Syringe Driver Policy

Introduction

Quality Statement associated with this policy:

We support people to plan for important life changes, so they can have enough time to make informed decisions about their future, including at the end of their life.

Quality statements are the commitments that providers, commissioners and system leaders should live up to. Expressed as ‘we statements’, they show what is needed to deliver high-quality, person-centred care.

When they refer to 'people' we mean people who use services, their families, friends and unpaid carers. This includes:

- people with protected equality characteristics
- those most likely to have a poorer experience of care or experience inequalities.

Elizabeth Finn Homes will commit to the following quality statement for End of Life Care.

Elizabeth Finn Homes aims to provide all residents with a symptom free, dignified death, supporting the resident, relatives and friends.

End of life and palliative care is support for people who are in the last months or years of their life.

Equality Statement

Elizabeth Finn Homes (EFH) is committed to equal rights and the promotion of choice, person centred care and independence.

This policy demonstrates our commitment to creating a positive culture of respect for all individuals. The intention is, as required by the Equality Act 2010, to identify, remove or minimise discriminatory practice in the nine named protected characteristics of age, disability, sex, gender reassignment, pregnancy and maternity, race, sexual orientation, religion or belief, and marriage and civil partnership. It is also intended to reflect the Human Rights Act 1998 to promote positive practice and value the diversity of all individuals.

Scope

This policy fully reflects the current guidance issued by NICE Care of dying adults in the last days of life (NG31).

- Recognising when a person may be in the last days of life
- Communication
- Shared decision-making
- Maintaining hydration
- Pharmacological interventions
- Anticipatory prescribing

Key Points

This document contains the required standards for the use of a syringe driver in EFH

This policy has been developed to ensure the safe and effective use of the McKinley T34 syringe driver for continuous subcutaneous infusion at all EFH. In palliative care the role of the syringe driver has been firmly established by its ability to administer continuous subcutaneous infusions of analgesics, anti-emetics, sedatives, anti-cholinergic drugs and other drugs either as single agents or in combination.

Policy Statement

EFH is committed to meet the safety requirements of the IEC 60601-2-24 standards. EFH commissioned the McKinley T34 Syringe Pump to replace the Graseby MS26.

The McKinley T34 is a small, lightweight, ambulatory battery operated infusion pump which will deliver a measured volume of medications over a 24 hour period via a subcutaneous route. The McKinley T34 is programmed in millilitres per hour thereby, reducing the opportunity for user error and the associated possibility of under or over dose. The T34 McKinley syringe driver has the option for fixed (lock on) or variable infusion (lock off). The McKinley syringe driver in use across EFH will be programmed for use with 'lock on' function

Safe and effective use of the McKinley T34 will require:

- An understanding of the resident's condition, the clinical need for intervention, a good working knowledge of the equipment, how it is operated and trouble-shooting.
- Accurate and careful assessment skills to minimise risk/s associated with the subcutaneous infusion process and equipment used to support the process.
- Staff will undergo a Syringe Driver competency each year to evidence their competency.
- A holistic approach to supportive care.
- On-going monitoring and evaluation of interventions.

Responsibilities

It is the responsibility of the General Manager of each home to ensure that:

- Under no circumstances must any nurse operate the device unless they feel and have been assessed as being competent to safely undertake the task.
- Each nurse has a good working knowledge of the equipment and its functions, and complies with the manufacturer's instructions.
- All new nurses are provided with relevant education and training: Homes should source appropriate training in their county and implement the use of the Syringe driver competency prior to use.
- A full programme of servicing is maintained
- Adverse incidents are reported to the Medical Device Agency.

It is the responsibility of all clinical staff to fully comply with this policy.

The Policy

A syringe driver is a lightweight portable infusion pump that is battery powered and is capable of delivering precise doses of medication over a set period of time (Twycross and Wilcock, 2003).

Supporting Information for procedures and use:

A syringe driver should be used for residents who are unable, for whatever reason, to tolerate oral medication. A syringe driver may be indicated in the following situations:

- Persistent nausea and/or vomiting.
- Difficulty swallowing.
- Oral/pharyngeal lesions.
- Aversion to oral medication.

- Poor alimentary absorption.
- Intestinal obstruction.
- Profound weakness/cachexia.
- In the unconscious patient.
- Resident choice.

