Guidance for the Prescribing of Subcutaneous Furosemide

1.0 Introduction

This document sets out the guidance for the assessment and treatment of end stage heart failure by subcutaneous furosemide for the treatment of symptomatic fluid overload.

The decision to start a patient on subcutaneous furosemide with end stage heart failure should be taken by the Consultant in Cardiology and/or Consultant in Palliative Medicine, supported by the Heart Failure specialist nurses and Macmillan team.

This document provides guidance to the GP and hospital prescriber with regard to the indications, contraindications and monitoring required for subcutaneous furosemide.

2.0 Background information

Furosemide is a loop diuretic that is used to alleviate the symptoms of congestive heart failure (CHF) due to left systolic dysfunction. It is the standard first line therapy for the treatment of symptomatic fluid overload in CHF.

The doses and subcutaneous use are based on the clinical experience of the Heart Failure and Specialist Palliative Care Teams in Scarborough, with utilisation of the evidence referenced. This team have used subcutaneous furosemide with 43 patients at home in 3 years. It is established that the continuous intravenous infusion of furosemide produces a better diuresis than intermittent intravenous use, and a further study using subcutaneous furosemide in healthy volunteers confirmed that the subcutaneous route could have a good effect.

There are a small number of patients reaching the end of life with heart failure in whom starting subcutaneous furosemide is an appropriate option. These will be patients requiring parenteral diuretics for symptom control:

- Who want to be cared for at home at the end of life
- In whom hospital admission would not confer additional benefit at the patients stage of the illness
- The patient declines admission after discussion of the options

Initially, it would be proposed that subcutaneous furosemide is offered to those who are in the last days of life and wish to stay at home, but may become unable to take their diuretics orally. Monitoring of weight and U&Es is inappropriate in these patients.

3.0 Prescribing

Furosemide ampoules have a concentration of 10mg/mL in 2mL or 5mL ampoules. The injection is alkaline and it should not be mixed or diluted with glucose solutions or other acidic fluids. Sodium chloride 0.9% (10mL amps.) should also be prescribed for mixing with the furosemide to give via the subcutaneous route.

Bioavailability	60-70% po, but reduced by gastrointestinal oedema in CHF
Onset of action	30-60 min po; 2-5min iv; 30 min sc
Peak effect	1-2 h po
Plasma half life	50min-6h in heart failure, 10h in end stage renal failure
Duration of action	4-6h po; 4h sc

3.1 Cautions

Increased risk of hypokalaemia with steroids, β-adrenergic receptor agonists.

3.2 Undesirable effects

For full list see manufacturer's SPC
Transient pain at site of sc injection
Headaches, dizziness, fever, weakness, restlessness, blurred vision, deafness (usually after rapid iv injection)

3.3 Calculating the starting dose

1. Use the previous oral 24 hour requirement as a start dose and titrate up or down according to response. A maximum of 240mg in 24 hours is recommended. It can be used undiluted in a syringe driver

2. For severe pulmonary oedema in the terminal patient furosemide 20-40mg sc/im can be used 2 hourly

There is no good evidence for the combination of furosemide with other subcutaneous drugs. This would be at the discretion of the Consultant in Palliative Medicine. Mixing furosemide and midazolam in ITU settings has caused the solution to become cloudy.

4.0 Setting up the syringe driver

Policies and procedures for syringe drivers and subcutaneous medicines for the particular patient setting should be followed.

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^{o}C in normal light for 24 hours. Ensure that the driver is not exposed to excessive light by covering or using a holder.

Choose the appropriate syringe size 20mL or 30mL for the volume to be infused. A diluent may not be necessary but can be dilute with sodium chloride 0.9%.

4.1 Recommended infusion sites

Upper chest
Upper anterior aspect of arms

Sites are restricted in heart failure patients because of oedema. Sites to be avoided are bony prominences and areas where tissue is damaged.

5.0 References

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With thanks to Doncaster and Bassetlaw NHS trusts for sight of their documentation.