Treatment of Iron Deficiency Anaemia in Adults: Oral and Intravenous Iron Therapy

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

<table>
<thead>
<tr>
<th>Version Number:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does this version include changes to clinical advice:</td>
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<td>Approval Group:</td>
<td>Medicines Utilisation Subcommittee of ADTC</td>
</tr>
</tbody>
</table>

Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.
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1 Scope of guideline
This guideline focuses on the diagnosis and treatment of iron deficiency anaemia (IDA) in adult patients (16 years and over) in acute and primary care settings. The treatment of IDA is covered to include the place of oral and intravenous (IV) iron replacement therapy. For the purpose of the guideline the following clinical situations are not covered:

- pregnancy,
- postpartum anaemia,
- surgery/trauma,
- paediatrics (<16 years),
- patients with chronic kidney disease (CKD) stages 4-5.

2 Definition of IDA
Total adult iron content is approximately 4g with 75% present as haemoglobin (Hb) within the red blood cells (RBCs). Iron deficiency will develop over time when the body’s iron demand is not met by iron absorption from the diet. This leads to depletion of body iron stores and the state of ‘latent iron deficiency’. This is seen in some 20% of young females and is characterised by a reduced serum ferritin (see section below) but with a normal Hb concentration. IDA occurs in the more severe stages of iron deficiency when the body is iron deficient to the degree that red blood cell and Hb production is reduced.

Key messages in the management of IDA

- Oral iron is the first line treatment of choice
  The clinical benefit of treatment should be considered

- Determine underlying cause
  Investigations to determine the underlying cause should be considered in parallel with treatment

- Intravenous iron should be reserved as a last resort
  For the vast majority of patients treatment with oral iron is appropriate
2.1 Diagnostic tests used to establish state of IDA
See section 3 for a diagnostic and treatment algorithm in the management of IDA.

Serum ferritin
Serum ferritin is the most useful test in confirming the diagnosis of IDA. A serum ferritin level <15micrograms/L is diagnostic of iron deficiency. There is no other cause of a reduced serum ferritin. In elderly patients iron deficiency may exist with values between 15-50micrograms/L.

The test can be difficult to interpret if infection or inflammation is also present. Serum ferritin shows an acute phase response, and levels of up to 100micrograms/L can be found even in the presence of iron deficiency. A level >100micrograms/L generally rules out iron deficiency even in the presence of inflammatory disease. If serum ferritin results are equivocal, practitioners should consider monitoring the Hb concentration in response to a trial of oral iron.

Transferrin saturation
Serum iron, transferrin levels and transferrin saturation (TSAT) have no role in the diagnosis of IDA. Their role should be limited to investigation of high serum ferritin values and iron overload.

Red cell indices
Modern automated full blood count (FBC) cell counters in haematology laboratories will identify the changes in red cells that classically accompany IDA. In IDA the Hb is reduced and the RBCs are small (microcytic) contain less Hb and are pale (hypochromic). Mean cell volume (MCV) and the mean corpuscular Hb (MCH) are reduced reflecting the RBC microcytosis and hypochromia. It must be noted however that not all patients with IDA will have hypochromic microcytic RBC indices. Red cell indices cannot be relied upon to diagnose IDA in the absence of a low serum ferritin.
3 Diagnostic and Treatment Algorithm for IDA

**Male: Hb <130g/L**

- Ferritin: >100 micrograms/L
  - Generally rules out IDA even in presence of inflammatory disease

- Ferritin: 15-50 micrograms/L
  - Intermediate result

- Ferritin: <15 micrograms/L
  - Absolute evidence of iron deficiency irrespective of age or inflammatory disease

**Women: Hb <115g/L**

- Ferritin: >100 micrograms/L
  - Likely IDA in elderly patients and those with inflammatory disease

- Ferritin: 15-50 micrograms/L
  - Intermediate result

- Ferritin: <15 micrograms/L
  - Generally rules out IDA even in presence of inflammatory disease

