RCH@Home Manual: Parenteral Nutrition via Central Venous Access Device

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1 What is parenteral nutrition?

Parenteral Nutrition (PN) is a sterile liquid which is made to be given directly into the child’s blood stream (intravenous). PN is usually given to a child via their central venous access device which is a tube that is inserted directly into the veins (see section 2 for a full description).

Parenteral nutrition contains sugars, protein, electrolytes, vitamins, minerals and fats which are made specifically for each child depending on what their body needs. The child has PN when they are unable to absorb or process food (or enough food) due to problems with their digestive (gastrointestinal) tract.

2 What is a central venous access device?

A Central Venous Access Device (CVAD) is a thin rubber tube which is inserted into the child’s body and is used to give medication and nutrition. You may also hear a CVAD being called a central line which is how we will talk about the line in this manual.

Part of the central line sits outside the body (external). And the rest is put into a vein inside the body (intravenous) with the tip of the line ending in or near the heart.

Where you see the central line entering into the body is called the insertion site or exit point. The insertion site needs careful cleaning by a trained person and must always be covered with a waterproof, sterile dressing. There is usually at least 5cm of this line covered in a sterile dressing (depending on size of child). The rest of the external line is not under a dressing but needs to be kept clean and secure.

When the central line is not being used, the end of the external line is “capped off” with a red cap or a smart site (see child specific care page to confirm what the child uses). There will be a clamp on the external part of the central line. This clamp does not sit under the dressing so it can be easy for the child to play with. It is important that the clamp is left shut (clamped) when the line is not being used and that it is open (unclamped) when the line is being used to give nutrition or medication.

Many children having PN have a Broviac catheter which is a type of central line (see child specific care page to confirm what central line the child has). When a child has a Broviac catheter there will be a ‘Dracon cuff’ which sits just under the skin and helps to hold the central line in the correct position. The Dracon cuff should not be seen outside of the body.
3 Possible problems with a central line

3.1 Line Infection

Anyone with a central line is at risk of getting an infection in their line. A central line infection is a very serious and potentially life threatening problem. Hand washing is the most important thing you can do to prevent a line infection (see infection control manual section).

All signs of infection must be reported to the child’s main caregiver immediately as a child with a central line infection can become very unwell very quickly. If necessary call an ambulance 000.

3.1.1 Signs of a line infection

- Central line insertion site looks red and/or has ooze
- Child’s temperature is more than 38 degrees
- Child is breathing faster than normal
- Child is unusually tired or sleepy
- Change in alertness
- Change in behaviour

3.1.2 Preventing an infection

- Follow the 5 moments for hand hygiene (Hand Hygiene Australia)
- Keep the end of the central line out of the nappy.
- Keep the external part of the central line clean
- Make sure the central line waterproof dressing is clean, dry and not peeling off the skin
- Do not use any PN solution that looks different to normal (you will be shown what is normal during your training)
- When assisting parents with a central line you will be taught to use an Aseptic Non Touch Technique. This technique must be followed at all times.

3.2 Accidental disconnection or breakage of the CVAD

If you see any signs of disconnection or disconnection tell the main caregiver immediately.

3.2.1 Signs that a line has moved, broken or leaking

- You can see the Dacron cuff that normally sits under the skin
- Fluid is leaking around the insertion site
- You can see swelling or red areas around the insertion site or along where the central line catheter sits under the skin
- Any fluid leaking from the line at any time including when pushing in medications or PN.
- If there is a large amount of blood leaking from the line call an ambulance (000) for transport to hospital and alert parents when safe to do so. If able then clamp or pinch the line closed so that the blood can’t come out. If able then cover the break with a waterproof dressing.

3.2.2 Preventing a breakage

- Check that all tubing has the right connections and that they are secure
- Protect lines from all sharp surfaces or objects
- Make sure the line is strapped firmly to the child’s body
- Make sure no part of the central line is hanging free and able to get caught and pulled on
- Make sure the waterproof insertion site dressing is on properly (no peeling or tears)

### 3.3 Troubleshooting Problems with a CVAD

#### 3.3.1 The Red cap/Smart site comes off the end of the line
Make sure the clamp on the line is shut (clamped) above the leak/end. Clean the end of central line with a chlorhexidine and alcohol swab for 20 seconds and screw a new cap/smart site on. Tell the parent(s) immediately.

#### 3.3.2 Catheter has been cut or broken
If possible move the clamp above the break and clamp the line. If this is not possible, pinch the line to clamp it. Clean the broken end with an alcohol swab and seal with a waterproof dressing, to stop air going up the tube with each breath. Call ambulance 000 as the child will need to go to hospital for the line to be fixed. Inform parents as soon as possible. Place the broken line in a plastic bag and send it to hospital with the child.

#### 3.3.3 The clamp comes opened when the central line isn’t being used
Close the clamp and tell the parent(s) as they may need to provide further care.

#### 3.3.4 Dressing comes off
If the waterproof dressing is peeling at the edges inform the parents. If the dressing comes completely off, place a waterproof sterile dressing over the insertion site. Call the parent(s) who will need to replace the dressing using a sterile procedure.

