# Implanted Central Venous Access Device (Alternatively called a port) in Children

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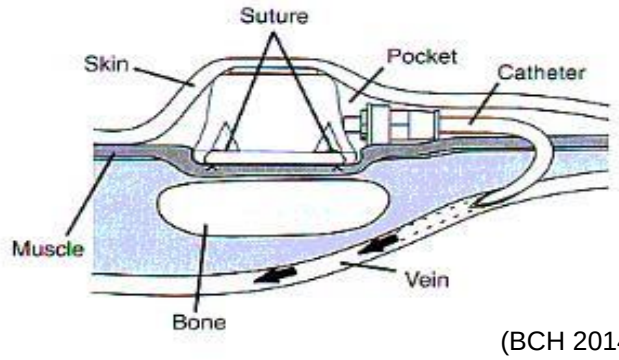
**Key Amendments**

| Date | Amendment | Approved by |
|---|---|---|
| 19th Nov 2020 | Document extended for 1 year | Dr J West/Paediatric QIM |
| 26th March 2021 | Approved with no amendments | Paediatric QIM |
| 9th Feb 24 | Approved with no changes | Paediatric Guideline Review |

## Introduction

All paediatric patients cared for within WAHT will have their implanted central venous access device (port) inserted/removed under general anaesthetic at a specialist paediatric centre (usually Birmingham Children's Hospital – BCH). The insertion/removal of paediatric ports will not occur at WAHT.




(BCH 2014)

The principles of care will sometimes therefore follow guidance from BCH. This guideline is very heavily based on the guidance followed at BCH (BCH 2014). The infection rates audits will be coordinated by BCH as they coordinate the care of all paediatric centrally inserted devices.

# Details of Guideline

## Accessing the Port

Whilst the port is in use a Huber (non-coring) needle is used to penetrate the septum to facilitate blood sampling and intravenous medications injection. Generally only a 22g non-coring needle should be used, but for TPN or Blood a 20g may be used (BCH 2014).

The principles of Aseptic Non Touch Technique (ANTT) are used to insert the needle however where possible a change of gloves is required immediately before the needle is inserted as outlined below.

Once inserted, the needle can be left in situ for up to 7 days.
After 7 days the needle should be changed to prevent infection.
Alternatively if access no longer required it should be heplocked before removal.

Once the needle is inserted, the hub of the needle is accessed using an aseptic non touch technique in the same way as a skin tunnelled central venous catheter is accessed

# Needle Insertion

## Equipment Required

- Local Anaesthetic Cream if needed
- Clean dressing trolley, procedure or sharps tray
- Non Sterile Gloves
- Dressing pack
- Sterile Gloves
- 10 ml syringes
- Non Coring Port Needle ('Gripper Needle')
- Blue Needles
- Filter Needle
- 0.9% Sodium chloride x2 10ml ampoules
- 2-4mls Heparinised saline (100iu in 1ml)(dependent on age of child. 2mls is recommended for child aged 1 to 8 years and 4 mls for child over 8 years (BCH, 2014). This should be prescribed if possible but one dose can be given under the WAHT Patient Group Direction
- 70% Isopropyl alcohol / 2% Chlorhexidine gluconate wipes (Sani-Cloth CHG 2%)
- ChloraPrep One-Step (2% Chlorhexidine Gluconate/70% Isopropyl Alcohol) skin cleanser
- A transparent, semi-permeable and sterile dressing eg IV 3000
- Gauze swabs
- Cap
- Liquid soap
- Alcohol Rub and access to a hand wash basin
- Sharps Box

## Procedure

| **Action** | **Rationale** |
|---|---|
| Explain procedure at a level appropriate to child or young person and parent. Check if the child/young person has any special preparations e.g. local anaesthetic cream-apply if needed | To ensure informed consent and aid compliance |
| Locate the portal septum – either visually or by palpation – apply local anaesthetic cream | |
| If used, remove local anaesthetic cream (allowing sufficient time for the cream to work) | |
| **Put apron on, WASH HANDS using Ayliffe technique and dry thoroughly** | Effective hand hygiene is vital to reduce the risk of contaminating key parts. Reduce risk of cross infection |
| Clean an appropriate work surface/tray and allow to dry | To safely hold equipment/sharps whilst reducing cross infection |
| Collect equipment together | To ensure contamination of gloves does not occur once they are in use |
| Check the saline and heparin solutions strength and expiry dates. Ensure an independent second check also occurs by an appropriately qualified member of staff. | To ensure correct dosages are administered.<br><br>**NOTE - Community children's nurses will not be able to complete the independent second check when accessing the port in the community.** |