**IDA**
- Assess severity
- Determine cause
- Treat
- Assess response

**Assess severity**
- Hb <50g/L or severe symptoms consider hospital admission

**Determine and treat underlying cause**
- Assess for any source of bleeding.
- Refer for further investigations to appropriate speciality.
  - Refer to BSG IDA guideline (www.bsg.org.uk) for further information

**1st line treatment:** oral iron
  - See section 4.1

**Assess Response**
- Recheck Hb and ferritin levels monthly.
  - (Hb levels should rise by at least 20g/L over 4 weeks)

**Hb response**
- Continue treatment for 3 months after Hb optimised

- Recheck Hb and ferritin 3 months after stopping.
- Consider ongoing prophylactic dose (see BNF) in at risk patients*

**Poor Hb response**
- Assess any obvious cause(s)
- Recheck ferritin
  - Unchanged
  - Higher IDA unlikely and other diagnosis should be considered

**Unchanged**
- Assess compliance (see section 4.1)
- Unable to tolerate or not responding
  - Seek specialist advice regarding further assessment or investigation and consider need for IV iron (see section 4.2)

**2nd line treatment:** IV iron
  - See section 4.2.1 for inclusion criteria

**Assess response** (see section 4.2.9)

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*At risk patients:*
- Recurring anaemia and further investigations not indicated/appropriate
- Habitually consume an iron-poor diet
- Malabsorption
- Menorrhagia
- Gastrectomy
4 Treatment of IDA

Treatment with iron replacement therapy should be considered for patients with clinically relevant IDA in whom the clinical benefit of treatment outweighs any risks. Patients should preferably be treated with oral iron. IV iron therapy should only be considered as a last resort in the treatment of IDA in a hospital setting. IV iron therapy does not produce a faster Hb response than oral iron provided that the oral iron preparation is taken reliably and is absorbed adequately. IV iron therapy is therefore rarely indicated, may produce severe adverse effects, and should be reserved for patients who meet the inclusion criteria defined in section 4.2.1.

4.1 Oral iron therapy

Patients with established IDA should be given 100-200mg of elemental iron daily. Hb regeneration is little affected by the type of salt used provided sufficient iron is given, and in most patients the speed of response is not critical. Choice of preparation is thus usually decided by the incidence of side effects and cost. Patients should be advised on correct administration to optimise absorption, including avoiding other medications or antacids at the same time. Patients should be educated on their dietary iron intake, including details of iron rich foods and factors which may inhibit or promote iron absorption. This should be consolidated by the provision of an information leaflet (see example).

If there is an inadequate response to therapy (see section 3), patient compliance should be assessed. If the iron treatment is not tolerated adverse effects should be addressed by:

- reducing the dose frequency of the iron supplement,
- recommending the patient takes iron with or after meals,
- giving a different iron formulation/salt with a lower content of elemental iron (see table 1),
- offering reassurance to patients who have black stools,
- offering a laxative to patients with constipation.

### Table 1: Elemental iron content of oral iron preparations

The irritant adverse effects are usually related to the amount of elemental iron taken rather than the type of preparation. *Preparations containing 100mg of elemental iron can cause significant side effects and use should be discouraged.*

<table>
<thead>
<tr>
<th>Iron salt</th>
<th>Dosage form</th>
<th>Elemental iron content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tablet and capsule formulations</strong></td>
<td>Ferrous fumarate</td>
<td>210mg tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>322mg tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>305mg capsules (Galfer®)</td>
</tr>
<tr>
<td></td>
<td>Ferrous sulphate</td>
<td>200mg tablets (dried)</td>
</tr>
<tr>
<td></td>
<td>Ferrous gluconate</td>
<td>300mg tablets</td>
</tr>
<tr>
<td><strong>Liquid formulations</strong></td>
<td>Ferrous fumarate</td>
<td>140mg/5ml oral solution</td>
</tr>
<tr>
<td></td>
<td>Ferrous sulphate</td>
<td>125mg/ml oral drops (Ironorm®)</td>
</tr>
<tr>
<td></td>
<td>Sodium feredetate</td>
<td>190mg/5ml oral solution (Sytron®)</td>
</tr>
</tbody>
</table>

