Iron Deficiency & Anaemia in Heart Failure

Educational Handout

This info sheet has been developed for healthcare practitioners to provide guidance on managing iron deficiency specifically in the context of Heart Failure.

SIXTY SECONDS ON...

Iron Deficiency &Anaemia in Heart Failure

Iron is critically important to life. It is required by the human body to carry out a number of essential functions, including the transport of oxygen in the blood.

The human body can absorb, store and transfer iron; but it cannot produce iron. Instead, in health, we rely on iron obtained from the food we eat.

Lack of iron in the body may lead to iron deficiency, with or without anaemia.

- Symptoms of iron deficiency include breathlessness, tiredness, and lack of energy.

How Common is Iron Deficiency in People with Heart Failure?

Iron deficiency affects up to **1 in 2 people** with chronic Heart Failure (at home).

Iron deficiency affects **4 out of 5 people** hospitalised with acute Heart Failure (in the hospital).

In people with Heart Failure, iron deficiency is associated with more severe symptoms, increased risk of hospitalisation for Heart Failure and reduced survival.

Who Should Be Tested?

- Clinical guidelines recommend that every patient with Heart Failure should be screened for iron deficiency, at initial diagnosis and periodically thereafter (at least annually);
- Failure to diagnose and correct iron deficiency can lead to worse prognosis in people with Heart Failure.

Treatment of Iron Deficiency in Heart Failure: Intravenous or Oral Iron?

- Intravenous iron treatments have been shown to improve symptoms, well-being and reduce the risk of hospitalisation due to Heart Failure in people with an ejection fraction <50%.
- Oral iron is not recommended in patients with Heart Failure as it has not been shown to be effective.

Treatment of Iron Deficiency in Patients with HFpEF

- To date, all studies on iron deficiency in Heart Failure have focussed on patients with an EF <50%. Until new studies provide more data, it is recommended that patients with HFpEF and iron deficiency are managed in the 'usual way', which may involve a prescription for iron tablets in the first instance.
- In patients with HFpEF, intravenous iron would be recommended when oral iron is either not tolerated, ineffective (patient is still iron-deficient on repeat blood testing after 6-12 weeks of oral iron), or in cases when iron needs to be replenished quickly.

What do the Guidelines Say?

The European Society of Cardiology Guidelines for the diagnosis and treatment of acute and chronic Heart Failure (2023 Focussed Update) recommends IV iron supplementation for patients with HFrEF or HFmrEF and iron deficiency to improve symptoms and quality of life and should be considered to reduce the risk of HF hospitalisation*.

While the UK has not issued specific guidance on managing iron deficiency in Heart Failure, most UK healthcare services tend to align with European guidance on this matter.

Acknowledgements and thank yous

Dr Fozia Ahmed Consultant Cardiologist, Manchester Heart Centre, Manchester Royal Infirmary.

Nick Hartshorne-Evans Founder and CEO, the Pumping Marvellous Foundation.

* Iron carboxymaltose and iron derisomaltose are recommended to reduce risk of hospitalisation.

Iron: Key Facts

Vital for Life: iron is required to fulfil numerous essential bodily functions, its main role is transporting oxygen to organs via the bloodstream.

No Internal Production: the body cannot produce iron, which must be obtained externally (e.g., through food); in Heart Failure, dietary iron may be insufficient.

Iron Deficiency: inadequate iron stores in the body can lead to iron deficiency. This can occur with or without anaemia (reduced red blood cells or decreased haemoglobin in the blood).

Common Symptoms: symptoms of iron deficiency include breathlessness, tiredness, and lack of energy, which can impact well-being/quality of life. These symptoms can be challenging to distinguish from those of other conditions, such as Heart Failure; blood tests are therefore necessary to confirm iron deficiency as a contributing factor.

Untreated Iron Deficiency: if left untreated, iron deficiency can progress to iron-deficiency anaemia; a condition associated with more severe symptoms, including severe fatigue, weakness and increased risk of complications.

Prognosis: addressing iron deficiency is essential for symptom relief and improving the overall prognosis/quality of life, especially in individuals with Heart Failure/other chronic conditions.

Monitoring: regular monitoring/follow-ups with healthcare providers are important to assess treatment progress, manage potential side effects, and adjust treatment plans accordingly.

If iron deficiency is suspected or are you are experiencing symptoms such as fatigue, weakness, pale skin, or shortness of breath, seeking medical evaluation and appropriate treatment is essential. Iron deficiency can have various underlying causes; treatment should be based on the specific diagnosis and the individual's health status.

