INTRAVENOUS FUROSEMIDE PROTOCOL FOR HEART FAILURE

Authors
Sharon Andrews & Lucy Girdler-Heald with guidance from Caroline Cooper

Reviewed by:
- Dr Swinburn, Dr Gadgil, Dr Howard, Dr Pizura
- Adult Services Improvement Group on 21st June 2013
- Medicines Management Group
- CCG Medicines Management Group-18.9.2013

Approved by:
BHFT Medicines Management Group

Date approved:
17th September 2013

Review date:
Reviewed – 12/08/2015

Sharon Andrews 27.8.2013
This protocol is to be read in conjunction with BHFT Policies:-

- CCR126 Intravenous Therapy for Adults & Children in non acute settings
- ICC002 Hand Hygiene
- ICC003 Personal Protective Equipment
- ICC005 Management of Sharps, Inoculation and Needlestick Injury
- INF008 Policy for the Safe Handling and Disposal of Sharps (West CHS)
- ICC005 Guidance on Sharps/Contamination Injury (West CHS)
- ICC008 Single Use Medical Devices
- ICC009 Blood and Body Fluids Spillage
- ICC010 Safe Collection, Handling and Transportation of Laboratory Specimens
- ICC018 Aseptic Technique
- CCR049 Medical Devices Training
- CCR006 Care and Control of Medicines
- CCR119 Guidelines for Continuous Subcutaneous Syringe Drivers used in Adult Palliative Care
- CCR035R Consent to Examination and/or Treatment

All staff that administer intravenous using the intravenous route must have received training and been assessed as set out in this policy. Nurses must be registered with the Nursing and Midwifery Council.
Aim

The predominant symptoms of worsening heart function, breathlessness and worsening oedema are due to congestion. Currently, if increased oral diuretics fail to improve symptoms when the patient is at home, they are admitted to hospital for intravenous (IV) diuretic treatment. The goal of IV diuretic treatment is to relieve congestion and associated symptoms. IV diuretic treatment can be administered in the community to suitable patients under the supervision of the specialist heart failure nursing team as an alternative to a hospital admission.

Suitable patients may be identified by any member of the multi-disciplinary heart failure team.

- The background to heart failure should be consistent with the natural history of the patient’s disease trajectory. Congestion should not be due to another reversible cause i.e. Furosemide would not be the only treatment required for patients with uncontrolled atrial fibrillation, bradycardias, sepsis, thyroid disease, anaemia, significantly worsening renal function etc.
- The referring clinician needs to ensure that reversible causes of cardiac decompensation have been excluded.
- Inclusion and Exclusion Criteria – see below
- The patient should be fully involved in the decision to have this service. They need to understand the nature of the treatment and agree management of the IV diuretic plan with their Heart Failure Specialist Nurse (HFSN).
- Patients would need to have sufficient mobility to be able to get to and from a toilet, or a commode, and a means of emptying it would need to be provided. An agreed decision about urinary catheterisation for bed-bound patients would need to be taken.
- Frequency of administration and dose of IV diuretic- see below although this may be tailored to a specific patient on discussion with the lead physician.

Patient screening

Inclusion criteria

- Documented or estimated weight gain of > 3 kgs:
  - Associated with peripheral oedema and/or orthopnoea
  - Despite adherence to optimal oral diuretic
  - Not attributable to other cause
- Agreement to administer bolus with lead clinician
- Clarification of baseline medication
- Adequate social arrangements to manage IV therapy

Sharon Andrews 27.8.2013
Exclusion criteria

- Baseline creatinine > 250 umol/l
- Baseline sodium < 125mmol/l
- Baseline potassium [K+] < 3.5mmol/l or > 5.5 mmol/l
- Systolic blood pressure (BP) < 90mmHg
- Evidence of acute coronary syndrome or haemodynamically significant arrhythmia
- Significant abnormality of liver function (3x normal level of AST or ALT) or low serum protein levels.
- Patient declined
- Patient lacking capacity to consent

Concomitant medication

Prior to commencing infusion:

- Discontinue existing prescribed oral loop diuretics.
- Continue other heart failure medications (ACEI or ARB) and beta blocker at baseline dose unless adjustment was indicated clinically.

