Pediatric PICC Line Placement



A peripherally inserted central catheter (PICC line) is most often used to deliver medication over a long period. The doctor or nurse inserts the PICC line, which is a thin tube, into a vein in the arm. The tube is advanced until it reaches the superior vena cava, a vein that carries blood to the heart.

Tell the doctor or nurse about your child's recent illnesses, medical conditions or allergies. List all the medications your child is taking, including herbal supplements and aspirin. You may be told to withhold aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), or blood thinners several days prior to the procedure. Some children, depending on their age, may be sedated for the procedure. Children who are not sedated are given a local anesthetic to numb the area where the catheter is inserted.

What is PICC Line Placement?

A simple intravenous (IV) line delivers medication, nutrition and fluids during a short period of time. When an IV line is needed for a longer period, or more secure venous access is needed, a PICC line is used. A PICC line can remain in place for weeks to months if needed, although rules may vary among different hospitals. The PICC line can be easily and repeatedly accessed without needle punctures to the patient. This special catheter is more secure and durable than a simple IV line and may be required for the delivery of certain medications.

What are some common uses of the procedure?

A PICC line may be used when patients need:

- prolonged IV antibiotic (http://www.radiologyinfo.org) treatment
- medications that cannot be safely swallowed by the patient
- medications that cannot be safely delivered through a standard IV line
- chemotherapy (http://www.radiologyinfo.org) (anti-cancer drugs)
- IV feeding for nutritional support
- repeated blood draws

How should my child prepare?

Your child's blood may be tested before PICC line placement to check if certain blood levels are safe for the procedure.

You should report all medications that your child is taking, including herbal supplements. List any allergies, especially to local anesthetic (http://www.radiologyinfo.org) , general anesthesia (http://www.radiologyinfo.org) or to contrast materials (http://www.radiologyinfo.org) containing iodine. Your child's doctor may advise you to withhold aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners a few days before the procedure. Do not stop your child's medication until you have been given the doctor's approval.

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You will receive specific instructions on how to help your child prepare. These will include any changes to their regular medication schedule.

You may be told to withhold food or drink several hours before the procedure if anesthesia or sedation is to be used.

Your child will wear a gown during the procedure. Jewelry, removable dental appliances, eye glasses and metal objects might interfere with the x-ray images. Therefore, they will need to be removed.

What does the equipment look like?

In this procedure, ultrasound (http://www.radiologyinfo.org) and x-ray (http://www.radiologyinfo.org) equipment, a needle, a guide wire (http://www.radiologyinfo.org) and a PICC line are used.

Ultrasound scanners consist of a console containing a computer and electronics. A video display screen and a transducer that is used to scan the body also are included. Ultrasound does not use radiation.

Ultrasound is used to assess and identify a vein for catheter placement. It is used to look for veins that may be larger and deeper than veins that can be seen or felt on the skin surface. Ultrasound gel is used to improve the quality of the image. Ultrasound is helpful because it provides the doctor or nurse with real-time guidance finding a vein. This helps improve the likelihood of a successful PICC line placement and to minimize the risk of complications, such as bleeding.

Fluoroscopy, which converts x-rays into video images on a screen, is used to watch and guide the procedure. Fluoroscopy allows the doctor or nurse to watch the wire and catheter on a live display so they can safely advance the catheter into position.

A PICC line is a thin plastic or silicone tube (catheter (http://www.radiologyinfo.org)) long enough to extend from a patient's arm vein to the largest vein near the heart (the superior vena cava (http://www.radiologyinfo.org)). A PICC line that does not extend as far as the superior vena cava is called a midline catheter (http://www.radiologyinfo.org) . PICC lines may have as many as three openings and may be used for injection of medicine or contrast material.

Other equipment that may be used include devices to monitor your child's heart rate and blood pressure.

How is the procedure performed?

PICC lines are most often placed by a specially trained healthcare professional, such as an interventional radiologist (http://www.radiologyinfo.org) , in an interventional radiology (http://www.radiologyinfo.org) suite. PICC lines are occasionally placed in an operating room, or at the bedside without image guidance. PICC line placement can be performed on an outpatient or inpatient basis. Procedure length varies, although it usually takes about an hour to complete.

Your child will be placed face up on the table. Straps and bolsters may be placed to help your child remain still. An IV line will be inserted into a vein in the hand or arm if IV sedation is needed.

The doctor or nurse will use ultrasound to identify the best vein to use for the procedure, usually a vein within the arm. Occasionally, a vein in the leg is used. Tell the doctor or nurse in advance if your child has a strong preference for where the catheter is placed.

The skin at the PICC insertion site is cleaned and covered with a sterile surgical drape.

The doctor or nurse will numb the area on the arm with a local anesthetic. A small needle will be inserted into the site using ultrasound as a guide. Next, a thin guide wire is inserted through the needle and moved through the vein using x-ray (fluoroscopy (http://www.radiologyinfo.org)) or ultrasound guidance. The catheter is advanced over the wire until the tip of the catheter is in an appropriate position.

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The guide wire is removed and the catheter is tested. A special bandage is placed on the insertion site to keep the line secure. If image guidance was not used during placement of the PICC, an x-ray may be taken to ensure the catheter is correctly positioned.

What will my child experience during the procedure?

Devices to monitor your child's heart rate and blood pressure may be attached to their body.

If the procedure is done with sedation, the IV sedative will make your child feel relaxed, sleepy and comfortable for the procedure. Your child may not remain awake, depending on how deeply your child is sedated.

