Iron deficiency in pregnancy
Full Clinical Guideline

Reference No.: UHDB/AN/10:23/I3

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1. Introduction

Iron deficiency is a significant problem for pregnant women in the UK and the commonest cause of anaemia in pregnancy globally.

Deficiency without anaemia is associated with maternal fatigue and increased risk of postpartum depression. Without prophylaxis there is a high risk of progression to anaemia. Individual risk of iron deficiency needs to be considered for all pregnant women to allow preventative treatment.

Iron deficiency anaemia is associated with increased maternal morbidity and mortality, as well as perinatal morbidity and mortality. Prompt recognition, investigation and treatment regimes aimed at improving compliance, absorption and effectiveness are necessary to minimise risk of adverse outcomes, postnatal anaemia and need for transfusion.

Routine iron supplementation for all pregnant women is NOT recommended as there is insufficient evidence to assess the benefits and potential hazards.

2. Purpose and Outcomes

- To provide all healthcare professionals caring for pregnant women with national evidence based recommendations for the prevention, diagnosis and treatment of iron deficiency anaemia in pregnancy and the postpartum period

- To ensure timely and safe management and a multidisciplinary approach to the use of iron therapy in pregnancy (oral and parenteral)

3. Abbreviations

BJH - British Journal of Haematology
BSH - British Society of Haematology
IDA - Iron Deficiency Anaemia
IOL - Induction of Labour
LBW - Low Birth Weight
PPH - Postpartum Haemorrhage
SGA - Small for Gestational Age

4. Key Responsibilities and Duties

Healthcare professionals providing care for pregnant women need to:

- Be vigilant for iron deficiency in pregnancy,
- Promptly treat and investigate anaemia
- Maximise efforts to correct antenatal anaemia before birth to reduce the associated maternal and perinatal morbidity, postnatal anaemia and risk of need for transfusion.
- Consider and decide the most appropriate iron therapy
- Ensure therapy is effective

Obstetric medical staff need to:

- Decide when parenteral iron is advised
- To prescribe parenteral iron and make arrangements for safe delivery in a timely manner in an appropriate setting

5. Diagnosis and Management of Iron Deficiency

5. 1 Definition of Anaemia

First trimester (up to 12 weeks)	Haemoglobin < 110g/l
Second and third trimesters	Haemoglobin < 105g/l
Immediately postpartum	Haemoglobin < 100 g/l

5.2 Maternal and Perinatal Effects of Iron Deficiency

Effects of iron deficiency with or without anaemia:

- Prolonged fatigue (responds to Fe replacement)
- Increased risk of postnatal depression
- Poor quality of life

Additional effects of iron deficiency with anaemia:

- Increased risk of postpartum haemorrhage
- Increased risk of puerperal sepsis
- Hb < 70g/dl associated with a 2 fold increase in risk of mortality

- Increased risk SGA, LBW and stillbirth
- Increased risk preterm birth
- Increased risk of perinatal and neonatal mortality

- Lower serum ferritin in cord blood at blood at birth (compromised fetal iron supply for high growth rate in first 4-6 months after birth)
- Potential implications for Neurodevelopmental impairment

5.3 Symptoms and Signs of Iron Deficiency

Early iron depletion: Fatigue, Irritability, Poor concentration, Hair loss

ID Anaemia: Fatigue, Pallor, Weakness, Headaches, Palpitations, Dizziness, Shortness of breath, Irritability, Restless legs, Pica

5.4 ***Diagnosis***

Hb below defined levels above

Low MCV, MCH, MCHC suggestive (caution as MCV physiologically increases in pregnancy and may also be low in haemoglobinopathies)

Serum ferritin < 30 µg/l diagnostic (normal does not exclude as physiological increase in acute phase proteins associated with pregnancy)