Cardiac Iron Deficiency Pathway

Who to test
Every patient with Heart Failure should be tested for iron deficiency.

When to test
- At initial diagnosis in patients with suspected chronic HF.
- In patients with confirmed chronic Heart Failure, 1-2 times per year.
- In acute Heart Failure (prior to discharge from hospital).

What to test
Test for iron deficiency. FBC, Transferrin saturation (TSAT), Ferritin.

Step 1 — **Test for Iron Deficiency**
Ferritin <100 µg/L **OR Ferritin** 100-299 µg/L when **TSAT** <20%

If iron deficient, treat the deficiency and refer the patient for further investigation.

Step 2 — **Check anaemia status**
Male Hb <13 g/dL **Female** Hb <12 g/dL

No / **Yes**

Step 3 — **Intravenous iron has been shown to be beneficial in the following patients**
- Symptomatic chronic Heart Failure with reduced (HFrEF) and mildly-reduced Ejection Fraction (HFmrEF) with iron deficiency, with or without anaemia.
- Currently or recently hospitalised due to worsening Heart Failure, with HFrEF or HFmrEF and iron deficiency, with or without anaemia.
- Do not administer IV iron in people with a Hb of >150.
- IV iron therapy should be avoided in patients with active infection.

This figure has been developed using published guidelines.

Non-Cardiac Referral

Treat IDA and consider the following:

If ♀ Hb <120 ♂ Hb <130 with ferritin <15 (or <50 with inflammation) and the cause of anaemia has not previously been investigated consider referral to gastroenterology**.

Referral using Suspected Cancer Referral Should be used for patients aged >60 with IDA and consider referral for patients aged >50 with IDA and rectal bleeding.

British Society of Gastroenterology guidelines for the management of iron deficiency anaemia in adult's gut 2021;70:2030-2051.

**For female patients, obtain a history of whether per vaginal bleeding may be implicated as a cause of IDA.

Reproduced with kind permission from the Manchester Heart Centre at Manchester Royal Infirmary.

Pharmacosmos UK funded this educational resource as a hands-off educational grant.

PHARMACOSMOS
Committed to Quality

Pumping Marvellous
The heart failure charity

PATIENT RESOURCES

Pumping Marvellous provides a full set of patient resources in Heart Failure. To view them go to https://qrco.de/PatientResource or scan the QR code.

SCAN ME

Pumping Marvellous also provides patient resources free of charge to NHS teams. Please order here: https://qrco.de/OrderResources

SCAN ME

EDUCATION

Can you give a recap on what role iron plays in the blood?
Iron has several important functions in the human body. It transports oxygen around the body and is required by every organ of the body function properly. Too much or too little iron can be harmful for the body. Although iron levels are tightly regulated, the body cannot produce iron.

So how is iron metabolised and how does it relate to Heart Failure?
Iron metabolism is very complex but is now much more understood. The discovery of Hepcidin, a protein which plays a key role in iron homeostasis by regulating the entry of iron into the circulation, has further explained how Heart Failure and iron deficiency are correlated.

How is iron vital to heart function?
Iron is essential for optimal heart function. Too much or too little iron can contribute to, or exacerbate heart problems; including irregular heartbeats and Heart Failure.

What are the different types of iron deficiency?
Absolute Iron Deficiency: the body's iron stores are reduced (laboratory tests for low serum ferritin levels may indicate this). **Functional Iron Deficiency:** the body's iron stores are adequate, but the body's ability to use it is impaired (iron may not be readily available for red blood cell production despite the presence of iron stores); this is often seen in chronic diseases e.g., chronic Heart Failure and chronic kidney disease. **Iron-Deficiency Anaemia:** this severe form of iron deficiency occurs when iron stores are depleted enough to reduce the number of red blood cells/the amount of haemoglobin in the blood.

It's essential to diagnose/address iron deficiency early, preventing its progression to severe stages - particularly iron-deficiency anaemia, which can significantly impact health. Healthcare providers can conduct blood tests to assess iron status and determine the appropriate treatments based on the type/severity of iron deficiency; including iron supplementation, dietary changes, or addressing underlying causes of the deficiency.

Does diet help?
Food intake is how the body takes in iron. There are two types of iron in food, both haem and non-haem iron is found in animal food. Only non-haem is found in plant food, with <5% of non-haem being absorbed. A healthy diet is advisable, however in practice if a patient is iron deficient then regular dietary iron alone is unlikely to be sufficient to replenish and maintain iron stores.