**Note:** refer to the NHS GGC formulary at www.ggcmedicines.org.uk for preferred list choices
4.2 Intravenous iron therapy

4.2.1 Inclusion criteria

IV iron therapy is considered for the treatment of IDA in adults in the following situations:

- Genuine intolerance to oral iron preparations. Iron preparations with a low content of elemental iron must be tried (with food) before acceptance of genuine intolerance to oral iron (see section 4.1).
- Severe IDA and concern regarding the patient’s ability to comply with oral iron treatment.
- Patients with clinically active inflammatory bowel disease (IBD), with previous intolerance to oral iron, with haemoglobin below 10g/dL, and in patients who need erythropoiesis-stimulating agents.1
- Patients with heart failure (HF) with reduced ejection fraction, New York Heart Association (NYHA) class III with an left ventricular ejection fraction (LVEF) ≤45%, or NYHA class II, LVEF ≤40%, who have a Hb level of 95 to 135g/L and iron deficiency (defined as ferritin <100 micrograms/L or ferritin <300micrograms/L if TSAT<20%.2

IV iron therapy should be initiated by a consultant, specialist trainee or equivalent. Some services may delegate responsibility to nominated non medical prescribers (NMPs). IV iron should not be administered out of hours or when adequate supervision is unavailable.

4.2.2 Exclusion criteria

The following information lists the contraindications and cautions to Ferinject® (ferric carboxymaltose) and Monofer® (iron isomaltoside 1000) therapy:

Contraindications
- Hypersensitivity to the active substance, the product itself or any excipients in the product
- Known serious hypersensitivity to other parenteral iron products
- Non-iron deficiency anaemia
- Iron overload or disturbance in utilisation of iron
- Decompensated liver disease (Monofer® only).

Cautions
- Hypersensitivity reactions (see section 4.2.6.1)
- Hepatic dysfunction
- Acute or chronic infection
- Extravasation (see section 4.2.6.2)
- Sodium-controlled diet (Ferinject® only)
- Hypophosphataemia (Ferinject® only).

See individual Summaries of Product Characteristics (SPCs) for detailed information (available via www.medicines.org.uk).

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1 Dignass AU et al., the European Crohn’s and Colitis Organisation [ECCO], European Consensus on the Diagnosis and Management of Iron Deficiency and Anaemia in Inflammatory Bowel Diseases, Journal of Crohn’s and Colitis, 9 (3), March 2015, 211-222

4.2.3 Choice of product
Ferinject® (ferric carboxymaltose) and Monofer® (iron isomaltoside 1000) are both included on the GGC formulary for the treatment of IDA. Their use is restricted to specialist initiation when oral iron preparations are ineffective or cannot be used. Use is restricted to administration by intravenous infusion. Administration as a bolus injection remains non-formulary.

The following treatment decision tool can be used to help guide the product selection.

4.2.4 How to prescribe and administer IV iron
For further information on how to prescribe and administer the IV iron preparations as infusions:
- Ferinject® (ferric carboxymaltose) refer to appendix 1
- Monofer® (iron isomaltoside 1000) refer to appendix 2

A checklist for prescribing and administration is included in appendix 3.

4.2.5 Interaction with oral iron preparations
Combined treatment with oral and IV iron may lead to the appearance of highly toxic non transferrin bound iron. Oral iron therapy should generally not be required following IV iron replacement.