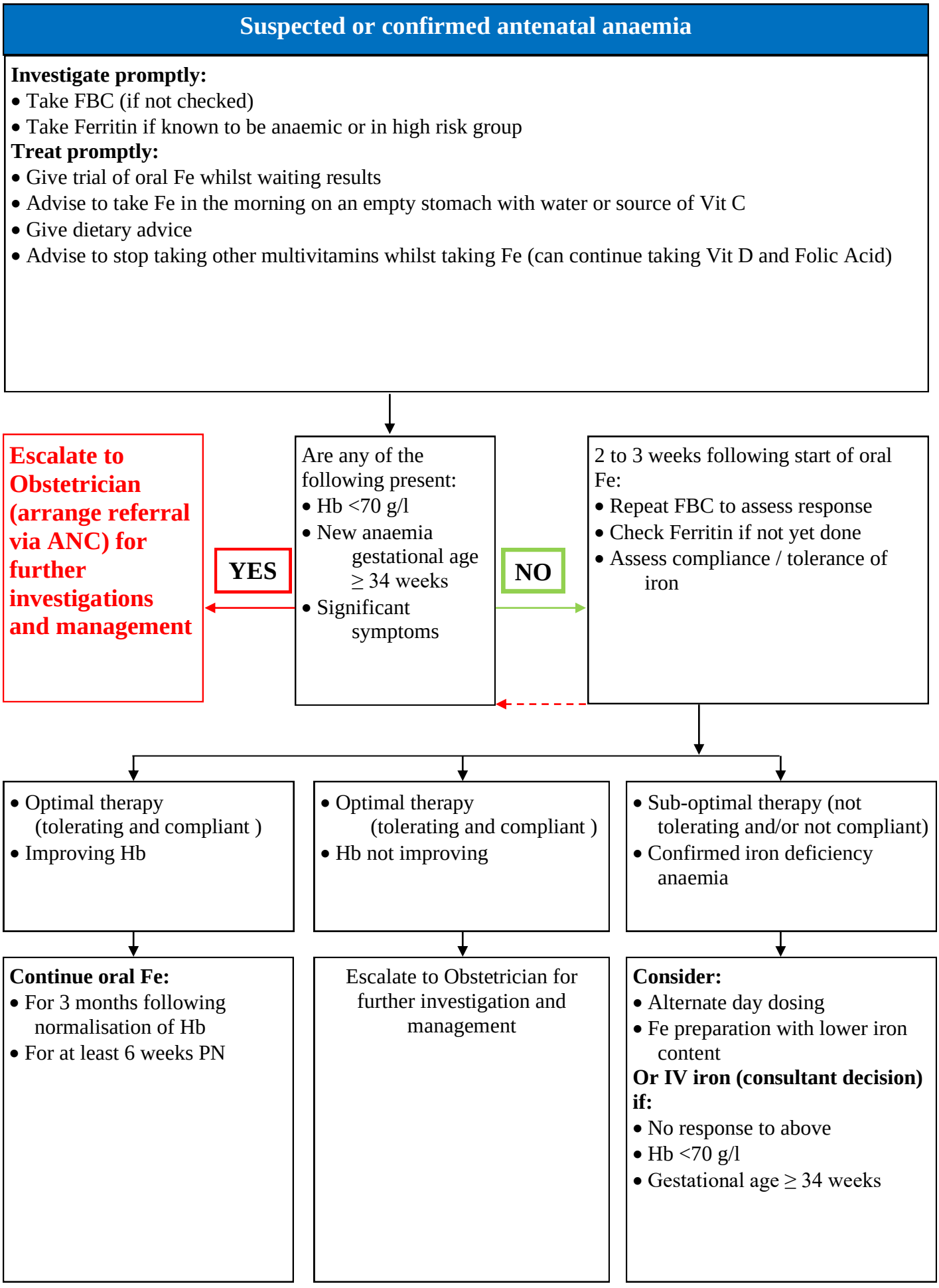
5.5 Identifying Women at Risk of Iron Deficiency Anaemia

Anaemia present	**Not yet anaemic but at high risk**	**Not yet anaemic**
Serum ferritin required before iron supplementation	Consider iron supplementation +/- serum ferritin testing	Serum ferritin advised
• Known Haemoglobinopathy (Sickle Cell or Thallasaemia patient) • Prior to parenteral iron replacement with Ferinject®	• Previous anaemia • Parity 3 or greater • Twin or higher order multiple pregnancy • Inter-pregnancy interval < 1 year • Poor dietary habits/vegetarian or vegan diet • Teenagers • Recent history of clinically significant bleeding	• High risk of bleeding during pregnancy or birth • Women declining blood products • Women for whom there may be difficulties cross-matching compatible blood

Table 1

Dietary advice on how to maximise iron absorption from diet should be given to all women at risk of IDA Iron in your diet, patient information, NHS Blood and transplant NHS

5.6 Antenatal management of Iron Deficiency



Multivitamins or other 'off the shelf' preparations are not recommended. They contain other minerals that may interfere with iron absorption or may have insufficient amounts of iron

Recent studies suggest that lower doses of iron or intermittent supplementation may be advantageous and improve dose limiting tolerance and compliance.
Recommended doses of elemental iron are 40-80mg once daily or alternate days ***Optimal absorption appears to be achieved with alternate day dosing***
Avoid twice or three times daily dosing as higher doses increase side effects such as gastric irritation, nausea and bowel irritation.

