

PAEDIATRIC NURSING PRACTICE MANUAL
SECTION 2

DRUG AND INTRAVENOUS (IV) THERAPY

2.3 INTRAVENOUS (IV) THERAPY

2.3.3.1 CANNULATION OF A PERIPHERAL VEIN BY A NURSE

Aims

1. To gain peripheral venous access in order to administer fluids, blood products, medications and/or nutritional components.
2. To minimise the risk of complications when initiating IV therapy.

Key points

1. This procedure is an aseptic non touch technique. Refer to [A&NTT Framework](#). Strict adherence to hand hygiene and protection of 'key parts' and 'key sites' from contamination remains the cornerstone of preventing vascular catheter-related infections.¹⁻³
2. Only nurses in Emergency Department, Haematology/Oncology and Ambulatory Care services who have been certified as competent and can maintain competence in the insertion of IV cannula may perform this procedure.
3. At least two people are required for this procedure - the operator and another person to maintain the safety of the child during insertion (See Clinical Holding [PNPM 1.11](#)).
4. Local anaesthetic (eg. lignocaine) is not routinely used for cannulation purposes, however, if required only a medical officer may administer lignocaine injection at the site of cannula insertion.
5. In the case of two unsuccessful insertion attempts, the operator will seek the assistance of another experienced nurse or medical officer for one additional attempt. A medical officer **must** be informed after a total of three unsuccessful attempts.

Known Complications of IV Therapy^{4,5,6}

Phlebitis

Contributing factors

- Catheter material and size
- Site of insertion
- Skill of operator
- Duration of cannula
- Type and rate of infusion
- Dilution of solution
- Frequency of dressing change
- Presence of existing infection
- Type of skin prep
- Host factors
- Insertion of the cannula in an Emergency Department

Infection

Contributing factors

- Contaminated infusions
- Inadequate skin preparation
- Poor technique
- Host factors

Extravasation

Contributing factors

- Type of drug
- Age
- Site of cannula
- Type of cannula
- Duration of cannula

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Perth, Western Australia

All protocols should be read in conjunction with the Disclaimer in the Preface of this manual



Pain Management:

Topical anaesthetic cream (eg. EMLA or LMX4) can reduce the pain associated with the insertion of intravenous needles^{7,8}. The use of a topical anaesthetic however requires planning as the cream must be applied at least 45-60 minutes before the proposed procedure. It is therefore suitable for elective IV cannula insertion but not for emergencies.

EMLA is to be used with caution in infants less than 6 months of age and premature infants. Refer to [Acute Pain Service protocols](#). Consider oral sucrose for neonates and infants <6 months of age^{9,10} (refer to [Neonatal guidelines](#)). Implement play and distraction throughout the procedure.

Equipment

Cannula selection¹¹⁻¹⁵

Select cannula based on purpose and duration of use, and age of patient. Consider risk of infection, phlebitis and extravasation.

1. Where possible, use catheters made from polyurethanes which are associated with decreased risk of infection and phlebitis.
2. Select the smallest cannula for the largest vessel. Large gauge cannula's have been associated with increased risk of mechanical phlebitis.
3. Use a safety IV cannula eg. Acuvance[®] to reduce the risk of needle stick injury.

Other required equipment

Topical anaesthetic cream

Trolley or large tray

IV starter kit

Skin antiseptic - 2% chlorhexidine in 70% isopropyl alcohol swabs^{15,16,17} (Use an aqueous based alternative if there is a known allergy to alcohol or for very young infants)

Tourniquet

Pre-filled saline syringe (BD[™] posiflush) **or**,

Syringe & non bevelled drawing up needle & ampoule of sodium chloride 0.9%

Short extension set

Needle free bung(s)

Transparent occlusive dressing (eg. Tegaderm[®])^{16,18,19}

Gloves, non sterile

Paper bag

Additional equipment which may be required

3-way tap and additional needle free bungs

Splint and tape (to secure splint) :Transparent tape is used for a child less than 12 months of age

Prescribed infusion fluid

Administration set

Volumetric pump and pole

Intravenous line ± additive labels

Selection of Catheter Site^{15,20-24}

1. **Infants:** select a hand or foot in preference to a leg, arm, or the ante cubital fossa.
2. **Older children:** Choose long straight veins in an upper extremity away from the joints if possible in preference to sites on the lower extremities. If possible avoid veins in the dominant hand and use distal veins first.