- It is recommended that oral iron preparations are discontinued at least 48 hours prior to IV iron infusions.
- The need for oral iron therapy should be reviewed following IV iron replacement. If deemed necessary, oral iron should not be started for at least 5 days after the last IV iron infusion.
4.2.6 Monitoring during infusion
4.2.6.1 Hypersensitivity reactions

IV administered iron preparations can cause hypersensitivity reactions including serious and potentially fatal anaphylactic/anaphylactoid reactions. Hypersensitivity reactions have also been reported after previously uneventful doses of parenteral iron complexes. Caution is therefore needed with every dose of IV iron that is given, even if previous administrations have been well tolerated.

An IV iron product should not be used in patients with known hypersensitivity to: the active substance, the product itself, or any excipients in the product. They should not be used in patients with known serious hypersensitivity to any other parenteral iron products.

The risk of hypersensitivity is enhanced in patients with: known allergies (including drug allergies), history of severe asthma, eczema or other atopic allergy, immune or inflammatory conditions (e.g. systemic lupus erythematosus, rheumatoid arthritis).

Patients should be closely monitored for signs of hypersensitivity reactions during and for at least 30 minutes after every administration. Reactions usually occur within the first few minutes of administration and are characterised by sudden onset respiratory failure and/or cardiovascular collapse. National Early Warning Scores (NEWS) should be monitored pre-infusion, 15 minutes after starting the infusion and at 30 minutes following completion of the infusion. Additional observations are at the discretion of each clinical area, but are essential if the patient is unstable or appears to be experiencing an adverse reaction. If hypersensitivity reactions or signs of intolerance occur, the treatment must be stopped immediately.

IV iron should be administered in areas where the patient can be readily observed by clinical staff and during day time hours. Facilities for cardio-pulmonary resuscitation must be available and staff must be trained to manage anaphylactic reactions. Further information on management on anaphylaxis is available here.
4.2.6.2 Extravasation monitoring

Caution should be exercised to avoid paravenous leakage when administering IV iron. Paravenous leakage at the infusion site may lead to irritation of the skin and potentially long lasting brown discolouration at the site of infusion. It should be suspected if one or more of the following is observed:

- The infusion is not flowing freely or has stopped.
- Swelling, discomfort, burning or pain occurs at the infusion site.

There is no published evidence to suggest that extravasation correlates with the use of positive pressure devices. It is widely thought that gravity devices minimise the risk of extravasation. Yet it is difficult to find the evidence in the literature to support this view and recent studies suggest there is no such link. The most effective safeguard against extravasation is to visually inspect the infusion site regularly. Patients should be informed about the possibility of discolouration and advised to report any signs of irritation or pain at the infusion site.

Extravasation reactions

Data supporting the management of extravasation reactions for non-cytotoxic agents are limited, and management is often extrapolated from other drugs with variable results. The guidance below is extrapolated from the West of Scotland Cancer Network guideline for the management of extravasation reactions with systemic anti-cancer therapy. For further information please refer to the guideline available here.

In case of suspected paravenous leakage, treatment requires prompt attention:

- Stop the infusion immediately and disconnect the drip, do not remove the cannula.
- Inform medical staff immediately.
- Aspirate the extravasated drug by connecting a clean syringe to the cannula and drawing back.
- Mark the extravasation area with a pen and remove the cannula.
- Elevate the limb (if possible).
- Cool the area for 24-48 hours and closely monitor the skin and underlying tissues for changes.
- Consider referral to plastic surgery team.
- Clearly document the management plan in the patient’s medical records.
- Complete a clinical incident form.

4.2.7 Adverse effects

Refer to individual product SPCs for full details. All IV iron products are black triangle drugs ▼. All suspected reactions (including those considered not to be serious) should be reported. An electronic form is available at https://yellowcard.mhra.gov.uk/ or alternatively, yellow cards are available in the inside cover of the BNF.