A tourniquet (a band tied tightly around the arm) may be used to help enlarge the vein and make it easier to place the PICC line. Your child may feel a slight pin prick when the IV line needle is inserted and the local anesthetic is injected. Your child may feel some pressure when the needle is placed into the vein. The doctor or nurse will ask your child if they are uncomfortable and may give them more sedation or numbing medicine.

If your child is not staying overnight at the hospital, they should rest at home for the remainder of the day. Your child may resume routine activities the next day, but should avoid lifting heavy objects for several days. While the PICC line is in place, be cautious with activities where the PICC line could be easily pulled or accidentally removed. If this occurs, hold pressure over the site until bleeding stops and call your doctor. Bleeding should stop within a few minutes.

Your child may experience bruising, swelling and tenderness in the arm. These symptoms clear up in a few days. Pain medicine may help during this time.

You will receive instructions on how to help care for your child's PICC line. It is important to keep the catheter site clean and dry. Follow the advice you are given about bathing and showering with a PICC line. The incision site should not be held under water such as by swimming or soaking in a tub.

You may be advised to flush your child's catheter with a heparin (http://www.radiologyinfo.org) solution. This will help keep blood clots (http://www.radiologyinfo.org) from forming and blocking the catheter.

Call the doctor if you have any questions about your child's PICC line or if:

- The device malfunctions.
- There is bleeding at the insertion site.
- Your child develops a fever.
- There is redness, increased swelling, tenderness, warmth or fluid drainage at the catheter insertion site.

When the decision is made to remove the PICC line, a health professional will remove it similar to the way an IV would be removed. The site will be covered with a bandage.

Who interprets the results and how do we get them?

The doctor or nurse will use x-ray imaging or ultrasound during the procedure or take a chest x-ray immediately after to confirm the PICC line is correctly positioned. Your child's doctor or nurse will also check how well the device is functioning. This will be done by injecting fluid through the catheter using a syringe.

What are the benefits vs. risks?

Benefits

- A PICC line allows your child to receive medication or nutritional support not suitable via a standard IV.

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- A PICC line provides a simple and painless means of drawing blood, delivering drugs and nutrients, or both.
- A PICC line may spare the patient the discomfort and stress of repeated needle punctures.
- A PICC line is a great solution for patients requiring treatment over a longer period of time, such as chemotherapy. They will not need to have an IV line placed for each treatment.
- A PICC line may be necessary when medicines or fluids that irritate the wall of the vein are needed.

Risks

PICC lines pose risks occurring during or shortly after placement. There are also delayed risks that occur simply because the device is in your child's body. PICC line placement risks include:

- Any procedure that involves placing a catheter inside a blood vessel carries the risk of damaging the blood vessel. However, precautions are taken to reduce these risks.
- Bruising and bleeding may occur. This risk can be minimized through a blood test in advance to be sure that your child's blood clots normally. If your child's blood is too thin, the procedure may be postponed. Or, your child may receive medication or blood products to improve blood clotting.
- The normal heart rhythm may be disturbed while the catheter is inserted, but this is usually only temporary. The problem is easily recognized during the procedure and eliminated by adjusting the catheter position.
- Rarely, the catheter will enter an artery rather than a vein. If this happens, the catheter will have to be removed. Most often the artery heals by itself. It rarely has to be surgically repaired.

Delayed Risks:

- Two types of delayed infection may develop: skin infection at the catheter insertion site or bloodstream infection. The risk of delayed infection can be minimized if everyone handling the device carefully follows the sterile care instructions provided. The PICC line site should be carefully inspected each time the dressing is changed. The risk of infection is higher for individuals who have low white blood cell counts.
- A hole or break in the catheter may lead to fluid leakage. Two important first aid measures: 1) clamp the catheter between the damaged part and the skin insertion site; 2) tape a sterile gauze pad to the skin to cover the break. Catheters rarely fracture inside the body. If this does happen, a chest x-ray will show the problem. The broken fragment can usually be removed without open surgery.
- The catheter may become accidentally dislodged. If this happens, apply pressure to the insertion site using a sterile dressing and call your child's doctor immediately. The bleeding usually stops within several minutes.
- A large amount of air in the catheter may create an emergency that causes chest pain or shortness of breath. If your child develops chest pain or shortness of breath, you should clamp the catheter right away. Have your child lie down on their left side and call 9-1-1. This problem can be avoided by always clamping the catheter before and after inserting a syringe. Make sure that the catheter cap is screwed on tightly.
- The PICC line may become obstructed by clotted blood or fibrin sheath (http://www.radiologyinfo.org) . You can minimize the risk by carefully following instructions about flushing the catheter. Once a catheter becomes closed off, it sometimes can be cleared by injecting medication. At other times, it must be removed or exchanged for a new catheter. Contact your child's doctor if you believe the catheter has become blocked.
- If the vein in which the catheter lies becomes closed off, the arm, shoulder, neck or head may develop swelling. If this occurs, call your child's doctor immediately. The clot may be treated by a blood-thinning medication; occasionally, the catheter will have to be removed.
- Rarely, patients experience a sensation of skipped or irregular heartbeat that may be related to the catheter. Call your child's doctor if your child complains of a funny feeling in their heart. The catheter tip may need to be readjusted slightly to relieve this.

What are the limitations of a PICC line placement?

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Some patients have veins that are not well suited for a PICC line. This usually happens when these access veins have been used for a long period (years of intravenous feeding, etc.). It may be very difficult to find a suitable vein in these patients. If this happens, the doctor or nurse will discuss other options for catheter placement.

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