

Iron Deficiency & Anaemia in Heart Failure



A successful Second National Heart Failure Nurse Meeting was held in September 2018 in Manchester. The meeting focused on the review of iron deficiency and anaemia in heart failure. Below are some of the learning highlights from the meeting, presented in a format of key questions and answers from the day, and some TOP TIPS on how to address the issue of heart failure and iron deficiency in clinical practice.

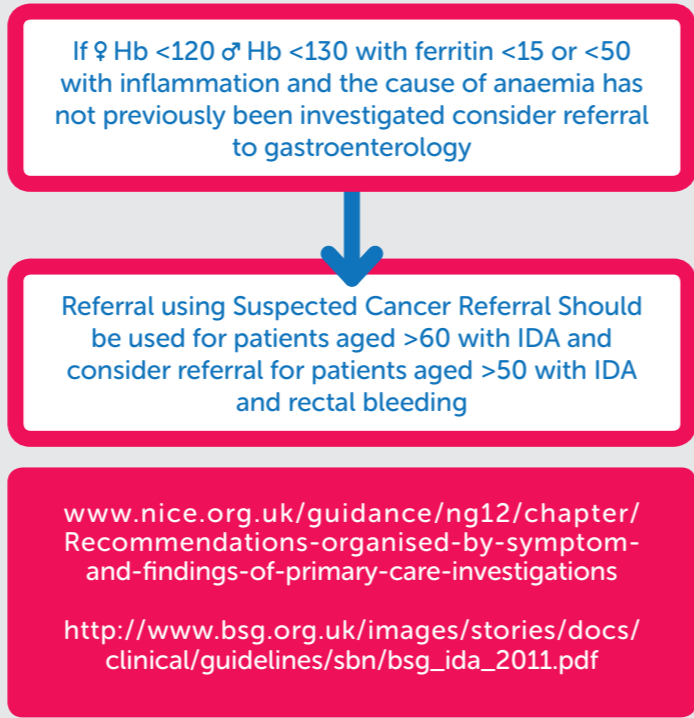
Thanks go to the Chairs of the programme Mrs Jayne Masters and Mrs Annie MacCallum, and the speakers of the day, Dr John Baxter, Dr Sue Piper, Dr Ewan McKay, Dr Parminder Chaggar, Dr Simon Williams, Dr Carla Plymen, Dr Robin Ray and Ms Louise Clayton on which the following information is based.

A big thank you to Dr Fozia Ahmed Consultant Cardiologist, for her contribution to this document and sharing the pathway that has been designed and utilised at Manchester Royal Infirmary.

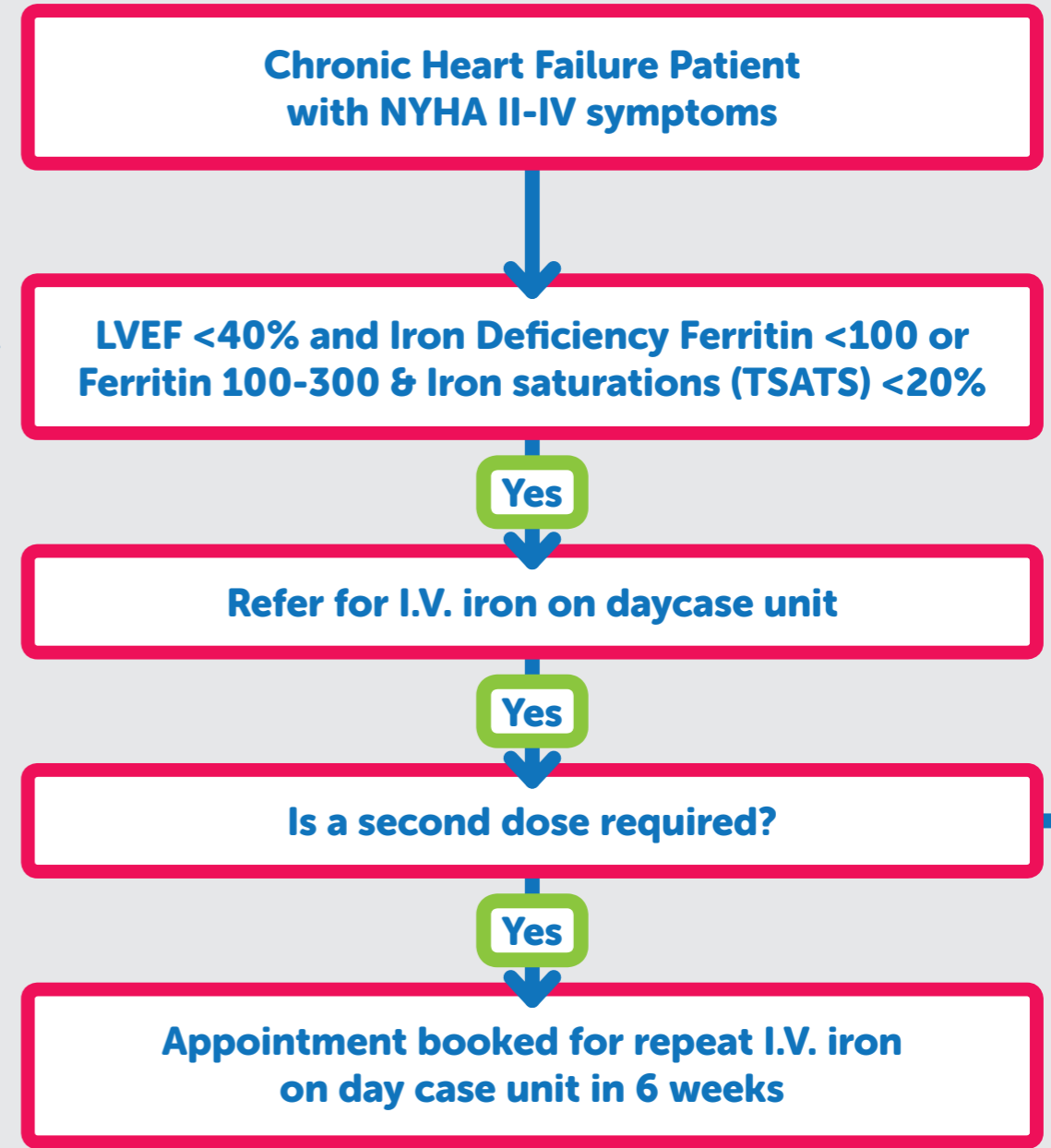
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Non Cardiac Referral