4.2.8 Communication of treatment with primary care

Treatment with IV iron should be clearly communicated with the patient’s GP. This could be via a discharge letter or outpatient clinic letter. It should include details of the treatment received and clearly state arrangements in place for follow up blood monitoring.
4.2.9 Monitoring response to treatment
It is good practice to recheck Hb and ferritin levels to assess response to IV iron treatment. These should be assessed no earlier than 4 weeks following treatment. Hb levels should rise by at least 20g/L over 4 weeks. It is the responsibility of the initiating prescriber to ensure arrangements are in place for follow up blood monitoring. This may be arranged via an outpatient clinic or asking the GP to complete. If to be carried out by the GP this must be clearly communicated. The patient should also be made aware of follow up plans.
Appendix 1 Prescribing & Administration Information for Ferinject® (ferric carboxymaltose)

**STEP 1 Calculate dose for intravenous infusion**

The dose of IV iron must be individually calculated based on a calculation of the patient's total iron deficit.

| Ferinject® (ferric carboxymaltose) doses for range of Haemoglobin (Hb) and body weight |
|----------------------------------|------------------|------------------|------------------|
| Weight                           | Hb < 100g/L      | Hb ≥ 100g/L and < 130g/L |
| 25-34 kg                         | Week 1 500mg     | Week 1 500mg     |
| 35-37 kg                         | Week 1 500mg     | Week 1 500mg     |
|                                 | Week 2 500mg     | Week 2 500mg     |
|                                 | Week 3 500mg     |                  |
| 38-49 kg                         | Week 1 750mg     | Week 1 500mg     |
|                                 | Week 2 750mg     | Week 2 500mg     |
| 50-69 kg                         | Week 1 1,000mg   | Week 1 1,000mg   |
|                                 | Week 2 500mg     |                  |
| ≥70 kg                           | Week 1 1,000mg   | Week 1 1,000mg   |
|                                 | Week 2 500mg     |                  |

**STEP 2 Prescribe on ONCE ONLY section of kardex**

The following is an example for a patient who weighs between 35-37kg and has an Hb <100g/L.

<table>
<thead>
<tr>
<th>DATE</th>
<th>DRUG</th>
<th>DOSE</th>
<th>ROUTE</th>
<th>TIME (24hr)</th>
<th>PRESCRIBER (PRINT &amp; SIGN)</th>
<th>GIVEN BY</th>
<th>TIME GIVEN (24hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Ferinject® (ferric carboxymaltose)</td>
<td>500mg</td>
<td>IV</td>
<td>09:00</td>
<td>A. Prescriber</td>
<td>A. Nurse</td>
<td>09:00</td>
</tr>
<tr>
<td>Week 2</td>
<td>Ferinject® (ferric carboxymaltose)</td>
<td>500mg</td>
<td>IV</td>
<td>09:00</td>
<td>A. Prescriber</td>
<td>A. Nurse</td>
<td>09:00</td>
</tr>
<tr>
<td>Week 3</td>
<td>Ferinject® (ferric carboxymaltose)</td>
<td>500mg</td>
<td>IV</td>
<td>09:00</td>
<td>A. Prescriber</td>
<td>A. Nurse</td>
<td>09:00</td>
</tr>
</tbody>
</table>

**STEP 3 Prescribe on infusion chart**

The table below provides information on the preparation of Ferinject® (ferric carboxymaltose) for a range of doses. This information should be transcribed onto an infusion chart for administration.

<table>
<thead>
<tr>
<th>Ferinject® (ferric carboxymaltose)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dose</strong></td>
</tr>
<tr>
<td>500mg</td>
</tr>
<tr>
<td>750mg</td>
</tr>
<tr>
<td>1,000mg</td>
</tr>
<tr>
<td>1,500mg</td>
</tr>
<tr>
<td>2,000mg</td>
</tr>
<tr>
<td><strong>Dose (volume) of 50mg/ml vial</strong></td>
</tr>
<tr>
<td>500mg (10ml)</td>
</tr>
<tr>
<td>750mg (15ml)</td>
</tr>
<tr>
<td>1,000mg (20ml)</td>
</tr>
<tr>
<td><strong>Infusion fluid</strong></td>
</tr>
<tr>
<td>100ml sodium chloride 0.9%*</td>
</tr>
<tr>
<td><strong>Drug concentration</strong></td>
</tr>
<tr>
<td>5mg/ml</td>
</tr>
<tr>
<td>7.5mg/ml</td>
</tr>
<tr>
<td>10mg/ml</td>
</tr>
<tr>
<td><strong>Infusion rate</strong></td>
</tr>
<tr>
<td>400ml/hour over 15 minutes</td>
</tr>
<tr>
<td>Fluid restricted patients: 200ml/hour over 30 minutes</td>
</tr>
</tbody>
</table>

