



PROCEDURE

Continuous Subcutaneous Infusion for Palliative Care (using NikiT34 syringe pump)

Scope (Staff):	Clinical Staff
Scope (Area):	PMH (valid for PCH)

This document should be read in conjunction with this [DISCLAIMER](#)

Aims

1. To provide optimum comfort and symptom control for palliative patients.
2. To provide instruction to clinical staff for the insertion of a subcutaneous device and management of a continuous subcutaneous infusion (CSI) using the Niki T34 syringe pump.

Key points

- All clinical staff must work within their scope of practice and in accordance with CAHS medication safety policies, procedures and protocols. Refer also to the following procedures/ protocols:
 - Medication Administration (PMH policy)
 - Medication, Checking and Administration (PMH procedure)
 - [Schedule 8 and Schedule 4 Restricted Drug](#) (Clinical Practice Manual)
 - [Acute Pain Service Policies and Protocols](#)(CAHS Intranet)
- All staff caring for a patient with a CSI using NikiT34 syringe pump must have received appropriate instruction for the set up and operation of the device.
- Use aseptic technique for insertion and maintenance of an indwelling subcutaneous device.¹
- Only the Niki T34™ portable syringe driver is to be used for palliative care patients requiring a continuous subcutaneous infusion. The device has been configured specifically for palliative care to deliver the infusion over 24 hours and must not be recalibrated without prior authorisation from the palliative care team.
- A rigid tamper-proof 'lock-box' must be used for the administration of Schedule 8 and Schedule 4R medications.
- A loading dose of the medication (eg. analgesia, anticonvulsant) may be required at the start of the infusion to ensure therapeutic drug levels are reached quickly.

Indications

- Patients who, for a variety of reasons, are unable to take or tolerate oral/enteral medications and the subcutaneous route is preferred over intravenous route or repeated intramuscular injections.^{2, 3}
 - A Continuous Subcutaneous Infusion (CSI) can achieve more stable drug plasma levels and more effective symptom control than intermittent administration.⁴

Common medications used for palliative patients

More than one drug can be mixed and administered in the same syringe; however it is uncommon for more than two medications to be combined for paediatric patients. Check compatibility, required diluent and stability with the ward pharmacist.

- Morphine
- Midazolam
- Morphine + Midazolam
- Phenobarbitone

Medications contraindicated for subcutaneous administration:

The following drugs can cause irritation and/or tissue damage if given via the subcutaneous route:

- Antibiotics
- Diazepam
- Chlorpromazine
- Prochlorperazine (Stemetil)

Procedure

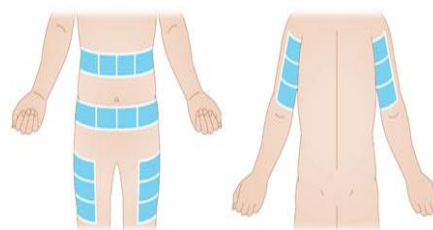
Insertion of Indwelling Subcutaneous Catheter

Type of catheter

- The Saf-T-Intima™ indwelling subcutaneous catheter is to be used for a continuous subcutaneous infusion.
- For intermittent administration an Insuflon may be needed to be sited at a different location (refer to Clinical Practice Manual '[Subcutaneous Indwelling Catheter - Insuflon™](#)')
- The subcutaneous catheter can remain in situ for up to seven days, longer if no complications arise. Change the catheter at the earliest signs of complication – redness, swelling, leaking as optimum symptom control may be compromised.
- Rotate the subcutaneous catheter site with each insertion.

Site Selection

- Select the most appropriate injection site; preferred sites in children are the abdomen, upper thigh, upper arm where there is more subcutaneous tissue. ⁵
- Apply topical anaesthesia to selected site if appropriate for the specified time before cannula insertion.
- Avoid:
 - Bony prominences, as there is less subcutaneous tissue and absorption will be reduced.
 - Joints, as more likely to be uncomfortable and easier to dislodge.
 - Oedematous, infected, broken, or bruised skin.
 - Recently irradiated skin areas.

