Guideline for the administration of subcutaneous furosemide

(North Yorkshire, York and Vale)

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Target audience:	All staff who manage the administration of subcutaneous furosemide

Version History Log

This area should detail the version history for this document. It should detail the key elements of the changes to the versions.

Version	Date Approved	Version Author	Status & location	Details of significant changes
1	12/2008	Authoring team stated above		New protocol
2	01/12/2008			Agreed subject to clarification of scope, locality, monitoring and reporting arrangements
3	01/09/2016	Janet Raw	Approved	Clarified Scope, locality arrangement, monitoring and reporting arrangements Circulated to cardiology dept, Specialist palliative care pharmacy group
4	April 2017	Miriam Johnson	Approved via Y&S Medicines Commissioning Committee	Clinical reporting and pharmacy update
5	Nov 2022	Kelly Scott/Jane Crewe	Approved by North Yorkshire and York Area Prescribing Committee	Guideline adopted by HDFT. Minor changes to format and wording

Contents

Guideline for Administration of Subcutaneous Furosemide

Indications for use

For patients who require parental diuretics because:

- There is minimal or no response to high dose oral diuretics.
- They are unable to take diuretics orally, but these are needed for symptom management.
- They have poor or no venous access, or decline intravenous treatment.

Suitable patients may be expected to recover from an acute episode and return to oral medication and may have a longer prognosis. For others subcutaneous furosemide may be used to manage symptoms or replace the usual oral dose of diuretic in the last short weeks/days of life

Advantages to the patient

- Avoids the necessity of intermittent intravenous furosemide and the siting of an intravenous cannula.
- The syringe drivers used are lightweight, allow mobility and continued independence. The 24-hour subcutaneous infusion reduces intrusion into the patient privacy.

Recommended Infusion Sites

- Upper chest
- Upper anterior of arms

Sites may be restricted in heart failure patients because of probable oedema. Also, sites to be avoided are bony prominences and areas where tissue is damaged, thus decreasing absorption.

For further advice on recommended sites, set up of a syringe driver and insertion of an appropriate cannula, please refer to local protocols.

NB: if there is very poor peripheral perfusion in the terminal stage, subcutaneous absorption may be limited and stat doses of intramuscular diuretics or alternative measures such as anti-muscarinics, buccal nitrates or sedation may be needed to alleviate terminal pulmonary oedema.

Recommended dose, prescribing, administration and monitoring

It is important to recognise that this approach in this setting is largely empirical, based on reports of case series in healthy volunteers and patients, and mainly provided by the clinical experience of the local team to date.[1, 2, 3] A pharmaceutical company (scPharmaceuticals) demonstrated in a phase 3 trial that in heart failure there was equivalent (100%) bioavailability of furosemide after subcutaneous administration when compared with intravenous administration [4].

Add that this is standard/established practice in palliative care and is referenced in the Palliative Care Formulary (PCF 8) [5] and The Syringe Driver 4th ed. [6]

Where to prescribe (documentation):

To be prescribed by the clinician, depending upon the locality using either/or

- The York and Scarborough Hospitals NHS Foundation Trust anticipatory drug and syringe driver chart. This is available through Oracle; order number FY03000081.
- The Harrogate and District NHS Foundation Trust community palliative care medication administration chart WHZ061.
- In hospital this should be prescribed via EPMA.

Dose:

In this guideline we recommend the following conversions [5]

- oral to SC conversion for furosemide is 1:1 *(see note below)*
- oral bumetanide 1mg is equivalent to oral furosemide 40mg

1. Use the previous oral 24-hour requirement as a start dose and titrate up or down according to response. For example, if the patient has been taking 120mg oral furosemide in 24 hours, start on 120mg furosemide/24 hours in the syringe driver.

   Note: Based on bioavailability of oral furosemide which is approximately 60-70%, this will be a dose increase.

2. The dose should be **reviewed every 24 hours (hospital) or 24-48 hours (community) aiming for a daily weight loss of at least 1kg/day**. In some patients it may be more appropriate to rely on clinical examination rather than weight.

3. If a weight loss rate of 1kg/day has not been achieved after 48 hours *consider* one of the following: increase dose of furosemide by 50% and/or add a thiazide such as xipamide or bendroflumethiazide. or add/increase dose of aldosterone antagonist. If in doubt discuss with heart failure nurse specialist/cardiologist/palliative physician.

4. If, on review, subcutaneous administration at a maximum dose possible in the syringe driver appears to be ineffective and a dose increase is deemed to be appropriate, then 12 hourly syringe driver administration will allow an increased dose for a few days. It is recognised that this may be logistically difficult in the community. If the maximum dose possible via a syringe driver is ineffective with regard to weight loss and/or symptom control, then a clinical reassessment and judgement will be required, and the future management plan negotiated with the patient and family as appropriate.

Administration:

5. Choose the appropriate syringe size (20mL) for the volume to be infused, a diluent may or may not be necessary. The furosemide can be diluted with 0.9% sodium chloride. Furosemide **must not** be diluted with glucose solutions. The solution should be infused following the Trust guidelines for the ambulatory syringe driver, available on the Trust intranet.