When should intravenous iron be used?
In people with Heart Failure (EF <50%), intravenous iron, but not oral iron, has been shown to be effective and is recommended for the management of iron deficiency. In people without Heart Failure, intravenous iron is recommended when oral iron is ineffective, not tolerated or when there is the need to rapidly correct iron levels.

How big a problem is iron deficiency in Heart Failure?
Anaemia and iron deficiency are two important comorbidities in Heart Failure (Anand & Gupta 2018). Data from clinical studies indicates that up to 50% of patients with Heart Failure may be iron deficient. The consequences of iron deficiency in Heart Failure include reduced functional capacity despite optimal therapy, increased risk of hospitalisation, increased symptoms and poorer quality of life.
Why is iron deficiency common in people with Heart Failure?

People with Heart Failure have higher levels of the hormone hepcidin, which regulates the body's iron levels. High hepcidin levels can block the absorption of iron from the gut, meaning iron tablets/supplementation are often ineffective in correcting iron deficiency in Heart Failure.

Patients with heart conditions are often on blood-thinning medications, which also increase the risk of iron deficiency. Kidney impairment is also common in Heart Failure and is associated with iron deficiency.

Top Tips for Healthcare Professionals

- Remember the significance of an inflammatory response when interpreting blood results, in particular ferritin.
- Don't forget the significance of taking a good history, think of all factors that may have caused iron deficiency or anaemia.
- Iron deficiency is common in patients hospitalised with Heart Failure. Consider correcting iron deficiency prior to discharge, or soon after to reduce the risk of re-hospitalisation for Heart Failure.
- Iron supplements bought over the counter will have little effect on iron deficiency and dosages of supplements are poor. Too high a dose can also be detrimental.
- Use the animated video by Pumping Marvellous to explain the significance of iron deficiency in Heart Failure to patients.
- Setting up a new IV iron service for the sole purpose of managing iron deficiency in Heart Failure may not be sustainable. Consider approaching any current services that already exist. IV iron services are often managed by renal, gastro and haematology services. Similarly, investigate any current ambulatory IV services you have at your Trust.
- The administration of iv iron for iron deficiency in Heart Failure is considered to be cost-effective compared to placebo (QOL and hospitalisation over 24 weeks). Analysis indicates that IV FCM had a costing of £12,482 per QUALY gained (threshold of £20,000-30,000/QALY gained typically used by NICE.

HOW TO DIAGNOSE

A blood test can diagnose iron deficiency, with or without anaemia. Here's how healthcare professionals apply these tests towards diagnosis:

1. Ferritin Level:
- Low ferritin (a protein that stores iron in the body) levels can indicate a depleted iron store.
- Low ferritin is often one of the earliest signs of iron deficiency, even before the development of anaemia.

2. Transferrin Saturation (TSAT):
- TSAT is a measure of how much iron is bound to transferrin, a protein that transports iron in the blood.
- A low TSAT indicates that there is insufficient iron available in the blood.

3. Haemoglobin (Hb) Level:
w- Haemoglobin (a protein in red blood cells that carries oxygen throughout the body) levels are used to diagnose anaemia (lower-than-average haemoglobin levels in the blood).

Diagnosing iron deficiency typically involves interpreting the results of these tests together:
- Low ferritin: suggests that iron stores are depleted.
- Low TSAT: indicates that the available iron in the blood is insufficient.
- Low haemoglobin: suggests anaemia.

REFERENCES

Anand,I., Gupta,P. (2018) Anaemia and Iron Deficiency in Heart Failure, https://www.ahajournals.org/doi/pdf/10.1161/CIRCULATIONAHA.118.03009
Ebner,N., von Haehling,S. (2013) Iron deficiency in Heart Failure a Practical Guide, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3798931/
ESC (2016) Acute and Chronic Heart Failure Guidelines, https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Acute-and-Chronic-Heart-Failure
SIGN (2016) Management of Chronic Heart Failure, https://www.sign.ac.uk/sign-147-management-of-chronic-heart-failure.html
2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic Heart Failure: European Heart Journal (2023); ehad195, https://doi.org/10.1093/eurheartj/ehad195
Chronic heart failure in adults: diagnosis and management, https://www.nice.org.uk/guidance/ng106

Contact Us

Donate

01772 796542

www.pumpingmarvellous.org

Pumping Marvellous

@pumpinghearts

helpforhearts (closed support group)

heart failure nurse community forum