Preoperative GP Management:
using the wait time to investigate anaemia and iron deficiency and to optimise haemoglobin and iron stores

This template\(^1\) is for patients referred to Fremantle Hospital undergoing procedures in which substantial blood loss is anticipated such as major orthopaedic, vascular, cardiac, urological and general surgery or for surgery for patients that are typically anaemic such as gynaecological surgery.

Recommended screening to accompany GP referral (results from ≤ 3 months prior to referral):
- Full blood count & reticulocyte count – single cost when ordered together
- Iron studies\(^2\) including Ferritin
- CRP and Creatinine – single cost when ordered together
- U&Es and LFTs
- Vitamin B12 & Folate if indicated – single cost when ordered together
- Other investigations as appropriate depending on comorbidity

Is the patient anaemic?
Hb <130 g/L (male) or Hb <120 g/L (female)

Is Ferritin < 100mcg/L?

No

- Consider iron therapy\(^8\) if anticipated postoperative Hb decrease is ≥30 g/L
- Determine cause and need for GI investigations if Ferritin is suggestive of iron deficiency <30 mcg/L\(^2,3\)

Yes

- Evaluate possible causes based on clinical findings
- Discuss with gastroenterologist regarding GI investigations and their timing in relation to surgery\(^3\)
- Commence iron therapy\(^9\)

Ferritin <30 mcg/L\(^2,3\)

- CRP\(^4\)

Raised

Possible iron deficiency

- Consider clinical context
- Consider haematology advice or, in the presence of chronic kidney disease, renal advice
- Discuss with gastroenterologist regarding GI investigations and their timing in relation to surgery\(^3\)
- Commence iron therapy\(^9\)

Normal

Possible anaemia of chronic disease or inflammation, or other cause\(^5\)

- Consider clinical context
- Review renal function, MCV/MCH and blood film
- Check B12/folate levels & reticulocyte count
- Check liver and thyroid function
- Seek haematology advice or, in the presence of chronic kidney disease, renal advice

Ferritin 30–100 mcg/L\(^2,3\)

Ferritin >100 mcg/L

For clinical advice: FHHS Anaemia Service, Telephone 9431 2886

‘Fit for Surgery’ (anaemia and iron deficiency specific)

Reduced likelihood of anaemia / iron deficiency delays to patient being wait listed for surgery at Fremantle Hospital
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# Iron therapy

**Oral iron** in divided daily doses unless insufficient time to surgery or contraindicated. Evaluate response after 1 month. Provide patient information material.

**IV iron** if oral regime is not successful or contraindicated or if rapid iron repletion is clinically important (e.g. <2 months to non deferrable surgery):

- referral to private service provider for IV iron or
- consult with FHHS Anaemia Service

Note: if renal insufficiency or abnormal LFTs, consult with the FHHS Anaemia Service in the first instance.

Also consider **Vitamin B12 & Folate** if indicated

**NOTE:** 1 mcg/L of Ferritin is equivalent to 8–10 mg of storage iron. It will take approximately 165 mg of storage iron to reconstitute 10 g/L of Hb in a 70 kg adult.

If **preoperative Ferritin is <100 mcg/L**, **blood loss resulting in a postoperative Hb drop of ≥30 g/L would deplete iron stores and impede post-operative erythropoesis.**

**Reminder:**

- Anaemia is a contraindication for elective surgery.
- Iron deficiency with or without anaemia is a risk factor and can predispose the surgical patient to post operative anaemia and transfusion.
- Investigation of the causes of anaemia / iron deficiency through GP (GI / renal / haematology) should commence pre-operatively.
- Please include all relevant screening and management information with the referral and also forward subsequent results in the lead up to the patient being wait listed for surgery.

**Abbreviations**

<table>
<thead>
<tr>
<th>CRP</th>
<th>C-reactive protein</th>
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<tbody>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
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<tr>
<td>Hb</td>
<td>haemoglobin</td>
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<tr>
<td>IV</td>
<td>intravenous</td>
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<tr>
<td>MCH</td>
<td>mean cell/corpuscular haemoglobin (pg)</td>
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<tr>
<td>MCV</td>
<td>mean cell/corpuscular volume (fL)</td>
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**Footnotes:**

1. Anaemia may be multifactorial, especially in the elderly or in those with chronic disease, renal impairment, nutritional deficiencies or malabsorption.

2. In an anemic adult, a ferritin level <15 mcg/L is diagnostic of iron deficiency, and levels between 15–30 mcg/L are highly suggestive. However, ferritin is elevated in inflammation, infection, liver disease and malignancy. This can result in misleadingly elevated ferritin levels in iron-deficient patients with coexisting systemic illness. In the elderly or in patients with inflammation, iron deficiency may still be present with ferritin values up to 60–100 mcg/L.

3. Patients without a clear physiological explanation for iron deficiency (especially men and postmenopausal women) should be evaluated by gastroscopy/colonoscopy to exclude a source of GI bleeding, particularly a malignant lesion. Determine possible causes based on history and examination; initiate iron therapy; screen for coeliac disease; discuss timing of scopes with a gastroenterologist.

4. CRP may be normal in the presence of chronic disease and inflammation.

5. Consider thalassaemia if MCH or MCV is low and not explained by iron deficiency, or if long standing. Check B12/folate if macrocytic or if there are risk factors for deficiency (e.g. decreased intake or absorption), or if anaemia is unexplained. Consider blood loss or haemolysis if reticulocyte count is increased. Seek haematology advice or, in presence of chronic kidney disease, nephrology advice

For more information on the diagnosis, investigation and management of iron deficiency anaemia refer to:


**Disclaimer**

The information above, developed by consensus, can be used as a guide. Any algorithm should always take into account the patient’s history and clinical assessment, and the nature of the proposed surgical procedure.

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