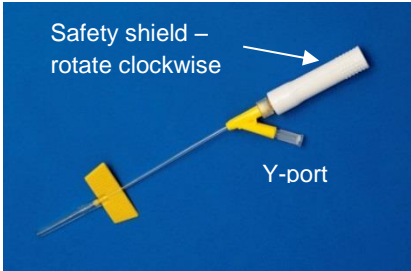
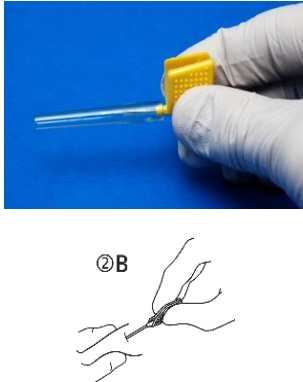
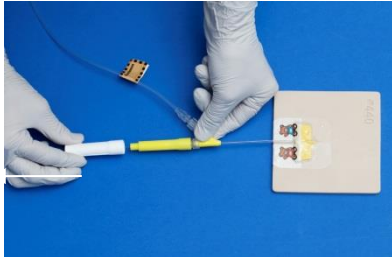


Equipment for insertion of Saf-T-Intima:

- [Topical local anaesthetic cream](#) (if indicated)
 - Consider oral sucrose for infants < 3 months
- Dressing pack
- Saf-T-Intima™ 24g (yellow) indwelling catheter
- Skin cleansing wipe - 2% chlorhexidine gluconate/70% alcohol unless contraindicated.
- Occlusive transparent dressing
- Gloves

Steps	Additional Information
Explain procedure and prepare child/ carer. Remove topical anaesthetic cream. Consider oral sucrose for infants < 3months (where appropriate)	
Gather equipment Perform hand hygiene. Empty equipment onto general aseptic field using non touch technique.	

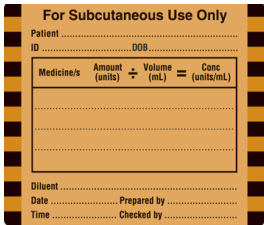

Continuous Subcutaneous Infusion (CSI) for Palliative Care – Using NikiT34 Syringe Pump

Steps	Additional Information
<p>Don gloves and inspect Saf-T-intima:</p> <ul style="list-style-type: none"> remove needle cap and check integrity of catheter tip hold catheter firmly and turn safety shield clockwise to loosen the needle, turn the bevel upwards prime Saf-T-Intima with 0.9% sodium chloride (approx 0.2mL) via the Y-port 	
<p>Cleanse skin with 2% chlorhexidine in 70% isopropyl alcohol. Allow to dry.</p>	<p>Clean skin with soap and water if visibly soiled or for patients sensitive to chlorhexidine.</p> <p>Do not touch the skin with hands after cleansing.</p>
<p>To insert Saf-T-Intima:</p> <p>Grasp the textured wings and bring them together firmly (textured side down).</p> <p>Pinch the skin between thumb and forefinger.</p> <p>Insert cannula at an angle of 20⁰- 45⁰ to the skin.</p> <ul style="list-style-type: none"> If blood is visible in the catheter, remove and insert a new catheter at a different site. 	
<p>Secure the catheter and wings with a transparent semi-permeable dressing.</p> <p>Hold the Y-connector with one hand and pull back on the safety shield/introducer with other hand to reveal the needle encasement.</p> <p>Gently pull the yellow encasement away in one smooth single movement.</p> <p>Replace the injectable bung with a needle free bung.</p> <p>Loop the extension set and secure with tape.</p>	<p>Assistance may be required to hold the catheter wings during removal of the needle.</p>  <p>Check for patient sensitivity to tape.</p>
<p>Dispose of needle into sharps waste container immediately.</p> <p>Remove gloves and perform hand hygiene.</p> <p>Decontaminate trolley/ tray.</p>	

Preparing Medication Syringe

Equipment

- Prescribed medication and diluent
- 20mL BD Plastipak or 25mL Terumo luer lock syringe only
 - Pre-made syringe may be supplied by CIVAS; ensure the CIVAS order states type/size of syringe.
- Minimum volume extension set (e.g. microbore 152cm x 0.35mL)
- Subcutaneous infusion labels for syringe and line (available from PPC team or Oncology /Haematology Unit)

