OBSTETRICS AND GYNAECOLOGY
CLINICAL PRACTICE GUIDELINE

Palliative: Niki t34 syringe pump: Continuous subcutaneous infusion management

Scope (Staff):	WNHS Obstetrics and Gynaecology Directorate staff
Scope (Area):	Obstetrics and Gynaecology Directorate clinical areas at KEMH

This document should be read in conjunction with this Disclaimer

Aim

To guide staff in commencement and management of the NIKI T 34 syringe pump.

Key points

1. Prior to looking after a patient with this pump, all staff must have received instruction on how to operate the pump.
    - Note: If a staff member is unfamiliar with the operation of this pump they should refer to this clinical guideline and receive instruction and guidance from an experienced staff member when receiving care of a patient with Niki pump.
2. Advise the patient that the pump must not get wet. The pump can be removed for a short periods i.e. during a shower.
3. Insert a second Saf-T Intima for PRN medications.

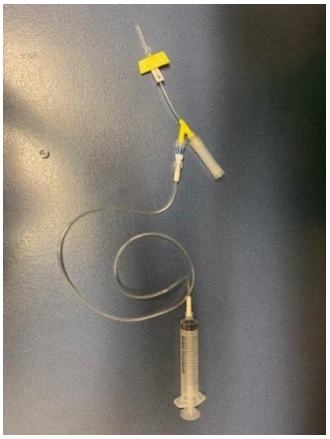
Background

The NIKI T34 pump is a system that delivers a continuous infusion of medications via the subcutaneous route, for symptom control. This is a useful alternative when the oral route is not possible or practical e.g. when the patient is unable to swallow safely, has intractable vomiting, intestinal obstruction or is unable to absorb oral medications for any reason. It is most frequently used in palliative care settings and persistent pain syndromes.

Components

The system consists of:

1. A subcutaneous cannula (Saf T Intima) inserted into the subcutaneous tissue and held in place by a dressing. A clear dressing is preferred because it allows easy inspection of the insertion site.
2. The cannula connected to the NIKI pump via sterile tubing.
3. The NIKI pump, a small portable machine which drives a syringe. It is powered by a 9 volt battery. The pump itself is enclosed in a sturdy plastic tamper proof container which should be locked when the NIKI is in use.
4. A 20ml syringe which can contain a single or variety of medications needed for symptom control. The syringe and line are to be labelled with subcutaneous additive labels. Medication doses can be adjusted as necessary for optimum symptom control. The pump pushes the plunger of the syringe steadily over 24 hours so that a consistent, continuous dose of medication is delivered, resulting in a steady blood level of medication.



Advantages of the Niki system

1. Consistent 24 hour delivery of medications ensuring constant optimal blood levels and hence steady symptom control.
2. It can be used when medications cannot be taken orally.
3. It is easy to use and does not require venous access.
4. The cannula is to be changed every 7 days, reducing the need for repeated punctures to the skin and therefore less trauma for the patient. The cannula can be changed more frequently if any signs of inflammation, such as erythema or irritation at insertion site.

Disadvantages of the Niki system

1. As it involves puncturing the skin, infection can occur. However, the infections are generally superficial, uncommon and easy to diagnose and manage.
2. Some medication can irritate the skin on injection.
3. It involves use of a small machine that needs to be carried by the ambulant patient.
4. It is not water proof and needs to be disconnected when showering.
5. It may need to be removed for certain investigations such as MRI.
6. There is a limited range of medications that can be delivered by the subcutaneous route and drug compatibilities should be checked when multiple medications in one pump. For advice on suitable medications, please contact the Palliative Care team.
7. With the initial set up and with any change of medications, it will take about 3 hours for the blood levels to stabilise. It is therefore not useful for instant

symptom control. Its main use is the delivery of medications to maintain background levels for symptom control, similar to slow release formulations.

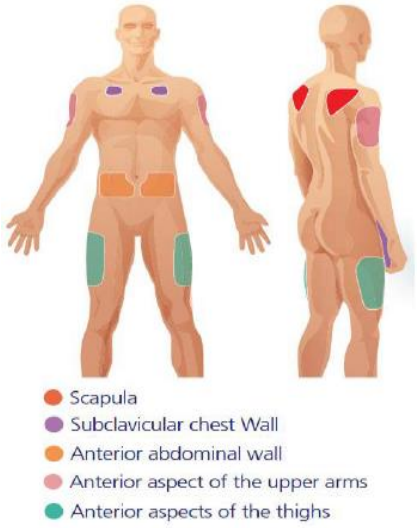
8. It does not have a bolus function for delivering rescue medications for control of breakthrough symptoms.

