

**PICC LINES**  
**Peripherally Inserted Central**  
**Catheters**

**Uncuffed skin tunneled central**  
**venous catheters**

**A guide for parents**

**© IV Team**  
**ICI Unit**  
**Great Ormond Street Hospital**  
**For Children NHS Trust**  
**And the Institute of Child Health**

## WHAT IS A PICC LINE?

PICC stands for “Peripherally Inserted Central Catheter”. It is a silicone rubber tube, which is placed in the antecubital fossa of the arm (the elbow crease) with the tip of the catheter lying in the superior vena cava, the large vein at the entrance to the right atrium of the heart. It is held in place by two small stitches in the skin. Their use appears to be associated with a lower rate of infection. This may be due to the fact that the antecubital fossa is less colonized with normal skin “bugs” and is less oily and moist than the chest and neck.

For smaller children or babies the same line is used but will be placed on the chest, this is called an uncuffed skin tunneled central venous catheter. It is tunneled under the skin of the chest wall to a vein in the neck. From there it is threaded through a large vein into the right atrium of the heart.

The PICC can stay in position for many months without causing any problems.

There is a special tip at the end of the catheter called a Groshong™ valve. This is a 3-position, pressure sensitive valve. It allows fluid infusion and blood aspiration. When the PICC is not in use, the valve maintains catheter patency by restricting the backflow of blood and preventing air embolism by remaining closed. This means there is no need to use clamps and heparin between each use of the line.

## HOW ARE THEY INSERTED?

The line is normally inserted in theatre under a general anaesthetic. However, the lines can be placed with only a local anaesthetic and sedation if necessary.

A small incision is made in the crease of the elbow and the catheter is guided to one of the large veins by ultrasound. Once inside the vein, the catheter is threaded up until it reaches the superior vena cava. The position of the catheter tip is checked with an x-ray.

For the line on the chest it will be inserted in theatre whilst your child is under a general anaesthetic. The Surgeon makes two incisions; one on the side of the neck, to access a vein and one near the nipple. A skin tunnel is then made between the two incisions and the catheter is threaded through. The surgeon then makes a small incision in the vein, which is usually the internal or external jugular vein. He will then thread the catheter through that vein until it gets to the large vein at the entrance to the right atrium of the heart. Your child will have a very short x-ray to check the position of the tip of the catheter.

The incision in the neck is then closed with dissolvable stitches and covered with steristrips, which should stay in place and be kept as dry as possible for 5

days. A clear dressing will be placed on the chest over the exit site to secure the line and help prevent infection.

It is quite safe having the catheter in this chosen vein because it lies in the direction of the blood flow and will not cause a blockage.

### **WHY ARE THEY USED?**

Your child requires a PICC line to help us give him/her their treatment in the safest, least painful and most convenient way. We can use the PICC to give your child their intravenous medication and to give full fluid support afterwards eg. for giving blood products and total parenteral nutrition (TPN). The PICC line can also be used for the majority of routine blood samples that your child will need during their treatment. It may be necessary in some special circumstances to take blood samples from your child's finger or from a vein in their hand or arm (for antibiotic levels, for example).

### **WHAT CARE DOES THE CATHETER REQUIRE?**

The catheter is looked after aseptically which involves careful hand washing, wearing gloves and being very clean. You will also notice a cap on the end of the catheter to protect the end.

When not in use, the PICC line has to be flushed once a week with a saline solution.

The exit site dressing also needs to be changed once a week. The old dressing is removed and the skin is cleaned with an antiseptic solution. A small loop is placed in the line and steristrips help to secure it. A clean dressing is then reapplied. If the dressing becomes loose, wet or dirty, it must be changed immediately.

### **POTENTIAL PROBLEMS**

#### **INFECTION**

The risk of infection is potentially great. Therefore, when handling the catheter, hands must be washed thoroughly in order to minimize the chances of introducing infection. However, if the catheter does become infected, it does not necessarily have to be removed. Attempts are made at clearing the infection with antibiotics, which is usually successful. However, if the infection persists, the catheter will have to be removed.

The skin around the exit site may also become infected. Discharge, tenderness, redness or swelling around the exit site could all be signs of

infection. A swab of the exit site will be taken and blood will be sent for cultures from your child's PICC. Exit site infections can progress to catheter infections if not treated promptly. If the exit site is infected, your child will be given antibiotics and will need their dressing changed more regularly.

Infection must not be confused with phlebitis, however, which is caused by the vein being irritated and then inflamed by the movement of the PICC. This can be avoided by having a secure dressing at the exit site, covered with a bandage. If phlebitis does occur, a warm compress should be applied to the affected area for 30 minutes.

## HOW TO PREVENT INFECTION

There are several things that you can do to reduce the risk of infection:

1. Ensure that the dressing is secure and is changed at least once a week. It will need to be changed immediately if it is wet, soiled with blood or is coming loose.
  2. Ensure that the catheter is kept as clean as possible, e.g. prevent the entire catheter from getting in the bath water.
  3. The dressings of choice at Great Ormond Street are called IV3000's. These are splash proof and will help to prevent water from getting under the PICC dressing. Please do not let your child swim, as there may be a risk of infection. But do not let your child escape from having baths! If the site gets wet in the bath, the site should be cleaned and redressed.
1. **N.B. For immunosuppressed children.** Take your child's temperature as per the neutropenic protocol; (go up to the local hospital if the temperature remains 38.0°C for 1 hour. If the temperature is 38.5°C go straight up - don't wait). This is because when children are neutropenic, they are very susceptible to infection and the PICC line is a possible source of infection. If you speak to someone you are not familiar with, please state that your child has a PICC line.