| Action | Rationale |
|---|---|
| **CLEAN HANDS with alcohol rub and ALLOW TO DRY** | To disinfect physically clean hands prior to putting gloves on |
| Put on non-sterile gloves | To comply with universal precautions when handling body fluids. Helps prevent cross infection. |
| Open a syringe and place onto a clean surface, **ENSURE** the key part does not touch the surface | Prevents contamination of key parts during removal from packaging |
| Open a second syringe and using the blue needle, draw up 10mls of the saline solution into the syringe | |
| Remove needle, dispose of safely and place syringe onto clean surface, **ENSURE** key part does not touch the surface | Safe handling of sharps reduces the risk of needle stick injuries |
| Using the filter needle, draw up 2-4mls of the heparin solution into a third syringe. Remove needle and dispose of safely | Filter needles reduce the risk of glass particles entering the line. Safe handling of sharps reduces the risk of needle stick injuries |
| Place syringe onto a clean surface, **ENSURE** key part does not touch the surface | Prevents contamination of key parts |
| Using the blue needle, draw a further 5mls of saline into a further syringe | |
| Remove needle, dispose of safely and attach syringe (containing 5mls of saline) onto the end of the non coring needle which will be used to access the port | Safe handling of sharps reduces the risk of needle stick injuries |
| Prime the non-coring needle with saline and clamp. Leave the syringe attached and place onto clean surface | Leaving the syringe attached helps to protect the key parts |
| Open your wipes and place onto your clean surface – do not unfold | Unfolding the wipes can lead to them drying out quickly |
| Open your ChloraPrep skin cleanser and place onto tray | |
| **REMOVE GLOVES, ALCOHOL HANDS AND CHANGE GLOVES TO STERILE PAIR** | Where possible using sterile gloves is best practice |
| Ensure child is sitting comfortably, securely and that the port site is exposed. | It is important that the child is secure to avoid sudden movements during insertion. |
| Locate the portal septum by palpation | |
| Clean the area around the port with ChloraPrep skin cleanser – ensure backwards and forwards motion is used several times | Backwards and Forwards motion helps to ensure different layers of skin are cleaned during the process. |

| Action | Rationale |
|---|---|
| | |
| Allow to dry | Disinfection is only complete if allowed to dry |
| Relocate the edges of the port and hold firmly between finger and thumb, pressing down gently | |
| Hold the port needle firmly and push it straight; at right angles to the skin; through the skin into the port septum, until it reaches the bottom of the portal chamber, avoiding any previous injection scars (as much as possible). **Do NOT use excessive pressure** | Excessive pressure may damage the needle tip and/or the port |
| Release clamp and draw back on the syringe to achieve bleed-back into the line. | Ensures correct positioning of the needle – if this does not happen, refer to 'maintaining patency' section on page 8 |
| Reclamp line, discard syringe and replace with the empty syringe – unclamp line and withdraw 3-4mls of blood. | 'Discard' sample removes the heparin placed into the line previously. |
| Reclamp line, discard syringe and replace with fresh syringe containing saline and unclamp line | Reduces the risk of cross contamination |
| Firmly and gently flush the line with the saline, a pulsating action is recommended. Clamp the line when all the saline has been instilled. | Pulsating action is recommended to prevent any build up of debris inside the line |
| Remove the syringe and replace with the syringe containing heparin | |
| Unclamp the line | |
| Firmly and gently instil the heparin solution into the line **BUT** clamp the line under positive pressure as the last 0.5mls is instilled | Clamping under positive pressure helps to ensure line blockage does not occur |
| Remove the syringe and wipe the hub with a clean wipe if contamination has occurred | The hub may have become contaminated with blood during the discard/sampling process |
| Allow to dry and put clean cap on. | |
| Apply sterile transparent dressing securely over the site. | Using a transparent dressing ensures close observation of the site can occur easily. |
| Make the line secure and comfortable for the patient | |
| Dispose of all equipment safely and appropriately | |
| **Clean tray** | Reduces the risk of cross contamination |
| **Remove gloves and wash hands** | Reduces the risk of cross contamination |

