RCN Gastrointestinal Nursing Forum

Iron deficiency and anaemia in adults: a new guide for nursing management

Vifor Pharma UK have supported the RCN Iron Deficiency Anaemia Project and development of the guidance: *Iron deficiency and anaemia in adults. RCN guidance for nursing staff (2015)*
Background

IDA affects 2 billion worldwide
Most common cause of anaemia worldwide
Causes >57,000 emergency admissions per year in NHS
Cost to NHS £55.48m
Aims of Guidance

Led by GI Forum
Developed by nurses from relevant specialties
For any nurse

Aims

- Identifying and managing IDA
- Why it occurs
- Dietary advice and oral iron
- IV iron and its delivery
- Patient info
- Specialty appendices
Definitions

Iron deficiency:
- When the supply of iron is insufficient to meet the body’s demand.
- Absolute iron deficiency:
  Total body iron depleted with low iron stores

- Functional iron deficiency:
  Inability to access stores to support erythropoietic demands

Iron deficiency anaemia:
- Absolute or functional iron deficiency
- Low Hb
Parameters

Iron deficiency:
- Ferritin <30µg/l if normal CRP
- Ferritin <100µg/l if raised CRP
- Transferrin saturation <16%

Anaemia:
- Hb <120 g/l in women; <130 g/l in men

Causes of ID and IDA

- Dietary insufficiency
- Increased demand for iron
- Inflammation
- Blood loss
- Malabsorption
Blood Loss

The commonest cause of IDA in older people in the UK is GI blood loss.

There is approximately 0.5mg iron in each ml of blood lost.

Body on average absorbs 1-2mg/day iron via the gut, up to a maximum of 20mg.²

GI Bleeding Disorders

Common
- Peptic ulcer disease
- Gastritis
- GI malignancy
- Angiodysplasia

Uncommon
- Oesophagitis
- Gastric antral vascular ectasia

Malabsorption of Iron

GI mucosal disease
- Coeliac disease
- Inflammatory Bowel Disease

Medications (e.g. PPIs)
Gut oedema (e.g. CHF)
Gastric surgery
Dietary interactions
Inflammation

Hepcidin is understood to be the principal regulator of iron homeostasis.

Peptide hormone produced by the liver.

Acts to reduce iron uptake by enterocytes in the GI tract and block the release of iron from hepatocyte and macrophage stores.

Levels are high when the body is iron replete and low when the body is iron deficient.

Hepcidin is also an acute-phase reactant.

Systemic inflammation, and co-morbid inflammatory conditions lead to the up-regulation of the hormone hepcidin which inhibits the utilisation of iron in the body.
Diagnosis of IDA

Presence of anaemia
Low Hb or RBC count

RBC morphology
Hypochromia Microcytosis

Serum markers
Low serum ferritin
Decreased transferrin saturation or increased soluble transferrin receptors
Indicators of Iron Deficiency Anaemia

Low haemoglobin (Hb)
- Hb <120g/l in women / <130g/l in men

Mean cell volume (MCV)
- Measure of the average size of RBCs in the blood sample
- <76 fl

Mean cell haemoglobin concentration (MCHC)
- Average concentration of Hb per red cell
- <30g/dl
Serum ferritin

Most specific biochemical test of total body iron stores in absence of inflammation or infection.

Low serum ferritin levels reflect depleted iron stores
- No universally agreed cut-off to diagnose IDA
- Usually between 10-30 µg/L

Serum ferritin is an acute phase protein \(\rightarrow\) increases in presence of inflammation or infection
- Can be \(\geq 100\) µg/L even in presence of iron deficiency\(^1\)
- C-reactive protein (CRP) can be used to assess degree of inflammation
- Other markers may be needed to diagnose iron deficiency

Dietary Iron

Enhancers – lean red meat, oily fish, vit C, fermented products (soy sauce & bread)

Inhibitors – calcium, phytates (cereals and seeds), polyphenol and tannin (tea & coffee)
Tips on Dietary Iron Advice

Only small amount of iron absorbed from diet
Haem iron (red meat) more easily absorbed
Don’t drink tea or coffee immediately around meals
Eat dairy as snacks rather than with meals
Eat x5 portions per day
AIM IS TO CORRECT ANAEMIA AND REPLENISH IRON STORES

Ferrous Iron Preparations Available in the UK

<table>
<thead>
<tr>
<th>Iron salt</th>
<th>Dose</th>
<th>Ferrous iron/dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferrous sulphate</td>
<td>300 mg</td>
<td>60 mg</td>
</tr>
<tr>
<td>Ferrous sulphate (dried)</td>
<td>200 mg</td>
<td>65 mg</td>
</tr>
<tr>
<td>Ferrous fumarate</td>
<td>200 mg</td>
<td>65 mg</td>
</tr>
<tr>
<td>Ferrous gluconate</td>
<td>300 mg</td>
<td>35 mg</td>
</tr>
</tbody>
</table>

Oral dose of ferrous iron for iron deficiency: 100 – 200 mg daily

- Historically administered as dried ferrous sulphate 200 mg three-times-daily (TDS).
- Hb should increase by approximately 1–2 g/L per day.
- Once Hb in normal range, treatment should continue for 3 months.
Oral Iron Therapy

Ongoing loss of blood may exceed capacity to absorb oral iron – body on average absorbs 1-2mg/day iron via the gut, up to a maximum of 20mg.¹

Absorption of oral iron may be limited due to hypochlorhydria/achlorhydria or gut oedema.

Therapy with oral iron can take a number of months.

Oral iron is poorly tolerated which can lead to reduced compliance.

