



THE CARE AND MAINTENANCE OF TOTALLY IMPLANTED VENOUS ACCESS DEVICES (PORTS)

This protocol applies to the management of ports used by the paediatric CF team at The Children's Hospital for Wales, Cardiff.

Difficulty in flushing a port or high pressure/resistance when injecting fluid through a port are indicators of potential problems, for example:

- Catheter disconnection or fragmentation
- Catheter rupture
- Drug extravasation
- Erosion of portal/catheter through the skin
- Blockage

Catheter blockage may be caused by:

- Thrombus
- Drug precipitate
- Growth of a fibrin sheath around the catheter
- Kinking of the catheter wall
- Lodging of the distal end of the catheter against a blood vessel/right atrial wall
- Occasionally severe coughing bouts may cause the catheter tip to turn back on itself within the lumen of a large vessel

When attempting to flush a port:

- Never use less than a 10 ml syringe
- Flush with 0.9% sodium chloride
- Do not use force
- Observe for pain or swelling. If present STOP
- Seek advice from the cystic fibrosis nurse specialists or medical staff from the CF Unit UHW
- Document procedure in patient's notes

Any out-of-hours concerns should be discussed with the Respiratory Consultant on call (via UHW hospital switchboard).

DIFFICULTY IN FLUSHING

Perform the following actions in order

Potential causes

Action

Clamp may be closed

Open clamp

The port needle may not be in contact with the back plate of the port

Remove existing needle and re-access ensuring that the needle passes through the portal septum at a 90 degree angle and contacts the back plate

The needle may be too short to pass through the septum and reach the back plate

Remove existing needle and re-access using a longer needle, which should reach the back plate

The tip of the catheter may be wedged in a small vessel or the tip may be pressed against the vessel wall

Ask patient to cough, deep breathe, and change position: move their shoulders and rotate their head. Check flow while attempting to flush port while the patient is in different positions. If there is still resistance the catheter may be occluded or disconnected.

OCCLUSION, DISCONNECTION OR FRAGMENTATION

If the port cannot be flushed, or there is significant resistance, or if it flushes but does not withdraw blood

- Request a chest x ray within 24 hours. This is to check if there is a fracture or line displacement.
- If the chest xray shows no fracture or displacement, attempt to flush the catheter.
- If the portacath does not flush at all, a contrast study cannot be performed, the port cannot be used and will need to be removed/replaced.
- If you can flush into the portacath, a contrast study will help exclude extravasation and may help in identifying thrombus or a fibrin sheath. This may be treatable with urokinase (see below). Please inform the consultant and request a contrast study from radiology.
- Doppler studies or bilateral arm venograms may be performed by the radiologist to distinguish between a fibrin sheath and SVC obstruction by thrombus.

PARTIAL BLOCKAGE: ADMINISTRATION OF UROKINASE

If contrast studies confirm a partial blockage:

- Use a 10 ml syringe, flush with 0.9% saline alternating between instillation and aspiration
- If unsuccessful consider using Urokinase. See below.

Urokinase is licensed for use as an anti-thrombolytic for occluded central venous catheters. It is not licensed for use in children but is the preferred choice for clearing occlusions in ports. The dose for a child aged 1 month-18 years is 5000-10,000 units (BNF 2012-2013) remaining in the line for 2-4 hours. Further information can be obtained from pharmacy.

Administration of Urokinase should always be discussed with medical staff and nurses familiar with the procedure. The correct dose should be prescribed following local hospital policy and product information.

Urokinase should only be instilled into the total priming volume of a device (to prevent overflow administration into the blood stream). The total priming volume is the port itself, as well as the non-coring needle and extension set. Most children/young people who have had a port inserted at The Children's Hospital for Wales have a Bard low profile port inserted. The volumes for the port, needles and extension sets most commonly used are given below.

If in doubt please discuss with the CF team or check the patient's notes.