Cardiac Iron Deficiency Pathway



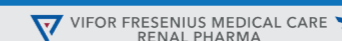
TOP TIPS!

- Remember the significance of an inflammatory response when interpreting blood results, in particular ferritin
- Don't forget the significance of taking a history, think of all causes that may have caused iron deficiency or anaemia
- Use the animated video by Pumping Marvellous to explain the significance of iron deficiency in heart failure to patients <https://www.youtube.com/watch?v=oo0zBfUlyMg>
- 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
- 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. Could any new service be linked to CQUIN to assist in its creation?

- Consider enrolling the patient in the IRONMAN clinical trial. Find details at <https://ukctg.nihr.ac.uk/trials/trial-details/trial-details?trialNumber=NCT02642562>
- 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 QALY gained (threshold of £20,000-30,000/QALY gained typically used by NICE)
- See the following journal item for flow charts etc on the giving of iron. McDonagh, T. & Macdougall, I. (2015) European Journal Heart Failure for Treatment of Iron Deficiency in Heart Failure <https://onlinelibrary.wiley.com/doi/full/10.1002/ehf.236>
- Ensure you have the correct coding. The number and nature of comorbidities a heart failure has, impacts on the tariff remunerated for treatment. Therefore if you fail to code properly then you may not recoup the full costs of treatment. If you fail to code properly you may not recoup the costs of treatment

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Thanking Vifor Pharma for providing a hands off educational grant for the development & production of this resource



PATIENT RESOURCES

A list of our Marvellous Guides for people, carers and families living with heart failure -

- HOPE
- **Big Pocket Guide to heart failure**
- **Guide to caring for heart failure patients**
- **Guide to having a cardiac device**
- **Guide to medicines in heart failure**
- **Guide to PPCM**
- **Guide to walking a day in my shoes**
- **Guide to ECHO**
- **Mister Marvellous**
- **Symptom checker**
- **Map of heart failure**
- **My appointment diary**

EDUCATION

Can you give a recap on what role iron plays in the blood?

Iron has several important functions and is instrumental for normal human health. It is necessary for oxygen transport and storage, acts as a co-factor for numerous proteins involved in DNA replication and repair, and is critical for normal brain function learning, memory and mood. The human body can absorb, store and transfer iron but is not able to excrete it. It requires tight regulation as insufficient amounts of iron or overabundance of iron has detrimental effects on the body.

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 Heparin, 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 vital is it to heart function?

Too much or too little can lead to arrhythmia, diastolic and systolic dysfunction, as well as overt failure. Moreover, it has an important role in other physiological functions that contribute to the heart failure syndrome, e.g. impaired mitochondrial function.

Are there different types of iron deficiency?

There are two main types of iron deficiency in heart failure. Functional iron deficiency -inadequate iron supply to meet demand despite normal or abundant iron stores. This is characterised by the presence of normal or high ferritin (100-300ng/ml), TSAT <20% and high hepcidin. Whereas absolute iron deficiency – is characterised by depleted body iron stores. In this setting there is low serum ferritin (<100ng/ml), TSAT <20% and low hepcidin.

