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Guidance for Administration of Continuous Subcutaneous Furosemide in the Community for Adults with End Stage Heart Failure

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	Electronic Medicines Compendium https://www.medicines.org.uk/emc/ and search furosemide http://www.scpharmaceuticals.com/resources/newsevents/news-item/scpharmaceuticals-announces-positiveresults-from-pivotal-trial-of-its-novel-subcutaneousfurosemide-formulation-in-patients-with-heart-failure Version 1 Adapted from NHS Doncaster and Bassetlaw APC Guidance for the Prescribing of Subcutaneous Furosemide by Bolus or Syringe Driver for Heart Failure by Melinda Presland, Macmillan Palliative Care Pharmacist, City Healthcare Partnership CIC Hull. Version 2 incorporated Guideline for the administration of subcutaneous furosemide in the Community Setting. (York & Selby, Scarborough & Ryedale localities) Authors: Janet Raw Heart Failure Nurse Specialist, Tim Houghton Consultant Cardiologist and Miriam Johnson Professor of Palliative Medicine, September 2016.
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Document Revisions			
Date	**Author**	**Nature of Change**	**Reference**
July 2019	Steve Bayston Macmillan Palliative Care Pharmacist, Professor Andrew Clark, Cardiology, Tracey Fellowes Heart Failure Specialist Nurse, Dr Michelle Fleming, Consultant in Palliative Medicine, Dr Hannah Leahy Consultant in Palliative Medicine, Christine Merrick, Heart Failure Specialist Nurse, Melinda Presland, MacMillan Palliative Care Pharmacist, Fiona Shepherd, Heart Failure Specialist Nurse, Tracy Turner, Heart Failure Specialist Nurse, Alison Walker, Heart Failure Specialist Nurse	To provide consistency in locality wide guidance	
July 2021	Review due	No Changes needed	

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1. INTRODUCTION

This document sets out guidance for the assessment and treatment of fluid overload due to end-stage heart failure with continuous subcutaneous infusion of furosemide.

These guidelines are NOT to be used for facilitating early discharge from hospital when a patient is receiving intravenous furosemide.

This document aims to provide clear guidance to healthcare professionals regarding the procedures that should be adopted when clinical responsibility for a patient on subcutaneous furosemide is shared between primary and secondary care.

Patient suitability and the decision to start subcutaneous furosemide in those with end-stage heart failure should be a multidisciplinary approach – led by a consultant and/or specialist registrar in cardiology and consultant in palliative medicine and will involve heart failure specialist nurses, GP and community nursing staff.

2. PURPOSE

The purpose of this document is to describe the Standard Operating Procedures for Administration of Continuous Subcutaneous Furosemide in the Community for Adults with End Stage Heart Failure.

Furosemide is a loop diuretic. It is the standard first line therapy used to alleviate symptoms of fluid retention in patients with heart failure.

Furosemide is usually administered by mouth or intravenously. The parenteral route can be useful in those with extensive oedema as oedema in the gut wall can reduce absorption of oral medication. Intravenous furosemide with specialist monitoring in a cardiology unit is the optimal medical management but some patients with end-stage heart failure would strongly prefer to stay at home and hospital admission is not acceptable to them. Using the subcutaneous route gives the patient the option to stay

in a community setting whilst trying to improve absorption of diuretic to alleviate symptoms. It avoids the necessity of intermittent intravenous furosemide and the siting of an intravenous cannula

The use of continuous subcutaneous infusion (CSCI) furosemide is largely empirically based on reports in healthy volunteers. However, an industry-led phase 3 trial of a branded, pH-adjusted formulation of SC furosemide vs IV furosemide in heart failure showed 100% bioavailability and equivalent diuresis at 8 hours and 24 hours following administration. Furosemide CSCI has been used safely and effectively for symptom control for patients with end-stage heart failure in other localities.

It is recommended that subcutaneous furosemide is used only in the context of this guidance and with regular audit.

3. SCOPE

Adult patients with end-stage heart failure, for whom starting subcutaneous furosemide is deemed appropriate by specialist teams as above.

