MIL
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NHS Trust

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This Medicines Information Leaflet is produced locally to encourage prescribing which is cost effective to the NHS. Information will be given on quality improvement issues and the costs to hospital and community.

Intravenous Iron Replacement

See Flowchart: Management of Iron Deficiency in Adults (overleaf) to determine whether IV iron replacement is appropriate

Intravenous iron replacement is indicated for the treatment of iron-deficiency anaemia when oral iron preparations are ineffective or cannot be used, when there is continuing blood loss, or in malabsorption.[1,2,3] IV iron should be considered as an alternative to blood transfusion unless the symptoms of anaemia are severe or life-threatening.

Iron deficiency is associated with many symptoms and adverse consequences and may impair a range of bodily functions such as muscle function, neurotransmitter activity, exercise tolerance, epithelial changes, and alteration in gastrointestinal functions.

Signs & symptoms of iron deficiency which may indicate the need for IV iron include:

- Fatigue and/or shortness of breath;
- Serum ferritin less than 30micrograms/ml;
- Haemoglobin (Hb) less than the target for the patient (see relevant section for the patient)

Patients at risk of iron-deficiency anaemia include pregnant women, children, surgical patients (particularly GI surgery), medical patients, haematology patients and the elderly. Other patients who may benefit include those who refuse red cell transfusions (such as Jehovah's Witnesses).

IV iron is not licensed for use in children below 14 years of age so seek specialist advice for paediatric patients.[1,2,3]

Different patient populations have specific clinical requirements and targets for haemoglobin:

Haemoglobin (Hb) definition for anaemia (WHO)

- Hb less than 13g/dL (adult men),
- Hb less than 12g/dL (non-pregnant women)

Ferritin measures are a way of directly assessing iron stores (but may be difficult to interpret in the elderly and those with inflammation).

Intravenous iron replacement is **not appropriate** for patients who are:

- asymptomatic (with the exception of pre-op anaemia management);
- have an Hb above 10.5g/dL; or
- able to take oral iron preparations or via a nasogastric tube (tablets or liquid). If patients are unable to tolerate oral iron try reducing the frequency of doses, using a different preparation and advise they take the iron with food, BEFORE you consider prescribing IV iron.

During and after pregnancy iron deficiency may cause problems including additional lethargy, lactation failure and postpartum depression. It may also have implications for neonatal iron stores. Intravenous iron is contra-indicated in the first trimester of pregnancy.[2,3] Target haemoglobin:

- Hb more than 11g/dL (pregnancy) and
- Hb more than 10g/dL (post-partum)

Gastroenterology and Renal patients routinely require iron replacement and these clinical specialties have specific guidance in place.

Elderly patients may require a lower target haemoglobin and often have co-morbidities which complicate the clinical picture. Consider particularly for patients with iron deficiency anaemia when:

- chronic blood loss (instead of transfusion);
- unable to tolerate oral iron;
- oral iron not effective due to malabsorption;
- reduced oral absorption eg. achlorhydria;
- cognitive impairment with unsupervised medication

Patients with swallowing difficulty should receive the liquid iron preparation orally.

Monitoring

Blood pressure – during and after administration
Injection site – monitor for signs of irritation
Haemaglobin – 4-6 weeks after the last dose
Ferritin – at least 7 days after the last dose

Prescribing IV iron

Brand names should be used when prescribing IV iron and the prescription must always be written in full on the infusion side of the prescription chart.

The prescription should be clear in terms of the preparation of the infusion, and rate of administration (see Administering IV iron).

For inpatients, **Venofer® (iron sucrose)** is the first-line IV iron preparation. It is administered in single doses of 200mg up to three times per week so requires dosing over the course of at least three days[6] (see Venofer monograph on the Pharmacy intranet Injectables site for details.).

Ferinject® (ferric carboxymaltose) may be used for outpatients, those attending for pre-assessment or day-case treatment, and for inpatients likely to be discharged within the next 72 hours.
A single dose of 1g can be administered by IV infusion over 15 minutes. If further doses are required they should be given at least a week later. (See Ferinject monograph on the Pharmacy intranet Injectables site for details.)