Rectal route inappropriate due to local disease e.g. absence of rectum, tumour, fistula, haemorrhoids or where rectal route unacceptable to patient/family.

When indicated, continuous subcutaneous infusion of medications via a syringe driver is a simple and effective technique. It is, however, important to remember that drugs given via the parenteral route are not inherently more effective than when given orally.

Advantages of using a syringe driver include:

- Increased comfort for the resident as there is less need for repeated injections control of multiple symptoms with a combination of drugs.
- Infusion timing is accurate.
- Plasma drug concentrations are more stable, and appropriate symptom control can be achieved without the toxic effects of the peaks and troughs resulting from episodic drug administration.
- Independence and mobility is increased as the syringe driver is lightweight and can be worn in a holster under or over clothes.
- Generally, only requires renewing once daily.

Disadvantages in using a syringe driver include:

- Inflammation or infection may occur at the entry site causing reduced absorption of medications some medications or combinations of medications may precipitate e.g. cyclizine.
- If the residents analgesic dose requirement is not known, it may be necessary to give top up subcutaneous injections for breakthrough pain.
- The resident is attached to a device there is therefore a requirement to position the syringe driver to cause the least inconvenience to the resident.
- Occasionally technical problems may arise.

Site Selection

Areas suitable for continuous subcutaneous infusion include those with a good depth of subcutaneous fat and away from joints.

The recommended sites to use are:

- The lateral aspects of the upper arm or thigh.
- The abdomen.
- The anterior chest below the clavicle (not if using soft set).

The nurse should consider the residents mobility and the preferred way of carrying the pump before selecting the site.

Areas which **should not** be used for cannula placement are:

- Lymphoedematous limbs, as the rate of absorption would be adversely affected (the cannula will breach skin integrity and increase risk of infection in an already susceptible limb).
- Bony prominences, as the amount of subcutaneous tissue is reduced, impairing the rate of drug absorption.
- Sites of infection or areas of broken skin.
- The upper abdomen in residents with an enlarged liver (there is a risk of puncturing the liver capsule).
- Skin folds, and chest walls in cachexic patients.

Care of the Skin Site

The infusion site should be renewed when there is evidence of inflammation (erythema or reddening) or poor absorption (a hard-subcutaneous swelling). The time taken for this to occur can vary from hours to days depending on the patient and the drugs being infused (Twycross and Wilcock, 2003).

If the skin site breaks down rapidly, the following should be considered:

- Further diluting the drug infused, the McKinley drivers can take up to a 50ml syringe.
- Changing the site dressing.
- Changing the combination of drugs.

Drug Compatibility and Stability

In the context of single drug infusions, instability is not usually a significant problem. In palliative care, however, when two or more drugs may be prescribed for administration via a continuous subcutaneous infusion, compatibility is important.

The stability of Cyclizine and Dexamethasone when combined together in a single syringe driver cannot be guaranteed. If concerned please contact the local hospice or Pharmacy for advice.

General Recommendations

- The maximum recommended concentration for single agent Diamorphine is 250mg/ml.
- The number of drugs combined in a single syringe should be kept to a minimum.
- The preferred diluent for most drugs is water for injections.
- Use sodium chloride 0.9% as the diluent for non-steroidal anti-inflammatory drugs such as Ketorolac, and for Ketamine, Octreotide and Levomepromazine.
- Dilute Diamorphine prior to mixing with other drugs.
- Do not use 0.9% saline to dilute Cyclizine – it increases the risk of precipitation as insoluble Cyclizine Chloride.
- The addition of Cyclizine at a dose in excess of 10mg/ml of diluent may cause precipitation of crystals in the tubing.

Potential Problems

- Storing drugs in the refrigerator or wearing a syringe driver whilst outside in cold weather may reduce the solubility of the drugs.
- The syringe should be protected from light as some drugs are prone to deterioration. This problem can be eliminated by placing the syringe driver in the carrying pouch.
- If the contents of the syringe become cloudy or discolour before or during administration, the syringe must be discarded immediately.
- If incompatibility problems persist and alternative drugs or routes are not available, consider the use of two syringe drivers.

