

Subcutaneous insulin infusion in Newborn Intensive Care Unit (NICU)

Procedure Responsibilities and Authorisation

Department Responsible for Procedure	Neonatal Intensive Care Unit
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Target Audience	Registered Nurses
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Procedure Review History

Version	Updated by	Date Updated	Summary of Changes
2	Leanne Baker	March 2013	3 yearly Update
3	Joyce Mok	July 2016	3 yearly update
4	Joyce Mok	Oct 2019	3 yearly review
5	Kimmy Fulgencio	October 2022	3 yearly review

Subcutaneous insulin infusion in Newborn Intensive Care Unit (NICU)

1 Overview

1.1 Purpose

To outline the procedure on how to deliver continuous insulin infusion subcutaneously for infants requiring insulin and who have compromised central venous or intravenous access.

1.2 Scope

Medical and Nursing staff in NICU.

1.3 Patient group

Infants in NICU.

1.4 Definitions

CVL	Central venous line
Infusion	Delivery of a medication or fluids via continuously running slow and/or prolonged delivery into a vein or subcutaneous layer, using a syringe drive pump.
PAL	Peripheral arterial line
Subcutaneous	Adipose (fatty) tissue beneath the skin.
UAC	Umbilical artery catheter

2 Clinical Management

2.1 Competency required

Registered Nurse with Te Whatu Ora Waikato Generic IV Certificate and NICU specific Advanced CVL/UAC/PAL certification.

2.2 Equipment

- 24g butterfly needle extension set (BD Saf-T-Intima)
- Non-sterile gloves
- Trolley cleaned with hyposal
- Sterile guard and gauze swabs
- Tegaderm™ or Opsite™ transparent dressing
- Steristrips™
- Alcohol-Chlorhexidine prep pad for skin preparation or use aqueous chlorhexidine non-alcohol cleansing agent for infants with fragile skin
- Rubbish bag

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Note:

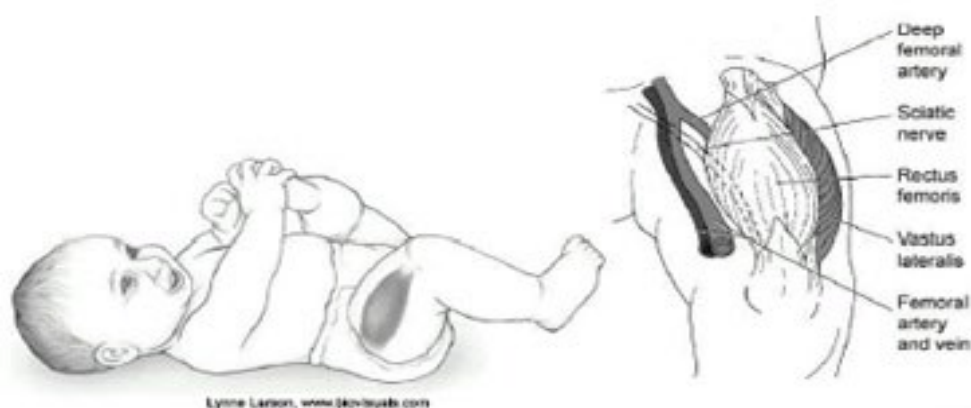
- Insulin solution prepared by 2 nurses as per [Medicines Management](#) policy (Ref 0138) and [Insulin for Hyperglycaemia in neonates](#) drug guideline (Ref 2932).
- Two person procedure, e.g. second nurse as assistant.

2.3 Procedure

2.3.1 Preparation

- Identify the right patient and check patient label against medication chart with 2nd nurse to ensure correct identification of patient and prescription.
- Explain the procedure to the parents or guardians to allay their fears and increase understanding.
- Perform hand hygiene.
- Collect equipment and place on trolley.
- Open up paper guard onto trolley and place equipment on clean field.
- Consider giving sucrose 25% as per [Sucrose Oral Liquid for Analgesia in Neonates and Infants](#) drug guideline (Ref 2905) prior to procedure to minimize pain and discomfort.
- Identify the appropriate insertion site which should have adequate subcutaneous tissue and intact skin. Ask assistant to position infant slightly lateral with lateral aspect of thigh accessible and hold infant gently.

Note: Contraindicated with sites that are inflamed, oedematous, infected, scarred or covered by a mole, birthmark or other lesions.

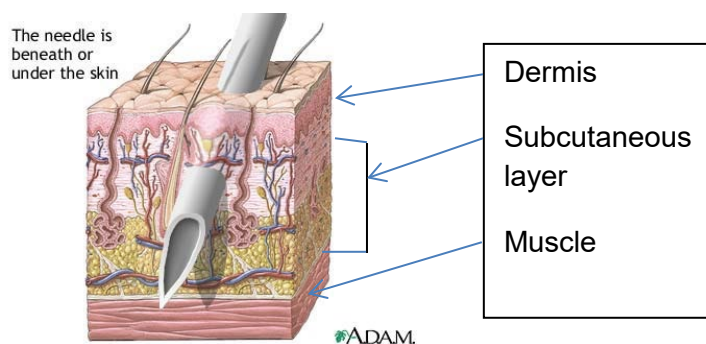
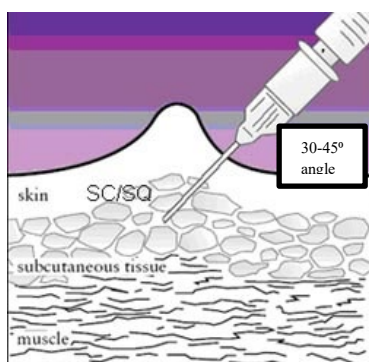


