Gloucestershire Hospitals
NHS Foundation Trust

Pre-Operative Anaemia Management (POAM)

Introduction:

Pre-operative anaemia is present in approximately 30% of patients undergoing non-cardiac surgery[1, 2]. The presence of pre-operative anaemia is the strongest predictor of peri-operative blood transfusion and is an independent risk factor for post-operative morbidity and mortality. Even mild anaemia increases the risk of poor outcomes after surgery. Anaemia also results in an increased length of hospital stay and has an adverse effect on both functional recovery and post-op quality of life. According to the NICE Quality Statement (QS138), iron should be offered before and after surgery to people with iron deficiency anaemia who are having surgery.

Anaemia is defined by the WHO as Hb <130g/L in males and <120g/L in females, however as there is no difference in perioperative blood loss between genders we should screen for an Hb <130g/L in both men and women. Anaemia is easy to detect and should be treated prior to surgery[4]. The Trust MBOS (maximum blood ordering schedule) determines those patients who require a group and save (G&S) pre-operatively which should ideally be done at least four weeks before surgery. These patients are considered at greater risk of perioperative blood loss. When taking their G&S the patient's blood should be screened using the point of care testing kit (hemocue®) to detect anaemia. If they are anaemic (Hb <130g/L), haematinics and T-sats will be added to the blood request form and oral iron treatment started immediately.

The results of the haematinics will determine the cause of anaemia and its treatment.
Before starting any treatment patients will be given information about the above risks of anaemia before surgery and the benefits of its treatment.

The decision to postpone surgery should be made on an individual patient basis taking in to account their comorbidities and risk of blood loss. An Hb >130g/L should not be used as a threshold for proceeding to surgery but a target for preoperative optimisation. IV iron stores remain present for 6-8 weeks after administration so the benefits for erythropoiesis will continue into the postop period. This will improve functional status post-op, hopefully improving recovery and ability to tolerate any ongoing treatment (e.g. chemotherapy).

Iron deficiency anaemia:

- Defined as anaemia with a ferritin <30 mcg/L.
- **Hb<110g/L in men and Hb<100g/L in women with an iron deficient picture and no obvious cause require direct referral to colorectal IDA 2ww clinic: ghn-tr.twoweekwaits@nhs.net** (The patient's GP should be informed).
- Patients with iron deficiency anaemia should be managed with iron therapy.
- Oral iron therapy can take at least four weeks to replenish iron stores, so should be started immediately. If oral iron is not tolerated, IV iron should be prescribed.
- If surgery is within 4 weeks and cannot be delayed IV iron should be prescribed.

Anaemia of Chronic disease (ACD):

- Patients with chronic inflammatory conditions often have a functional iron deficiency.
- If ferritin is between 30-100 mcg/L and Transferrin sats (Tsats) are <20% in the presence of anaemia functional iron deficiency is likely.
- Due to the inflammatory process, patients with functional iron deficiency are unable to absorb and transport oral iron effectively and should be managed with intra-venous iron therapy. A CRP >5 implies an inflammatory cause for iron deficiency.