Preparing the Resident

Before setting up a syringe driver, its use should be discussed with the resident and family. Explanation should include what a syringe driver is, what it looks like and why it is planned to use one.

It is important to acknowledge that some residents and relatives may equate the initiation of a syringe driver with impending death. Opportunities to ask questions should always be provided. If the residents family is not present, the nurse should ensure that time is offered at the next visit to explain the nature and intention of the procedure and treatment.

Setting up a McKinley T34 syringe driver

Equipment Required

1. T34 McKinley Syringe Driver – fit for purpose, cleaned and serviced.
2. Battery (PP3 / 6LR61 9v / MN1604) Normal life span of batteries is 3-4 days.
3. Washable carrying cover for mobile residents, washed at 60 degrees following each resident use.
4. Winged infusion device.
5. Luer lock syringe of appropriate size. McKinley T34 are able to take 10ml, 20ml and 30ml and 50ml syringes.
6. Transparent adhesive dressing.
7. Drugs and diluent.
8. Blunt fill needles (18G).
9. Drug additive label.
10. Residents prescription chart (EMAR).
11. Syringe driver record sheet.

Choice of Syringe

The McKinley T34 syringe driver may be used with most makes of syringes. The most commonly used syringes are the 10ml and 20m, a larger dilution will reduce both the risks of adverse site reactions and incompatibility.

It is therefore recommended that 20ml and 30ml syringes should be used and that they MUST have a luer lock facility in order to avoid leakage or accidental disconnection.

The recommended make of syringe is Becton Dickinson (BD).

N.B. The 50ml luer lock syringe is the largest syringe that will fit the McKinley T34 syringe driver. It allows drugs to be diluted up to approximately 34mls volume for BD syringes. This reduces the need for a second syringe pump when giving larger volume drugs, e.g. metoclopramide. The 50ml syringe would only be used in exceptional circumstances.

20ml syringe = maximum fill volume 18ml if NOT priming 17ml
30ml syringe = maximum fill volume 23.5ml if NOT priming 22ml
50ml syringe = Maximum fill volume 34.9 if NOT priming 34ml

Preparation of the Syringe

Calculate dosage of drugs and diluents required over a 24 hour period.
Draw up the prescribed drugs with diluents to the required volume.

Labelling

All syringes containing drug additives must be labelled. If there is any doubt as to the contents of a syringe, the contents must be discarded. This is particularly important for continuity of care, especially where residents transfer from one care setting to another. The label must be completed in ink or other indelible print. The label is required to state:

1. The name of the resident for whom it is intended.
2. The date and time of medications were prepared.
3. The initials of the person preparing the contents.
4. The name and dose of all drugs e.g. morphine 15mg, haloperidol 5mg, etc.
5. The name of the diluent e.g. water for injection.
6. The total visual volume of the contents.
7. The intended route of infusion.

The label must be attached to the syringe. The label must not interfere with the mechanism of the infusion device, i.e. where there is contact with the barrel clamp arm. The label should be flagged at the tip end of the syringe, leaving the scale visible so that it can still be read.

Priming the Infusion Line

Using a previously prepared syringe, connect to an infusion set. Gently depress the plunger until the infusion tubing is filled up to the needle tip.

Note: each time a new infusion set is used, infusion administration time will be shortened.

Pre-loading and Syringe Placement

Install the battery. Before placing the syringe into the pump ensure the barrel clamp arm is down then press and hold the 'ON/OFF' key until the 'SELF TEST' screen appears. Check the display reads 'Pall Care 24Hr'

The LCD display will read 'PRE-LOADING' and the actuator will start to move. Wait until it stops moving and the syringe sensor detection screen (syringe graphic) appears stating 'pre-loading use NO to interrupt'.

Note: During pre-loading the actuator always returns to the start position of the last infusion programmed.

Checking/Changing the Battery

Press 'INFO' key repeatedly until the battery level appears on the screen and then press 'YES' to confirm.

Verify there is sufficient battery power for the programme. Discard the battery if less than 20% life remaining at the start of the infusion. The average battery life, starting at 100%, is approximately 3-4 days depending on use. Always use an alkaline/ lithium 9V battery. These can be identified by the international code '6LR61' on the battery or packaging.