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.

How big a problem is iron deficiency in heart failure?

Anaemia and iron deficiency are two important co-morbidities 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.

FUTURE TRIALS

What are the future trials to be aware of?

The Iron Man clinical trial is designed to evaluate the safety and efficacy of iv iron compared to standard of care and will examine the effects of IV iron on hard endpoints such as CV mortality and heart failure hospitalisation. Fair-HF2 is investigating the effects of IV iron in patients with systolic failure on morbidity and mortality. HEART-FID is looking at the safety and efficacy of FCM compared to placebo and incidence of death and hospitalisation.

HEALTHCARE PROFESSIONAL RESOURCES

- **Iron deficiency and anaemia in heart failure**
- **Primary care what you need to know about the NICE Chronic Heart Failure Guidelines 2018 for adults**

Online resources for patients and healthcare professionals

Just Heart Failure - find your local heart failure nursing team www.justheartfailure.org

PMTVLive - Our YouTube channel packed with great resources

Heart Failure Aware - Our educational page on Facebook with heaps of resource and knowledge for patients and healthcare professionals alike

Search "**Help for Hearts**" on Facebook - Our closed community for patients, carers and family members offering peer to peer support 24hrs a day

Search "**Heart Failure Nurse Community Forum**" on Facebook - Our closed community for Heart Failure Nurses helping nurses and teams communicate with each other.

HOW TO TEST AND SPOT

What should we be testing for?

- FBC, noting the MCV
- Serum Ferritin
- TSAT

I have the results, what am I looking for?

Here is a recap of some basic definitions

HB - a protein in your blood that carries oxygen to tissues and organs.

MCV - mean corpuscular volume, is the average red blood cell volume (its size) if it is raised with anaemia think B12 and folic acid deficiencies, liver disease and alcoholism. If reduced then iron deficiency, think on going silent blood loss, inflammation or thalassemia.

Ferritin - protein that contains iron and is the primary form of iron stored in cells. Ferritin levels found in the blood gives a reflection of total amount stored in the body.

TSAT - or serum transferrin saturation, is a measure of the amount of iron in the blood that is bound to a protein called transferrin. This protein binds to iron and transfers it around the body.

TIBC - or total iron-binding capacity, is a measure of the bloods capacity to bind iron with transferrin.

B12 - a vitamin required for maturation of developing red blood cells in bone marrow.

Folate - vitamin B9 works closely with B12 in making red blood cell.

The aforementioned tests, either individually or in combination, can help steer you towards deciding if the patient is iron deficient or has iron deficiency anaemia and the reasons why. It is important to consider all causes of iron deficiency and anaemia, including chronic blood loss- ask the question Why? Take a history, and consider sinister causes such as gastrointestinal malignancy.

GUIDELINES & TREATMENTS

What do the ESC guidelines say about iron deficiency in heart failure?

According to ESC guidance and based on the clinical trials of Fair-HF and Confirm-HF the following should be used as reference for the detection of iron deficiency: Serum Ferritin <100ug/L OR Serum Ferritin 100-299 ug/L when TSAT <20%

What else should I be aware of in heart failure?

Like C-reactive protein (CRP), Ferritin is an acute phase protein whose levels may increase during inflammatory processes, intercurrent infection or oxidative stress. This point should be considered when a patient presents with acute failure- testing of Ferritin levels may well be abnormally raised at this time and or when co-morbidities of an inflammatory nature are present. Transferrin is a negative acute phase reactant; therefore levels decrease during periods of inflammation. (Ebner & von Haehling 2013).

How do we treat iron deficiency?

Iron repletion is associated with improvement in symptoms, reduced hospital admissions, and improved quality of life. The administration of oral iron has so far not been shown to improve iron deficiency in heart failure. As a result of both Fair-HF and Confirm-HF, ESC (2016) guidelines recommend the administration of IV iron- ferric carboxymaltose (FCM), as the means of addressing iron deficiency in heart failure. SIGN (2016) also made similar recommendations. However NICE (2018) have made no recommendation on the management of iron deficiency in heart failure and await further trial data.

Which heart failure patients should we check for iron deficiency and how often?

Guidance (ESC & SIGN) would suggest that we should check all new patients with heart failure and every six months which could

REFERENCES

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Ebner,N., von Haehling,S. (2013) Iron deficiency in Heart Failure a Practical Guide
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ESC (2016) Acute and Chronic Heart Failure Guidelines
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SIGN (2016) Management of Chronic Heart Failure
<https://www.sign.ac.uk/sign-147-management-of-chronic-heart-failure.html>

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Educational Handout



Contact Us



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www.pumpingmarvellous.org



heartfailureaware (open)



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helpforhearts (closed support group)



heart failure nurse community forum