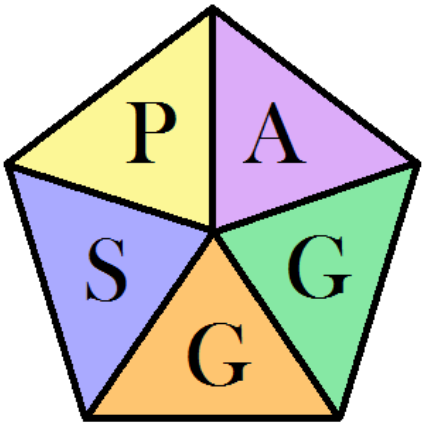


Specialist Palliative Care
Audit and Guidelines Group

# Specialist Palliative Care Audit and Guidelines Group (SPAGG)

## Clinical Guideline for the Prescribing and Administration of Furosemide via continuous subcutaneous infusion (CSCI) for Heart Failure Patients at end of life

## Version 2

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|---|---|
| Date Issued: | December 2022 |
| Review Date: | November 2025 |

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| **Document Title** | Prescribing and administration of CSCI (continuous subcutaneous infusion) furosemide for heart failure patients who are at end of life |
| **Document Date** | November 2022 |
| **Document Purpose and Intended Audience** | The aim of these guidelines is to ensure staff are informed and able to manage patients who require treatment with continuous subcutaneous infusions of furosemide at end of life<br><br>These guidelines are suitable for use in both primary community care and in the in-patient setting |
| **Authors** | Christina Radcliffe, Consultant Palliative Medicine St Mary's Hospice, Birmingham<br>Karen Green, Palliative Urgent Response Team Leader Sandwell and West Birmingham NHS Trust |
| **Consultation Process** | C. Radcliffe and K. Green reviewed and updated the guidelines.<br><br>Subsequently reviewed and endorsed by SPAGG<br><br>Reviewed by Dr A Reynolds 2022 |
| **Monitoring** | Monitoring of guideline implementation locally |
| **Review Date** | November 2025 |
| **Approval Signatures:**<br>SPAGG chair<br>SPAGG secretary | <br><br>J. Tomas<br>A. Gray |
| **Date Approved by SPAGG: November 2022** | |
| **Date submitted to Area Prescribing Committee:** | |

**Version History**

| Version | Date | Summary of change/ process |
|---|---|---|
| 1.0 | Dec 2022 | Expansion on importance of MDT decision making |
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# Table of Contents

# 1 Scope of the Guideline

This guideline sets out the guidance for the assessment and treatment of patients with end stage heart failure who require subcutaneous furosemide at end of life.

The aim of treatment is to provide symptomatic relief.

Furosemide is the drug of choice after all other reversible causes of fluid overload are excluded, e.g. uncontrolled atrial fibrillation, bradycardias, sepsis, thyroid disease, anaemia, significantly worsening renal function and pulmonary emboli.

**The guideline can be used in all settings e.g. hospital, hospice, care homes and community.**

# 2 General Information

Prior to starting treatment the patient and carers/relatives should be made aware that the aim of treatment is symptomatic relief only.

There should be an MDT consensus before initiating treatment

Blood tests are not always helpful at the end of life but may be considered on an individual patient basis, particularly when increasing doses, or in patients at high risk of electrolyte abnormalities

Sometimes patients may improve following treatment e.g. if deterioration is due to decompensated heart failure rather than dying and therefore patient review will be required.

# 3 Background Information

## 3.1 Indications

Furosemide is a loop diuretic that is used to alleviate the symptoms of breathlessness and oedema. It is the standard first line therapy for treatment of symptomatic fluid overload in congestive heart failure.

## 3.2 Mode of Action

Loop diuretics inhibit sodium and water reabsorption from the ascending limb of the loop of Henle in the renal tubule and are powerful diuretics. Loop diuretics are potent and act rapidly.

## 3.3 Pharmacological properties of furosemide

*Bioavailability:* 60-70% orally but may be reduced by gastro-intestinal oedema in heart failure. The bioavailability of subcutaneous furosemide (compared to IV) is noted to be 100%, with equivalent diuresis to the intravenous route.

*Onset of action:* 30-60 minutes when administered orally
30 minutes when administered subcutaneously

*Peak effect:* 1-2 hours when administered orally

*Plasma half-life:* 50 min- 6 hours in heart failure
10 hours in end stage renal failure

*Duration of action:* 4-6 hours when administered orally
4 hours when administered subcutaneously

### 3.4 Cautions

Increased risk of hypokalaemia with steroids or B-adrenergic receptor agonists (such as Salbutamol, Salmeterol and Terbutaline)

### 3.5 Undesirable Effects

- Transient pain at site of subcutaneous injection
- Localised skin reactions (swelling, erythema) – occurred in 3/21 cases recalled by health professionals in a recent regional survey
- Headaches, dizziness, fever, weakness, restlessness, blurred vision, deafness (usually after rapid IV injection)
- For full list see manufacturers summary of product characteristics (SPC) via https://www.medicines.org.uk/emc/

### 3.6 Interactions

Diuretic effect may be antagonised by corticosteroids or non-steroidal anti-inflammatory drugs (NSAIDS), increased risk of nephrotoxicity with NSAIDS.
Furosemide-induced hypokalaemia can increase the risk of cardiac arrhythmias with drugs known to prolong the QT interval, such as citalopram and methadone, and concurrent use alongside risperidone in patients with dementia is associated with an increased risk of death.
Furosemide is unlikely to be involved in significant drug interactions when used via CSCI for end of life care.

