Preoperative Anemia Management & Hemoglobin (Hgb) Optimization

**At-Risk Patient Populations:** Hgb <130g/L (male or female), weight <65kg, female gender, complex or revision surgery, renal disease, anti-platelet and/or anti-coagulant therapy, hematologic conditions (i.e.: Thalassemia), ‘No Blood’/transfusion-refusal

**Ideal Timeline for Assessment:** Ideally at surgical INTAKE, at time of acceptance for surgery; at least 30 days preop

### Hemoglobin Levels

<table>
<thead>
<tr>
<th>Hgb less than 100g/L</th>
<th>Hgb 100-130g/L</th>
<th>Hgb greater than 130g/L</th>
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</table>
| **Consider DELAY of elective procedure.** Notify appropriate physician for discussion & investigation. | **Investigate Cause:** blood loss (e.g.: GI, menstrual, epistaxis), anti-coagulant status, renal/hepatic failure, poor nutritional status, etc. Refer to appropriate physician for investigation/treatment of underlying cause, if able. **Testing:** CBC, Retic Count, Ferritin*, Creatinine, Iron Panel (Serum Iron/TIBC)  
*Consider false elevation with inflammation | **Consider needs of elective procedure.** Consider further Hgb optimization & intra-op blood-sparing modalities |

### Microcytic (MCV <80 fl)

**Consider:** iron deficiency, Thalassemia, chronic disease, sideroblastic anemia

- Check: Serum Ferritin\(^1\), Iron Panel\(^2\)  
  (Serum Iron, TIBC, T-Sat, CRP)  
  \(^1\) Consider false elevation with inflammation (e.g.: SLE, RA, sepsis, inflammatory bowel)  
  \(^2\) Test should be performed fasting for accuracy

### Normocytic (MCV 80-100 fl)

**Consider:** anemia of chronic disease, cancer, marrow problem, inflammation, hemolysis, bleeding, renal failure

- Ferritin <30mcg  
  T-Sat <20%  
  TIBC >72mcg  
  Retic low  
  **Iron Deficient**

- Ferritin 30-100mcg  
  T-Sat <20%  
  TIBC 45-72mcg  
  Retic low  
  **Probable Iron Deficient**

- Ferritin >100mcg  
  T-Sat <20%  
  TIBC <45mcg  
  Retic low  
  **Anemia of Chronic Disease or combination w Iron Deficiency**

- Ferritin >100mcg  
  T-Sat >20%  
  TIBC <45mcg  
  Creatinine >120 or eGFR <60 mL/min  
  **Possible Anemia of Chronic Kidney Disease**

### Macrocytic (MCV >100 fl)

**Consider:** hepatic disease (fatty liver, cirrhosis), ETOH, thyroid disease, B12 or folate deficiency, myelodysplasias, drugs: HIV anti-viral, Methotrexate\(^3\), Septra\(^\text{®} \)

- Check: TSH, Liver investigations, Serum B12, Serum Folate

- Ferritin >100mcg  
  T-Sat >20%  
  Creatinine >120 or eGFR <60 mL/min  
  **Consider Trial of Erythropoietic-Stimulating Agent (ESA) with Iron**

- Serum Folate or Serum B12 low  
  TSH elevated  
  **abnormal liver investigations**

### Oral Therapy:

- Choice of oral iron agent should consider degree of iron deficiency, drug interactions, likelihood of compliance with therapy, likelihood of iron/Hgb correction by surgery date

### ESA (erythropoietin, EPO, Eprex®) Therapy:

- Requires iron repletion or concurrent iron therapy  
- Requires consideration of risk/benefit balance

**Standard ESA Dosing:**

- 600iu/Kg given SC weekly to target Hgb  
- Ex: 20,000-40,000iu SC given on day 21, 14, and day 7 preop, and then day of surgery
- CHECK Hgb after every 2 doses to monitor effect and avoid exceeding safe Hgb targets

### Points of Emphasis:

- Patient Blood Management strategies (including Anemia Management & Hgb Optimization) should be individualized to patient condition and risks of surgical procedure. Ideal preop Hgb targets may need to be adjusted for:
  - Renal disease (e.g.: max 120g/L)
  - Patients refusing transfusion “No Blood”
  - Patients with pre-existing arterial-venous thrombotic events should be monitored closely

### Oral ESA Therapy:

- Common side effects: nausea, constipation, GI upset, fluid retention  
- Monitor iron overload: iron panel, liver investigations  
- If blood loss or additional anesthesia, continue ESA to maintain Hgb

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