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3. Prior to making the final selection, palpate the chosen vein to ensure it is not hard, bumpy or flat. IV insertion in hard or scarred veins may lead to impaired blood flow, is likely to be more difficult to insert and more painful for the patients.
4. Warmth encourages vasodilation; consider a warm bath or wrap infants/young children in a warm blanket prior to cannulation attempt. For older children consider a warm compress to the site for 10 to 15 minutes before cannula insertion.
5. **Contraindicated site:** Do not insert cannula on the side of AV shunts. If long term therapy is likely, consider transferring the cannula inserted in a lower extremity site to an upper extremity site if the latter becomes available. Central venous access may need to be considered if therapy is likely to be greater than 7 days. Discuss with treating medical team.

PROCEDURE	ADDITIONAL INFORMATION
Explain procedure to patient/parent/carer.	Utilise developmentally appropriate play and distraction; involve play therapist.
Perform hand hygiene. Clean tray/trolley with sporacidal wipe. Allow to dry whilst gathering equipment. Put on plastic apron. Perform hand hygiene.	
Prepare equipment; prime the extension set with saline using non touch technique. Apply end caps to syringes/tubing until ready to connect to the cannula.	
Remove topical anaesthetic cream and confirm selection of the site.	
Apply the tourniquet above insertion site. Do not leave tourniquet on for extended period of time.	For a child, an assistant's hand used both as a tourniquet and restraint is often more acceptable to a child than a tourniquet.
Perform hand hygiene. Don gloves.	Use sterile gloves if touching 'key parts' & 'key sites' is unavoidable.
Disinfect the selected site with 2% chlorhexidine gluconate/70%isopropyl alcohol swab for at least 30 seconds. ¹⁵⁻¹⁷ Allow to air dry completely.	Use vigorous back-and-forth motion for adequate cleansing. ^{16,23} Do not re-palpate the skin after cleansing.
Before insertion, inspect the cannula to ensure that the needle is fully inserted into the plastic cannula and that the cannula tip is not damaged.	Do not touch the shaft or tip of the cannula.
Ensure the bevel of the cannula is facing upwards.	Facilitates the piercing of the skin by the bevel.

PROCEDURE	ADDITIONAL INFORMATION
Insert the needle and the cannula into the vein at an angle 10-45° depending on the depth of the vein.	Gentle traction on skin may stabilise the vein under the skin.
When blood return/flashback is visualised, partially withdraw the needle and advance the cannula.	
Release the tourniquet. Note: If the child requires blood collection at time of cannulation, release tourniquet after blood has been collected.	Use a blunt plastic cannula and syringe to slowly withdraw blood from the hub (eg. for blood cultures) or allow for passive flow of blood directly into the bottles.
Leaving the plastic cannula in place, remove the needle. Dispose of the needle immediately into sharps container.	
Apply slight occlusive pressure to the vein above the distal end of the cannula.	Prevents blood loss from the cannula before connection to the extension set.
Secure the hub of the cannula with sterile adhesive tape provided in the IV starter kit.	Do not cover the puncture site.
Attach primed extension set to the cannula hub. Flush the cannula with normal saline. Attach needle free bungs to the extension ports.	Confirms the line is patent and accessible.
Cover the insertion site with a sterile transparent dressing. ^{16,19} 	Ensure that the insertion site and the area proximal to the site are visible for inspection purposes.
If infusion ordered, prime the administration set and attach to the cannula extension.	Label all bags (with additives) and lines and with blue intravenous labels as per PNPM 2.12.1 .
If the site needs to be immobilised, use a well padded splint and strapping if necessary.	For infants <12 months, a transparent tape must be used (eg. Blenderm).

PROCEDURE	ADDITIONAL INFORMATION
If a bandage is used, apply it at each end of splint so that the insertion site is lightly covered for easy inspection.	Remove the bandage completely for inspection of the surrounding area at regular intervals. See PNPM 2.3.5 PIVAS scale and PNPM 2.3.2 Peripheral Intravenous (PIV) Access – Principles and Management.
Dispose of equipment safely. Decontaminate trolley/tray with sporacidal detergent (eg. Tuffie™ 5 wipes). Remove gloves and perform hand hygiene.	
Documentation ²⁵ : Date and time of insertion Insertion site (vein) Gauge of cannula Number of attempts Child's tolerance to the procedure	

References:

1. Pratt RJ, Pellowe C M. et al; Epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England. Journal of Hospital Infection 65 (Supp 1). 2007
2. Rowley S, Clare S, Macqueen S and Molyneux R. ANTT v2: An updated practice framework for aseptic technique. British Journal of Nursing 2010 (Intravenous Supplement) 19:5
3. National Health and Medical Research Council, Australian Guidelines for the Prevention and Control of Infections in Healthcare. NHMRC 2010 Part B1.7. Available from http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/cd33_infection_control_healthcare_0.pdf?bcsj_scan_4612728BE7E7B4AB=0&bcsj_scan_filename=cd33_infection_control_healthcare_0.pdf. Accessed 31 December 2012

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