IRON DEFICIENCY ANAEMIA IN PREGNANCY AND CHILDBIRTH
# Iron Deficiency Anaemia in Pregnancy and Childbirth

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IRON DEFICIENCY ANAEMIA IN PREGNANCY AND CHILDBIRTH

1 DEFINITION

The British Committee for Standards in Haematology (BCSH) (2011) defines Iron Deficiency Anaemia (IDA) in Pregnancy as Haemoglobin (Hb) less than 110g/dl in the first trimester and less than 105g/dl in the second and third trimesters and less than 100g/dl in the postnatal period. The BCSH set the UK standard for haematological assessment for every pregnant woman. Breymann (2002) demonstrates the additional haematological values as the benchmark for assessment, diagnosis and management plan.

2 THE IMPLICATIONS TO MATERNAL HEALTH

IDA is a significant complication, contributing to an overall adverse maternal outcome through the pregnancy, childbirth and the puerperium. The major symptoms of IDA are pallor, lethargy, and excessive fatigue, sleeping difficulties, dyspnoea, light headedness, dizziness and disorientation. There is a decrease in thermo-regulation and an increase susceptibility to infection.

IDA increases the risk of ante partum haemorrhage (APH), postpartum haemorrhage (PPH) and delayed healing of perineal trauma or caesarean section wounds. It also affects breast feeding, milk quality and quantity with lactation being interrupted or stopped as a result of the poor supply and excessive fatigue. However, routine iron supplementation is not recommended for all women in the UK who do not demonstrate Iron deficiency

3 THE IMPLICATION TO FETAL AND NEWBORN HEALTH

The effects of IDA for the Fetus and the newborn are as significant as those for the mother; poor nutrient levels lead to poor uterine growth, decreased liquor, asymmetrical growth patterns, small for gestational age, premature delivery and low birth weight. Poor lactation leads to poor weight gain and failure to thrive, increasing the potential need for medical care and even hospitalisation.

4 BOOKING ASSESSMENT AND IDENTIFICATION OF IRON DEFICIENCY ANAEMIA

During the booking appointment the Midwife must take a comprehensive medical, lifestyle and diet history; documenting problematic areas and developing (with the woman) a management plan for the duration of her pregnancy, through to the childbirth and postnatal period. The Midwife must give the ‘Iron in Pregnancy’ leaflet to all new pregnant women at booking. This must be documented in the hand held records.

A full comprehensive assessment of the woman’s haematological profile is essential. Every effort should be made to ensure women have the routine blood analysis at booking and in readiness for the 28/40 and 34/40 pregnancy appointments. Blood result should be reviewed at the 16/40, 28/40 and 34/40 and should be within the
normal range as per Eastern Pathology Alliance (EPA) at this Trust laboratory assessment range (see table below):

<table>
<thead>
<tr>
<th>NORMAL VALUES for FULL BLOOD COUNT IN ADULT FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Blood Cells</td>
</tr>
<tr>
<td>Neutrophil</td>
</tr>
<tr>
<td>Lymphocytes</td>
</tr>
<tr>
<td>Monocytes</td>
</tr>
<tr>
<td>Eosinophils</td>
</tr>
<tr>
<td>Basophils</td>
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<tr>
<td>Red Blood Cells</td>
</tr>
<tr>
<td>Haemoglobin</td>
</tr>
<tr>
<td>Haeematocrit</td>
</tr>
<tr>
<td>MCV</td>
</tr>
<tr>
<td>MCH</td>
</tr>
<tr>
<td>MCHC</td>
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<tr>
<td>Platelet Count</td>
</tr>
</tbody>
</table>

Any deviation from these ranges should be reviewed, investigated and appropriate treatment commenced. Documentation of results and discussion regarding maternal health, dietary requirements and improving general food intake must be recorded in the hand-held records.

5 MANAGEMENT OF ANAEMIA: SEE FLOWCHARTS 1A-D AND 2

5.1 AT BOOKING: haemoglobin less than 110 g/dl = ANAEMIA. See flowcharts 1a-d. If women have had multiple pregnancies and previously required treatment with Iron (oral or intravenous) consider checking the Ferritin at booking.

At booking, the responsibility of reviewing the blood results lies with the midwife requesting them. If the FBC is within range, (see table above) general maternal health, dietary information and lifestyle discussions should be documented in the hand-held records. Plans should be discussed for routine 28/40 bloods to be taken prior to the appointment. If the blood results are abnormal use flowcharts 1a-d to plan management, and treat accordingly. Any previous blood results could be used to establish a haematological profile and should be made available.

