CENTRE FOR GI HEALTH
GASTROINTESTINAL MEDICINE
ENDOSCOPY
NUTRITION

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IRON DEFICIENCY ANAEMIA (IDA)

Management of iron deficiency is a common clinical problem and may signal the presence of unsuspected digestive disease.

Data from large studies indicates iron deficiency with accompanying anaemia is present in 1-3% of the adult population. Iron deficiency without anaemia is more common and seen in up to 11% of women (usually premenopausal) and 4% of men.

It is estimated that up to 15% of Australians older than 65 have IDA. Some of these patients harbour serious but potentially remediable pathologies. In this sense serum iron studies are an important surrogate marker of internal disease and we would recommend using the iron panel as part of a general health screening tool for adult patients of all ages.

Causes of Iron Deficiency Anaemia:

- Blood loss may be either OVERT (obvious) such as menorrhagia, haemorrhage, melena or haematuria or OCCULT (not obvious) and sometimes overt but obscure such as significant per rectal blood loss from a bleeding Meckels diverticulum or small bowel tumour which cannot be demonstrated by conventional endoscopy.
- Poor oral absorption of iron is a less common contributor to iron deficiency but observed in coeliac disease, general malabsorptive states, chronic disease states and after gastric bypass surgery or partial gastrectomy.
- Regular blood donations or excessive venesection for iron overload states such as hemochromatosis may cause IDA.
- Rarer causes include intravascular haemolysis (valve / marathon running) and paroxysmal nocturnal haemoglobinuria.

Common Causes of Gastrointestinal Tract Bleeding

Oesophagitis
Peptic
Pill Induced
Peptic ulcer disease
Gastric Antral Vascular Ectasia (GAVE)
Portal hypertension
Varices
Arteriovenous malformations
Malignancy
Oesophageal, Gastric, Small bowel, Colorectal
GISTS (Gastrointestinal Stromal Tumours)
Postsurgical anastomosis
Aortoenteric fistulae
Diverticular Disease
Inflammatory Bowel Disease
Haemorrhoids
Ischaemia
Radiation associated

In a large study, men and postmenopausal women with IDA had a 30 times increase relative risk of developing a GI malignancy in the next 48 months highlightng the importance of further investigation.

Most studies demonstrate the presence of GI malignancy in this population between 7-13%.

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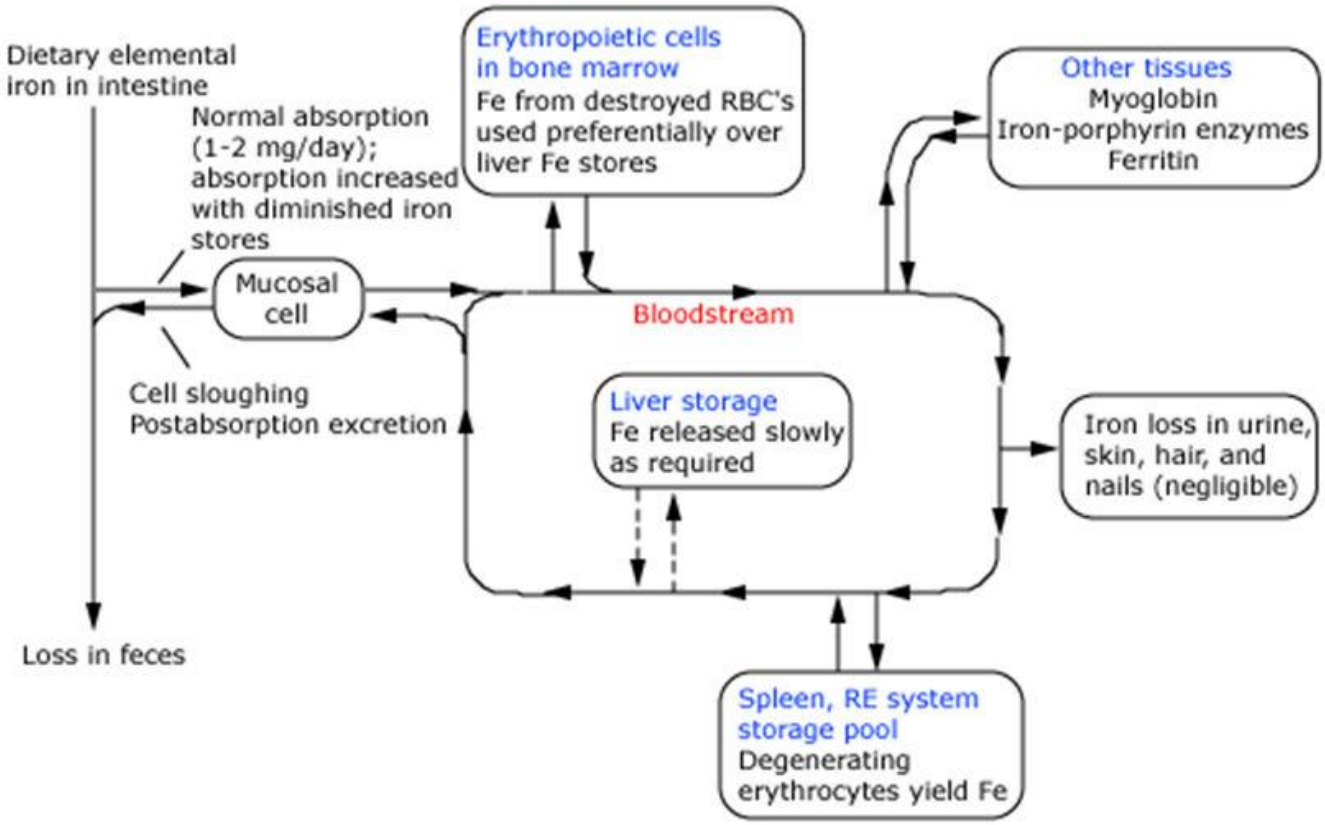
Stages of Iron Deficiency

Iron is absorbed across the duodenum and jejunum not the stomach (sustained release or enteric coated tablets should be avoided).