Steps	Additional Information
Prepare prescribed medication using an aseptic technique and in accordance with hospital protocols.	Refer to Medication Checking and Administration and Schedule 8 and Schedule 4 Restricted Drug Policies .
<p>Syringe size & dilution:</p> <p>Volume of undiluted, prepared drug(s):</p> <ul style="list-style-type: none"> • ≤10mL: use 20mL syringe Dilute up to 18mL with 0.9% saline • ≤15mL: use 20mL syringe Dilute up to 18mL with 0.9% saline 	<p><u>Use only luer-lock BD Plastipak or Terumo syringe.</u></p> <p>0.9% saline is the preferred diluent.^{2, 6,7}</p> <p>Water for injection or 5% dextrose may be required for some medications, check with ward pharmacist.</p>
<p>Attach extension set to the syringe but do not prime the line.</p> <p>Protect end of extension set with a cap until ready to attach to the catheter.</p>	<p>The first set up requires purging by the pump to maintain correct administration rate over 24 hours.</p>
<p>Label syringe and administration set with colour-coded sticker to identify Subcut route. Avoid placing over syringe graduation markers.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	<p>Do not place label at the point where the Niki T34 barrel clamp is applied as incorrect syringe recognition may result.⁸</p> <p>See also Labelling of Injectable Medications and Fluids.</p>



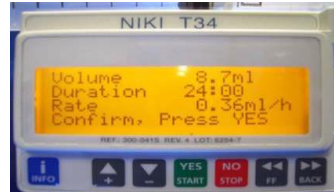
Setting the Niki T34™ Infusion Pump⁹





Equipment

- NIKI-T34™ infusion pump:
 - programmed for palliative care patients only (available from Paediatric Palliative Care team (PPC) or Oncology/Haematology Unit)

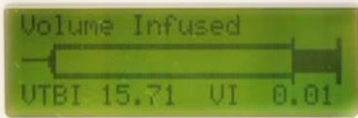
Additional Equipment:

- Spare 9v alkaline battery
- Lock box and key

Steps	Additional Information
<p>1. Switch the pump 'ON'. Check pump settings:</p> <ul style="list-style-type: none"> • Occlusion alarm 540-800mmHg • Max Rate 5ml/hr • Program Lock ON • % Battery power remaining <p>2. Wait for the pump to pre-load.</p> <p>Note: The plunger sensor (actuator) will return to the start position of the last infusion.</p>	<p>The machine will calibrate itself to the default settings..</p>  <p>At least 90% battery life required for a 24 hour infusion. Change the battery if in doubt.</p>
<p>3. Align the medication syringe to the pump syringe sensors and use the FF /back keys to move the actuator to the correct position.</p>	<p>Do not attempt to manually move the actuator as this can damage the device</p>
<p>4. The pump will display 'Load Syringe'</p> <p>Lift the barrel arm clamp and align the syringe in place with numbers facing operator.</p> <p>Lower the clamp.</p> <p>Once correctly loaded the pump will detect the syringe type and ask for confirmation.</p> <p>Use the ▲▼ keys to select syringe</p>	<p><u>Use only BD Plastipak® or Terumo® luer lock syringe.</u></p> 
<p>5. Review the screen settings:</p> <p>Volume, duration and rate</p> <p>Confirm YES if correct.</p>	

Steps	Additional Information
<p>6. Screen will display ‘Start Infusion?’</p> <p>If using pump for first time or commencing a new infusion Press NO:</p> <p>DO NOT attach syringe/administration set to patient until the set has been primed:</p> <ul style="list-style-type: none"> • Press the FF key. Display will read “PURGE. • Ensure patient is NOT connected to the infusion - confirm by pressing YES. • To prime, press and hold the FF key: 2mL is maximum purge volume. • Reconfirm syringe type after purging and select YES to resume. • Attach administration set to patients’ cannula. <p>To start infusion:</p> <p>‘Start Infusion’ will be displayed on the screen, when ready press YES to commence.</p>	 <p>Purge can only be performed once per infusion.</p>  <p>Current extension is approx 0.35ml</p> <p>The display will now show the new volume and a new duration to account for purged volume. The rate will remain constant. Do not change the settings without prior consultation with PPC.</p>
<p>To lock the keypad:</p> <p>Press and hold ‘INFO’ key until a bar is displayed moving from left to right. Hold key until bar is full and beep is heard to confirm lock is activated.</p> <p>A green light will flash intermittently above the On/Off key to confirm infusion is running.</p> <p>During the infusion the rate and time remaining will be displayed on the screen.</p>	 
<p>Place syringe pump in lock-box and place in the protective pouch if appropriate.</p>	