Continuous subcutaneous furosemide infusion should only be prescribed after discussion between the individual patient and the Heart Failure Multi-Disciplinary Team (HF MDT). The team must agree that treatment outside hospital is appropriate, and the patient must prefer home/hospice treatment to hospital admission. Suitable patients are those who strongly prefer to remain at home/hospice rather than be admitted to hospital for symptom control, and in whom the HFMDT agree that care in the community is appropriate.

Note: Continuous subcutaneous furosemide infusion is not required routinely for end stage heart failure patients in the last days of life and oral diuretics should not be routinely converted to subcutaneous furosemide infusion when capacity to swallow oral medications is lost. If there is very poor peripheral perfusion in the terminal stage, subcutaneous absorption may be limited and alternative measures such as antimuscarinics, buccal nitrates or sedation may be needed to alleviate terminal

pulmonary oedema. Just In Case drugs should be prescribed in anticipation of symptoms and CSCI of symptom control medications considered on an individual basis.

4. EQUALITY, DIVERSITY & INCLUSION

City Health Care Partnership is committed to developing, supporting and sustaining an inclusive and diverse workforce that is representative of the community that it services. Equally we are committed to the provision of services that respects our increasingly diverse populations and which promotes equality and access and care. Our culture promotes equality and fairness for all in our employment and care and actively discourages and form of discrimination.

5. ABBREVIATIONS & DEFINITIONS

CHCP	City Health Care Partnership
BNF	British National Formulary
HFMDT	Heart Failure Multidisciplinary Team
CSCI	Continuous Subcutaneous Infusion
SC	Subcutaneous
IV	Intravenous
mg	milligram
kg	kilogram
ml	millilitre
Amps	Ampoules
β	Beta
GP	General Practitioner
POS	Palliative Care Outcome Scale
AKPS	Australia-modified Karnofsky Performance Scale

6. ROLES & RESPONSIBILITIES

Furosemide CSCI for end stage heart failure patients should be delivered and monitored through a multi-disciplinary approach. All staff involved should familiarise themselves with the guidance.

The clinicians involved in the decision to start CSCI furosemide will be documented in the patients care plan. The clinician responsible for patient re-assessment will be documented in the care plan.

Heart failure specialist nurses will identify patients who may be suitable for CSCI furosemide and discuss with the HFMDT. This does not mean waiting until the next formal meeting but discussed with the relevant disciplines in the interim.

Palliative Care Nurses who identify a potentially suitable patient will initially discuss with a Palliative Care Consultant before Consultant Cardiologist. Again, this does not mean waiting until the next formal meeting but can be discussed with the relevant disciplines.

Cardiology consultants will offer guidance regarding monitoring and titration of diuretics. Specialist Palliative Care clinicians provide holistic needs assessment and advice regarding subcutaneous infusion delivery.

Primary Care teams will be involved in discussions regarding suitability for this treatment. GPs will not be asked to prescribe supplies of furosemide and diluent. This will be done by the heart failure specialist team following discussions at the HFMDT. The District Nursing team will be responsible for delivering the subcutaneous infusion as prescribed and according to the syringe driver policy in the community setting.

7. PROCESS

A plan for monitoring and advice (Appendix 1) will be agreed for each individual by the HFMDT. The plan will be within the electronic patient record on SystmOne. Integrated cross-specialty working will underpin patient management and review (community heart failure and palliative care teams along with primary care) and as such, consent for SystmOne sharing should be confirmed with the patient. If a GP practice does not use SystmOne, the care plan will be sent for scanning into the patient record used by the GP practice. If a patient is admitted into hospital, this care plan will be communicated with the hospital team as soon as possible.

Calculating the starting dose: All starting doses will be recommended by the HFMDT. The previous oral 24 hour requirement should be used as a starting dose and titrated up or down according to response. For example, if the patient has been taking 120mg oral furosemide in 24 hours, start on 120mg/24 hours in the syringe pump. This should be reviewed every 24 hours aiming for a daily weight loss of at least 1kg/day. Note: Oral bumetanide 1mg is equivalent to 40mg oral furosemide.