If in doubt, please contact the Palliative Care Consultant

Placement of the subcutaneous needle

Consider mobility, comfort and ease of access.

- Ambulatory patients- consider the abdomen, chest or upper arm.
- Agitated or distressed patients- the scapula is the preferred site, or a site that the patient is less likely to pull at the tubing



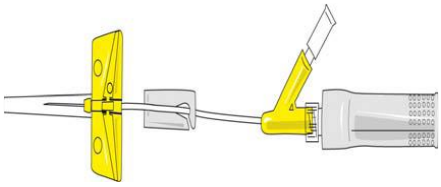
Sites not suitable for subcutaneous cannula placement

Site	Reasons why not suitable
Skin folds	• Device cannot be safely secured • Infusion site not easily observed • Potential for impaired absorption
Limb oedema / Lymphedema	• Infection risk • Impaired absorption
Bony prominence	• Reduced subcutaneous tissue • Impaired absorption • Device cannot be safely secured
Previously irradiated skin	• Impaired blood supply – reduced absorption • Infection risk • Dry/delicate skin
Near joints	• Potential for dislodgment • Uncomfortable for patient
Infected / broken skin	• Potential for infection

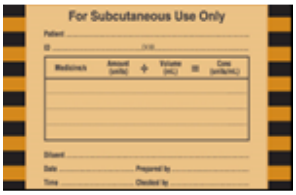
Acknowledgement: SCGHOPHCG: 'Insertion of subcutaneous cannula' within SCGH/OPH NPG 32 Subcutaneous Infusions (Syringe Drivers) and Subcutaneous Fluid Administration guideline.

Equipment

- Documentation: 'Subcutaneous Infusion Chart: Prescription and Progress Record Chart' (MR809.01) with documented prescription by doctor
- NIKI T34 syringe pump, rigid locked box with key and carry pouch
- 24-gauge SAF-T-Intima™ cannula. Saf-T-Intima™ cannula is used to reduce local site reactions and therefore increase longevity and reduce needle stick injuries.



- 70% isopropyl alcohol 2% chlorhexidine cleansing swab
- Subcutaneous drug additive labels for extension tubing and syringe



(To be used on extension tubing)

- Gloves (non-sterile) and PPE as required
- Needleless cap (bung)
- Prescribed medication, diluent and drawing-up needles / syringes
- A valid prescription must be written on MR 809.01 (Continuous Subcutaneous Infusion: Prescription & Progress Record Chart)
- 20mL Luer Lock syringe
- 75cm Luer lock extension tubing
- 10cm x 10cm sterile transparent dressing (e.g. tegaderm, opsite) – ensure dressing is labelled with date of insertion.
- 9 volt battery (ensure a spare battery is available on the ward). Always use an alkaline battery. Do not use non-alkaline or rechargeable batteries.

Procedure

Note: Attend the 5 moments of hand hygiene throughout the procedures as required.

Day 1- Commencement of infusion

1. Explain to the patient about medication delivery via a subcutaneous intima and Niki pump, and gain verbal consent for the use of medication delivery via this method.
2. Check the medication order.
3. Choose appropriate site for insertion of subcutaneous Saf-T intima.
4. Swab the insertion site with a 70% isopropyl alcohol 2% chlorhexidine cleansing swab
5. Insert Saf-T-intima cannula/s. Date the cannula dressing with date of insertion. Attach a needleless cap (bung) to the end of the Saf-T- intima cannula

Fitting the battery

1. Slide the compartment cover at the back of the pump. Place the battery into the compartment.
2. Ensure battery terminals are aligned as per the diagram inside the compartment.

Battery test

1. Always check there is enough charge to set up the infusion (usually > 20%). (Note the pump will alarm if the battery life is low)
2. Switch the pump on (press and hold ON/OFF button until “beeps”).
3. Press the INFO key.
4. Select ‘BATTERY LIFE’ from the menu and press ‘YES’ to confirm.
5. Verify that sufficient battery charge is available to complete the current programme. If not, change the battery. Then hold the ON/OFF button until “beeps” to turn off.

