

PATIENT INFORMATION SHEET FOR INTRAVENOUS (IV) IRON THERAPY

Please read this leaflet carefully. This information sheet summarises essential information and FAQs about intravenous (IV) iron therapy.

What is the role of iron in the body?

Iron is an essential nutrient that provides oxygen and energy for bodily processes.

- Iron is an important part of haemoglobin (Hb), which is the red pigment that gives blood its distinct colour. Haemoglobin is the substance that carries oxygen around your body.
- Iron is a key component of enzymes involved in manufacturing energy in the muscles.

Lack of iron, known as iron deficiency, has many symptoms including: fatigue, tiredness, exhaustion, trouble sleeping, poor thought processing, brain fog, anxiety, depression, restless legs, hair loss, shortness of breath, heart palpitations, paleness and pica (craving ice/paper/soil/other non-foods).

Why do I need intravenous iron therapy?

Your blood results have shown that you are iron deficient. Without treatment, iron deficiency can progress to anaemia, whereby there is insufficient iron for red blood cell production, resulting in reduced oxygen carrying capacity in the blood. The symptoms of iron deficiency occur in both patients with iron deficiency anaemia (IDA) and in patients with iron deficiency without anaemia (IDWA).

Many patients struggle with these symptoms for years, despite trying to make appropriate dietary changes or taking oral iron supplements, which can often be poorly tolerated due to gastrointestinal side effects. In these cases, simple measures have failed to meet the patient's iron requirements, therefore, an iron infusion is the best option. Other patients may opt for intravenous iron as a means of rapidly replenishing iron stores as it is the most efficient treatment strategy.



How is iron deficiency detected?

Iron status is detected by measuring ferritin concentration and transferrin saturation.

- Ferritin is a protein that stores iron in the cell, particularly the liver. Measurement of ferritin reflects the body's iron stores. A low ferritin value indicates reduced iron storage.
- Transferrin carries iron from the body's stores to the bone marrow, where iron is used to make red blood cells. Transferrin saturation (TSAT) with iron indicates iron availability, therefore, a low TSAT value indicates iron deficiency.

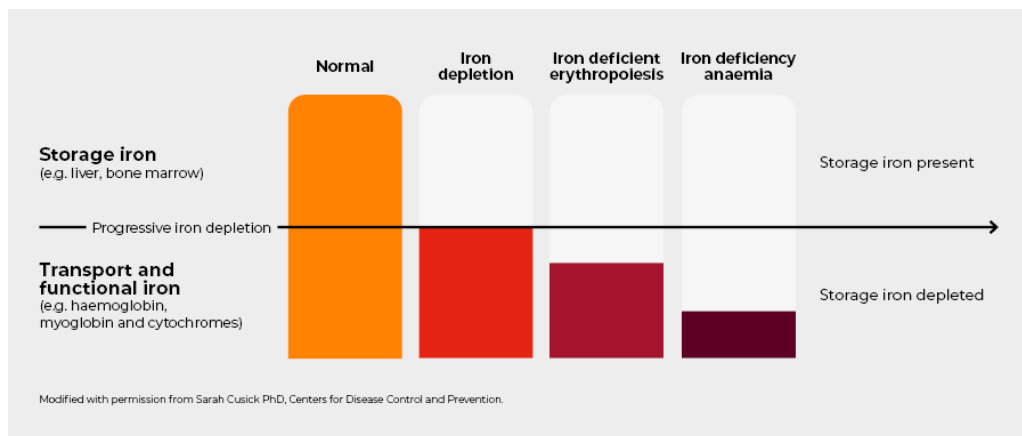
How does iron deficiency progress to anaemia?

Iron is essential for creating haemoglobin and consequently red blood cells for transporting oxygen around the body. Less available iron reduces the amount of haemoglobin that can be made. When this leads to less red blood cell production and less capacity for oxygen transport, the person has become anaemic. Anaemia is defined as a concentration of haemoglobin [Hb] in the blood that is:

[Hb] < 120g/L for women

[Hb] < 130g/L for men

In iron deficiency anaemia, the red blood cells that are produced are of lower quality. These cells are smaller than normal, microcytic, which is detected in blood tests by a low mean corpuscular volume (MCV) value and low mean corpuscular haemoglobin (MCH).



What is the normal amount of iron in the body?