Contra-indications

IV iron must not be used in patients with:

- Hypersensitivity to the product
- Anaemia not due to iron deficiency

Venofer® is also contra-indicated and Ferinject® is cautioned in patients with a history of **asthma, eczema** or other atopic **allergy**, because they are more at risk of allergic reactions.

Caution and a risk/benefit evaluation of the patient is advised when using IV iron in patients with:

- Liver dysfunction
- Acute or chronic infection

It is recommended by the manufacturer that intravenous iron is stopped in patients with ongoing bacteraemia. Patients with chronic infection may have suppressed erythropoiesis.

Side effects of IV iron

Hypotension may occur if the injection is administered too rapidly - monitor blood pressure.
Other side effects include: fever, shivering, headache, dizziness, flushing, rash, taste disturbance, nausea, vomiting, abdominal pain, diarrhoea, constipation, and muscle pain.
Any side effects, however minor, should be reported to the doctor. The patient should be advised to contact their GP if they experience any side effects at home after the infusion.

Extravasation may cause tissue damage because iron has a high pH (10-11) therefore leakage at the injection site may lead to pain, inflammation, tissue necrosis and brown discoloration of the skin.

RISK OF ANAPHYLAXIS
Intravenous iron preparations can cause severe allergic, anaphylactic or hypersensitivity reactions. Facilities for cardio-pulmonary resuscitation must be available and the patient MUST be **observed** during and for AT LEAST **30 minutes** after administration by a nurse or doctor for any adverse effects.[5]

Caution is needed with **every dose** of intravenous iron that is given, even if previous administrations have been well tolerated.[5]

Oral iron replacement, if appropriate, should be started at least 5 days after the last dose of intravenous iron.[2]

Administering IV iron

Intravenous iron must be administered by a suitably trained doctor, nurse or midwife. Ensure a doctor is readily available until 30 minutes after the infusion. Please prescribe, request, supply and administer as early as possible. There is usually no need to request or supply overnighy (i.e. between 10pm and 8am)
See the relevant monograph on the Pharmacy intranet Injectables site for details.

Venofer® (iron sucrose)

Venofer® (iron sucrose) 200mg in 200ml sodium chloride 0.9% administered by IV infusion (preferred method) over at least 30 minutes via an infusion pump.

For a 200mg dose remove 60ml from a 250ml bag of sodium chloride 0.9% then add 200mg (10ml) Venofer® (= 200mg in 200ml).

Do not dilute to less than 1mg per 1ml as the solution is not stable.

Venofer® may also be administered as an IV bolus injection (preferably via a central line).[4]

Ferinject® (ferric carboxymaltose)

Ferinject® (ferric carboxymaltose) 1g to be administered by IV infusion over at least 15 minutes in 100ml to 250ml sodium chloride 0.9%.

A maximum quantity of ONE DOSE will be supplied by Pharmacy at any one time to avoid inadvertent administration of the whole course.