Continuous Subcutaneous Infusion (CSI) for Palliative Care – Using NikiT34 Syringe Pump

Steps	Additional Information
<p>Monitoring during Infusion:</p> <p>Check infusion data and battery each hour.</p> <ul style="list-style-type: none"> Press 'INFO' key once to read Vol Infused (VI), Vol to be infused (VTBI). Check this matches the contents in the syringe. To check battery level press 'INFO' key twice. If discrepancy in pump readings and volume observed in syringe, investigate cause: check for kinks, cannula site, change battery; 	<p>Whilst in 'lock' mode, only the Stop, Start and Info keys are active.</p> <p>Checks can be done whilst infusion running.</p>  <p>Liaise with Palliative Care team.</p>
<p>To unlock keypad.</p> <ul style="list-style-type: none"> Press and hold INFO key. <p>To switch off pump:</p> <ul style="list-style-type: none"> Press 'NO/STOP' key then switch 'OFF.' 	

Loading a New Syringe

Steps	Additional Information
<p>Prepare prescribed medications in the appropriate syringe - dilute to 18mls.</p> <ul style="list-style-type: none"> Press STOP key. Unlock the pump: press and hold INFO key. Clamp administration set, lift arm clamp to remove syringe. Close arm clamp. Attach new syringe to administration set using no touch technique. Align the medication syringe to the pump syringe sensors and use the FF /Back keys to move the actuator to the correct position. Lift arm clamp, place syringe in pump and close arm clamp. Confirm syringe brand and press YES 	<p>To avoid inadvertent medication bolus</p>

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<p>Screen will display: Press YES to Resume, NO for New Syringe</p> <p>Press NO</p>	<p>YES – will retain the current programme</p> <p>NO –deletes current programme and a new programme is calculated.</p>
<p>Check and review the data:</p> <p>Press YES to confirm, then YES to start infusion when prompted.</p> <p>Lock key pad by holding down INFO button</p>	

Discontinuing the Infusion

Steps	Additional Information
<p>Document final volume infused and any remaining volume.</p>	
<p>Unlock the syringe pump and press 'STOP.'</p> <p>Raise the arm clamp and remove the syringe from the pump.</p> <p>Press and hold down the 'ON/OFF' button until the screen turns off.</p>	
<p>Perform hand hygiene.</p> <p>Apply non sterile gloves.</p>	
<p>Remove the extension set from the Saf-T-Intima™ catheter.</p> <p>Remove the transparent dressing and tapes.</p> <p>Remove the Saf-T-Intima™ catheter.</p>	
<p>Inspect the site for redness, swelling, pain, and/or infection.</p> <p>If pus is present, swab the site and report to medical team.</p>	
<p>Dispose of equipment and unused medication into clinical waste according to relevant medication protocol.</p>	<p>Refer to Schedule 8 and Schedule 4 Restricted drugs for discarding.</p>
<p>Remove gloves and perform hand hygiene.</p> <p>Clean NIKI T34™ pump with detergent wipe only.</p>	<p>Do not use alcohol based products to clean equipment as per manufacturer instruction.11</p>
<p>Document date of removal on nursing care plan and in the patients notes; include appearance of the site on removal.</p>	

Observations and Documentation

Effective symptom relief is the primary goal and must be discussed with the treating team/Palliative Care team if optimum control is not achieved. A non-functioning subcutaneous catheter may contribute to reduced symptom control.