Daily weight is a useful guide for monitoring diuresis, with the aim of achieving weight loss of at least 1kg/day. Some patients may benefit symptomatically but not achieve a 1kg/day weight loss: the situation should be assessed individually. Some patients may not be able to weigh themselves and alternate assessment strategies will be documented in the care plan. Review will be daily with change in syringe driver by community nursing team. The plan of care will state clearly what is to be assessed during syringe driver change, including the frequency of observations and monitoring of renal function. The plan of care will name the clinician whom the community nursing team will report to in the case of concerns during review of the patient. This may be the heart failure specialist nurse if the patient is under their care, or GP or community palliative care team. If the patient is under the care of the heart failure nurse and receiving CSCI furosemide at a time when the heart failure nurse is not on duty, an alternative contact will be documented in the care plan. Advice can be sought from Dove House Hospice and/or cardiology registrar.

If, on review by the named clinician stated in care plan, subcutaneous administration is ineffective for symptom control, the patient will be reassessed and a new management plan created. Admission to hospital may be considered as part of this revised management plan, if appropriate for the individual.

If a weight loss of 1kg/day has not been achieved after 48 hours and patient remains symptomatic, consider increasing CSCI furosemide by 50% and discuss management plan with the lead clinicians (cardiology and palliative medicine).

If symptoms improve with the administration of subcutaneous furosemide, it may be appropriate for the infusion to be discontinued and oral medicines restarted.

Prescribing: Furosemide ampoules have a concentration of furosemide 10mg/ml in 2ml or 5ml ampoules. The preferred diluent for subcutaneous furosemide is sodium chloride 0.9% injection (10ml amps) which will also need to be prescribed. Furosemide is unlicensed for subcutaneous administration.

Cautions: Increased risk of hypokalaemia with steroids and β-adrenergic receptor agonists.

Blood pressure should be monitored as hypotension can result from diuresis. Renal function is usually impaired in end-stage heart failure. The frequency of monitoring blood tests during furosemide CSCI therapy will depend upon the individual patient.

Undesirable effects: For full list see manufacturers Summary of Product Characteristics, the BNF and the current Palliative Care Formulary. Information is also available at www.palliativedrugs.com .

As recommended by 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 though most are mild but occasionally these can be more troublesome. Daily inspection is mandatory and re-siting is necessary at the first sign or symptom of a site reaction (redness, swelling, pain).

Setting up the Syringe Pump: Please refer to and follow the syringe pump policy.

Choose the appropriate syringe size 10ml, 20ml or 30ml for the volume to be infused.

A diluent may or may not be necessary. The furosemide can be diluted with sodium chloride 0.9%. Note: furosemide **must not** be diluted in glucose solutions.

For larger doses, syringe pumps running over a 24h period can use undiluted furosemide to increase maximum dose. An alternative is to have 2 syringe pumps running in parallel over a 24h period which will allow a higher dose.

There is no firm evidence for the combination of furosemide with other subcutaneous drugs. **If other medications are required, a separate pump should be used**

Recommended infusion Sites

- Upper chest
- Upper anterior aspect of arms

Sites maybe restricted in heart failure patients due to potential oedema. Other sites to be avoided are bony prominences and areas where tissue is damaged as this impacts upon absorption.

8. APPROVAL

This SOP has been reviewed and approved by the stakeholders identified on the document checklist submitted to the Therapeutics & Pathways Group which reviewed the checklist and ratified this document.

9. MONITORING & COMPLIANCE

The application of this SOP will be discussed and reviewed within clinical supervision/ the compliance with this SOP will be audited within the services annual audit plan.

- Management of fluid overload – duration of furosemide CSCI treatment, doses, monitoring
- Relief of symptoms such as breathlessness and fatigue
- Patient reported outcomes such as sleeping patterns and general comfort (for those known to the specialist palliative care team, palliative care outcome measures; POS, AKPS and Phase of Illness should be recorded pre and post intervention)
- Complications including infusion site problems and syringe pump problems
- Documentation of verbal consent, including discussion of benefit and risk
- Achievement of preferred place of care

Audit form (Appendix 2) should be completed following an episode of CSCI furosemide. This monitoring and data collection sheet should be completed at every clinical review. Once treatment is complete, the form should be sent to the heart failure specialist nurse team for collation of data

10. REVIEW

This SOP will be reviewed every 3 years or sooner if prompted by changes in legislation or best practice requirements. Audit and evaluation tools may be developed independently without the need to revise this guideline.

