Peripheral inserted central catheters (PICCs) are often used for patients needing central venous (CV) access, both in the hospital and out. Clinicians greatly prefer them over femoral catheters and internal jugular catheters to provide CV access for appropriate patients. Why? PICC lines use blood vessels farther away from the large arteries found near the femoral and internal jugular region.

Because you’re likely to encounter more and more PICC lines no matter where you work, you need to understand them and their indications and contraindications (see Guide to PICC lines). You also need to know how to assess, maintain, and manage PICC lines to ensure they’re functioning effectively. For all the details, read on.

**PICC line 101**

Manufactured with single, double, or triple lumens, PICC lines are indicated for a variety of uses. These include infusing multiple I.V. fluids, long-term antibiotics, chemotherapy, or total parental nutrition (TPN); drawing blood; and even monitoring central venous pressure (CVP). Some PICC lines have specialized catheter tubing that can tolerate the high pressure per square inch needed for a computed tomography scan with contrast, usually about 300 psi.

Using ultrasound to search for deep veins in the upper arm, PICC lines are often placed at the bedside or in the OR by specially trained nurses. They may also be placed by interventional radiologists or physicians. PICC lines are usually placed in the basilica or brachial veins in the upper arms but can also be placed in the cephalic vein. The PICC line insertion specialist measures and documents the circumference of the patient’s arm before the PICC line is inserted to establish a baseline circumference.

**Who can’t use a PICC line?**

Some patients with an implanted defibrillator or pacemaker may not be able to have a PICC line inserted in an extremity. The good news? Most of these patients can have the PICC line inserted on the opposite arm to avoid interfering with the pacemaker wires.

For a PICC line to be effective, the patient needs to have a normal sinus rhythm. Contraindications include patients with a P wave that’s intermittent, not identifiable, or not present.

Be alert for patients with chronic kidney disease; PICC line placement may not be appropriate for them. These patients usually have elevated blood urea nitrogen (BUN) and creatinine levels and a decreased glomerular filtration rate (GFR), which indicate decreased or poor kidney function. Patients with elevated BUN and creatinine levels and a low GFR may need clearance from the nephrologist before they have a PICC line inserted.

If the patient is a candidate for dialysis and may need long-term access with an
arteriovenous shunt or fistula placement, inserting a PICC line into a vein in either upper arm can decrease the potential access sites for a future fistula or shunt, according to the National Kidney Foundation’s Kidney Disease Outcomes Quality Initiative. Also, placing a PICC line increases the risk of developing deep venous thrombosis.

**Tips on tips**
The recommended tip location is about 2 cm above the heart, at the distal superior vena cava, also known as the cavoatrial junction. At our hospital, we use ECG-based guidance technology that allows real-time feedback on catheter tip location. This guidance system tracks the catheter’s direction by using magnets and cardiac electrical signal detection. We can then determine the catheter’s direction as it’s inserted and confirm tip placement, which is shown by an increase in amplitude of the P wave as compared with the original rhythm.

This combined technology is FDA-approved to be used in place of chest X-rays to confirm catheter placement and provides the following benefits:
- less exposure to radiation
- lower costs
- fewer catheter malpositions
- less placement time
- immediate tip location confirmation, which allows the PICC line to be used right away.

**Keeping PICC lines ready**
Care and maintenance of a PICC line includes assessing the site for signs and symptoms of infection, including redness, tenderness, or swelling. To keep an eye on any swelling, the patient’s arm circumference can be compared with the baseline measurement taken before PICC line insertion.

Assess the dressing and make sure that it’s clean and intact. If the edges start to peel away or are soiled or bloodied, the dressing may need to be changed. Review your facility’s policy and procedure for PICC line dressing changes; some hospitals mandate that the dressing be changed at least once a week.

Components of the dressing usually include an antimicrobial patch, an adhesive device to keep it in place, and a transparent dressing.

**Guide to PICC lines**

<table>
<thead>
<tr>
<th>Description</th>
<th>Indications</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Nursing considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone rubber</td>
<td>• Long-term CV access&lt;br&gt;• Patient with poor CV access&lt;br&gt;• Patient at risk for fatal complications from CV catheter insertion&lt;br&gt;• Patient who needs CV access but is scheduled for or has had head or neck surgery</td>
<td>• Peripherally inserted&lt;br&gt;• Easily inserted at bedside with minimal complications&lt;br&gt;• May be inserted by a specially trained nurse in some states</td>
<td>• Catheter may occlude smaller peripheral vessels&lt;br&gt;• May be difficult to keep immobile&lt;br&gt;• Long path to CV circulation</td>
<td>• Check frequently for signs of phlebitis and thrombus formation&lt;br&gt;• Insert catheter above the antecubital fossa&lt;br&gt;• Basilic vein is preferable to cephalic vein&lt;br&gt;• Use arm board if necessary&lt;br&gt;• Length of catheter may alter CVP measurements</td>
</tr>
<tr>
<td>209 (50.8 cm) long</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available in 16G,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18G, 20G, and 22G</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can be used as</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>midline catheter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percutaneously</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>placed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

memory jogger
Here’s the long and short of it! The other name for peripherally inserted catheters will help you remember why they’re used: **LONG-line catheters are for **LONG-term use.
Check your facility’s policy and procedure to determine which items are required with the dressing. Assess for good blood flow on aspiration and ease of flushing. You should be able to easily flush the line and draw back blood without any resistance.

Are you meeting resistance? If so, check the caps for any clots or kinks in the line. If everything else looks fine, contact the healthcare provider or PICC specialist for further instruction. The PICC line may need to be declotted with a special declotting agent according to your facility’s policy and procedure.

Another key point: When the PICC line is indicated for infusing TPN, one port should be reserved for only TPN. To help decrease the risk of bacterial contamination, no other medications or I.V. fluids should be infused through this port.

**What goes in, must come out**

After therapy is no longer indicated, such as when the patient is no longer receiving TPN or I.V. fluids, the PICC line should be removed. The reason? It’s better not to have any unnecessary central lines in the body.

Don’t stress! PICC lines are easy to remove. Follow your facility’s policy and procedure for removing PICC lines. Find out the length of the PICC line before insertion so you can make sure you remove the entire line. If the PICC line that’s removed isn’t as long as you expected, contact the healthcare provider immediately because the catheter tip may have broken off. If an infection is suspected, the catheter tip can be cut off and sent to the lab for culturing. Place gauze over the insertion site along with a sterile dressing and leave it on for 24 hours; change as needed.

**PICC a winner!**

Now you know the reasons why PICC lines are used and how to care for and manage them, whether you work in a hospital or an outpatient setting. Properly caring for PICC lines helps keep them optimally functional for a longer time; decreases infection rates; and increases patient safety, satisfaction, and usage.

***Learn more about it***


Jerome Argame is a Direct Care Nurse and PICC Line Specialist at the VA Medical Center in Long Beach, Calif.

The author has disclosed that he has no financial relationships related to this article.

DOI: 10.1097/01.NME.0000432874.05582.bf