At end-of-life, the frequency of patient observations may be modified following discussion with the primary treating consultant or the Palliative Care team.

Observations

Observe and record the following one hourly for first four hours, then at 4 hourly thereafter:
5

Note: at end of life frequency of observations will be determined by the palliative care team as minimal intervention will be the aim of care.

- Site appearance:
 - Remove the catheter if any of the following signs present and resite at a different location.
 - Tenderness/pain
 - Excessive redness
 - Presence of a haematoma
 - Leaking at insertion site
- Syringe/line contents:
 - Change syringe if any change in colour, clouding or crystallisation is visible.
 - Check volume left in the syringe matches the volumes displayed on the pump.
- Infusion delivery and pump settings:
 - Infusion rate
 - Volume infused (VI)
 - Volume to be infused (VTBI) (correlate the volume remaining with the time remaining).
 - Check battery status and replace if <90% (shown as a percentage on the NIKI T34 display panel)

Document


- On the nursing care plan: Date of subcutaneous catheter insertion; site used
- Fluid Balance Chart: Site inspection and volumes infused
- Patient medical records: complications, actions taken and outcome.

Related internal policies, procedures and guidelines
Medication Administration (<i>PMH policy pending</i>)
Medication Preparation, Checking and Administration (<i>PMH pending</i>)
Schedule 8 and Schedule 4 Restricted drugs (Clinical Practice Manual)
Subcutaneous Indwelling Catheter - Insuflon™ (Clinical Practice Manual)
Protocol for the use of the Topical Anaesthetic Agents: EMLA® and LMX4® Cream

References
1. Pratt R, Pellowe CM, Wilson JA, Loveday HP, Harper PJ, Jones SR , et al. Epic 2: National evidence based guidelines for preventing healthcare associated infections in NHS Hospitals in England [Literature Review]. J Hospital Infection. 2007;65(1):Supp. S1-64.
2. Mitten T. Subcutaneous drug infusions: a review of problems and solutions. International Journal of Palliative Nursing [Literature Review] 2001; 7(2):75-85.
3. Great Ormond Street Hospital for Children NHS Trust. Clinical guidelines: Subcutaneous access (infusions and injections) [Literature Review]. London: Great Ormond Street Hospital; 2009.
4. NHS Greater Glasgow and Clyde Primary Care Palliative Care Team. Guidelines for Use of Subcutaneous Medications in Palliative Care for Adults [Expert opinion]2012 15 Jan 2013. Available from: http://www.palliativecareggc.org.uk/uploads/file/guidelines/subcut_guidelines_primary_care_140109.pdf .
5. Royal Children’s Hospital - Melbourne. Indwelling subcutaneous catheter (Insuflon™): Management [Expert opinion]. Clinical Practice Guidelines (Nursing) [Internet]. 2011 14 Jan 2014. Available from: http://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Indwelling_subcutaneous_catheter_Insuflon_management/ .
6. NHS Brent. Policy for the use of Subcutaneous Infusions in Adults and Children with Palliative Care Needs. Syringe Driver Policy [Internet]. 2009 16 Jan 2013; (4). Available from: http://www.brentpct.org/doxpixandgragix/NP26_UsingSubcutaneousInfusionsInPatientsWithPalliativeCareNeedsPolicy_0709.doc.pdf
7. Dickman A & Schneider J. The Syringe Driver: Continuous subcutaneous infusions in palliative care 3rd ed. Oxford: Oxford University Press; 2011.
8. Caesarea Medical Electronics (CME-Infusion). Niki T34 Syringe Pump: Instruction Manual via InfuSystem 2008. Available from: https://www.infusystem.com/images/manuals/Niki%20T34.pdf .
9. CME McKinley UK NIKI T34™ Pump user instructions Manufacturer's instructions [Internet]. n.d. 15 Jan 2014. Available from: http://www.mckinleymed.co.uk/training/t34/help.php .

Useful resources (including related forms)
CME Medical UK Ltd. T34 Ambulatory Syringe Pump. (UK resource site for information only. Note set up guides may differ slightly, follow instructions in this document).

This document can be made available in alternative formats on request for a person with a disability.

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