Women with a history of previous treatment for iron deficiency should have Ferritin levels checked, and should be given oral iron supplements if the current Ferritin is less than 30 µg/l.

For women with anaemia and MCV less than 99 use flowcharts 1a, 1b and 1c. A repeat FBC should be taken 2 weeks after commencement of oral iron therapy. An increase of 1 g/dl demonstrates effective treatment and compliance. Iron therapy should continue for at least three months, or until 34/40, whichever is the longer. Women
should be counselled on the correct administration of iron to avoid adverse gastrointestinal side effects and maximise absorption.

This includes:

- Iron should be taken on an empty stomach
- Iron should be taken one hour before meals
- Iron should be taken with a source of vitamin C e.g. orange juice to maximise absorption
- Iron should not be taken with other medications or antacids or tea as this prevents absorption

Note: low MCV and MCH can occur due to thalassemia trait. The midwife must ensure that booking haemoglobinopathy screening has been performed.

Women should be counselled re place of delivery if iron deficiency persists. BCSH recommend Hb >10g/dl for home confinement, as evidence suggests an increased risk of PPH in iron deficient women.

6 MANAGEMENT OF ANAEMIA WITH MCV ABOVE 101 IS OUTLINED IN FLOWCHART 1D

6.1 28/40 PREGNANT: haemoglobin less than 105 g/dl=ANAEMIA. See flowchart 2

If blood results show MCV and MCH values within normal haematological ranges BUT the Hb is less than 105g/dl, the woman should be advised to increase her intake of iron rich foods, ensure that she has been given the Iron In Pregnancy leaflet and be treated with Ferrous Fumarate 322mg BD. A management plan for rechecking her full blood count (FBC) should be made after two weeks of treatment, (BCSH guidelines) and then just prior to her 34/40 appointment. The management plan should be clearly documented in the hand-held record

A FBC which demonstrates a dropping Hb – less than 105g/dl, with either a dropping MCV – or a MCV less than 81fl, a dropping MCH – or MCH below 25 and a MCHC below 31.5 should be investigated fully (See flowchart 2).

Note: low MCV and MCH can occur due to thalassemia trait. The midwife must ensure that the booking haemoglobinopathy screening was performed.

If the blood results are abnormal, the Midwife must organise a further FBC, and measure Ferritin, Serum Folate, Vitamin B12 and Iron studies and a further appointment be given for 1/52 to fully assess these results and make a management plan (see table below):

<table>
<thead>
<tr>
<th>NORMAL VALUES</th>
</tr>
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<tbody>
<tr>
<td>Ferritin</td>
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<tr>
<td>Serum Folate</td>
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<tr>
<td>Vitamin B12</td>
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</tbody>
</table>
Hb less than 110g/dl, low MCV pre-28/40 is treated with Ferrous Fumarate 322mg BD (if thalassemia has been excluded). An abnormal Serum Folate result (below 2.7ng/ml) should be rechecked and if the result remains low then it should be treated with Folic Acid - 5 mg daily for 12 weeks minimum or to the end of pregnancy if it is greater than 12 weeks before EDD. Ensuring the B12 levels are measured and treated as failure to do so could lead to severe neurological disorders. An indeterminate B12 result – between 211-246pg/ml – requires repeat testing. If indeterminate result again, should be treated with Hydroxycobalamin 1mg/ml for one dose, if below 211 pg/dl, treat with 6 doses of Hydroxycobalamin 1mg/ml alternate days over 2 weeks. B12 levels can fall in normal pregnancy in the absence of true B12 deficiency which would require life-long supplementation, so Vitamin B 12 levels should be checked 3 months postnatally and the results reviewed by a GP and further investigations / treatment as required

6.2 34/40 PREGNANT

If the Hb is less than 105g/dl and/or a dropping MCV which does not respond to oral iron, or women are intolerant of oral iron or the Ferritin has risen but the Hb has not then Iron studies should be performed on venous blood in the laboratory and treatment should be with administration of Intravenous Iron therapy – see protocol.

7 POSTNATAL TREATMENT AND MANAGEMENT PLAN

If Hb <100g/dl, or excessive blood loss (>500ml) at delivery, the woman will usually require iron therapy. The need for oral versus intravenous iron supplementation must be considered taking into account degree of anaemia and symptoms, social circumstances and likely compliance. It is worth remembering that women who are iron deficient post delivery and who wish to breastfeed may benefit from the speed of recovery using intravenous iron. Oral Ferrous Fumarate 322mg BD should be given for a minimum of 3 months post delivery to ensure stores are fully replenished, with the GP dispensing the treatment following initial treatment from the hospital. Iron supplementation should continue for 3 months after the FBC has returned to normal to restock the body stores. Blood should be checked for iron deficiency for 12 months post treatment by the GP.