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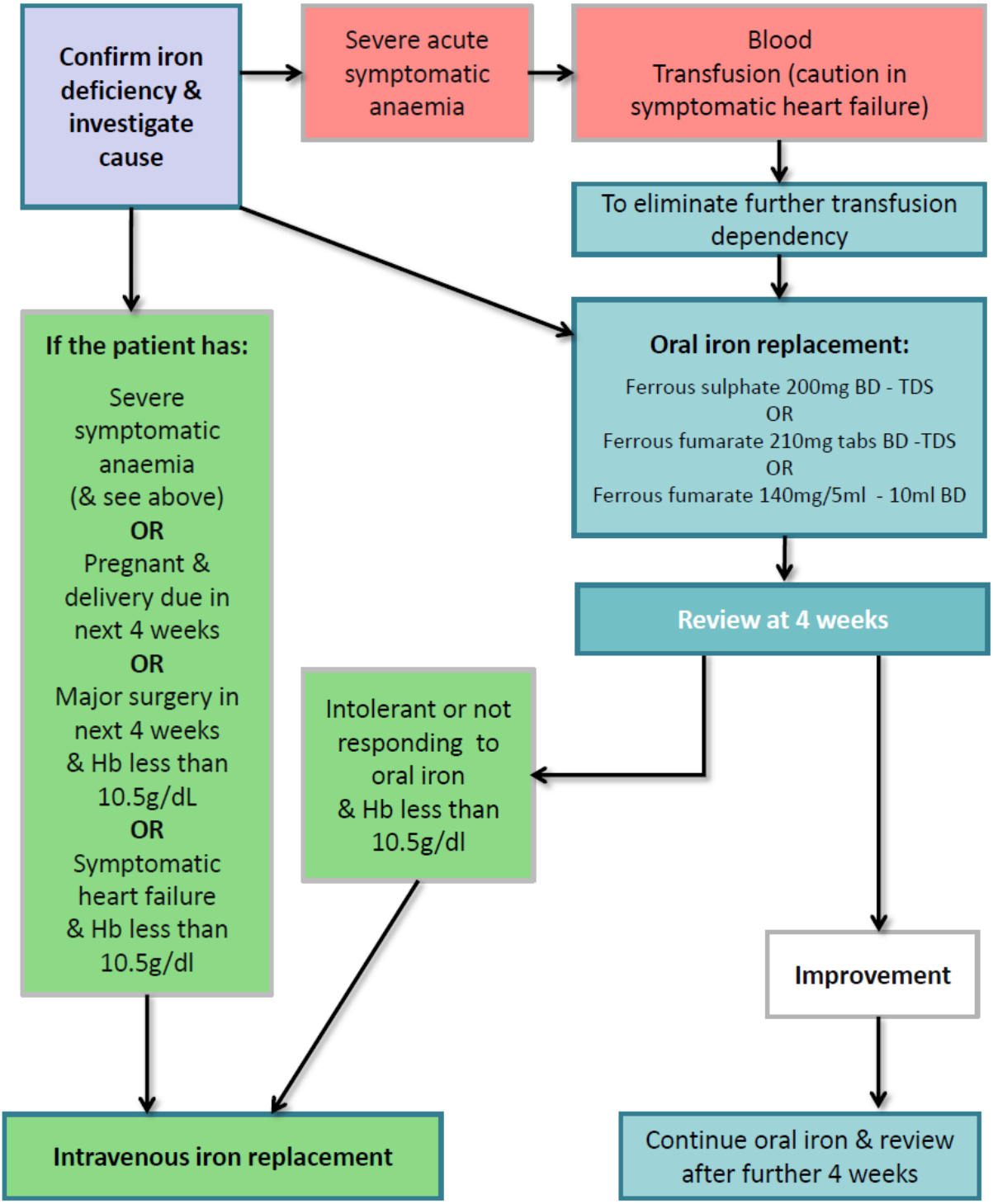
Management of iron deficiency in adults



In-patients: Venofer® 200mg x3 per week
Out-patients: Ferinject® 1g single dose

These guidelines do not apply to renal patients who should be treated according to local guidelines

References:
1. British National Formulary (BNF) 66 (Sept 2013)
2. Summary of Product Characteristics (SPC) for Iron Sucrose solution (Venofer®) Vifor Pharma UK Ltd. Last updated 13/11/2013. Accessed via www.medicines.org.uk March 2014
3. Summary of Product Characteristics (SPC) for Ferric carboxymaltose (Ferinject®) Vifor Pharma UK Ltd. Last updated 23/10/2013. Accessed via www.medicines.org.uk
4.Injectable Medicines Guide via www.injguide.nhs.uk Feb 2011
5. MHRA Drug Safety Update:Intravenous iron and serious hypersensitivity reactions: new strengthened recommendations to manage and minimise risk. August 2013
6. Personal communication – Habib Ahmed · Senior Medical Information Officer, Vifor Pharma UK Ltd.