Lower doses are better tolerated

Warn patients of GI side effects (most can tolerate)

¹ Gasche C et al. Inflamm Bowel Dis 2007;13:1545–53
Reasons for a Failure to Respond to Oral Iron\(^1\)

1. Failure to take tablets
2. Continuing haemorrhage
3. Wrong diagnosis (e.g. thalassaemia trait, sideroblastic anaemia)
4. Mixed deficiency (e.g. associated folate or vitamin B\(_{12}\) deficiency)
5. Malabsorption
6. Raised hepcidin and other inflammatory cytokine levels, altering absorption

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Parenteral Iron

In the UK, parenteral administration of iron is reserved for patients who have been intolerant of oral iron therapy, or in whom oral iron therapy is not appropriate.

Comparative clinical trials show a faster and more prolonged response with IV iron than with oral iron.¹

IV iron is more effective, better tolerated and improves QoL to a greater extent than oral iron.¹

¹ Gasche C et al. Inflamm Bowel Dis 2007;13:1545–53
<table>
<thead>
<tr>
<th></th>
<th>Venofer</th>
<th>Cosmofer</th>
<th>Monofer</th>
<th>Ferinject</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum single dose</strong></td>
<td>200mg</td>
<td>20mg/kg</td>
<td>20mg/kg</td>
<td>20mg/kg, up to 1000mg</td>
</tr>
<tr>
<td></td>
<td>3x per wk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test dose required</strong></td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Infusion times</strong></td>
<td>30 mins</td>
<td>4-6 hours</td>
<td>≤1000mg - 30 mins</td>
<td>≤500mg - 6 mins</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;1000mg - 60 mins</td>
<td>&gt;500mg - 15 mins</td>
</tr>
<tr>
<td><strong>Use in children</strong></td>
<td>✗</td>
<td>≥14 years</td>
<td>✗</td>
<td>≥14 years</td>
</tr>
<tr>
<td><strong>Use in pregnancy</strong></td>
<td>Not in 1st trimester</td>
<td>Not in 1st trimester</td>
<td>Not in 1st trimester</td>
<td>Not in 1st trimester</td>
</tr>
<tr>
<td><strong>Use in breastfeeding</strong></td>
<td>✓</td>
<td>Not recommended</td>
<td>No information</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Use with caution in asthma, eczema or other atopic allergy</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Use with caution in decompensated cirrhosis and hepatitis</strong></td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Use with caution in rheumatoid arthritis with active inflammation</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Acute renal failure</strong></td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Use with caution in patients with acute or chronic infection</strong></td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Treatment Options for ID/IDA

<table>
<thead>
<tr>
<th></th>
<th>Oral iron</th>
<th>IV iron</th>
<th>Blood transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td>High iron content</td>
<td>Essential in cases of cardiovascular instability¹</td>
</tr>
<tr>
<td>Non-invasive</td>
<td></td>
<td>100% bioavailable</td>
<td>Replaces RBCs</td>
</tr>
<tr>
<td>Simple administration</td>
<td></td>
<td>Compliance</td>
<td>Compliance</td>
</tr>
<tr>
<td>Convenient</td>
<td></td>
<td>Fast acting²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well tolerated³</td>
<td></td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intolerance</td>
<td></td>
<td>Potential adverse reactions</td>
<td>Potential transfusion reactions</td>
</tr>
<tr>
<td>Potential poor compliance</td>
<td></td>
<td>Invasive</td>
<td>Invasive</td>
</tr>
<tr>
<td>Risk of malabsorption in inflammatory conditions</td>
<td></td>
<td>Day case / inpatient</td>
<td>Day case / inpatient – secondary care input needed</td>
</tr>
<tr>
<td>Slower to increase haemoglobin vs IV iron²</td>
<td></td>
<td>Cost</td>
<td>Cost</td>
</tr>
<tr>
<td>Interactions with common oral drugs</td>
<td></td>
<td></td>
<td>Limited supply</td>
</tr>
<tr>
<td>Can delay investigative procedures, i.e. colonoscopies</td>
<td></td>
<td></td>
<td>May worsen outcomes in acute bleeds and surgical cases⁴</td>
</tr>
<tr>
<td>Can only absorb 10-20mg a day³</td>
<td></td>
<td></td>
<td>Complex administration</td>
</tr>
</tbody>
</table>

Blood Transfusion

Emphasis to reduce inappropriate and overuse of blood transfusion
Patient blood management (PBM)
Puts patients at heart of decision making
2013 Audit – 25% of transfusion for anaemia could have been avoided, only 8% give IV iron
Preop Optimisation

Assessing pre op patients
‘Anaemia should be identified and treated in a timely fashion’

Handbook of Transfusion Medicine

Assess anaemia and bleeding risk
Escalate issues
Discuss patients views on blood transfusion (e.g. Jehovahs witness)
Appendices

Gastro
Heavy Menstrual bleeding
Patient blood management
Renal
Pregnancy, postpartum and post delivery
Contains more specialist info, references and guidance
Questions for you……

Who are the patients at risk of IDA in your practice?

What’s your current role in identifying IDA and escalating treatment?

How are the issues or dietary and oral iron addressed?

Is there any option to use IV iron as treatment within your Trust? When can patients access it?

Would you feel able to promote IV iron as an alternative to blood transfusion?

Are you able to influence IV iron pre op?
Availability

The full RCN guidance *Iron deficiency and anaemia in adults. RCN guidance for nursing staff (2015)* can be downloaded at [www.rcn.org.uk/publications](http://www.rcn.org.uk/publications)

Hard copies at this meeting.
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