

Information for clinicians

Iron deficiency and iron deficiency anaemia

Iron is essential for red blood cell production and iron deficiency is the most common nutritional deficiency worldwide both in developed and developing countries. Iron deficiency (ID) is a progressive process of decreasing iron stores from normal, through stages of depletion, to absent with the eventual consequence being iron deficiency anaemia (IDA). The prevalence of IDA in the UK National Diet and Nutrition Survey (NDNS) 2016 was 5% or above in all age groups (<https://www.gov.uk/government/collections/national-diet-and-nutrition-survey>).

Causes of ID and IDA include inadequate dietary intake, impaired absorption and blood loss. The management of ID requires investigation and correction of the underlying cause in addition to treatment with iron.

Most patients with IDA do not require transfusion. While acute blood loss is frequently associated with haemodynamic instability and poor oxygen delivery, chronic IDA is not associated with hypovolaemia, and oxygen delivery is facilitated by increases in 2,3-diphosphoglycerate and a shift in oxygen dissociation.

Patients presenting with severe IDA and symptoms of inadequate oxygen delivery (e.g. syncope, chest pain) are likely to benefit from transfusion. If a decision is made to transfuse a patient for IDA with symptoms of inadequate oxygen delivery, a single unit of red cells is usually sufficient and further increases in haemoglobin concentration (Hb) can be achieved with oral and/or parenteral iron.

Parenteral iron therapy is indicated when there is non-compliance with, or intolerance to, oral iron or proven malabsorption. Several papers report a faster increase in Hb and better replenishment of iron stores when compared with oral therapy. When the degree of anaemia is severe or time to correct anaemia is limited parenteral iron should be considered.

Safety data regarding iron (both oral and modern parenteral preparations) versus transfusion supports the initial use of oral iron. Side effects of oral iron include nausea and gastric discomfort. Recently developed intravenous iron formulations are safer than earlier preparations.

Avoiding unnecessary red cell transfusions is both beneficial for patients and essential to ensure that supplies meet appropriate demands.

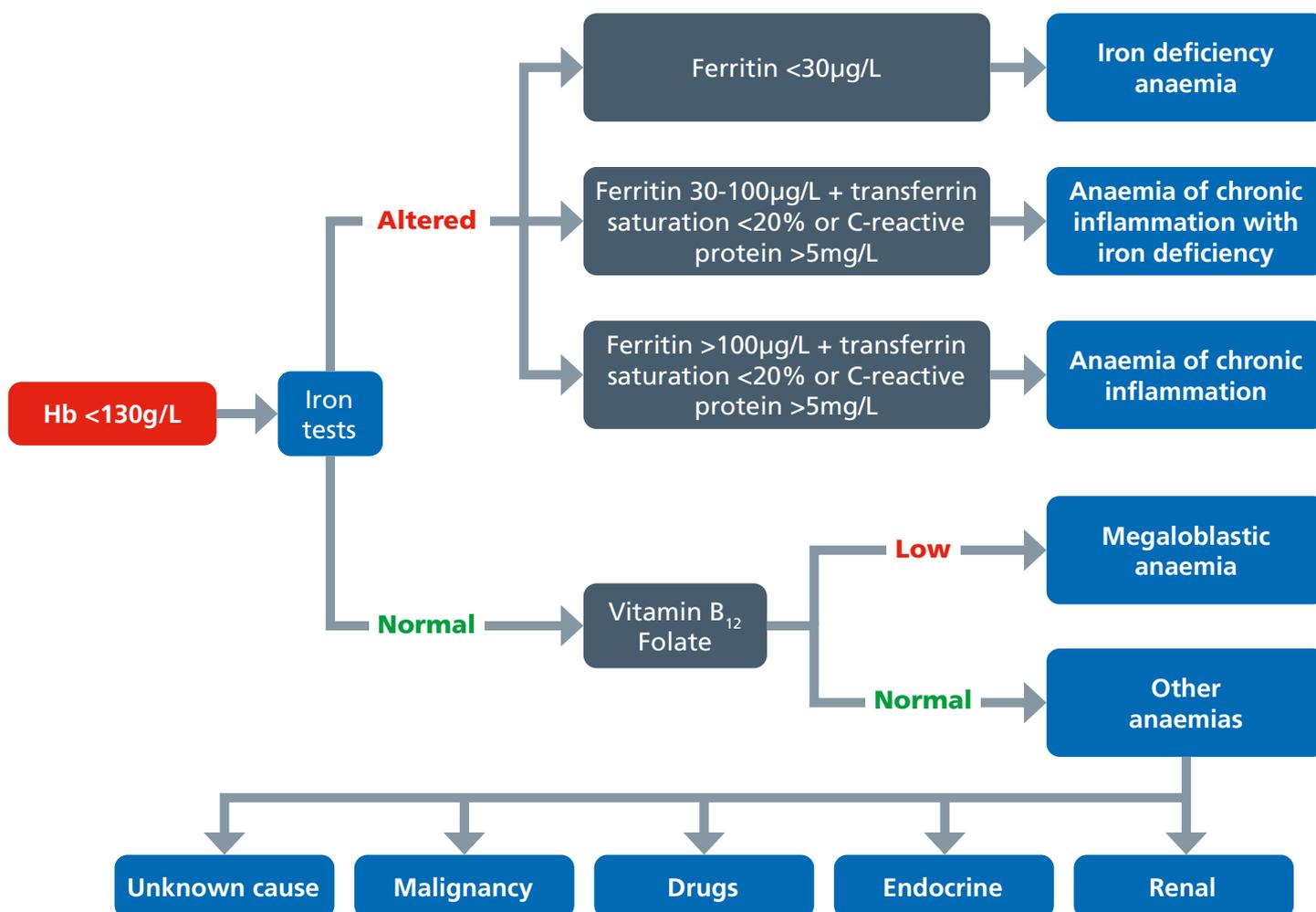
NB. Transfusions given for haematinic deficiencies with no symptoms are reportable to SHOT (Serious Hazards of Transfusion UK haemovigilance scheme).