Safety thresholds for intervention

STOP intravenous therapy if:

- Target weight/desired weight loss and symptoms improvement achieved (efficacy threshold)
- Creatinine > 50% above baseline or > 300 umol/l
- Potassium [K+] < 3.0mmol/l or > 6.0 mmol/l
- Systolic blood pressure (BP) < 85mmHg (if symptomatic)
- Discuss with lead physician & consider admission to hospital

REDUCE intravenous therapy if:

- Reduce bolus dosing and consider alteration to medication and discussion with lead physician if:

Sharon Andrews 27.8.2013
• Creatinine > 250 umols/L Consider reduction in ACEI or ARB dose
• Potassium [K+] < 3.3mmol/l or > 5.5 mmol/l. Consider K+ supplement if K+ low or reduction in ACEI or ARB dose if high.

• Systolic blood pressure (BP) <90 mmHg (if symptomatic)

• Consider (if postural hypotensive symptoms despite being fluid overloaded) reduce/stop vasodilators, reduce ACEI or ARB dose, reduce beta-blockers

Routine observations

• Before IV diuretic therapy the following need to be undertaken:
  • Baseline FBC, urea and electrolytes, creatinine, liver function tests including albumin, thyroid function tests.
  • Daily recording of blood pressure, pulse, symptoms, weight and cannula inspection
  • Daily U&Es – if requested by the consultant cardiologist, otherwise to have U&Es every other day

Post IV diuretic schedule medication

• On completion of IV diuretic treatment the oral diuretic should be prescribed by the Independent Nurse Prescriber, the Lead Physician or the GP

• Weight and fluid status will need to be closely monitored and oral diuretic dose may need to be further adjusted.

• Doses of ACEI (or ARB) and beta blocker may have been adjusted and may thus require re-optimisation. Both changes made to medication and arrangement to re-optimise medication should be documented in post IV diuretic correspondence to GP and copy of which should be retained within the patient record.
INTRAVENOUS FUROSEMIDE PROTOCOL FOR HEART FAILURE

This protocol refers to the treatment of the heart failure patient who is retaining fluid despite optimal care.

This will present clinically as:

- Increased oedema and symptomatic and or
- Gain in weight of >3kgs greater than base-line weight
- Despite
  - Optimal doses of oral diuretic
  - Fluid restriction to <1.5 litres/day and on a low salt diet

Intravenous Furosemide should be given as a once fixed-dose bolus until target weight loss is achieved:

- Cannulation in accordance with CCR126 Intravenous Therapy for Adults & Children in non-acute settings
  - Day 1: Bolus dose of furosemide 80 mg.
  - Days 2-4:
    - Continue at furosemide 80 mg once daily
    - If diuresis of >2 litres or weight loss of >2kg per day reduce to 40 mg once daily
  - Day 4: Review/discuss with supervising physician:
    - Discontinuation of bolus dose
    - On-going bolus dose with incremental increase (i.e. twice daily bolus)
    - On-going bolus dose with the addition of an adjunctive diuretic to enhance diuresis (e.g. metolazone, bendroflumethiazide or spironolactone)
    - Admission to hospital

STOP IV furosemide if:

- Target weight/desired weight loss and symptoms improvement achieved (efficacy threshold)
- Safety threshold crossed
- On clinical advice

On clinical advice:

- A higher initial IV diuretic dose may be considered in individual patients in whom effective dosing was known from prior treatment. On clinical advice from the lead physician, IV Furosemide may be offered to palliative patients for symptom relief if they have expressed that their preferred place of care/death is at home.
Procedure for administering Intravenous Furosemide

**Purpose:** To safely administer IV Furosemide as per manufacturer’s information and prescribers calculations on the prescription.