Dose must be split. Maximum weekly dose = 1,000mg of iron or 20mg iron/kg body weight

*Remove the required dose volume (e.g. 10ml for a 500mg dose) from the bag prior to adding Ferinject®
**Appendix 2 Prescribing & Administration Information for Monofer® (iron isomaltoside 1000)**

**STEP 1 Calculate dose for intravenous infusion**

The dose of IV iron must be individually calculated based on a calculation of the patients total iron deficit.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dose (volume) of 100mg/ml vial</th>
<th>Infusion fluid</th>
<th>Drug concentration</th>
<th>Infusion rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-49kg</td>
<td>500mg</td>
<td>100ml sodium chloride 0.9%*</td>
<td>5mg/ml</td>
<td>200 ml/hour over 30 minutes</td>
</tr>
<tr>
<td>50-69kg</td>
<td>1,000mg</td>
<td>100ml sodium chloride 0.9%*</td>
<td>10mg/ml</td>
<td>200 ml/hour over 30 minutes</td>
</tr>
<tr>
<td>70-74kg</td>
<td>1,500mg</td>
<td>100ml sodium chloride 0.9%*</td>
<td>15mg/ml</td>
<td>200 ml/hour over 30 minutes</td>
</tr>
<tr>
<td>75-99kg</td>
<td>2,000mg</td>
<td>100ml sodium chloride 0.9%*</td>
<td>20mg/ml</td>
<td>200 ml/hour over 30 minutes</td>
</tr>
<tr>
<td>≥100kg</td>
<td>2,000mg</td>
<td>100ml sodium chloride 0.9%*</td>
<td>20mg/ml</td>
<td>200 ml/hour over 30 minutes</td>
</tr>
</tbody>
</table>

**STEP 2 Prescribe on ONCE ONLY section of kardex**

The following is an example for a patient who weighs between 50-69kg and has a Hb <100g/L.

<table>
<thead>
<tr>
<th>DATE</th>
<th>DRUG</th>
<th>DOSE</th>
<th>ROUTE</th>
<th>TIME (24hr)</th>
<th>PRESCRIBER (PRINT &amp; SIGN)</th>
<th>GIVEN BY</th>
<th>TIME GIVEN (24hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Monofer® (iron isomaltoside 1000)</td>
<td>1,000mg</td>
<td>IV</td>
<td>09:00</td>
<td>A. Prescriber</td>
<td>A. Nurse</td>
<td>09:00</td>
</tr>
<tr>
<td>Week 2</td>
<td>Monofer® (iron isomaltoside 1000)</td>
<td>500mg</td>
<td>IV</td>
<td>09:00</td>
<td>A. Prescriber</td>
<td>A. Nurse</td>
<td>09:00</td>
</tr>
</tbody>
</table>

**STEP 3 Prescribe on infusion chart**

The table below provides information on the preparation of Monofer® (iron isomaltoside 1000) for a range of doses. This information should be transcribed onto an infusion chart for administration.