Syringe selection

1. The NIKI T34 is programmed to recognise most commonly used 20 mL syringes.
2. Ensure the NIKI T34 has been pre-programmed to a fixed duration of 24 hours and has the programme lock function on. (The Lock function needs to be OFF to allow pump to be programmed with new syringe).
3. **Loading the syringe**

   3.1 Perform hand hygiene as per the 5 moments throughout procedure

   3.2 Review medication order and prepare labels for syringe and extension tubing.

   3.3 Draw up the prescribed medication and diluent to equal 18mL in total (ensure appropriate documentation of S4R/S8 medications). Order should stipulate whether normal saline or water for injection as diluent. Label syringe.

   3.4 Connect the extension line to the Luer Lock syringe.

   3.5 Press and hold the ON/OFF button on the NIKI pump, until it beeps to turn on.

   3.6 The version of the software will flash on the screen. The screen will then flash ‘Pre-loading’. Wait for the pump to pre load. It calibrates itself during this process.

   3.7 Measure the drawn up syringe against the NIKI T34 and press either FF or BACK to align actuator to the syringe plunger. The actuator can only be moved in this way. Do not try and force and move the actuator manually as this could damage the device.

   3.8 The pump will state ‘Load Syringe’.

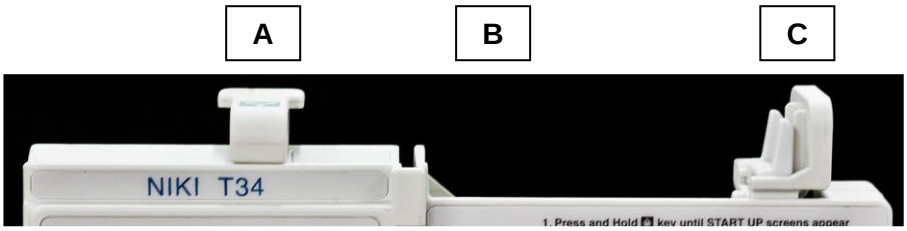
   3.9 Raise the barrel arm clamp and place the syringe in, then lower the barrel arm clamp. If the syringe is not placed in correctly the screen will flash at which sensor the placement is incorrect. Check the 3 sensors:

A - Barrel Clamp Arm

B - Syringe ear/collar sensor small metal switch. Detect the secure loading of the syringe collar.

C - Plunger Sensor- ensure plunger between the fingers.

3.10



Once the syringe is correctly loaded, the screen will ask for identification of the syringe brand. Use the ▲▼ to select syringe brand.

3.11 Review and check the data on the screen- Volume, Duration, Rate e.g.18mL, 24 hours, 0.75mL / hour.
Recommended rate range 0.74- 0.76 ml/hr.

3.12 To confirm press 'YES'

3.13 Display will read 'START INFUSION'. **DO NOT COMMENCE INFUSION IF THIS IS DAY 1** as the line requires priming, or if changing extension tubing and Saf-T intima cannula.

4. Priming the line

4.1 **Do not** manually prime the extension set, use the pump settings to do this.

4.2 Press the 'FF' button. The display will read 'PURGE DISCONNECT FROM PATIENT'. Note: If priming fails to be completed correctly, remove the syringe, turn the pump off and recommence from step 1.

4.3 Confirm disconnection by pressing YES.

4.4 To prime the line, press and hold the 'FF' button. Maximum purge is 2mL. The screen will display: 'press YES to resume, NO for new syringe'. Press 'YES' to resume, not NO for new syringe, otherwise pump will not have calculated for priming the line.

4.5 Once primed, again select the correct brand of the syringe.

4.6 Press 'YES' to resume.

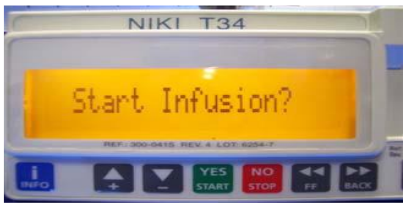
4.7 The display will now show the new volume and a new duration. The rate will remain constant.

4.8 To confirm press 'YES'.

4.9 Once the Niki pump has completed the priming process, connect the infusion line to the patient.

5. Commencing the infusion

5.1 Pump will state 'START INFUSION?'. To confirm press 'YES'.



5.2 With the commencement of the pump the keypad lock needs to be activated. With the pump infusing, press and hold the INFO key until a chart is displayed showing a bar moving from left to right. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been activated.