Iron is predominantly distributed within the red blood cells and muscles of the body. At any one time there is typically between 3000 - 4000mg of iron in the body. The body cannot synthesise iron, therefore, preserves as much iron as possible through effective recycling processes. Only around 1-2mg of iron is lost per day, usually through sweat, which is then accounted for by absorbing iron from the diet. Problems with this process occur when there are issues with replenishing the iron stores or when there is a greater loss of iron, typically leading to iron deficiency.

What are the causes of iron deficiency?

One of the top causes is nutritional deficiency. There are two types of iron available in the diet: haem iron and non-haem iron. Haem iron is exclusively found in meat products and is absorbed 10 times better than non-haem iron as it utilises a more effective absorption process in the gut. Non-haem iron is the only available iron type in plant-based foods, making it more difficult to absorb sufficient iron from plant-based diets. The body requires an absorption of 2-8mg of iron from the diet daily to account for iron losses.

To meet this demand, optimally red meat should be incorporated in the diet. Plant-based products rich in iron include cereals, soya, green vegetables and pulses. Vitamin C is essential for the non-haem iron absorption process, therefore, incorporating foods such as citrus into the diet can aid the absorption process. Other dietary changes include avoiding consuming tannins, found in tea and coffee, for an hour after eating as tannins are known to reduce the absorption of iron. Similarly, antacid medication reduces the absorption of iron as an acidic environment is required to separate iron from food for absorption.

In women, the commonest cause of iron deficiency is blood loss due to menstruation. Typical menstruation results in 25mg of iron loss per month, which is 300mg per year. Heavy menstrual bleeding (HMB) can result in over 40mg of iron loss per month, adding up to over 480mg per year. HMB is surprisingly common, affecting 1 in 4 women at some point in their life. HMB can be identified as:

- ❖ needing to change sanitary products every 2 hours
- ❖ changing sanitary products throughout the night
- ❖ bleeding through clothing
- ❖ passing blood clots larger than 2.5cm
- ❖ using 2 forms of sanitary product simultaneously



Another common cause of iron deficiency is pregnancy, as the foetal development requires around 1400mg of iron and is provided from the mother. Further iron is lost in labour induced blood loss, with a caesarean section blood loss typically resulting in a 250mg loss of iron. Blood loss from surgery is also a cause of iron deficiency, while bariatric weight loss surgery further increases the risk of iron deficiency as it compromises the section of gut responsible for iron absorption. Further causes of iron loss include inflammation from gastrointestinal disease (IBS/Coeliac/Chron's/colitis), arthritis, chronic exercise, diabetes or various chronic diseases.

How much iron does an iron deficient person have?

The body normally has 3000 - 4000mg of iron in total. In iron deficiency, the body is usually functioning utilising 30-50% of the iron stores, therefore, an iron deficient person usually has 1000mg - 2000mg of bodily iron. To put this in perspective, your body has several years of iron in reserve. Reduced iron absorption or increased iron loss progressively results in iron deficiency, often meaning symptom onset can go unnoticed.

Below illustrates the quantity of iron available, the amount annually absorbed through diet and the amount of iron potentially lost in a year through various mechanisms.

Iron available: 3000-4000mg

Iron potentially gained/lost over one year:

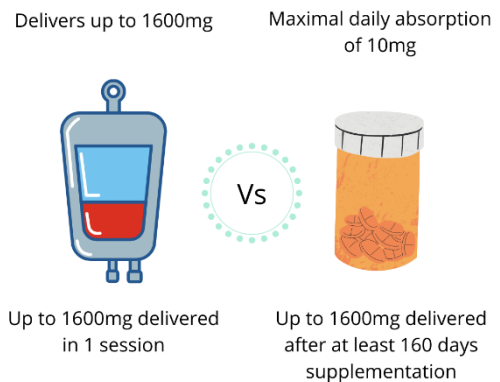
Normal dietary absorption	=	+2000mg
Normal losses	=	-1000mg
Losses from normal periods	=	-250mg
Losses from Heavy periods	=	-500mg
Pregnancy	=	-1400mg
Blood loss (1litre)	=	-500mg

As the table above shows, women lose a significant amount of iron through menstruation and pregnancy, which largely contributes to 1 in 10 women being iron deficient. With the high prevalence, iron deficiency can often be overlooked. In a large European survey, most women experienced symptoms of iron deficiency an average of 7-8 years before seeking help.

Why can I not just take iron tablets?