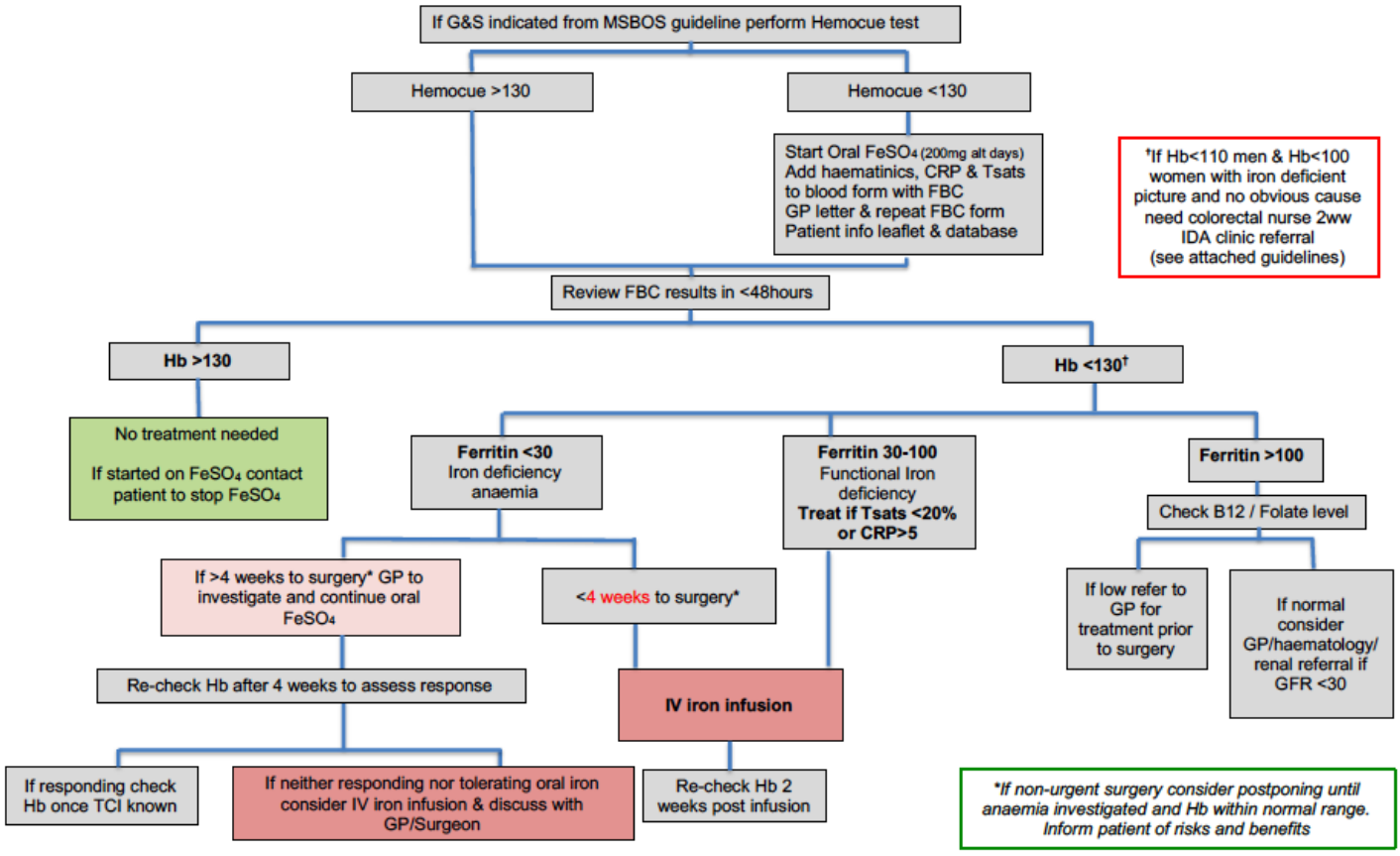
Vitamin B12 and folate deficiency:

- Patients with B12 and/or folate deficiency should be referred to their GP for prescription of appropriate replacement therapy. Ferritin will be >100mcg/l.

Other causes of anaemia:

- Consider renal referral in patients who have a ferritin >100mcg/l in presence of anaemia and eGFR<30
- Consider haematology referral in patients who have a ferritin >100mcg/l in presence of anaemia and normal B12/folate.

Pathway for optimisation of pre-operative anaemia:



Iron replacement therapy

Oral iron (Ferrous sulphate)

Ferrous sulphate is an oral preparation of iron used to replace deficient iron stores. It is taken as a 200mg tablet on alternate days. It can take at least four weeks to restore Haemoglobin to normal levels. Some patients find it difficult to tolerate due to adverse effects

such as nausea, vomiting, constipation or diarrhoea. Patients who are found to be anaemic on screening will be started on oral iron immediately to allow as much time as possible for treatment. This therapy may change once the exact cause is determined from the FBC and haematinics. Patients should receive a pre-op anaemia information leaflet and be advised to take oral iron on an empty stomach or with vitamin C containing drinks (e.g. Orange juice). If taking antacids advise to take at least 2 hours before or 4 hours after antacid ingestion.
Hb levels need rechecking after 4 weeks of oral iron to assess response. If inadequate response or not tolerating oral iron consider IV iron infusion.