# 4 Prescribing and Administration

When switching from oral to subcutaneous route of administration calculate the starting dose using the previous oral 24 hour requirement as a start dose and titrate up or down according to response. A PO:SC conversion ratio of 1:1 is generally used.

**N.B. administration via the subcutaneous route is unlicensed.**

Subcutaneous infusion average dose range is 80-120mg over 24 hours. However, doses as high as 240mg/24 hours may be required in some patients. Doses greater than 240mg/24 hour need consultant (palliative or cardiology) advice. Doses greater than 240mg/24 hours may need two syringe drivers due to infusion volume.

### 4.1 Setting up the syringe driver

- Follow local policies and procedures for syringe driver and subcutaneous medicines.
- Drug stability – exposure to light may cause degradation and discoloration, the solution should not be used if a yellow colour is present.

### 4.2 Formulation and compatibilities

- Solution for injection comes in 10mg/ml 20mg/2ml or 50mg/5ml ampoules
- Diluent: 0.9% sodium chloride
- Furosemide **must not be** diluted in glucose solutions
- Furosemide is incompatible with most drugs via CSCI
- A second CSCI may be needed to treat other symptoms

'Rescue' bolus doses of subcutaneous furosemide may also be considered, particularly in cases of more acute decompensation or where pulmonary oedema is suspected.

# 5 Recommendations for infusion sites

- Upper chest/Upper anterior aspects of arms
- Sites are restricted in heart failure patients, oedematous areas, bony prominences and areas of tissue damage should be avoided since absorption may be reduced.
- If there is very poor peripheral perfusion in the terminal stage, subcutaneous absorption may be limited and alternative measures such as opioids, anti-muscarinic medicines, buccal nitrates or sedation may be needed to alleviate terminal pulmonary oedema.

# 6 Monitoring of CSCI furosemide

- Site of administration for any signs of irritation or infection
- Symptoms – only monitor bloods if likely to change management, weight may be used for monitoring but not appropriate if dying
- Monitor for signs of postural hypotension and consider checking blood pressure

# 7 Patient Selection

7.1 Inclusion Criteria

- End stage heart failure approaching end of life – last 2 weeks (NYHA class 4)
- Symptoms of SOB/severe oedema
- If the patient is under the care of a cardiologist must have discussion with team
- GP willing to support if in community or planning discharge to a community setting
- Oral medications not working/not tolerated/not able to swallow
- Patient choice for symptom management

7.2 Exclusion Criteria

No absolute contraindications but may wish to be cautious in:

- renal failure
- liver failure
- anuria
- electrolyte disturbance
- dehydration

In these cases, discuss further with Consultant in Palliative Medicine

# 8 Roles and Responsibilities

8.1 Consultant in Cardiology or Palliative Medicine with support of Clinical Nurse Specialists

- Assess heart failure patient symptoms with regard to appropriateness of subcutaneous furosemide use, considering any contraindications
- Initiate and titrate the dosage regime for CSCI furosemide
- Assess response and side effects
- Arrange shared care with GP when patient is managed on a stable regimen
- Provide clear instructions to the GP, heart failure CNS, palliative CNS, district nurses and other health professionals involved in the patients care. The patient will have a copy of this letter and advice

8.2 General Practitioner

- Review the patient at regular agreed intervals to monitor control of symptoms
- Liaise with the community and specialist nurses as appropriate to provide ongoing patient care

- Refer to specialist when symptoms fail to respond to the CSCI furosemide

8.3 District Nursing Team/Community Nursing Team

- Ensure they have the knowledge and understanding of the use of furosemide via CSCI
- Administer the diuretic as prescribed
- Be aware of when and how to contact relevant health professional(s) for advice and support regarding subcutaneous furosemide concerns to ensure continuity of care in a timely manner
- Follow the local policy and guidance on syringe drivers

# 9 Abbreviations and Definitions

9.1 Abbreviations

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| CNS | Clinical Nurse Specialist |
| CSCI | Continuous Subcutaneous Infusion |
| MDT | Multi-Disciplinary Team |
| NYHA Class IV | New York Heart Association Functional Classification |
| PO | Oral Medication by Mouth |
| SOB | Shortness of Breath |
| SC | Sub Cutaneous |
| SPC | Summary of Product characteristics |

9.2 Definitions

**Decompensated Heart Failure**
A sudden worsening of signs and symptoms of heart failure typically includes difficulty breathing, pulmonary and peripheral oedema, fatigue and pain.

**NYHA Functional Classification**

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|---|---|
| NYHA II | no limitation of ordinary physical activity |
| NYHA II | slight limitation of ordinary physical activity by dyspnoea, fatigue or palpitation |
| NYHA III | marked limitation of less than ordinary physical activity by dyspnoea, fatigue or palpitation |
| NYHA IV | severe limitations of physical activity, symptomatic at rest, mostly bedbound |

# 10 References


1. www.palliativedrugs.com
2. British National Formulary Number 72, Sept 2016-March 2017
3. Heart Failure from Advanced to Bereavement, Johnson et al, 2012
4. The Syringe Driver: Continuous subcutaneous infusions in palliative care 4th Edition


# 11 Acknowledgements


This guidance was adapted from The Royal Wolverhampton NHS Trust and Bassetlaw and Doncaster CCG clinical guidelines for sc furosemide with an emphasis on end of life care only.