Dietary changes and oral supplementation with iron tablets is effective for many people, particularly those with mild iron deficiency and few symptoms. Iron tablets are often prescribed in high doses which frequently results in abdominal cramps, nausea, constipation or diarrhoea. Only a maximum of 10mg of iron can be absorbed from the gut into the body per day, therefore, research has found that a 60mg dose of iron taken on alternating days is best tolerated by patients.

Besides a third of patients being unable to tolerate iron tablets due to the side effects, the limited daily iron absorption from the gut to the body means that it would take at least 100 days of supplementation to absorb 1000mg of iron. Most patients need 4-6 weeks to see their anaemia improve and would need to be on iron supplements for 3-9 months, to fully replenish normal iron stores.



Why should I have an intravenous iron infusion?

Novel preparations of intravenous iron enable an individual to receive a 'total dose' infusion safely in 15 to 30 minutes. This means we can safely and effectively provide up to 1600mg of iron in a single infusion, which is sufficient for replenishing iron stores effectively in a single visit. An iron infusion is a considerably faster and more effective method to correct anaemia than iron tablets. The iron is delivered directly into the blood, which enables the iron to be supplied efficiently to the muscles and bone marrow, where it is in great demand.

Patients feel noticeably better in a matter of days, with anaemia often corrected within 10 to days post treatment. Patients frequently report more energy, less fatigue, better concentration and less breathlessness within the first few weeks. As the treatment is a total dose, you may not require any further treatment or iron tablets.

How do I prepare for an iron infusion?

- ❖ Ensure you are well hydrated and have eaten a light meal before attending your treatment.
- ❖ Stop taking any oral iron supplements the day before attending to your appointment.
- ❖ Please read this patient information sheet and have a look on our website for further information. If you have any questions, then either bring these to your appointment or drop us an email for our team to get back to you.

How is intravenous iron administered?

When you come in the team will see you to go through your indication and need for the infusion. You will have your pulse and blood pressure taken then a small needle will be placed in a vein in your hand or arm, this is a cannula that the infusion will go through. It's important that this is sitting well within a vein so they will check this with a flush of cold water that you may feel going up the arm. The iron is then given as a slow injection/infusion/drip over 15-30 minutes. The iron is a black liquid given in a bag of saline, with a total volume of 100ml. The preparation is set up as a 'drip' and the rate of the infusion is controlled by a pump.

Are there any risks?

We understand that patients may experience anxiety prior to this procedure, however, we can assure you that intravenous iron treatment is a safe procedure. Intravenous iron will only be recommended to you if deemed suitable by our consultant team. You will be monitored by our team throughout your treatment and for 30 minutes after your treatment to ensure your safety. A phone call will also be carried out with our team 48 hours after your treatment to address any concerns you have and to assess your welfare.

Are there any side effects?

In unfortunate cases the line sometimes leaks, in which case this can leave a brown stain or tattoo. Around 4% of patients experience side effects, with the most common being a metallic taste in your mouth, this normally disappears within 15 minutes post-treatment. Other side effects include skin flushing, light headedness, queasiness or dizziness. If you experience these symptoms, please tell the person providing the treatment. The nurse may stop the infusion for several minutes and restart it more slowly over 30 minutes to settle the symptoms.

Other side effects that are rarer include lowering of blood pressure, tingling, limb numbness, abdominal discomfort, muscular aches and pains, fever, rashes and swelling of the hands/feet. In extremely rare cases, there can be anaphylactic-like reactions (e.g. paleness, swollen lips, itchiness, weakness, sweating, dizziness, feeling of tightness in the chest, chest pain, fast pulse, difficulty in breathing). These may be an allergic reaction to the iron preparation, which you will be given antihistamine medication (hay fever tablet) or sometimes a steroid injection to treat.

Are the iron preparations safe?

We only provide patients with iron preparations that have undergone rigorous safety checks. The preparations we use are:

- ❖ Monofer – which is an iron isomaltoside solution providing up to 1600mg of iron in 30 minutes
- ❖ Ferinject (Injectafer) – which is a ferric caboxymaltose solution providing up to 1000mg of iron in 15 minutes

Older preparations using iron dextran were associated with complications, we do not use these iron preparations, and it is important when researching iron infusion experiences online to check which solutions were used.

