T34 Syringe Pumps for Palliative & End of Life Care:
Use of Infusion Equipment During Covid-19

Purpose

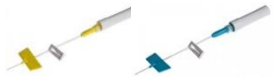
The T34 Syringe Pump is used within all board areas in Scotland to deliver continuous subcutaneous infusions of medicines for palliative and end of life care. This paper contains guidance for use of the following infusion equipment under pandemic conditions, in view of increased demand and current supply chain issues;

- Becton Dickenson (BD) Saf-T-Intima 22g and 24g cannula.
- Infusion line: 100cm Syringe Exten Set Admin Integ anti-syphon valve 100-172SX
- 9v alkaline battery PP3 6LRV

The recommendations below reflect a rapid review of available evidence, a survey of local guidance/policy and current practice in Scottish health boards, and input from pharmacy, clinicians, medical physics and infection control. These are intended to support practice in caring for people with Covid-19 and non-Covid related palliative care needs, but do not replace individual patient assessment. Advice should be obtained from local specialist palliative care and pharmacy services where needed. This guidance does not apply to the use of the T34 syringe pump for purposes other than palliative and end of life care.

Recommendations & Clinical Notes

1. BD Saf-T-Intima vialon cannula 22g blue 383328 /9 and 24g yellow 383318/9. May be supplied as single port / Y



Recommendation: Either the 24 or 22 gauge Saf T Intima cannula can be used. The cannula may be left in situ for up to 7 days provided there is no evidence of site reaction: hardness, inflammation, leakage or discomfort at the subcutaneous insertion site.

- Prophylactic cannula change at 2-3 days is current practice in some areas. There is evidence however that when using non-metal cannula, sites can remain intact and viable for longer.
- Site reactions can be caused by a range of factors. This includes the medicines used, chemical irritation, the tonicity and PH of the solution. Where site reactions occur frequently, measures such as increasing dilution e.g. using a 30ml rather than 20ml syringe, or a change to prescription or diluent may help- contact specialist palliative care or pharmacy for advice.

In exceptional circumstances, e.g. site options limited due to cachexia, it may be appropriate to leave the cannula in place longer than 7 days provided the integrity of the site remains. The incidence of site reactions increases with duration in situ and so monitoring is essential, involving the patient and / or carer where possible.

2. Infusion line:

There are supply issues with the 100cm Syringe Extension Set Admin Integrated anti-syphon valve 100-172SX, priming volume 0.5mls. The CareFusion PA-100v extension set 100cm extension line with built in anti-syphon valve may be supplied as an alternative. This has a slightly higher priming volume of 1.14mls. This does not require any change to the 24hr prescription. It is recommended practice when administering medicines via a continuous subcutaneous infusion that anticipatory 'PRN' medicines should routinely be available to manage any breakthrough symptoms. This includes at the time the 24hr infusion is commenced or when the medication prescription is changed, when there can be a time lag to effect due to the low flow rates of the T34. For prescribing information including anticipatory medicines refer to the Scottish Palliative Care Guidelines.

No clinical studies were sourced that defined the optimum frequency of line change. The Healthcare Improvement Scotland (2019) guidelines advise changing the line when changing the cannula as best practice and "*ideally"* when altering the medication prescription to a different combination.[1]

A survey of geographical board areas was completed to identify current practice, local policy and guidance via the Scottish Palliative Care Pharmacists Group. A response was received from 13/14 areas surveyed. The recommendations below are informed by survey responses and expert consensus.

Recommendation- the infusion line should be changed when;

a) the cannula is changed due to site reaction or at 7 days- whichever soonest

- However, where frequent cannula changes are required e.g. ≤ 3 days, advice from pharmacy / specialist palliative care should be sought on how to manage this. Where assessment indicates that site reactions are occurring frequently due to the medication or solution, then a new cannula is required but the line may be re-used. Disconnect from the old cannula, flush with 5mls of the appropriate diluent, re-prime with the new syringe of medicines and attach to the new cannula. Aseptic technique must be used throughout this procedure.

b) different medicines are prescribed which are incompatible for infusion with the current medicines in the line

- Refer to the Scottish Palliative Care Guidelines Syringe pump medication tables / seek advice from pharmacy or palliative care services regarding compatibility.
- In a clinical situation under pandemic circumstances where a new line is not available and the patient requires an infusion for symptom control, the line may be disconnected from the cannula, flushed with 5mls of an appropriate diluent, then re-primed with the syringe of the new medicines and re-attached to the cannula. Aseptic technique must be used throughout this procedure.

Recommendation: the infusion line does not require to be routinely changed when;

a) the dose of the same medicine(s) is changed and the new medicine concentrations remain compatible

- NB: there is a small volume of fluid contained within the infusion line.
- Where the dose of the medicines in the continuous infusion mixture is increased, PRN 'as required' medicines can be used to support symptom control where needed, including administration at the time the new 24hr syringe is commenced. This may also be required due to the low flow rate of the T34, influencing the time taken for the increased dose taking effect.

b) different medicines are prescribed and the previous and current medicines are compatible

- To check compatibility refer to the Scottish Palliative Care Guidelines Syringe pump medication tables Seek advice from pharmacy or palliative care services.
- Where there is any concern about compatibility, the line may be disconnected from the cannula, flushed with 5mls of an appropriate diluent and re-primed with the syringe of new medicines. Aseptic technique must be used throughout this procedure.