**Once the needle is in situ, unaltered Aseptic Non Touch Technique can be used as for any other paediatric intravenous procedure. Please refer to WAHT-PAE-029 for details of this technique.**

## Important Considerations

By implanting a Port in a child/ young person's body, their body is altered; the child/young person may become very self conscious.

Prior to accessing a port, it is important that the child/young person is offered as much choice as possible e.g. which room, who will accompany them (if anyone), do they want anaesthetic cream to numb the skin etc.

A child/young person who has had a port accessed many times is likely to be very aware of how they like their port to be accessed, their opinion should be acknowledged and respected.

## Frequency of Flushing

In order to maintain patency, when the needle is in situ but not being used immediately, it must be flushed with heparin (100iu/ml). 2mls is recommended for child aged 1 to 8 years and 4 mls for child over 8 years (unless otherwise advised by the manufacturer (EPIC 2014, BCH 2014)).

When not in regular use, the port should be accessed with a needle every 4-5 weeks, bled back and flushed with heparin100 iu/ml as above to ensure long term patency is maintained.

## Surveillance

When the port is accessed daily, examination of the exit site for signs of local sepsis should occur. If Catheter Related Sepsis is suspected, appropriate cultures should be taken.

When the port has a needle in situ, nursing notes should routinely document the condition of the insertion site. Children and families should be encouraged to report any changes in exit site condition.

## Potential Safety Issues, Risks and Complications

## INFECTION – insertion site and/or port line

Infection of the site can be caused by extravasation of fluids; failure to change the needle after 7 days or local bacterial contamination. It is therefore vital that close observation of the site occurs at all times, especially when the port is in use.

It is important to remember that children who have had chemotherapy treatment may be immunocompromised and may not show obvious signs of infection. Complaints of soreness, unexplained pyrexia and damaged/wet dressings are reasons for immediate inspection of the exit site and replacement of the dressing.

If the needle is to remain in situ at home, patient and family/carer education regarding dressing care and maintenance should be documented in the patient's nursing notes.

## Prevention of infection

- Use correct technique when inserting and accessing needles
- Use port needle once only
- Ensure that needle sits flush to the skin at all times and that the dressing is intact
- Observe port for signs of redness, swelling and tracking – report to senior/medical staff if present/concerned. **NB** children who have received chemotherapy may be immunocompromised and may not display obvious signs of infection. Complaints of soreness,

port reported as 'feeling funny/uncomfortable' or unexpected pyrexia should be investigated further in this patient group.

- Change port needles weekly when in use – NB some specialities (e.g. respiratory patients with cystic fibrosis may leave needles for up to 2 weeks to complete a course of antibiotics)
- Remove needle asap after the completion of regular treatment

## Treatment

- Swab the site.
- Take a blood culture sample from the port – peripheral samples are **NOT** routinely taken unless specifically requested by BCH.
- Commence appropriate antibiotic/anti fungal treatment. Children who are under the care of the haematology/oncology department at BCH should follow the pyrexial/neutropenic antibiotic flow sheet (see CP-PAE-001 'Febrile Neutropenia, Neutropenic Sepsis or Suspected Central Venous Line Infections Care pathway for children and Young Persons').

## Maintaining Patency

The patency of the port must be checked prior to administration of medications and / or solutions.

## Checking For Blood Return

Prior to administration of medications/solutions the port should be aspirated and blood return seen to confirm patency. If resistance is met with absence of blood return, the practitioner should take further steps to assess patency prior to continuing with medication administration [INS 2006].

Failure to aspirate blood:

- Ask the child/young person to cough, take deep breaths or change their position. Asking the child to flap their arms, lean from side to side or wave their arms in the air may also help blood aspiration. These can be undertaken with the syringe still attached to the hub of the insertion needle provided the syringe is held safely to prevent accidental removal and the hub of the line is covered if the child is coughing to minimise infection risk.