<table>
<thead>
<tr>
<th>Dose</th>
<th>Maximum weekly dose = 20mg iron/kg body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>500mg</td>
<td>1,000mg</td>
</tr>
<tr>
<td>1,000mg</td>
<td>1,500mg</td>
</tr>
<tr>
<td>1,500mg</td>
<td>2,000mg</td>
</tr>
<tr>
<td>2,000mg</td>
<td></td>
</tr>
</tbody>
</table>

*Remove the required dose volume (e.g. 5ml for a 500mg dose) from the bag prior to adding Monofer®*
## Checklist for Prescribing & Administration of Ferinject® (ferric carboxymaltose) and Monofer® (iron isomaltoside 1000) infusions

### Pre-infusion

<table>
<thead>
<tr>
<th>Action</th>
<th>Initial when complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>(refer to following section of guideline for further information)</td>
<td></td>
</tr>
</tbody>
</table>

- **Prescriber**
  - Check meets inclusion criteria ([section 4.2.1](#)) and no contraindications to therapy ([section 4.2.2](#)).
  - Stop oral iron treatment at least 48 hours prior to infusion (inform patient/carer and/or discontinue on inpatient kardex) ([section 4.2.5](#)).
  - Ensure patient/carer receives adequate information regarding treatment and discuss risks and benefits. Information leaflet can be used to support this ([appendix 4](#)).
  - Calculate dose and determine number of infusions required. Prescribe on infusion chart and kardex (Ferinject® ([appendix 1](#)) or Monofer® ([appendix 2](#))).

- **Nursing staff**
  - Check patient/carer read information leaflet, answer any questions and confirm happy to proceed with treatment.
  - Confirm that adequate supervision and full facilities for cardio-pulmonary resuscitation available ([section 4.2.6.1](#)). **NOT for out of hours administration.**
  - Ensure the following injectable medications are available: adrenaline (1 in 1,000), hydrocortisone and chlorphenamine injections.
  - Peripheral Vascular Cannula (PVC) check (as per PVC care plan).
  - Flush the PVC with a minimum of 5ml of 0.9% sodium chloride (using a 10ml syringe). Administer using a push pause technique.
  - Record baseline observations (National Early Warning Scores (NEWS)).
  - Advise patient/carer where possible, to notify staff immediately if they feel unwell or experience any pain/discomfort at the cannula site.

### During infusion

<table>
<thead>
<tr>
<th>Nursing staff</th>
<th>+ 15 mins</th>
<th>+ 30 mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC check (as per PVC care plan).</td>
<td>Observations (NEWS).</td>
<td>PVC check (as per PVC care plan).</td>
</tr>
</tbody>
</table>

### Post-infusion

<table>
<thead>
<tr>
<th>Nursing staff</th>
<th>30 mins post infusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC check (as per PVC care plan).</td>
<td>Flush the PVC with a minimum of 5ml of 0.9% sodium chloride (using a 10ml syringe). Administer using a push pause technique.</td>
</tr>
<tr>
<td></td>
<td>Observations (NEWS).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prescriber</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrange appointment for subsequent infusion(s) (if required).</td>
<td></td>
</tr>
<tr>
<td>Ensure follow up plan in place to recheck Hb and ferritin after 1 month (<a href="#">section 4.2.9</a>).</td>
<td></td>
</tr>
<tr>
<td>Inform primary care of administration (<a href="#">section 4.2.8</a>).</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4 Patient relative information leaflet for Ferinject® (ferric carboxymaltose) and Monofer® (iron isomaltoside 1000) infusions

See generic example on next page
Iron Infusions

Patient / relative information leaflet

Please read this leaflet carefully and discuss any questions you may have with your doctor or nurse.

Why am I being treated with this medicine?
Your blood test results show that the amount of iron you have in your blood is low. The most common way to treat this is to take iron by mouth as a tablet or liquid. This works well for most people and is usually tried first. However, some people may need iron to be given straight into the body through a vein. This is called an iron infusion. It might be needed if you:

- are not able to take iron tablets or liquid
- are not responding to iron tablets or liquid or not absorbing them
- if you have chronic heart failure.

Why is iron important?
Iron is an essential nutrient that your body needs to make red blood cells, which carry oxygen around your body. If you do not have enough iron, you can become anaemic. This can cause tiredness, low energy levels, low mood, feeling faint and breathlessness.