Nurses must follow the NMC standards and guidance around the administration of medicines and MRSOP 4007

**Objective:** To ensure safe administration of Furosemide

**Responsibility:** All nurses administering Furosemide

**Procedure:**

**Information required**

See Medusa for manufacturer specific product information

Prescription (Furosemide will be prescribed on FP10)

**Equipment**

Sterile field
- 5 mls syringe x 2
- Sodium Chloride 0.9% 5mls x 2
- 80 mgs Minijet injector containing 80mg in 8mL
- Or 20 mg ampoule of Furosemide (or two vials depending on prescription)
- 1 blunt fill needle
- 1 blunt filter needle
- Apron
- Unsterile Gloves
- Sterile Gloves
- 2% chlorhexidine disinfection wipe
- Cannula 24 Gauge or butterfly if anticipate single day of treatment or difficulty with cannulation

1. **Procedure**

1.1 Wash hands put on apron
1.2 Open all equipment on to sterile field
1.3 Put on unsterile gloves

Sharon Andrews 27.8.2013
1.4 Draw up sodium chloride 0.9% x 2

1.5 Draw up prescribed dose of Furosemide or prepare Minijet injector depending on dose required

1.6 Wash hands and change gloves

1.7 Insert cannula (or if in place follow 1.8 onwards)

1.8 If using existing cannula assess and document using the VIP score

1.9 Wipe end of infusion device with disinfection wipe and allow to dry

1.10 Flush infusion device with sodium chloride 5mls. (to check line patency)

1.11 Give Furosemide slowly, a rate of 4mgs per minute should not be exceeded

1.12 Wipe end of infusion device with disinfection wipe provided allow to dry

1.13 Flush 5mls sodium chloride (slowly as drug in the line) and finish with positive pressure.

1.14 Wipe end of infusion device with disinfection wipe provided allow to dry

1.15 Document cannulation

2.1 Dispose of clinical waste in appropriate waste device
### Patient Record Sheet- IV Furosemide

#### Day 1 (Admission)

<table>
<thead>
<tr>
<th>Date:</th>
<th>Weight (kg):………..kg Na+:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target weight:………..kg K+:</td>
</tr>
<tr>
<td></td>
<td>BP: ………/…… kg Urea:</td>
</tr>
</tbody>
</table>

Signed:  
Check: SBP>85 mmHg, K+>3.5mmols/L, Cr stable, oedema and above target weight  
Administer: 80 mg furosemide bolus

#### Day 2

<table>
<thead>
<tr>
<th>Date:</th>
<th>Weight (kg):………..kg Na+:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target weight:………..kg K+:</td>
</tr>
<tr>
<td></td>
<td>BP: ………/…… kg Urea:</td>
</tr>
</tbody>
</table>

Signed:  
Check: SBP>85 mmHg, K+>3.5mmols/L, Cr stable, oedema and above target weight  
Administer: 80 mg furosemide unless weight loss of > 2kgs per day in which case reduce to 40 mg once daily

#### Day 3

<table>
<thead>
<tr>
<th>Date:</th>
<th>Weight (kg):………..kg Na+:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target weight:………..kg K+:</td>
</tr>
<tr>
<td></td>
<td>BP: ………/…… kg Urea:</td>
</tr>
</tbody>
</table>

Signed:  
Check: SBP>85 mmHg, K+>3.5mmols/L, Cr stable, oedema and above target weight  
Administer:  
Weight down by 1-2 kgs: continue current dose  
Weight loss > 2kgs reduce to 40 mgs once daily  
At target: oral diuretics

#### Day 4

<table>
<thead>
<tr>
<th>Date:</th>
<th>Weight (kg):………..kg Na+:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target weight:………..kg K+:</td>
</tr>
<tr>
<td></td>
<td>BP: ………/…… kg Urea:</td>
</tr>
</tbody>
</table>

Signed:  
Check: SBP>85 mmHg, K+>3.5mmols/L, Cr stable, oedema and above target weight  
Administer:  
Weight down by 1-2 kgs: continue current dose  
No change in weight: increase furosemide by 40mgs/24 hours & discuss with Cardiologist  
At target: oral diuretics

Sharon Andrews 27.8.2013
Peripheral Intravenous Lines
All patients with intravenous lines must have the IV line site **checked when accessed or at least daily and recorded**, using the VIP Score. The site must also be observed:

- When giving bolus injections or short infusions.
- IV flow rates are checked or altered.
- When solution containers are changed.