#### 3.3.5 Central line Dracon cuff that normally sits under the skin is showing on the skin
This is a sign that the line is dislodged. Do not try to move the cuff or line. Tape the central line in place as it is. Place a waterproof sterile dressing over the site. Tell the parent(s) who will need to bring the child to the nearest hospital.

#### 3.3.6 The line comes out
Immediately put pressure on the insertion site with sterile gauze or a clean towel. If using sterile gauze, open the gauze pack and place all of the gauze onto the insertion site. Apply pressure to the insertion site for at least five minutes or longer if bleeding has not stopped. After five minutes and the bleeding has stopped you can secure the gauze by putting a waterproof dressing over the top. Immediately advise the parents that the line has come out. If you are unable to get in contact with the parents please call an Ambulance and maintain pressure on the area until they arrive to take over. Place the central line in a plastic bag to take to the hospital.

### 4 Assisting parents with caring for the central line
Support workers may be required to help the child’s parents with setting up sterile dressings, tubing, medication and PN. Special techniques are used to help prevent infection of a central line and these are known as aseptic non touch technique.

#### 4.1 What is Aseptic technique?
Aseptic technique is a way we can use to prevent bacteria being transferred from one place such as our hands or equipment to another place such as a child’s central line or their equipment used to care for their central line. There are different kinds of aseptic technique but when caring for a central line at home the support worker will use a non-touch technique and the parent will use a surgical aseptic technique.
4.1.1 Aseptic Non touch technique (ANTT)
Non touch technique involves careful hand hygiene and not touching the equipment that is to be used by the parent. The support worker will be required to open up the packaging of equipment such as gauze packs and syringes but it is very important not to touch the equipment that is inside the packaging.

4.1.2 Surgical Aseptic technique
This is used by the person accessing the central line (not the support worker) – usually the parent. It involves a mixture of:

- Hand hygiene
- Sterile gloves
- Clean work place such as an open dressing pack
- Sterile equipment that has been opened for them by the support worker (this equipment must not be touched by anybody other than the person who is performing the hook on. This person can only touch it when they have washed their hands and have their sterile gloves on)
- Not touching dirty areas once they have washed their hands and are wearing sterile gloves

4.2 Support workers role when connecting the child to TPN (hook on)
The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 11 and the support worker may only need to help with steps 12 – 17 making sure that hand hygiene is completed before starting step 12.

1. Remove all jewellery and tie hair back (if long)
2. Complete hand hygiene
3. Gather equipment which should include the following (be guided by parent)
   - Chlorhexidine hand gel
   - Parenteral Nutrition (supplied by Baxter Australia)
   - IV tubing to administer PN
   - Bodyguard pump (or other RCH approved pump)
   - Dressing pack
   - Alcohol/chlorhexidine liquid
   - Gauze pack
   - 10ml Syringes
   - 10ml Saline for injection ampoules
   - Blunt drawing up needles.
   - Red caps/smart sites
   - Heparin (as instructed by parent)
   - Sterile gloves
4. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%
5. Complete hand hygiene
6. Peel open the sterile glove packaging and place the packaging onto a clean area. The parent will use these gloves.
7. Remove the dressing pack from the plastic packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile drape
8. Pour alcohol solution into the plastic dressing tray. Make sure you don’t hold the bottle of alcohol too close to the dressing pack so that you don’t accidentally touch the dressing pack with the bottle.
Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

9. Open red caps onto the dressing pack
10. Open syringes onto the dressing pack
11. Open drawing up needles onto the dressing pack
12. When the parent is ready you can now open the saline ampoules and hold them steady while the parent “draws up” the saline into the sterile syringes.
13. The equipment is now prepared.
14. Complete hand hygiene again
15. Assist the parent by providing reassurance and comfort or distraction to the child.
16. When the parent asks you to you will need to unclamp the clamp on the central line.
17. When the parent asks you to you will need to clamp the clamp on the central line.

During a hook on the parent may ask the support worker to silence the pump – this will be explained further in section 4.3

### 4.3 Support workers role when disconnecting the child from TPN (hook off)

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 12 and the support worker may only need to help with steps 13 – 17, making sure that hand hygiene is completed before starting step 13.

1. Remove all jewellery and tie hair back (if long)
2. Complete hand hygiene
3. Have all equipment available which should include the following:
   - Dressing pack
   - Alcohol/chlorhexidine
   - Gauze pack
   - 10ml Syringes
   - 10ml Saline for injection ampoules
   - Drawing up needles.
   - Red caps (if not using smart sites)
   - Heparin (as instructed by parent)
   - Sterile gloves
4. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%
5. Complete hand hygiene
6. Peel open the sterile glove packaging onto a clean area. The parent will use these gloves.
7. Remove the dressing pack from the packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile drape.

8. Pour alcohol solution into the dressing tray. Make sure you don't hold the bottle of alcohol too close to the dressing pack so that you don't accidentally touch the dressing pack with the bottle.

9. Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

10. Open red caps onto the dressing pack

11. Open syringes onto the dressing pack

12. Open drawing up needles onto the dressing pack

13. When the parent is ready you can now open the saline ampoules and hold them steady while the parent "draws up" the saline into the sterile syringes.

14. The equipment is now prepared.

15. Complete hand hygiene again

16. Assist the parent by providing reassurance and comfort or distraction to the child.

17. When the parent asks you to you will need to unclamp the clamp on the central line.

18. When the parent asks you to you will need to clamp the clamp on the central line.

### 4.4 Support worker’s role when changing a central line dressing and redcap/smartsite

The waterproof central line dressing is changed every seven days, or more often if needed. This is done by the child’s parents. The support worker can help with setting up the equipment and caring for the child while the parent changes the dressing.

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 12 and the support worker may only need to help with steps 13 – 17, making sure that hand hygiene is completed before starting step 13.

1. Remove all jewellery and tie hair back (if long)

2. Have all equipment available which should include the following:
   - Dressing pack
   - Chlorhexidine 0.5% in Alcohol 70%
   - IV 3000 or tegaderm waterproof dressing
   - 10ml Syringes
   - 10ml Saline for injection ampoules
   - Drawing up needles.
   - Red caps or smart sites
   - Heparin (as instructed by parent)
   - Sterile gloves
   - Gauze pack

3. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%

4. Complete hand hygiene
5. Peel open the sterile glove packaging onto a clean area. The parent will use these gloves.

6. Remove the dressing pack from the packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile drape.

7. Pour alcohol solution into the dressing tray. Make sure you don’t hold the bottle of alcohol too close to the dressing pack so that you don’t accidently touch the dressing pack with the bottle.

Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

8. Open red caps/smartsites onto the dressing pack

9. Open syringes onto the dressing pack

10. Open drawing up needles onto the dressing pack

11. Open waterproof dressing onto the dressing pack

12. Open the spare gauze onto the dressing pack

13. When the parent is ready you can now open the saline ampoules and hold them steady while the parent “draws up” the saline into the sterile syringes. The saline ampoules must not touch the open dressing pack or the equipment on it. You must not touch the parent while they are drawing up the saline.

14. The equipment is now prepared.

15. Complete hand hygiene again

16. Assist the parent by providing reassurance and comfort or distraction to the child.

17. When the parent asks you to you will need to unclamp the clamp on the central line.

18. When the parent asks you to you will need to clamp the clamp on the central line.

19. You may need to hold the line for the parent while they clean the insertion site. Do not touch the skin near the insertion site.
5 The support workers role with The Bodyguard 323 pump

The bodyguard pump is used to deliver the PN to the child. The support worker is not allowed to be involved in programming or troubleshooting the pump.

Under direct supervision from the child’s main caregiver the support worker is allowed to:

- Silence the pump – only during set up, before the PN has started
- Load the giving set into the pump – the parent must visually check that this is loaded correctly before the support worker closes the pump door.
- Press the prime button when the parent requests them to

The support worker may not touch these buttons on the pump at any other time than when a parent is directing them.

5.1 Silencing the Pump

During set up the pump may alarm if it is turned on for two minutes but not infusing anything. The pump will display the message "Pump unattended". It is expected that this alarm will sound during set up of the PN. The parent may ask the support worker to silence the alarm during the set up.

When the alarm is sounding "press the red Stop/No button once.

The "pump unattended" alarm will continue to sound every two minutes until the parent starts the infusion. The support worker may need to silence the alarm a few times during the setup of the PN.
5.2 Loading the Set

Under supervision

1. Open the pump door by flipping the silver “pump door release” catch located on the lower right side of the pump (no. 5 on the diagram above).
2. Load the set into the pump making sure that the Key is inserted into the ‘keyway’ with the protrusions on the key facing upwards. The key can only be loaded one way so fluid flows in the direction of the arrows inside the pump door (See Diagram below).
3. When the set is loaded into the pump and has been visually checked by the parent, the support worker can close the pump door.

5.3 Priming the line

Priming the line means to let fluid run out of the bag of PN and down through the intravenous tubing which is also known as a giving set. This tubing (giving set) is used to deliver the PN from the bag to the child through their central line. Priming the line is only done during set up of the PN, it is never done when the tubing is connected to the child’s central line as this will cause the child to get too much PN too fast which can make them sick.

To prime the line

1. The parent will tell the support worker to “Press Prime the line”
2. Before pressing the Prime button check and make sure that the giving set is loaded correctly into the pump and that the giving set is not connected to the child. The parent should hold the end of the giving set over a container to catch any drips.
3. The support worker may now press the orange “Prime/Bolus” button on the bodyguard 323 pump. The line might need to be primed twice if the PN doesn't go all the way to the end of the giving set. The parent will instruct the support worker if this is needed.

References:

Nutrition Support Service, Home Parenteral Nutrition: instructions for the administration of parenteral nutrition at home. Royal Children’s Hospital, Melbourne

Bodyguard 323 training guide