Do I still need to take iron tablets/liquid?
If you are taking iron tablets or liquid these should be stopped before you receive the infusion. They are usually not needed after the treatment.

What does the infusion involve?
The treatment takes place in a hospital. A thin plastic tube called a cannula is placed in your vein and attached to an infusion that slowly delivers a liquid solution containing iron into the body.

Will I feel any pain?
You may feel a slight sting when the cannula is inserted to give the infusion. You should feel no pain during the iron infusion. If you do feel any pain, you should let nursing staff know immediately.

How long will it take?
It can take up to 60 minutes to complete the infusion. You will be monitored by nursing staff closely before, during and for 30 minutes following the infusion.

How often will I need an infusion?
Sometimes two iron infusions (given at least one week apart) are needed to fully top up your iron stores.
What are the most likely side effects?
Generally when side effects do occur, they are mild and settle down on their own. The most common side effects are temporary and include:

- headache, feeling sick or vomiting, muscle or joint pain
- changes in taste (e.g. metallic)
- changes to blood pressure or pulse.

What are the risks?
Rarely, you may experience a serious allergic reaction. If this happens you may experience some or all of the following symptoms:

- feeling dizzy
- fast pulse
- feeling light headed or faint due to a low blood pressure
- swelling in your face, lips, tongue, throat or body
- difficulty in breathing
- chest pain
- itchy skin, a rash or skin redness.

Skin staining (brown discolouration) may occur due to leakage of iron into the tissues around the cannula site. This is not common but the stain can be long-lasting or permanent.

You should tell your Doctor or nurse immediately if you:
- Feel unwell before, during or after the treatment.
- Experience any discomfort, burning, redness or swelling at the cannula site.

What happens after the infusion?
Unless you have an unexpected reaction, you will be able to drive home and do your normal activities. Before leaving ensure that you have:

- The number to contact if you have any worries or questions
- The dates for any follow up tests and / or appointments.

Sometimes side effects can start one to two days after the infusion. These will generally settle down without treatment over the next few days. If you are worried, or the side effects are interfering with your daily activities, please contact your GP for advice. If you have chest pain, difficulty breathing, dizziness or neck or mouth swelling CALL AN AMBULANCE (999).

Who can I talk to if I have any questions?
If you have any questions regarding the information in this leaflet, or your treatment with an iron infusion, please discuss these with your doctor or nurse.
If you require this information in an accessible format, such as large print or braille or in a community language, please use the contact details on your patient information leaflet or letter.

إذا كنت تحتاجون إلى هذه المعلومات في تنسيق يسهل الإطلاع عليه، كأن تطبع بأحرف كبيرة أو تكتب بطريقة بريل أو تترجم إلى إحدى اللغات المحلية، يرجى استخدام بيانات الاتصال المذكورة في نشرة المعلومات المريض أو الخطاب المرسل لكم.

如果您需要便于使用的信息版本，例如大号字体版本或盲文版或社区语言版本，请使用您的患者信息单或信函上的联系信息索取相应版本。

Aby uzyskać te informacje w przystępnym formacie, np. w druku powiększonym, alfabetie Braille’a lub w języku wspólnoty, prosimy o kontakt pod adresem podanym w liście lub na ulotce informacyjnej dla pacjenta.

Dacă aveți nevoie de aceste informații într-un format accesibil, cum ar fi caracterul mare, scrie braille sau într-o limbă comună, vă rugăm să utilizați datele de contact din scrisoarea sau prospectul informativ pentru pacient.

اگر آپ کو یہ معلومات کسی قابل رسائی فارمیٹ، جیسے بڑی حروف یا بریل یا کسی کمپیوٹر زبان میں دکتر بے تو براہ کرم آپ اب اپنے مريض سے متعلق معلومات پرچے یا خط پر دی گئی رابطے یا تفصیلات استعمال کریں.
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