5.3 During the infusion the rate will always be displayed in the middle of the screen.

5.4 At the bottom, the screen will alternate between brand and size of syringe and pump delivering.

5.5 A green light will flash intermittently above the ON/OFF key. This indicates the pump is functioning correctly.

5.6 Place the pump in the allocated tamper proof box and ensure it is locked with the key. The locked box must then be placed inside the protective pouch.

5.7 Document date of connection on the MR 809.01 Subcutaneous Infusion Chart.

Day 2 onwards

1. Perform hand hygiene as per the 5 moments throughout procedure as required.
2. Prepare the medication as per the prescription. If the medication doses are not changing, then there is no need to change the extension tubing or Saf-T intima cannula. If the medication is changing, change the tubing and the Saf-T intima cannula and repeat the setup as per Day 1 instructions.
3. Remove the keypad lock by pressing and holding the 'INFO' button until a chart is displayed showing a bar moving from right to left. Hold the key until the bar has moved completely across the screen and a beep is heard to confirm the lock has been deactivated.
4. Press the 'NO / STOP' BUTTON.
5. Unlock the locked box with the key and remove the pump. Raise the arm clamp, remove the old syringe and attach the new syringe to the infusion line and close the arm clamp. Ensure the syringe is labelled.
6. Measure drawn up syringe against the NIKI T34 and press either 'FF' or 'BACK' to align the actuator to the syringe plunger. Refer to the loading syringe section above
7. Select the correct syringe brand.
8. Select 'NO' for a new syringe. It is important to select 'NO' for new syringe, otherwise the pump will recalculate the rate and time incorporating the previous syringe volume.
9. Check and review the data on the screen (Volume, Duration, and Rate).
10. To confirm press 'YES'.
11. When 'START INFUSION?' is displayed, press 'YES'. Ensure if the tubing was clamped, that the clamp is opened prior to recommencement of infusion, otherwise an occlusion alarm will be triggered.
12. Activate the keypad lock by pressing and holding the INFO button until a chart is displayed showing a bar moving from left to right. Hold the button until the bar has moved completely across the screen and a beep is heard to confirm the lock is activated. The display will show the keypad is locked.
13. Place pump in locked box, ensure it is locked and then place in protective pouch.
14. Complete additive label and place onto extension tubing.
15. Document the date of insertion / syringe change on the MR 809.01 Subcutaneous Infusion Chart.

Observations and ongoing management

1. Observations hourly for the first two hours and then 4 hourly (or more frequently if clinically indicated).
2. Pump: Check the display – pump is working and infusion rate is as programmed, and document observations on the MR 809.01 Subcutaneous Infusion Chart. Include volume infused (VI) and Volume To Be Infused (VTBI), battery check (% remaining), light is flashing (pump is operational), time remaining:
    - Press the INFO button (single press) to check: VTBI and VI

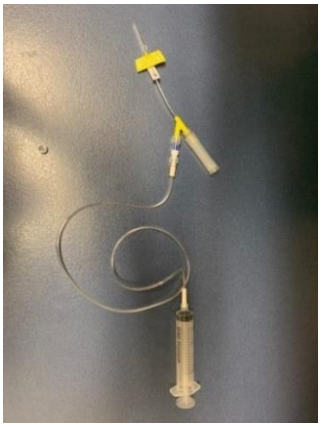
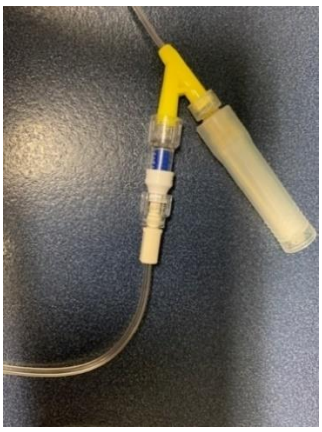
- Press the INFO button (double press) to check: Battery level – % remaining