Intra-venous (IV) iron

Ferinject® (Ferric Carboxymaltose) is one of five intra-venous iron preparations licenced in the UK. It does not require a test dose and has a short infusion time of 15 minutes for doses up to 1000 mg. Doses >1000 mg require the remaining dose to be infused >7days after initial infusion.

Monofer® (Iron [III] isomaltoside) is an intra-venous iron preparation licenced in UK for maximum single dose of up to 20mg/kg. This is given over 30mins and allows some patients to have a full dose in one hospital visit.

1. Contra-indications
- Iron overload.
- Previous allergic reaction to any intra-venous iron preparation.
- Anaemia not due to iron deficiency.
- Intra-venous iron given within the last 7 days.

2. Cautions
- Hepatic or renal impairment.
- Current bacterial infection.
- Any hypertensive disorder – can induce a hypertensive response.
- Risk of anaphylaxis increased in patients with a pre-existing allergic condition.

3. Dosing

Ferinject®

- Ferinject® dose is calculated using patient weight and current haemoglobin, as in table below.
- A single weekly administration of Ferinject® should not exceed 20mg iron/kg body weight to a maximum 1000mg of iron.
- Doses over 1000mg should be prescribed as two separate injections given at least 7 days apart, 1000mg for the first dose and the remainder for the second dose [3].

	Ferinject® Dose							
	35-39kg	40-49kg	50-59kg	60-69kg	70-79kg	80-89kg	90-99kg	≥100kg
Hb <100	700mg	800mg	1,000mg	1,000mg +500mg*	1,000mg +1,000mg*	1,000mg +1,000mg*	1,000mg +1,000mg*	1,000mg +1,000mg*
Hb ≥100	700mg	800mg	1,000mg	1,000mg	1,000mg + 500mg*	1,000mg + 500mg*	1,000mg + 500mg*	1,000mg +500mg*

*second dose to be given at least 1 week after first dose

Monofer®

- Monofer® dose is calculated using the following table:

	Monofer® Dose							
	35-39kg	40-49kg	50-59kg	60-69kg	70-79kg	80-89kg	90-99kg	≥100kg
Hb <100	700mg	800mg	1,000mg	1,200mg	1,400mg	1,600mg	1,800mg	2,000mg
Hb ≥100	700mg	800mg	1,000mg	1,000mg	1,400mg	1,500mg	1,500mg	1,500mg

4. Administration

IV iron is administered on the Medical day unit at GRH. It must be prescribed on the dedicated IV iron prescription sheet by a doctor or appropriate independent prescriber.

- IV iron must be diluted in 250ml 0.9% Saline and administered IV over at least 15 minutes for Ferinject® and 30 mins for Monofer®
- Must be administered in an area with resuscitation equipment and drugs to manage anaphylaxis.
- Baseline observations need to be recorded.
- Observations are required every 15 minutes from the commencement of the infusion and for 30 minutes after the infusion has finished.
- The infusion must be stopped immediately if there any signs or symptoms of an allergic reaction or if there is any leakage of the infusion into the surrounding tissues.
- Patients may be discharged 30 minutes after completion of the infusion, if no signs of adverse reaction are present.

5. Organising an IV iron infusion

- Book patient to attend on one of the predetermined sessions on the medical day unit (MDU) at GRH.
- Confirm the appointment with the patient. Ask them to contact MDU if alternative date required.
- Prescribe IV iron on dedicated IV iron prescription sheet and send to MDU with patient records.
- Arrange a repeat Haemoglobin with the patient's GP 2 weeks after infusion.

References:

1. Musallam KM, Tamim HM, Richards T et al (2011) Preoperative anaemia and postoperative outcomes in non-cardiac surgery: a retrospective cohort study. Lancet 378: 1396–407
2. Baron DM, Hochrieser H, Posch M et al. (2014) Preoperative anaemia is associated with poor clinical outcome in non-cardiac surgery patients. Br J. Anaesth 113(3):416-23
3. Ferinject ® Vifor Pharma UK Limited, Dort Nov 2018
4. Munoz et al. (2017) International consensus statement on the peri-operative management of anaemia and iron deficiency. Anaesth. 72(2):233-247