Advise to take iron early morning on an empty stomach, with water or a source of Vitamin C to enhance absorption

Avoid enteric coated or sustained release preparations as absorption is limited with these

Recommend alternate day dosing or preparations with lower iron content for women with significant nausea or epigastric discomfort

5.7 Recommended Dosing of Oral Iron Preparations

Iron Salt	Preparation	Dose	Element iron content
Ferrous Sulphate	200mg	od/alt day	65mg
Ferrous fumarate	210mg	od/alt days	65mg
Ferrous gluconate	300mg	x2 tablets	35mg each tablet
Ferrous feredate	195mg/5ml elixir	10mls	27.5mg/5mls

Table 2

5.8 Parenteral Iron Therapy
Oral iron is the treatment of choice for iron deficiency anaemia

The decision to give parenteral iron is a Consultant decision. It should only be administered in premises with facilities for management of acute anaphylaxis and cardio-pulmonary resuscitation

5.8.1 Indications
- Failure to respond to optimal oral therapy in confirmed Fe deficiency anaemia at 2-3 weeks
- Suboptimal therapy (poor compliance/tolerance) in confirmed Fe deficiency anaemia (see Flow chart 1)
- Inflammatory bowel disease/malabsorption syndromes
- Late pregnancy (consider after 34 weeks)
- Severe Fe deficiency anaemia and need to expedite response time

5.8.2 Contraindications
- Anaemia not confirmed as Fe deficiency, needing further investigation
- Disorders of iron storage/utilisation eg thalassaemia, haemochromatosis
- Hypersensitivity to parenteral iron
- Strong history of atopic allergies
- Liver disease or raised transaminases
- Untreated infection, acute or chronic (parenteral iron may exacerbate)
- First trimester of pregnancy
- Acute renal failure

5.8.3 Treatment Dose/administration
Hb and serum ferritin required before prescribing and consider need for further investigation of anaemia (eg B12/folate, see Flow Chart 1)

Oral iron needs to be discontinued as absorption will be reduced and should not be restarted before 5 days after the infusion.

A copy of the patient information leaflet (Ferinject®, iron infusion in Maternity. Appendix A) should be given to the patient

A copy of the guidelines should be available and all necessary drugs and resuscitation equipment to manage hypersensitivity reactions, anaphylaxis and cardiopulmonary resuscitation prior to administration.

Ferric Carboxymaltose (Ferrinject) is the preparation of choice for total dose iron infusion due advantage of quicker administration and easier dosing regimen. Due to a low incidence of anaphylaxis a test dose is not required

Please prescribe and administer as follows depending on booking weight:

Booking weight > 50kg
1000mg Ferric carboxymaltose in 250mls sodium chloride 0.9% to be given over 15 minutes

Booking weight < 50kg
500mg Ferric carboxymaltose in 100 mls sodium chloride 0.9% to be given over 15 minutes

5.8.4 Monitoring during parenteral iron therapy

Hypersensitivity reactions, including (rarely) severe /life threatening anaphylactoid reactions can occur including after previously uneventful doses of parenteral iron. Mild side effects can occur in up to 1 in 10 patients.

- Check there are no contraindications prior to commencing infusion
- Check BP and pulse prior to infusion
- Ensure staff trained in management of allergic reactions are available bearing in mind that such reactions can be delayed and happen after infusion has finished
- Avoid paravenous leakage as this may lead to skin irritation and lasting discoloration at the injection site. *Stop infusion immediately if any signs of this*
- Monitor for signs of hypersensitivity during and for 30 minutes after infusion. If any signs: urticarial /rash; itching; nausea; shivering; respiratory difficulty *stop infusion immediately, call for medical assistance and follow management guidelines below*

5.8.5 Management of Allergic Reaction with parenteral iron therapy

- Mild Reactions (flush, fever, rash, peripheral oedema)
  - Stop infusion, give oxygen by face mask
  - Call for urgent medical review
  - Give 10-20mg chlorphenamine (piriton) over 1 minute
  - Give hydrocortisone 100-300mg iv
  - Observe closely for anaphylaxis