- If the change of position/movement does not provide a blood aspirate, check needle position first. If the port has recently been accessed and usually bleeds back well, it may need to be re accessed. If the port has been accessed for a while, the dressing is still intact (the needle does not appear to have moved/changed position) and the port has bled back since being accessed, it may be gently flushed with 0.9% sodium chloride in a **10ml syringe only** (RCN 2010).

- If resistance is felt at any point, the lumen must **NOT** be used and BCH or the Children and Young People's Lead Cancer Nurse contacted for advice on actions to be taken. The position of the port may need to be checked, the needle may need to be reinserted or urokinase instilled in an attempt to unblock the port (see '*occlusion'* section below).

- If it is impossible to aspirate blood from the port (despite the use of urokinase as described below), it should not be used until the position has been checked. This may indicate occlusion, but could also be due to malpositioning of the needle, catheter or migration into an abnormal location.

- If in doubt, advice should be sought from a senior member of the nursing team or a medical colleague. Review by BCH can be arranged and if necessary, the port may need to be removed.

## Occlusion

It is important for the patency of the device to be maintained at all times. Blockage predisposes to

- Device damage
- Infection

- Patient inconvenience
- Disruption to drug delivery

Occlusion of the catheter lumen may be related to

- incorrectly positioned port needle (the distal end may be lodged in the port septum)
- thrombus formation
- migration of the catheter (a particular problem if the child has had the port in for a long time, they may have outgrown it)
- 'fish hooked' needle within the port
- the infusate
- kinking or compression of the catheter/tubing

(DH 2007)

## Incorrect Position of the Port Needle

The needle could be lodged in the septum of the port

## Treatment

Apply firm pressure on the needle to free it from the port septum (do not press too hard, or this may cause the needle to 'fishhook' on the base of the port), then check again for patency of the port.

## 'Fish Hooked' Needles

If the port needle is pushed too firmly into the port, there is a danger that the point of the needle will bend over where it has hit the base of the port. This hook may then block the needle and restrict the flow of fluid.

Unfortunately there is no treatment for this and the needle will need removing (though you will only see the 'fish hook' once the needle has been removed).

Removing the needle can be very uncomfortable and is likely to cause damage to the port septum.

(BCH 2014)

## Occlusion by an Intraluminal Thrombus or Growth of Fibrin Sheath

If you are confident that the line is blocked rather than a needle position problem, there are various methods that can be used in an attempt to regain patency.

**The following should be undertaken with care by experienced practitioners as there is a risk of pushing the obstruction into the child's blood system**

Initially, an attempt should be made to flush the lumen with 0.9% saline or heparinised saline(100iu/ml) in a 10ml syringe (BCH 2014). **Syringes smaller than 10mls should not be used in an attempt to unblock an implanted central venous access device lumen (Drewett 2000).**

Fibrinolytic agents can be used to unblock a thrombosed device (BCH 2014). Urokinase is the drug of choice at BCH. As WAHT works in partnership with BCH, it is also the drug used within WAHT paediatric department. Altepase is an alternative, but is not routinely used within WAHT paediatric department.

1) The recommended dose of Urokinase (5000 IU/lumen) should be injected directly into the device using a 10ml syringe **ONLY**. It should be left in situ for 2-4 hours (can be left longer, **BUT no more than 24 hours**).

2) Whenever possible, aspirate the Urokinase before attempting to flush the catheter. If the catheter can be aspirated and flushed it can be used immediately.

3) If the catheter remains blocked or unusually stiff, repeat as necessary up to a maximum of 3 times.

(BCH, 2014; BNF FOR CHILDREN 2014).

**If any practitioner (medical or nursing) is unsure of any part of the process to unblock a lumen, BCH should be contacted for advice.**

## Extravasation

Ensure that the exit site is observed regularly for signs of extravasation (swelling, redness, pain etc). Any changes should be reported to medical staff immediately (BCH 2010)

**Replacement of Hickman lines and Vascuports will require a surgical procedure under anaesthesia, and should only be undertaken if the catheter is infected, blocked or damaged. Discuss with the patient's consultant paediatrician or BCH.**

## Total Parenteral Nutrition (TPN) Administration

If the port is to be used for the administration of TPN, certain recommendations should be followed:

- The lumen should be protected by a terminal in-line filter (0.2μm) to prevent debris entering the central venous catheter (Bethune 2001).

