policy.

2. Always use contrast from the contrast warmer and ensure that it has been warmed to body temperature.

3. Ensure that the power injector settings DO NOT exceed the maximum flow rates and pressure settings provided by the manufacturer.
   a. Maximum flow – 5ml/sec
   b. Maximum pressure – 300psi

4. Release the clamp on the safety infusion set tubing. Flush the Smart Port with 10–20 mL 0.9% normal saline. The device should flush without resistance.

5. Close the clamp of the Safety Infusion Set tubing.

6. Remove the syringe from the Safety Infusion Set and attach the power injection tubing to the luer hub end of the safety infusion set. Release the clamp.

7. Instruct the patient to communicate immediately any pain or change in feeling during the injection. Perform the study.

8. If local pain, swelling or signs of extravasation are noted, the injection should be stopped immediately. NOTE: REFER TO EXTRAVASTION POLICY.

9. Close the clamp. Disengage the power injection tubing from the luer hub end of the safety infusion set.

10. Flush the Smart Port with 10–20 mL 0.9% normal saline.

11. If bleeding occurs at site, apply direct pressure using sterile gauze sponge.

12. Apply dressing if needed.


Power Port Identification:

Policy:
1. It is the responsibility of the technologist to determine if the port is power injectable prior to using it. Two identifiers are to be used for verification. The procedures below will define the methodology for identification. Acceptable identifiers are:
   a. Implant identification provided by the patient, i.e. implant care, key chain or ID bracelet.
   b. Visualization on chest x-ray or CT scout. The letters “CT” must be clearly visible.
   c. Procedure note in the EHT confirming the type of port placed.
   d. Palpation – the BARD port can be identified by its triangular shape and palpation bumps.

2. The following criteria are not to be used in confirmation of a power port:
   a. The nurse accessed the port
   b. The nurse stated that the port is power injectable
   c. The patient states that the port is power injectable

3. There will be situations where a port may be difficult to identify. The technologist should always consider asking a technologist that may be more experience in identification for assistance. If identification remains questionable, the technologist should contact the Radiologist or Radiology Resident.

4. If the port cannot be confirmed with certainty that it is power injectable then peripheral access will be used for the contrast injection.

5. The technologist must always document in RIS performing provider notes why the port was used or why the port was not used. If documentation is scanned into RIS it is still necessary to note in RIS performing provider notes (For example: Documentation for identification of port has been scanned into RIS).
   a. Port used – documentation must include how the port was identified (what two identifiers were used)
   b. Port not used – documentation must include specific information about why the port was not used. For example, could not confirm to be a power injectable port.
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**Policy #6.10**

**Written:** 03/06  
**Reviewed:** 10/16

**APPROVED BY:** Director of Radiology

<table>
<thead>
<tr>
<th>Procedure:</th>
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- Patient presents with port to be used for power injection
- Confirm that the port is a power injectable type
- Power port identification requires the technologist to use two identifiers
- Implant Identification—Implant ID card, keychain ring or ID bracelet
- Visualization on CT scout or chest x-ray
- Procedure note in the EMR confirms that a power port was placed
- Two identifiers confirm that the port is power injectable
- Do not use the port. Establish peripheral IV access. Document why the port was not used and notify the nurse that the port is not power injectable.
- Palpation as an identifier is limited to the palpation bumps and triangular shape of Bard Port

Palpation
- Palpate each system on the port to identify a triangular arrangement of three palpation bumps. Palpate sides of simple renal port to identify triangular port housing.

C. Port Palpations
- Single Port
- Dual Port
- Triport

Examples of Port Palpation
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