The new preparations are far safer and are now in routine NHS and worldwide use. In Australia, over 30,000 infusions of intravenous iron are given every month. In clinical trials of over 8000 patients, they compared patients who received intravenous iron with patients receiving a saline placebo solution and found that there was no difference in the number of events reported between the iron and placebo groups.

Around 4% of people who receive intravenous iron do fell some side effects, with most of these effects being mild and self-limiting. The major risk is calculated at less than 10 people in a million. In a detailed review (JAMA 2016) it was suggested that the risk of the new types of IV iron was similar to the risk of receiving penicillin, while presenting only a third of the risk of receiving a blood transfusion.

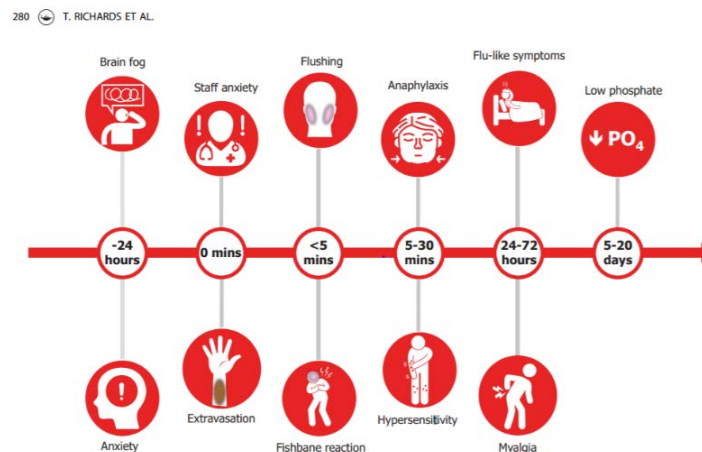


Figure 2. Adverse events associated with the administration of intravenous iron can be anticipated according to when they typically occur. Educational material and institutional training should prepare patients and staff for their occurrence, minimizing the need to unnecessarily withhold or abandon administration and reducing the need for subsequent patient visits.

What happens after the procedure?

Once the infusion has stopped, we check you are well, repeat your observations, then remove the cannula. You will then wait in the clinic for 30 minutes after your treatment to ensure you are well before you leave the clinic. You will then be contacted 48 hours after your treatment to check your welfare and discuss any queries you may have.

How long until I feel better?

Patients frequently report feeling that many of their iron deficiency symptoms have improved within a week of intravenous iron treatment. These symptoms often include leg cramps, headaches and non-food cravings. Fatigue and tiredness symptoms improve with the iron correction, while anaemia typically improves within 2-3 weeks.

Are there any situations I should not have an iron infusion?

You may not be able to receive an iron infusion if you are known to be sensitive/allergic to any iron preparations intended for intramuscular or intravenous administration; you are feeling unwell; you have any acute or chronic active infections; you are known to have significant damage to your liver.

How long will I need to have the infusions?

The total dose infusion is one injection only, with the aim to restore your body's iron stores to normal in one visit. Unless you have ongoing blood loss issues, or another medical illness, it is unlikely you will need further infusions. Around 20% of patients do require a second infusion after 2-3 months, with this usually occurring in patients who were initially very iron deficient or for patients with ongoing iron losses.

We recommend that you repeat your blood tests 6 weeks after your iron infusion, which can be carried out through your GP or an external provider. The target results are:

Haemoglobin (Hb)	> 120g/l	target > 130g/L
Ferritin	> 30 µg/L (minimum)	target 50-100 µg/L
Transferrin Saturation (TSAT)	> 20% (minimum)	target 30% - 40%

How do I improve hair loss as a result of iron deficiency?

Some patients have significant hair loss (shedding) or poor hair quality as a result of iron deficiency. The recommendation is to keep your iron levels high, with the aim of sustaining a ferritin value > 80, for two years to allow full hair restoration. In this latter case then a repeat infusion may be needed to achieve such levels.

Who can I contact with queries or concerns?

Visit our website www.theironclinic.co.uk for more information or visit our social media pages for iron blogs, novel research and updates about the clinic. Click the icons for more.



For any queries, drop our team an email at info@theironclinic.co.uk or call **020 3875 8171**

For more FAQs please see the article: Questions and answers on iron deficiency treatment selection and the use of intravenous iron in routine clinical practice, Annals of Medicine, 53:1, 274-285, DOI: 0.1080/07853890.2020.1867323

<https://www.tandfonline.com/doi/full/10.1080/07853890.2020.1867323>