**Remove Cannula when clinically indicated**

<table>
<thead>
<tr>
<th>Date &amp; Time of Insertion</th>
<th>Gauge/Type of IV Device</th>
<th>Position of Device</th>
<th>Device Inserted By</th>
<th>Signature</th>
<th>Date of Removal</th>
<th>Reason for Removal</th>
<th>Removed by</th>
</tr>
</thead>
</table>

IV giving sets change at 72 hours. TPN giving sets change at 24 hours. Blood and blood products giving sets change after 2 Units or on completion (twelve hours maximum).

Sharon Andrews 27.8.2013
Document all lines in situ (a, b, c, etc. as per overleaf).

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Dressing Intact</th>
<th>IV Giving Set Labelled i.e. date/time of commencement</th>
<th>VIP Score</th>
<th>Any Action Taken</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Documentation of the cannulation, recording of VIP score prior to each administration and removal of device.
All about Intravenous Diuretics and how you will receive treatment at home

What is a diuretic?
Diuretics are used to reduce the excess fluid that occurs when your heart is not pumping properly (heart failure). The fluid can build up in two places:
• Your lungs, which makes you breathless (pulmonary oedema)
• In the soft tissues, which makes your ankles, legs and sometimes genitals and abdomen swell, (peripheral oedema)
If you are weighing yourself the build up of fluid might mean that your weight will increase.
Diuretics make you pass more urine than usual to get rid of the extra fluid, and are sometimes known as “water tablets”. The most common diuretics are furosemide, bumetanide, metolazone and bendroflumethiazide.

How can diuretics be given?
The most common way to give diuretics is in tablet form. Sometimes, the tablets do not work well enough and fluid can build up. In some people this can be sudden, in others it happens gradually. When the tablets stop working, giving the medicine by injection using a ‘cannula’ can be more effective.

What is a cannula?
An intravenous cannula is a small plastic tube that is inserted into a blood vessel and allows the diuretic to be injected directly into the body. The diuretic is given either gradually over 24 hours, or by injection over a few minutes. Although having a cannula has great benefits, care must be taken to avoid infection in the surrounding area. Nurses will wash their hands and wear gloves when dealing with cannulas, but you can help avoid infection too by:
• Avoiding touching the cannula and its dressing
• Keeping clothing next to the cannula clean
• Taking a shower rather than a bath.

Cannulas sometimes get accidentally dislodged or fall out, both of which may cause some bleeding. Don’t worry if this happens, just place a tissue or dressing on to the area and apply pressure until the bleeding stops. Then phone the nurses on the number on this leaflet.
Bleeding usually stops within a few minutes (unless you are taking blood-thinning medications). If the bleeding continues, raise your arm and continue to press gently on the area. If you are unable to stop the bleeding, call the nurses on the number on this leaflet. If you have any pain or redness around the cannula please let the nurses know.
Sharon Andrews 27.8.2013
What are the advantages of Intravenous diuretics?
The main advantage is that you can choose to stay at home rather than being admitted to hospital. Intravenous diuretics have been shown to be very effective and can be given over a short period of time.

What are the side effects?
The most common problems are:

1) **Dizziness when standing** due to a drop in blood pressure (postural hypotension). If this happens to you, the dose of diuretic might need to be reduced. Because there is an increased risk of falling if your blood pressure is low, it is important that you have someone in the house to help you when the treatment is being given.

2) **Passing increased amounts of urine**. You will need to go to the toilet more frequently than usual and easy access to a toilet/ commode or urine bottle will be important. If you find it difficult to move around, it may be necessary to use a catheter (a tube into the bladder).

3) **Changes in the levels of chemicals (electrolytes) in your blood**. Sodium and potassium can become low, and so your doctor/nurse may want to do regular blood tests.

What if the treatment does not work?
The action taken will depend on your wishes and will be tailored to your individual needs. You may need to be admitted to hospital for more treatment, or it may be possible to alter some other medication. These and other options will be discussed with you when making your care plan.

Who provides the service?
Your cardiologist/physician or specialist heart failure nurse will create your individual care plan. The numbers to call if you have any problems during the treatment are as follows:

**Contact details:**

**MONDAY – FRIDAY DAYTIME**

Community Heart Failure Team – 0118 9525443

Out of hours: 0300 365 1234 (Health Hub)