Key interventions

- Hospitals should have guidelines, education and resources to support the recognition, detection and treatment of ID and IDA. Guidelines should include appropriate investigations for the cause of iron deficiency.
- Laboratory procedures should be in place to support empowerment of staff to identify and challenge inappropriate transfusion requests for iron deficient patients.
- Separate pathways should be in place for elective surgical patients, to allow for pre-operative optimisation, and for anaemia in pregnancy.

Patients suspected of having anaemia should have FBC and haematinics checked (ferritin, CRP, TSATS, B12 and folate) to determine the type of deficiency.

Algorithm for classification of perioperative anaemias¹



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It is important to distinguish iron deficiency from other causes of anaemia.

- If iron deficiency is confirmed, further investigations should determine the cause e.g. GI or gynaecological bleeding, inflammatory conditions or dietary insufficiency.
- Refer to relevant speciality for further investigation and treatment if indicated.
- Discuss dietary advice e.g. provide Iron in your diet information leaflet, if appropriate.

In moderate to severe cases, the therapeutic options are:

- **Oral iron:** daily (40–60 mg) or alternate day (80–100 mg) treatment should be used in patients with ID and no contra-indications. Support with nutritional advice i.e. take vitamin C (e.g. orange juice to help absorption) and avoid tea or coffee within an hour of taking medication.
- **Intravenous iron:** for patients unable to tolerate, or unresponsive to, oral iron or if there is a need to raise iron levels rapidly.
- **Transfusion:** may be required if patients have reached agreed transfusion triggers, become increasingly symptomatic, or experience cardiovascular compromise. Underlying iron deficiency should still be rectified.

Guidance

NICE Blood Transfusion Guidelines NG24²

Intravenous and oral iron

- Offer oral iron before and after surgery to patients with iron deficiency anaemia. [Based on very low to low quality evidence from RCTs, cost effectiveness evidence, and the experience and opinion of the Guideline Development Group (GDG).]
- Consider intravenous iron before or after surgery for patients who:
 - ▶ Have IDA and cannot tolerate/absorb oral iron or are unable to adhere to oral iron treatment
 - ▶ Are diagnosed as having functional iron deficiency or
 - ▶ Are diagnosed as having IDA and the interval between the diagnosis of anaemia and surgery is predicted to be too short for oral iron to be effective

RCN iron deficiency and anaemia in adults

<https://www.rcn.org.uk/professional-development/publications/pub-007460>

Patient Blood Management: an evidence-based approach to care

<https://www.transfusionguidelines.org/uk-transfusion-committees/national-blood-transfusion-committee/patient-blood-management>

WHO guideline on use of ferritin concentrations to assess iron status in individuals and populations

<https://apps.who.int/iris/handle/10665/331505>

Pavord, S., Daru, J., Prasannan, N., Robinson, S., Stanworth, S., Girling, J. and (2020), UK guidelines on the management of iron deficiency in pregnancy. *British Journal of Haematology*, 188: 819-830

<https://b-s-h.org.uk/guidelines/guidelines/uk-guidelines-on-the-management-of-iron-deficiency-in-pregnancy/>

A summary of oral and intravenous iron preparations available in the UK is provided in this guideline.

Resources

NHS Blood and Transplant PBM website

<https://hospital.blood.co.uk/patient-services/patient-blood-management/>

NHS Blood and Transplant Patient Information Leaflets

<https://hospital.blood.co.uk/patient-services/patient-blood-management/patient-information-leaflets/>

National Institute of Health and Care Excellence Clinical Knowledge Scenarios. Anaemia-iron deficiency (2018)

<https://cks.nice.org.uk/anaemia-iron-deficiency>

Definitions of current SHOT reporting categories and what to report

<https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Definitions-update-10.01.20-FINAL.pdf>

Choosing Wisely UK

<https://www.choosingwisely.co.uk/i-am-a-clinician/recommendations/#1476655947791-98e68713-aae4>

Serious Hazards of Transfusion UK haemovigilance scheme

<https://www.shotuk.org/wp-content/uploads/myimages/Not-choosing-wisely-BBTS-2019-poster-final.pdf>

References

1. Muñoz, M., Acheson, A.G., Auerbach, M., Besser, M., Habler, O., Kehlet, H., Liubruno, G.M., Lasocki, S., Meybohm, P., Rao Baikady, R., Richards, T., Shander, A., So-Osman, C., Spahn, D.R. and Klein, A.A. (2017), International consensus statement on the peri-operative management of anaemia and iron deficiency. *Anaesthesia*, 72: 233-247. doi:10.1111/anae.13773
2. National Institute for Health and Care Excellence (2015) Blood Transfusion {NG24} <https://www.nice.org.uk/guidance/ng24>

Contact us

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This leaflet was prepared by NHS Blood and Transplant in collaboration with the National Blood Transfusion Committee. Further supplies can be obtained by accessing <https://hospital.nhsbtleaflets.co.uk>

Individual copies of this leaflet can be obtained by calling 01865 381010.

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