Iron homeostasis



The normal iron content of the body is 3 to 4 grams. It exists in the following forms:

- Haemoglobin in circulating red cells — approximately 2 grams
- Iron containing proteins (eg: myoglobin, cytochromes, catalase) — 400 mg
- Plasma iron bound to transferrin — 3 to 7 mg

The remainder is storage iron in the form of ferritin or hemosiderin.

Stored iron is found predominantly in the liver, spleen and bone marrow and can be estimated by the simple equation:
Iron stores (mg) ~8-10 x ferritin (ng/ml).

Iron depletion is manifest in stages determined by the degree of deficiency -

1. Iron store (ferritin) becomes depleted
2. Low serum iron
3. Increased levels of total iron binding capacity (TIBC), low % saturation of transferrin (transferrin
4. saturation - which is calculated by saturation % = serum Iron/ TIBC x 100)
5. Anaemia - typically hypochromic and microcytic.

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Estimation of Iron Stores

Serum ferritin is a good indicator of iron stores but can be elevated as an acute phase reactant and may be falsely increased in the setting of inflammation, infection, liver disease and some cancers.

Inflammation usually elevates serum ferritin levels 3 fold. A rule of thumb is to divide the serum ferritin by a factor of 3 in the setting of acute inflammation to gain a more accurate assessment of the true ferritin level.

A serum ferritin less than 15ng/ml is 100% specific for iron deficiency.

Soluble transferrin receptor, (sTfR) is derived from bone marrow erythroid precursors and is a measure of erythropoetic activity in IDA however increased levels of sTfR are not as sensitive nor as specific as low serum levels of ferritin.

The two most important conditions to distinguish from IDA are anaemia of chronic disease and Thalassaemia. In chronic disease states upregulation of the liver protein hepcidin (acute phase reactant) has a negative effect on the iron transport protein ferroportin and may contribute to the anaemia observed.

Search for a source of blood and iron loss:

It is imperative that investigation of iron deficiency be considered. Check for a history of peptic ulcer disease, liver disease, (varices and coagulopathies), inquire regarding a family history of colonic or gastric cancer as well as bleeding disorder.
A careful medication history for use of aspirin, anti-inflammatories (including Cox 2 inhibitors) and anti-coagulants should be made as well as recent travel history (hookworm).

Coeliac disease (CD) found in up to 1 % of our Caucasian population should be considered in all patients (CD is twice as likely in women and may be associated with type 1 diabetes and autoimmune disorders).

Gastroscopy and colonoscopy as combined investigations are mandatory in the evaluation of IDA. Patients are often referred for one procedure which draws out investigation and is more costly for the patient.

- Studies have determined that Upper GI causes (ulcer/ GORD/HP gastritis etc) may be found in 30-40% of patients presenting with IDA.
- Lower GI causes such as colorectal cancer are found in 8-12% with larger polyps or inflammatory bowel disease accounting for 15-20% of cases.

In 10-20% pathology is demonstrated in upper and lower gastrointestinal tract. No obvious cause can be demonstrated in 15-30% of investigated patients by standard endoscopy (obscure loss).

For significant and unexplained IDA small bowel investigation by wireless Capsule endoscopy (Pillcam) is required (as an MBS requirement patents must be anaemic and iron deficient with a negative gastroscopy and colonoscopy performed within 6 months to qualify for this investigation).

Further investigation by barium small bowel follow through, CT or MRI enterography may be required when standard endoscopy fails to reveal aetiology. Push enteroscopy and or double balloon enteroscopy are reserved for bleeding lesions identified by capsule endoscopy such as AVM's which may be amenable to argon plasma coagulation (APC) or for cases of ongoing bleeding where capsule study is negative. We normally include an MSU as part of the work up looking for renal tract blood loss.

Replacement

Whilst it is important to encourage the ingestion of iron rich foods most patients with IDA will require replacement with at least: Oral iron (ferrogradumet + /-Vit C), liquid elixir taken with orange juice or parenterally (monitoring is required for intravenous replacement).

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Oral iron supplements should be checked for their iron content as many only provide the recommended daily requirement and are not particularly helpful in deficiency states. Ascorbic acid enhances absorption whilst phytates (found in bran and oats), polyphenols (tea), calcium and soy, antacids and quinolones retard absorption.
150 -200 mg of elemental iron daily as replacement is recommended (equivalent to Ferrogradumet taken tds). It is estimated that the maximum absorptioon of iron across the gastrointestinal tract is 25mg per day (the amount of iron found in 25ml of packed red cells).
Haemoglobin should rise by at least 1g/dl per week with replacement.

Iron replacement is determined by the following calculation:
Haemoglobin iron deficit (mg) = BW x (14 - Hb) x (2.145).

For example a 60kg patient with haemoglobin of 8g/dl would require:
60 x (14-8) x 2.145 = 772mg of iron.

We recommend iron infusions (can last for 6-12 months) over intramuscular interjections and are happy to conduct these for your patients.

In Summary

Iron deficiency anaemia (IDA) may indicate serious underlying gastrointestinal pathology and should always be investigated.

Gastroscopy and colonoscopy combined are the preferred initial investigations. Further investigation by Capsule endoscopy and radiology may need to be considered.

Iron replacement orally or parenterally (faster replacement) are both appropriate.

All services involved in IDA investigation and treatment are available through GIH.