- **The Nutritional Care department at BCH recommend that children who require TPN administration via an implanted central venous access device have their device accessed using an aseptic technique. (See Appendix 1 for more details on aseptic technique).**

There may be other occasions when the use of aseptic technique is more appropriate to access children's ports e.g. when the individual accessing the CVC is unsure of the general cleanliness of the environment e.g. in individual patients home/school.

## Mobile/Hidden/Tilted Port

Sometimes the port may become mobile leading to difficulty in locating the septum

### Mobile Port:

- Palpate thoroughly for the port before attempting to access
- Evidence of scars from previous access' may not be an indication of the Port location
- Once identified, hold securely with 2 or 3 fingers (and don't let go until it's accessed!)

### Hidden Port:

- Try putting the child in a new position:
    - Leaning back, holding hands behind back
    - Sitting with chest out
    - Lying down with arm hanging over bed edge

### Tilted Port:

Occasionally the Port feels like it has 'tilted':

- Re-position as for hidden port
- Ask the child to move around, swing arms, twist from side to side etc

## Worn Out Septum

Ports should last for approximately 2000 punctures before the septum is worn out, but it is impossible to keep accurate records of how many times it has been used.
Some indications that the septum may be worn out;

- Patients may complain of pain over the port site
- The site may be red and swollen due to fluid leaking into the tissues (extravasation)
- When inserting the needle into the septum, it won't feel very tight around the needle, it will feel 'wobbly'

The only treatment for a worn out septum is to remove the port.

(BCH 2014)

# Needle Removal

## Equipment Required

- Clean dressing trolley, procedure or sharps tray
- Non Sterile Gloves
- 10 ml syringes
- Blue Needles
- Filter Needle
- 0.9% Sodium chloride x1 10ml ampoule
- 2-4mls Heparinised saline (100iu in 1ml), this should be prescribed if possible but one dose can be given under the WAHT Patient Group Direction
- 70% Isopropyl alcohol / 2% Chlorhexidine gluconate wipes (Sani-Cloth CHG 2%)
- Liquid soap
- Alcohol Rub and access to a hand wash basin
- Sharps Box

## Procedure

| Action | Rationale |
|---|---|
| Explain procedure at a level appropriate to child and parent. Check if the child has any special preparations e.g. some like to remove some of the dressing themselves | To ensure informed consent and aid compliance |
| **Put apron on, WASH HANDS using Ayliffe technique and dry thoroughly** | Effective hand hygiene is vital to reduce the risk of contaminating key parts. Reduce risk of cross infection |
| Clean an appropriate work surface/tray and allow to dry | To safely hold equipment/sharps whilst reducing cross infection |
| Collect equipment together | To ensure contamination of gloves does not occur once they are in use |
| Check the saline and heparin solutions strength and expiry dates. Ensure an independent second check also occurs by an appropriately qualified member of staff. | To ensure correct dosages are administered<br><br>**NOTE - Community children's nurses will not be able to complete the independent second check when accessing the port in the community.** |
| **CLEAN HANDS with alcohol rub and ALLOW TO DRY** | To disinfect physically clean hands prior to putting gloves on |
| Put on non-sterile gloves | To comply with universal precautions when handling body fluids. Helps prevent cross infection. |
| Open a syringe and using the blue needle draw up 10mls of the saline solution. | |