11. REFERENCES & ASSOCIATED DOCUMENTATION

Diuretic Effects of Subcutaneous Furosemide In Human Volunteer: A Randomised Pilot Study.

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V2 incorporated Guideline for the administration of subcutaneous furosemide in the Community Setting. (York & Selby, Scarborough & Ryedale localities) Authors: Janet Raw Heart Failure Nurse Specialist, Tim Houghton Consultant Cardiologist and Miriam Johnson Professor of Palliative Medicine, September 2016.

12. APPENDICES

Associated Documents – Appendix 1

Community Care Plan for Continuous Subcutaneous Infusion of Furosemide

Patient Details:	Name:	
	Address:	
	Date of Birth:	
	NHS Number:	

Clinicians consulted in decision to start care plan: Signature:	

Furosemide Dose:	mg/24 hours	Diluent:

Clinical symptom assessment (oedema, breathlessness):
Monitoring Requirements: (e.g. blood pressure, weight, bloods etc)

Review plan: (*e.g. duration of treatment, stopping treatment) – see review record overleaf*

Completed by: _____ Date: _____

Review Date:	**Comments:** Including symptom assessment, any change in dose/monitoring plan	**Signature:**

Appendix 2 – Palliative Care/Heart Failure Data Collection Sheet

Patient ID (Initials and NHS number)	Place of Care	Starting Dose of CSCI

*** Please complete Baseline prior to commencing syringe driver**

	Baseline	Final Day

Measurement	DD/MMM/YYYY	DD/MMM/YYYY
***Daily Oral Furosemide Equivalent (Assuming 40mg = 1mg Bumetanide)**	(mg)	
Pulse		
BP		
Weight (Kg)		
Basal Chest Crackles	Clear ☐ Crackles/Wheeze (Basal Only) ☐ Crackles/Wheeze (Whole Chest) ☐	Clear ☐ Crackles/Wheeze (Basal Only) ☐ Crackles/Wheeze (Whole Chest) ☐
Peripheral Oedema	None ☐ Mild (Below Knee) ☐ Moderate (Above Knee) ☐ Severe (Truncal/Ascites) ☐	None ☐ Mild (Below Knee) ☐ Moderate (Above Knee) ☐ Severe (Truncal/Ascites) ☐
How Does the Patient Rate Their Breathlessness at this Time Point? (NYHA score)	1 2 3 4 Please Enter Score ……	Please Enter Score ……

Patient Details **NHS Number** **Age** **Gender M** ☐ **F** ☐

	Measurements for Subcutaneous Furosemide Doses						
	Day 1 DD/MMM/YY	**Day 2** DD/MMM/YY	**Day 3** DD/MMM/YY	**Day 4** DD/MMM/YY	**Day 5** DD/MMM/YY	**Day 6** DD/MMM/YY	**Day 7** DD/MMM/YY
Dose CSCI (per 24 hours)							
Weight (kg)							
Syringe Driver Site Reaction (If Yes please answer next question)	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Please tick those that apply	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐
***If Site Changed**							

	Measurements for Subcutaneous Furosemide Doses						
	Day 1 DD/MMM/YY	**Day 2** DD/MMM/YY	**Day 3** DD/MMM/YY	**Day 4** DD/MMM/YY	**Day 5** DD/MMM/YY	**Day 6** DD/MMM/YY	**Day 7** DD/MMM/YY
Dose CSCI (per 24 hours)							
Weight (kg)							
Syringe Driver Site Reaction (If Yes please answer next question)	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Please tick those that apply	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐	Erythema ☐ Abscess ☐ Other eg on Antibiotics ☐
***If Site Changed**							