If you need to change the battery with the syringe driver still running remove the old battery and replace with a new one. Switch the syringe driver on using the ON/OFF button. Confirm the size and make of the syringe. Place YES to resume the infusion. The screen will display "REMAINING VOLUME, DURATION AND RATE OF INFUSION". Press YES to confirm. Screen will display "START INFUSION. Press YES to confirm.

Connect Infusion to the Syringe

Connect the infusion line to the syringe. If the actuator is not in the correct position to accommodate the syringe, leave the barrel clamp arm down and use the "FF "or "BACK" buttons on the keypad to move the actuator. Forward movement of the actuator is limited, for safety; therefore repeated presses of the "FF" key may be required when moving the actuator forward. Backwards movement is not restricted.

Fitting the Syringe to the Syringe Driver

Lift and turn the barrel clamp arm. Seat the filled syringe collar/ear and plunger so the back of the collar/ear sits in the central rest (ensure correct placement). The syringe collar/ears should be vertical.

Ensure that the scale on the syringe barrel is facing forward so that it can be easily read. Lower the barrel clamp arm. The syringe graphic on the screen ceases to flash when the syringe is correctly seated at all 3 points.

The syringe size and brand option will be displayed confirm by pressing YES, or use the up/down arrows to select as appropriate.

Removal of the Infusion Set

Following death remove the line from the resident and dispose of safely. If the death has been reported to the Coroner the line must not be removed.

Secure the label to the barrel of the syringe of the syringe. Enter the date and resident name in the controlled drug register. Place the syringe in the container provided in the controlled drugs cupboard.

The Syringe Driver in Use

Having checked the resident details and the prescription the pump calculates and displays the deliverable volume, duration of infusion and rate (mls per hour) press 'YES' to confirm or ON/OFF to return to syringe options. The pump screen will prompt 'start infusion'. Check the line connection and press YES to start the infusion. When the pump is running it will display the time remaining for the infusion, the rate in mls/hour and the green LED indicator will flash every 32 seconds.

Ensure the resident and carers know that the syringe driver must NOT be placed at a level higher than the infusion site. (It is possible for the contents to siphon out).

Keypad Lock

The McKinley T34 allows all users to lock the operation of the keypad during infusion. This function should be routinely used to prevent tampering with the device.

With the pump infusing press and hold the "INFO" key until a chart is displayed showing a "progress" 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.
Although the keypad lock is on, the following buttons are still active:

- NO/STOP
- YES/START
- INFO.

To de-activate the Keypad Lock: Pump must be infusing. Repeat the above procedure. The bar will move from right (lock) to left (unlock) and a beep will be heard.

Lockboxes

EFH has purchased sufficient lockboxes for each syringe driver. If a decision is made not to use a lockbox, this must be discussed with the General Manager and agreed. After commencing the infusion place the syringe driver in the lockbox. If a lockbox key is lost an incident form must be completed. One key fits all lockboxes a key will be on the drug keys.

Documentation and Monitoring

- Complete all required documentation on the residents drugs chart (EMAR).
- Syringe driver checks must occur on a regular basis at least four hourly.
- Check that the rate has not been altered.
- Check the volume remaining in the syringe and document the volume infused to assess whether pump is delivering medication at the desired rate.
- Check the solution in the syringe and the line for cloudiness, precipitation or colour
- change, and presence of large air bubbles (tiny ones not significant).
- Check that the green LED light is flashing every 32 seconds and that the bottom line of the LCD display is alternating between '<<<< Pump Delivering' and make/size of syringe.
- Check that line is securely attached to syringe and not leaking, and that the line is not kinked or trapped.
- Check the infusion site for redness, swelling, discomfort/pain, leakage of fluid.
- Record location of infusion site when syringe set up and when line is changed (reduces discomfort to resident when monitoring).
- When the site is changed, record the reason.

- Assess the patient for efficacy and side-effects of the medication, documenting this on the resident's records.