6. Furosemide should **not be** mixed in the same syringe with any other drugs as there is a high risk of incompatibility.

7. Drug stability: Exposure to light may cause degradation and discolouration, the solution should not be used if a yellow colour is present. Furosemide 10mg/mL in polypropylene syringes is stable at 25 °C in normal light for 24 hours. **If equipment permits** protect from light during infusion.

Monitoring:

8. Weight and/ or clinical symptoms as in points 2 and 3 above

9. Renal function and blood pressure will be appropriate for some patients.

Key points:

- **Review dose daily (hospital) or at least every 2 days (community), aiming for weight loss of at least 1kg/day**

- **If this is not achieved, then the options are for dose escalation and/or addition of thiazide/aldosterone antagonist**

- **If still not improving, a decision should be taken as to whether a change of route to IV diuretic is needed**

- **Do not start a patient on SC furosemide without regular assessment (defined above) and clinical decision-making**

Patient / carer information

The patient, relatives and carers should be given an explanation of how this method of drug administration benefits the individual patient and consent, when possible, from the patient or carers before administration is commenced.

Contra-indications and side effects

As listed in the BNF, in situations of symptom management / palliative care the prescribing physician will judge the best interests of the patient. Syringe driver site reactions may occur, most are mild, but occasionally can be more troublesome. Daily inspection is mandatory and re-sitting necessary at the first sign or symptom of a site reaction (redness, swelling, pain). Please remember to re-site in the recommended infusion sites. Please contact your local palliative care team for further advice.

Audit and Monitoring

Palliative care teams can consider adding to an audit programme and prospectively monitored by capturing a dataset for each patient, including;

- Management of fluid overload
- Relief of symptoms such as breathlessness and fatigue
- Patient reported outcomes such as improved sleeping patterns and general comfort
- Complications including infusion site problems, medical devices issues
- Documentation of verbal consent in the clinical record, including discussion of benefits and risks
- Facilitating the patient being managed at their preferred place of care

A suitable audit form can be found in Appendix 1

Complications and incidents related to this protocol will be reported and managed in line with Trust Policy.

References

(1) Verma AK, da Silva JH, Kuhl DR. Diuretic effects of subcutaneous furosemide in human volunteers: a randomized pilot study. *Ann Pharmacother* 2004 April;38(4):544-9.

(2) Zacharias H, Raw J, Nunn A, Parsons S, Johnson M. Is there a role for subcutaneous furosemide in the community and hospice management of end-stage heart failure? *Palliat Med* 2011 September;25(6):658-63.

(3) Goenaga MA, Millet M, Sanchez E, Garde C, Carrera JA, Arzellus E. Subcutaneous furosemide. *Ann Pharmacother* 2004 October;38(10):1751.

(4) DA Sica et al. Subcutaneous Furosemide in Heart Failure. Pharmacokinetic Characteristics of a Newly Buffered Solution. JACC: BASIC TO TRANSLATIONAL SCIENCE VOL. 3, NO. 1, 2018:25-34.

(5) Palliative care formulary PCF8 2022

(6) A Dickman and J Schneider The Syringe Driver 4th edDA Sica et al. Subcutaneous Furosemide in Heart Failure. Pharmacokinetic Characteristics of a Newly Buffered Solution. JACC: BASIC TO TRANSLATIONAL SCIENCE VOL. 3, NO. 1, 2018:25-34.

Further reading

Johnson MJ, Lehman R. Hogg K Editors. Heart Failure and Palliative Care: A team approach. 2nd Edition. Taylor & Francis Group. LLC. 2015.

Acknowledgements

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- GPs and Community Nursing Staff of North Yorkshire and York
- Angela Garton, Secretary to Heart Failure Team

Appendix A

SCF Data Collection Sheet 1

Palliative Care / Heart Failure Data Collection Sheet

Patient Initials ☐☐☐ **Audit Number** S ☐☐☐ **Age** ☐☐☐ **Gender** M☐ F☐

NYHA Class I☐ II☐ III☐ IV☐ **Date** DD/MM/YYYY

Place of Care:		**Preferred Place of Care:**	
Home	☐	**Home**	☐
Care Home	☐	**Care Home**	☐
Nursing Home	☐	**Nursing Home**	☐
Hospice	☐	**Hospice**	☐
Hospital	☐	**Hospital**	☐

Reason for Initiating Subcutaneous Furosemide:

A. At home and wishing to prevent hospital admission for parenteral diuretics ☐

B. In hospital and wishing to facilitate discharge despite continued need for parenteral diuretics ☐

C. In hospice and aiming to stabilise Heart Failure ☐
(Patient needs parenteral diuretics but either poor venous access or for ease of administration)

D. In hospice and aiming to prevent Pulmonary Oedema in terminal stage ☐
(Patient needs parenteral diuretics but either poor venous access or for ease of administration)

Was the aim achieved? Y☐ N☐

Additional Comments:

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Heart Failure Data Capture /SCH V2.2 October 2010