3. Check medication solution for crystallisation or precipitation. If present, discard the solution (If a S4R/S8, the discard should be witnessed by two authorised persons, of whom at least one is to be a Registered Nurse). Record the discarded volume on MR 809.01 Subcutaneous Infusion Chart and in the relevant S4/S8 Register.
4. Breakthrough medication must be given through a second Saf T Intima.
5. Pain scores:
   - Omit if the patient is sleeping.
   - If pain is unsatisfactory to the patient, administer PRN analgesia as prescribed on the medication chart.
   - If the pain continues to remain unsatisfactory to the patient, contact the prescriber or Medical Officer (MO).
6. Nausea: If unsatisfactory to patient, administer PRN anti-emetics as prescribed on medication chart. If unresolved, contact the prescriber/ MO.
7. Document the consciousness status. Respiratory depression is often preceded by sedation.
8. At least daily, check the insertion site for:
   - Inflammation
   - Swelling
   - Leaking
   - Hardness
   - Bleeding
   - Pain
9. The site should be changed if any of these symptoms are present. The Safe-T-Intima™ should be removed and replaced on the 7th day after insertion.
   - Document the site assessment and/or site change in the Integrated Progress Notes and update the care plan as required.

Disconnection of the pump for short durations

In situations such as having a shower or investigations such as an MRI:

1. Niki pump to be turned off
2. Disconnect Niki pump with the extension tube still attached
3. At the Saf-T- intima a needleless cap (bung) will still be attached – leave this attached
4. Attach a capped sterile blunt needle to the end of the extension tube which is attached to the Niki pump – as demonstrated in below photographs.


Re-connection of the Niki pump

1. Use of 70% isopropyl alcohol 2% chlorhexidine cleansing swab to wipe the end of the needleless cap (bung) on the Saf-T-intima
2. Disconnect the extension tubing from the capped sterile blunt needle and wipe with cleansing swap
3. Connect the extension tube to Saf-T-initma
4. Recommence the Niki pump

Discontinuing the syringe pump

1. Explain the procedure and reason why the pump is to be discontinued.
2. Perform hand hygiene as per the 5 moments throughout procedure as required.
3. Record the final VTBI and VI.
4. Press and hold the 'INFO' key to unlock the keypad.
5. Press the 'NO / STOP' button.
6. Extend the arm clamp and remove the syringe from the pump.
7. Press and hold down the 'ON/OFF' button until the screen turns off.
8. Remove the battery from the syringe pump.
9. Remove the extension line from the Saf-T-Intima™
10. Perform hand hygiene and don gloves/PPE.
11. Remove the Saf-T-Intima™ cannula if not required for breakthrough medications, clean the site and apply a dressing as required.
12. Remove gloves/PPE and perform hand hygiene.
13. Dispose of any unused medications as per protocol. Document discarded volume on MR 809.01 Subcutaneous Infusion Chart.
14. Clean the syringe pump with detergent wipes**. It must not be cleaned with alcohol impregnated wipes.**

References and resources

CME Ltd. Niki T34 syringe pump instruction manual. 2008. Available from: https://www.infusystem.com/images/manuals/Niki%20T34.pdf

Sir Charles Gairdner / Osborne Park Health Care Group- Nursing Practice Guideline: Subcutaneous Infusions (Syringe Drivers) and Subcutaneous Fluid Administration (No. 32) 2021.

Related WNHS policies, procedures and guidelines

WNHS guidelines:

- Obstetrics and Gynaecology Directorate: Palliative Care (Adults)
- Pharmacy: Medication Administration, Adult A-Z Medications and Restricted Schedule 4 (S4R) and Schedule 8 (S8) Medications

Forms: MR 809.01: Continuous Subcutaneous Infusion: Prescription & Progress Record Chart

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Version history

Number	Date	Summary
1	Aug 2012	First version. 'Niki t34 syringe pump: Management of continuous subcutaneous infusion' (C 14.2.2.3)
2	Dec 2015	Procedure, medication and observation information reviewed and updated
3	June 2017	Regular review- no major changes. Background, advantages and disadvantages added.
4	Oct 2021	• Added details for placement of subcutaneous needle • Ideally, breakthrough medication should be given through a second Saf T Intima Cannula as administering via side port on Niki infusion renders pump non-therapeutic for 4 hours
5	March 2025	• Content reviewed and updated • Additional advice under key points: 'Note: If a staff member is unfamiliar with the operation of this pump they should refer to this clinical guideline and receive instruction and guidance from an experienced staff member when receiving care of a patient with Niki pump.' • Photos of the syringe and tubing system added within the content

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