| Action | Rationale |
|---|---|
| Remove needle, dispose of safely and place syringe onto clean surface, **ENSURE** key part does not touch the surface | Prevents contamination of key parts during removal from packaging. Safe handling of sharps reduces the risk of needle stick injuries |
| Using the filter needle, draw up 4mls of the heparin solution into a third syringe. Remove needle and dispose of safely | Filter needles reduce the risk of glass particles entering the line. Safe handling of sharps reduces the risk of needle stick injuries |
| Place syringe onto a clean surface, **ENSURE** key part does not touch the surface | Prevents contamination of key parts |
| Place an empty syringe onto the clean surface | |
| Open your wipes and place onto your clean surface – do not unfold | Unfolding the wipes can lead to them drying out quickly |
| Ensure child is sitting comfortably, securely and that the port site is exposed. | It is important that the child is secure to avoid sudden movements during needle removal. |
| Remove the cap/intravenous line from the end of the port needle. Using a wipe, clean around the end and discard. **ALLOW TO DRY.** Repeat if necessary | Effective against bacteria, fungal and viral organisms |
| Attach the empty syringe onto the needle. Unclamp line and withdraw 3-4mls of blood. | 'Discard' sample removes the heparin placed into the line previously. |
| Reclamp line, discard syringe and replace with syringe containing saline and unclamp line | Reduces the risk of cross contamination |
| Firmly and gently flush the line with the saline, a pulsating action is recommended. Clamp the line when all the saline has been instilled. | Pulsating action is recommended to prevent any build up of debris inside the line |
| Remove the syringe and replace with the syringe containing heparin | |
| Unclamp the line | |
| Firmly and gently instil the heparin solution into the line **BUT** clamp the line just before all the heparin is instilled. | Clamping under positive pressure helps to ensure line blockage does not occur |
| Leave the syringe attached to the end of the line. Remove the dressing that secures the needle to the skin. | |
| Holding the port firmly with one hand, remove the needle with the other hand. | |

| Action | Rationale |
|---|---|
| | |
| Apply a plaster if needed or requested by the patient. | |
| Dispose of all equipment safely and appropriately | |
| **Clean tray** | Reduces the risk of cross contamination |
| **Remove gloves and wash hands** | Reduces the risk of cross contamination |

# Appendix 1

## Accessing an implanted central venous access device to be used for the administration of Total Parenteral Nutrition

**NB this guidance applies to devices that already have the needle inserted – the needle insertion procedure is the same as above**

### Equipment required:

- Clean dressing trolley, procedure or sharps tray
- Dressing pack
- Sterile gloves
- 10ml syringes
- Filter needle
- Blue Needle
- Alcohol 70%/chlorhexidine 2% solution or wipes
- 4mls Heparin solution 100 units/ml for IV administration
- 0.9% saline for IV administration
- Liquid soap
- Alcohol hand rub
- Sharps box

Explain procedure at a level the child understands

Clean appropriate work surface or tray

Tip dressing pack on to surface

Wash hands using Ayliffe technique

Open dressing pack by holding corners of paper only

Open sterile equipment onto pack

Open wipes and drop onto sterile area or pour solution into gallipot

Check saline and heparin solutions for strength and expiry date – ensure independent second check is completed by an appropriately qualified member of staff

**NOTE - Community children's nurses will not be able to complete the independent second check when accessing the port in the community.**

Break open the ampoules and stand next to the clean surface

Wash hands again or apply alcohol hand rub and allow to dry

Put on sterile gloves

Using needles draw up heparin solution and saline (as prescribed) into 10ml syringes

Remove needles and dispose of safely

Ensure child understands the procedure and ensure sitting comfortably with the line exposed

If the child is to assist ensure they have washed their hands or applied alcohol gel

Place the dressing towel or sterile glove paper under the line

With gauze soaked in spirit or a wipe pick up the line above the cap

Using another soaked gauze or wipe remove the cap

Discard onto a dirty area

With a clean gauze or wipe clean the hub of the line and repeat if necessary

Allow to dry

Attach the empty 10ml syringe and ask the child/parent to unclamp

Draw back to remove fluid/dead space (approx 3mls) in the line

Re-clamp the line, discard syringe and replace with syringe containing saline

Gently push 3-5 mls saline into the line

Re-clamp the line and dispose of saline syringe onto dirty area

**If PN lines are primed and ready to connect – connect lines at this point and procedure is complete – if line needs to be heplocked for any reason, continue with procedure as outlined below.**

Attach syringe containing heparin solution and ask for clamp to be opened

Firmly but gently push heparin solution using a pulsating action, and asking for the line to be clamped prior to expelling all the heparin solution

Apply a luer lock cap to safely occlude the line

Ensure that the line is secure and comfortable

Dispose of equipment safely

Remove gloves

Clean trolley/tray and wash hands

## References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