## BLOCKAGE

This is not common because of the Groshong™ valve at the tip of the catheter, which stops the backflow of blood up the line. If a blockage does occur, one of the IV nurses or a doctor can inject a special medicine called Urokinase or Alteplase that acts as a "clot buster". Blockages can be prevented, by ensuring that the line is flushed well weekly.

## BLOOD SAMPLING PROBLEMS

Sometimes it can be difficult to get blood samples from your child's catheter. This can be for a number of reasons. The catheter tip may be resting against the wall of your child's heart, which will make it difficult to get blood, or there may be a kink in the catheter. These problems can usually be solved by flushing the catheter with saline or by changing your child's position. If the problem persists we may take an x-ray to re-check the position of the catheter, and to check for kinks. We may also use urokinase or alteplase in case a small clot is beginning to form at the tip of the catheter.

## **BREAKAGE**

It is possible that the catheter can become damaged, usually due to excessive pulling and handling or accidental severing (occasionally helped by teeth or a pair of scissors!). Sometimes, the catheter can become damaged, especially at the weakest point, where the catheter joins the connector hub. This is why it is crucial that when the dressing is changed that at least half of the grey hub is covered. As long as there are two inches of intact catheter remaining, the damaged part of the catheter can be cut away and a new connector attached. Just contact the IV team on weekdays or the wards at any other time to arrange for the catheter to be repaired. You will receive a safety talk from the IV Team, prior to going home, so that you know what to do in an emergency situation.

## **HOW TO PREVENT BREAKAGE**

1. Whenever possible ensure that the catheter is kept covered by a bandage. This will help to prevent your child from getting hold of the catheter.
2. Try to stop a toddler from biting and pulling at the catheter.
3. Do not leave your child unsupervised with scissors.
4. If a split does occur, clamp the catheter close to the skin and contact the hospital for further instructions.

## **ACCIDENTAL REMOVAL**

This is extremely rare, although an ever-present risk, especially with young children. Sometimes a catheter can be pulled out slightly, but if the catheter is dislodged a lot, it may have to be removed. Because the PICC is a relatively fragile line, if it is pulled, it may snap and leave a segment of line in the body. If this happens, you must go to your local hospital immediately, taking the piece of PICC removed with you.

**N.B. If the catheter is accidentally removed, pressure should be applied at the small hole in the elbow crease. Blood loss is usually minimal.**

## HOW TO PREVENT ACCIDENTAL REMOVAL

1. Ensure the catheter is always fully secured to the arm ensuring that the catheter is looped with Steri-strips and is covered by the clear IV 3000 dressing.
2. Keep the catheter out of the way of toddlers' fingers.
3. When an in-patient, help us to keep the infusion lines off the floor, so that no one trips over them, resulting in the catheter being pulled.
4. It may be advisable to stop your child from participating in contact sports like rugby in case the catheter is accidentally pulled.

## THROMBUS

This is a rare complication associated with a PICC line. A thrombus is a blood clot, which forms around the end of the catheter and may interfere with the function of the catheter. In more serious circumstances the clot may interfere with your child's circulation. If your child complains of pain or swelling in their neck or arm on the side where the catheter is, please inform your local hospital and a member of the IV team or ward staff at Great Ormond Street immediately. The treatment for thrombus is planned individually for each child. Sometimes medicines are used to dissolve the clot, and sometimes the catheter has to be removed.

## AIR EMBOLUS

This is a very rare complication involving air entering the blood stream. If the catheter is damaged in any way, blood will usually flow out through the catheter preventing air from entering the line. All infusion lines are primed with fluid before being connected to prevent an air embolus. It takes quite a lot of air to cause any problems and small air bubbles are not dangerous. The Groshong™ valve at the tip of the catheter is another way of preventing an air embolus.

## HOW TO PREVENT AIR EMBOLUS

1. Ensure that there is a cap on the end of the catheter at all times. If the catheter is damaged and blood is leaking, apply clamps or bend the line over. (A member of the IV Team will show you how to use these clamps)  
**DO NOT LIFT THE CATHETER ABOVE THE LEVEL OF YOUR CHILD'S HEART IF THERE IS A HOLE IN THE CATHETER.**

## REMOVAL OF A PICC LINE

A PICC line can stay in place for many months. However, when the time has come for it to be removed, you will be bound to feel relieved!

The line can be removed without your child having a general anaesthetic. An experienced nurse or doctor can do it on the ward. The stitches are removed and then the catheter is very gently and slowly pulled out. Sometimes the vein goes into spasm and the line won't come out. If this happens, a warm compress is placed over the arm for 20-30 minutes until the spasm has stopped and then the removal can continue. Due to infection risks children are not able to keep their PICC lines after removal.

## HOME CARE OF A PICC LINE

**If you wish to** you can usually be taught to care for your child's PICC line at home.

## LOCAL SERVICES

As the PICC lines are a relatively new form of central venous access device, some Hospitals may not be so familiar with them. We are able to give other Health Care Professionals as much information as they need and reassure them that they are very similar to Hickman™ lines in their usage and maintenance.

## RETURNING TO SCHOOL

It is possible for your child to return to school with a PICC line in situ. The majority of children would normally know how to clamp their catheter and not to take the cap off. However, you may experience some anxiety at the prospect of leaving your child at school with no adult having knowledge of the catheter. We have designed a leaflet for you child's teacher, which is available on request. It would be more appropriate if you gave them this leaflet and a pair of clamps rather than us just posting it. If the teaching staff would like to talk to us about the catheter, we would be pleased to do so. Alternatively, your symptom care nurse or PCN will visit the school to discuss the catheter.