- Anaphylaxis (respiratory difficulty, cardiovascular collapse: < 1 in 10,000)
  - Stop infusion
  - Call for immediate help- Obstetric registrar/Consultant, anaesthetic SPR/Consultant
  - Lie flat/ in lateral tilt to avoid venocaval compression, secure airway, give oxygen by face mask
  - Give im adrenaline 500 micrograms (0.5ml of 1 in 1000) and call for CPR support

- Delayed Reaction (arthralgia, myalgia, fever)
  - Uncommon
  - May occur from a few hours to up to 4 days after infusion
  - Usually settles with simple analgesia and last 2-4 days

5.9 Management of Delivery with IDA

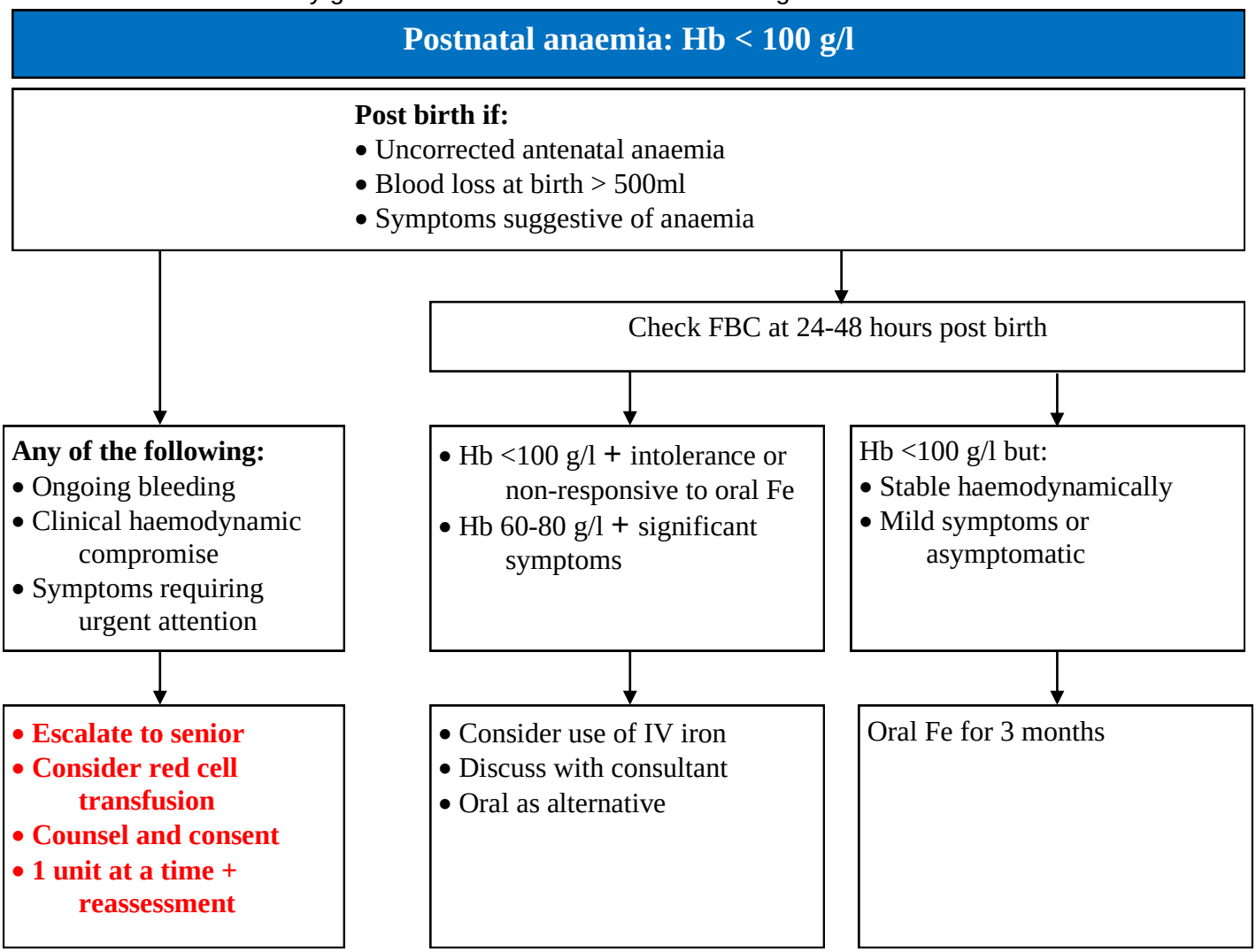
Aim to maximise Haemoglobin before delivery by early and prompt investigation and treatment of anaemia.