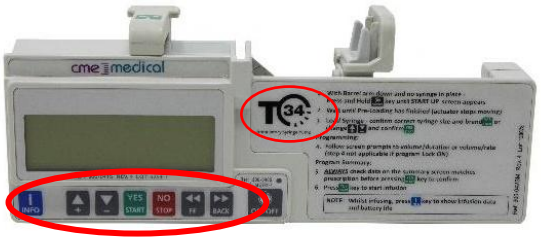
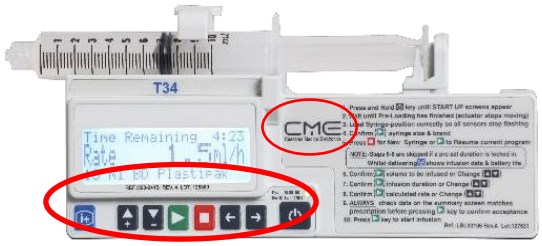
Infusion lines are for single patient use only.

3. Battery: 9v 6LR6 alkaline

Re-chargeable batteries should not be used.

Single battery life when using the T34 syringe pump Version 2 is approximately 3 days. Battery life for the current Version 3 in clinical use may be <24hrs. This requires risk assessment for use in community settings and the availability of spare batteries.

Quick guide to identifying the Version 2 and Version 3 T34 syringe pump

Version 2 (V2)	Version 3 (V3)
	
Text Keypad	IEC symbols keypad: same function

The T34 has a number of functions that can be used for monitoring purposes. Keypad controls provide access to a digital summary of the volume infused and remaining, and the battery power level. Frequently using these functions for routine monitoring can significantly reduce battery life and the user is still required to visually confirm the pump display is correct by inspecting the syringe contents to determine whether the pump is running to time.

Recommendations for conserving battery life;

a) <u>Within all settings</u>

- Check battery power when setting up or renewing the infusion and document this.
- Ensure the batteries used have a secure connection within the battery housing to avoid risk of unintended shutdown (V2). Contact medical physics for advice if needed.

b) <u>Within in-patient settings</u>

- Once the infusion is in progress battery power does not have to be routinely checked using the keypad function, as the low battery alarm should alert staff.
- Visual inspection of the contents of the syringe and volume remaining vs volume infused may be used as an alternative to using the keypad function for routine monitoring and when assessing whether the infusion is running to time. To allow this ensure the medicines label does not obscure the syringe markings.

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1 Healthcare Improvement Scotland (2019) *Guidelines for Use of the CME T34 Syringe Pump for Adults in Palliative Care*
2 Dickman, A. Schneider, J. (2016) *The Syringe Driver: Continuous Subcutaneous Infusions in Palliative Care* 4th ed. Oxford University Press
3 Mitchell, K. Pickard,J. Herbert,A. Lightfoot,J. Roberts,D. (2011) *Incidence and Causes for Syringe Driver Site Reaction in Palliative care: A Prospective Hospice Based Study* Palliative Medicine vol 26 no.8
4 Neo,S. Khemlani,M,Sim,K,Seah,A (2016) *Winged Metal Needle vs Plastic Winged and Non Winged cannula for Subcutaneous Infusion in Palliative Care: A Quality Improvement Project to Enhance Patient Care and Medical Staff safety in a Singaporean Hospital* Journal of Palliative Medicine vol 19 no 3
5 Torre, M (2002)*Subcutaneous Infusion Non-metal Cannula vs Metal Butterfly Needles: Review* British Journal of Community Nursing vol7 no 7
6 Pickhard,J. Mitchell,K.Roberts,D. (2008) *Syringe Driver Site Reactions: A Review of the Literature* European Journal of Pall care vol 15 no 3
7 Thomas,T. Barclay,S. (2015) *Continuous Subcutaneous Infusion in Palliative Care: A Review of Current Practice* International Journal of Palliative Nursing vol 21 no 2
8 Costello,J Nyatanga,B Mula,C Hull, J (2013) *The Benefits and Drawbacks of Syringe Driver in Palliative Care* International Journal Palliative Nursing vol 14 no 3
9 Graham,F. (2006) *Syringe Drivers and Subcutaneous Sites: A Review* European Journal of Palliative Care vol 13 no 4
10 Duems-Noriega,O Arino-Blasco,S (2015) *Subcutaneous Fluid & Drug Delivery: Safe, Efficient and Inexpensive* Rev In Geront vol 25 issue 1
11 Royal College of Nursing (2019) *Standards for Infusion Therapy* www.rcn.org.uk
12 Royal Marsden (2019) Manual of Clinical and Cancer Nursing Procedures 10th ed. www.rmmonline.co.uk
13 Healthcare Improvement Scotland (2019/20) Scottish Palliative Care Guidelines www.palliativecareguidelines.scot.nhs.uk/