McKinley T34 Alarm Conditions

When the syringe driver detects a problem four things will occur:

- The infusion stops and an audible alarm is activated
- A message appears on the display screen indicating the cause for the alarm
- The LED indicator turns red

An alarm will sound because :

- There is an occlusion or the syringe is empty
- The syringe is displaced
- The syringe driver is paused for too long
- The infusion is nearly complete: an alarm will sound 15 minutes from the end of an infusion
- The infusion is finished
- The battery is low
- The battery is depleted

Care and Maintenance

When the syringe driver is used as per instructions, it does not require any routine maintenance other than replacing the battery and occasional checking. It is EFH policy that syringe drivers are serviced annually. If the syringe driver is damaged in any way, the performance must always be checked before it is used again.

Decontamination

The outside surfaces of the syringe driver can be cleaned by wiping them with a soft cloth either dampened with a solution of mild detergent or disinfectant in water. Never dip or immerse the syringe driver in any liquid.

Troubleshooting

If the syringe driver does not perform as expected, if it is dropped, gets wet or is damaged in any way, it must be removed it from use immediately. It should be stored securely to ensure that it cannot be accidentally used again. Non-functioning or potential damaged syringe drivers must be returned to McKinley.

Warning: Risk of change in device performance: If the syringe driver gets wet do not just dry the outside and then continue to use it. Liquid may have got inside and damaged it. Follow the advice given above.

FAULT	POSSIBLE CAUSE	ACTION
The syringe driver will not start	The START button has not been pressed	Press again
	There is no battery	Fit a new battery
	The battery has been fitted incorrectly	Refit battery
	The battery is depleted	Fit a new battery
	The syringe driver is faulty	Service needed
The infusion is going too quickly or has ended early	Wrong syringe brand confirmed during set up/incorrect volume measured by syringe driver	Stop infusion. Set up a new infusion
	Syringe driver faulty or incorrectly calibrated	Service/calibration required
The syringe driver has stopped before emptying the syringe	Exhausted battery	Fit a new battery
	Blocked or trapped infusion line	Clear/renew line
	Faulty syringe driver	Service

Drugs Commonly Used for Continuous Subcutaneous Infusions

Cyclizine (anti-emetic) 50mg-150mg over 24 hours	Crystallisation commonly occurs when mixed with large doses of Diamorphine. Diluting with more water for injection in a larger syringe can avoid this problem. This drug commonly causes skin irritation at the site of the administration. Sometimes sites have to be changed daily
Dexamethasone (steroid) up to 16mg over 24 hours	May precipitate when mixed in syringe with another drug. Consider administering via a second syringe driver. This can be given as a once daily bolus via separate butterfly
Diamorphine (analgesic) No lower or upper limit but usually 10mg-100mg (1gm) over 24 hours	This is the opiate of choice to use in the syringe driver because of its solubility
Glycopyrronium (reducing secretions) 200mcg-1.2mg over 24 hours	Stat dose of 200mcg prn helpful in early stages. Precipitates with Dexamethasone
Haloperidol 2.5mg-10mg over 24 hours	Anti-emetic, sedative
Hyoscine Butylbromide (Buscopan) 20mg-80mg over 24 hours	Anti-spasmodic
Hyoscine Hydrobromide 0.4-2.4mg over 24 hours	Anti-muscarinic – reduces secretions
Levomeprazine (Nozinan) 6.25mg-200mg over 24 hours	Anti-emetic, sedative. Always dilute with normal saline
Metoclopramide 30mg-60mg over 24 hours	Anti-emetic
◆ Midazolam 5mg-60mg over 24 hours	Often useful when given as a stat dose of 2.5-10mg I.M. for terminal restlessness

The following drugs should not be administered subcutaneously:

Chlorpromazine
Diazepam
Prochlorperazine } TOO IRRITANT

Monitoring and Audit

This policy is subject to review every three years. Additional review will take place in response to medical device alerts, best practice recommendations, clinical review, patient and user feedback, and significant event audit.

Training

Under no circumstances must any nurse operate the devices unless they have attended appropriate training, and feel competent to safely undertake the task.

Each nurse must have a good working knowledge of the equipment and its functions.

Each Nurse must undergo an EFH Syringe Driver Competency every year – This competency should be assessed by a competent staff member of an equal or higher grade.

References

Twycross R and Wilcock A (2003) - Symptom Management in Advanced Cancer Radcliffe Medical Press, Oxford.

https://www.nice.org.uk/guidance/ng31/chapter/recommendations

Review date	Next Review Date
April 2024	April 2027