Priming Volume of Ports

- The priming volume of a complete 76 cm Bard low profile titanium catheter is 1.5 ml
- If the catheter has been cut then the volume can be calculated as follows: 0.2 ml per 10 cm of catheter (if not written in theatre notes the catheter length can be estimated from a chest x ray)

Priming volume of the needle and extension sets (Smiths Medical 22G gripper needles)

- 19 mm ($\frac{3}{4}$ inch) 0.5 ml
- 25 mm (1 inch) 0.3 ml
- 32 mm ($1\frac{1}{4}$ inch) 0.5 ml

Other makes will have this information on the packaging

PROCEDURE FOR ADMINISTRATION OF UROKINASE

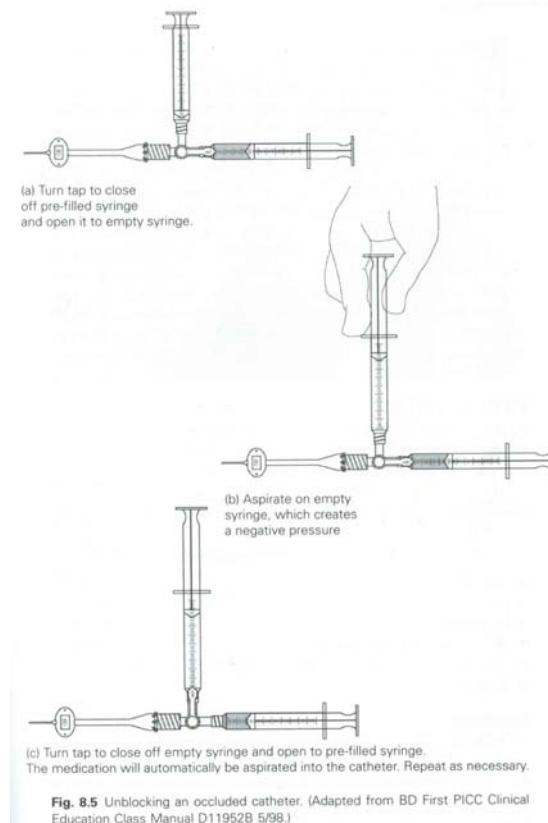
- Reconstitute a 10,000 unit vial with 2 ml of 0.9% sodium chloride
- Administer the correct calculated amount into the line and leave for 2-4 hours
- If unable to administer the calculated volume, a lesser amount may also be effective
- Label the line stating de clotting agent in situ and do not use
- After the desired amount of time aspirate the lysate and flush with 0.9% sodium chloride. Repeat if necessary.

TOTAL BLOCKAGE

If contrast cannot be injected into the port this usually mean that the port can no longer be used and needs to be removed.

On final option to consider is instilling urokinase into the port using a negative pressure technique. This is performed by using a 3 way tap, an empty 10 ml syringe and a 2 ml syringe containing urokinase to create a negative pressure within the system. See diagram below.

- Clamp needle and extension set, remove Bionector
- Attach the Luer Lock end of a three way tap to the end of the extension set. Ensure the 3 way tap is in the OFF position to the patient.
- Attach a 2 ml syringe containing the calculated amount of urokinase to one of the ports. Attach an empty 10 ml syringe to the remaining port.
- Turn the 3 way tap to the OFF position to the syringe containing the urokinase
- Gently pull back the plunger of the 10 ml syringe until the 3-5 ml mark is reached. Clamp while maintaining negative pressure and turn the 3 way tap OFF to the aspirated syringe
- Unclamp the extension set and open the 3 way tap to allow the urokinase to be drawn into the port
- When the urokinase has been drawn into the extension set turn the 3 way tap to close the flow. Clamp extension set. Replace Bionector. Leave for 2-4 hours.
- Label the line stating de-clotting agent in situ and do not use
- After the desired amount of time aspirate the lysate and check patency by flushing with 0.9% sodium chloride. Repeat if necessary.



Summary: Management of stiff, occluded, leaking or fragmented Portacaths