Doc ID:	0392	Version:	05	Issue Date:	16 DEC 2022	Review Date:	16 DEC 2025
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2.3.2 Inserting subcutaneous cannula (butterfly) – refer to diagrams below

- Perform hand hygiene.
- Remove the flow control plug from the Y-injection port to prime the device and leave the tubing on it.
- Prime butterfly tubing with labelled pre-prepared insulin solution to ensure no air in tubing and check the patency of device. Loosen the needle by rotating the safety shield.
- Wear clean non-sterile gloves.
- Prepare skin with alcohol-chlorhexidine prep pad or non-alcohol aqueous chlorhexidine cleansing agent for babies with fragile skin, and allow to dry.



- With your dominant hand, grasp the wings of the catheter and bring them together, pinching firmly.
- Lift skin fold between thumb and forefinger.
- Pinch up the skin between thumb and forefinger so as to lift the adipose tissue and then push the needle in the pinched up tissue at a 30° to 45° angle.
- Insert butterfly needle bevel facing upward at a 30° to 45° angle running along the lateral aspect of the thigh towards the baby's head, and insert up to the hub.
- Release skin and ensure needle sitting comfortable in place.
- Place the needle with bevel facing up because (1) Preterm babies have little subcutaneous tissue, and (2) to maintain skin integrity and ensure most comfortable placement of needle.
- Once satisfied with placement, release the wings with flat surface on the skin then secure the cannula with Steristrip™ across the hub. Cover the insertion site with a transparent dressing to allow good visualisation of whole area.
- Place a small amount of pressure on the wings to prevent dislodgement of the catheter. Grasp the safety shield then pull back slightly to recess the needle.

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- Draw back gently on syringe to ensure non-venous placement because infusion into a vein could cause blood sugars to drop rapidly. If blood return obtained, remove and discard the needle then insert a new one at another site.
- Remove the needle and wire then dispose it to sharp container.

Note: Do not reinsert the needle if the catheter is dislodged or withdrawn as it could shear the catheter.



Transparent dressing

2.3.3 Administering insulin infusion

- Ensure infusion is properly connected directly to the Y-arm of BD Saf-T-Intima or butterfly extension set and place into syringe pump.
- Set delivery rate as prescribed.
- Two nurses to check the correct pump rate prescribed on the General Treatment Sheet to ensure delivery of the correct dose and volume of medication over the correct time.
- Secure extra length of tubing with Duoderm™ base tape and leucoplast thin tape (as done with IV taping) to avoid drag on insertion site and dressing.
- Perform hand hygiene.
- Label the dressing with insertion date and time.
- Subcutaneous butterfly needle set may stay in situ for 72 hours or change earlier if indicated. Rotate sites to prevent tissue irritation, scarring and pain as it can cause lipodystrophy.
- Monitor and document hourly
 - Observations – vital signs
 - Site of insertion: signs of inflammation or infection
 - Volume of insulin infused
- Monitor blood sugar level as prescribed and after dosage change.
- Monitor and record fluid intake and output as per NICU procedures.

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2.4 Documentation

- Document the gauge, insertion date and time on infant's medical notes and care plan.
- Note the medication concentration and dose rate.
- Record any adverse reactions or complications in the notes.

2.5 Potential complications

- Hypoglycaemia
- Hyperglycaemia
- Extravasation of infusion site
- Infection
- Bruising and bleeding
- Fluid leakage
- Pain or discomfort
- Blockage

2.6 After care

- Dispose of sharps (if replacing a previous cannula) in a designated sharps disposal container.
- Dispose of other rubbish in designated container.
- Perform hand hygiene.

3 Audit

3.1 Indicators

- The preparation of the insulin solution follows the requirements in the Medicines Management policy
- The butterfly needle is positioned in accordance with 2.3.2
- Two nurses check the correct pump rate prescribed on the General Treatment Sheet to ensure delivery of the correct dose and volume of medication over the correct time.

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4 Evidence base

4.1 References

- Wolters Kluwer Health, May 2021, [Subcutaneous Injection Pediatric](#), Lippincott Procedures,
- Wolters Kluwer Health, August 2021, [Subcutaneous Infusion, Continuous \(hypodermoclysis\)](#), Lippincott Procedures,
- https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Subcutaneous_catheter_devices_management_of_insufilon_and_BD_safTIntima_devices/
- <https://starship.org.nz/guidelines/subcutaneous-catheter-device-insufilon-tm/>
- https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/BD_Saf-T-Intima%E2%84%A2_insertion_guide/?LangType=3081

4.2 Associated Te Whatu Ora Waikato Documents

- [Medicines Management](#) Policy (Ref 0138)
- [Insulin for Hyperglycaemia in neonates](#) drug guideline (Ref 2932).
- [Sucrose Oral Liquid for Analgesia in Neonates and Infants](#) (2905)

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