IDA is not an indication for IOL

Presence of IDA increases risk of PPH so place of birth should be recommended in the Consultant led unit for women with a Hb < 100g/l approaching birth.
Consideration should be given to need for an individualised plan taking into account other risk factors for haemorrhage such as previous obstetric history, parity, fibroids, multiple pregnancy, severity of anaemia and whether blood products would be accepted or not. This should include place of birth, intravenous access, G+S in labour and active third stage.

5.10 Management of Postpartum Anaemia (Hb < 100g/l)

Risk is reduced by good antenatal identification and management of anaemia



6. Monitoring Compliance and Effectiveness

Monitoring requirement	-	Compliance to guideline
Monitoring method	-	Retrospective case note review
Report prepared by	-	Named individual undertaking audit
Report sent to	-	Directorate audit meetings
Frequency		

Auditable Standards:

- Timely check of response to oral therapy
- Use of appropriate oral iron therapy regimens
- Number of patients requiring parenteral iron or blood transfusions
- Number of adverse reactions to parenteral iron
- Postnatal use of parenteral iron

7. References

UK Guidelines on the management of iron deficiency in pregnancy: BSH Guideline 2019; Pavord S et al; doi: 10.1111/bjh.16221

BNF. 70 January 2016.

Froessler B., Collingwood J., Hodyl N.A. *et al*.;Intravenous ferric carboxymaltose for anaemia in pregnancy. *BMC Pregnancy and Childbirth*. 2014; **14**:115

Ferinject®
Iron Infusion in Maternity

Introduction

You have been given this leaflet as you are anaemic with low iron levels in your body. Your doctor has suggested you receive Ferinject® which is a special type of iron preparation given through a drip which is used instead of iron tablets.

Reasons for using Ferinject®

- You are anaemic and have not responded to oral medication or the iron tablets have made you unwell.
- You are very anaemic after the birth of your baby
- You decided not to have a blood transfusion

Ferinject® can be used instead of blood unless there is an urgent need for blood. Blood transfusions are safe but there are some risks involved including a small risk of infection. Ferinject® is not a blood product and does not have the risks of blood.

Suitability for Ferinject®

You should not have Ferinject® if you:

- Have anaemia caused by deficiencies other than iron deficiency (e.g. B12 deficiency)
- Have ever been told by a doctor that you have 'iron overload'
- Have ever had an allergic reaction to iron given to you in a drip
- Have ever had a serious problem with your liver

Safety of Ferinject®

You should not use Ferinject® in the first 3 months of pregnancy. It is safe to use in the rest of pregnancy and after birth with few recorded problems.
Allergic reactions are uncommon (in less than 1% of cases) and the most serious allergic reaction, anaphylaxis, is rare (in less than 0.1% of cases). You will be monitored closely during and after the treatment.
Very little Ferinject® crosses into breastmilk so you can safely breast feed.
Side effects of Ferinject®: as with all medicines, Ferinject® can cause side effects. Common side effects but in less than 1% of cases include:

- Headache
- Dizziness
- High blood pressure
- Nausea
- Injection site reactions

Uncommon side effects in less that 0.1% of cases include:

- Tummy upsets (vomiting, tummy pain, diarrhoea, constipation)
- Flushing, fast heart rate, low blood pressure
- Muscle and joint pains, backache and muscle cramps
- Tiredness, chills, chest pain, swelling, pins and needles, raised temperature, itching and a rash.

How is Ferinject® given:

Ferinject® is usually given on the Pregnancy Assessment Unit. Before starting the treatment, the midwife will check your pulse, blood pressure and temperature.
A drip will be put in your arm or on the top of your hand and the Ferinject® infusion will be started. It will take about 15 minutes to give you the dose. The midwife will check your pulse, blood pressure and temperature again after the infusion has finished and you will usually be able to go home after 30 minutes unless there are other reasons to keep you in hospital.

Documentation Control

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Version Amendment	Version	Date	Author	Reason
	1	May 2020	Miss R Hamilton - Consultant Obstetrician	New
	2	Oct 2023	Miss R Hamilton - Consultant Obstetrician	Review
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Training and Dissemination: Cascaded electronically through lead sisters/midwives/doctors; Published on Intranet, Article in Business unit newsletter; emailed via NHS.net				
Consultation with:	Obstetric Staff			
Business Unit sign off:	23/10/2023: Maternity Guidelines Group: Miss A Joshi – Chair 06/11/2023: Maternity Governance Group / CD – Mr R Deveraj			
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