8 REFERENCES


Iron deficiency anaemia in pregnancy and childbirth

Hb less than 110 g/dl at booking (or less than 105 if above 12 weeks gestation) = ANAEMIA

- MCV below 81fl
  - See Flow Chart 1b

- MCV 81-100
  - See Flow Chart 1c

- MCV above 101
  - See Flow Chart 1d
Flow Chart 1b – Anaemia at Booking and MCV less than 81

Hb less than 110 g/dl at booking (or less than 105 if above 12 weeks gestation) = ANAEMIA

AND

MCV less than 81fl

Check Haemoglobinopathy Screen

Thalassemia Trait

Check Ferritin

Normal

Low

Normal Check Ferritin

Check Ferritin (if not previously done)

Ferritin below 30

Consider intravenous iron in second trimester

Ferritin above 30

Re-check Hb in 4 weeks after IV Iron

Unable to tolerate oral iron or failure to show rise in Hb after 2 weeks oral iron

Check Ferritin

Re-check Hb in 2 weeks

No action

Seek Haematology Advice

No response

Dietary advice and Oral Iron

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Iron deficiency anaemia in pregnancy and childbirth

**Dietary advice**

**Check B₁₂/Folate**

Ferritin below 30

Unable to tolerate oral iron or failure to show rise in Hb after 2 weeks oral iron

Check Ferritin (if not previously done)

Ferritin below 30

Consider intravenous iron in second trimester

Re-check Hb in 4 weeks after IV iron

**Normal Ferritin**

**Check B₁₂/Folate**

Low Folate

Follow flow chart 1d

Low B₁₂

**Normal**

Reschedule FBC in 2 weeks

Hb less than 11 (or less than 10.5 if above 12 weeks gestation)

Seek Haematology advice

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**Flow Chart 1c – Anaemia at Booking and MCV 81 – 99**

Hb less than 110g/dl at booking (or less than 105 if above 12 weeks gestation) = ANAEMIA

AND

MCV 81-99fl

Check Haemoglobinopathy Screen

Thalassemia Trait

Check Ferritin

Normal

Check B₁₂/Folate

If low see flow chart 1d

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M19 Iron deficiency anaemia in pregnancy and childbirth
Hb less than 110 g/dl at booking (or less than 105 if above 12 weeks gestation) = ANAEMIA
AND
MCV above 99fl

Check B₁₂/Folate

Low Folate
- Dietary advice and oral folic acid (5mg daily)
- Re-check Hb in 4 weeks
  - No response
    - Seek Haematology Advice

Low B₁₂
- B₁₂ <Low= DEFICIENT
  - High risk if: Vegan Diet, Ileal Disease, Malabsorption, Bariatric Surgery or Family History PA;
  - Hydroxycobalamin 1mg x 6 doses IM
  - Take sample for intrinsic factor antibodies. Take sample before giving B₁₂ (but do not wait for result)
  - If antibodies positive = Pernicious Anaemia
    - Refer to GP
  - If antibodies negative

Normal
  - Reschedule FBC in 2 weeks

B₁₂ INDETERMINATE
- Repeat in 4-8 weeks

B₁₂ INDETERMINATE
- Hydroxycobalamin 1mg one dose IM if still Low
- Request GP re-check B₁₂ 3 months post partum

B₁₂ normal

Hb less than 105 g/dl at 28 weeks = ANAEMIA

MCV <81 [exclude thalassemia - check booking bloods]

Dietary advice and Oral Iron

MCV 81-100
Check Ferritin

Low Ferritin (below 30)

Recheck Hb in 2 weeks

No rise in Hb
Follow IV Iron protocol (Confirm iron deficiency – check Ferritin)

Rise in Hb
Continue Oral Iron

Normal Ferritin

Check B₁₂/Folate

Low Folate

Dietary advice and oral folic acid (5mg daily)

No rise

Rise

B₁₂ <211 = DEFICIENT
High risk if: Vegan Diet, Illeal Disease, Malabsorption, Bariatric Surgery or Family History PA;

Hydroxycobalamin 1mg x 6 doses IM

Take sample for intrinsic factor antibodies. Take sample before giving B₁₂ but do not wait for result

If antibodies positive = Pernicious Anaemia
Refer to GP

If antibodies negative

B₁₂ INDeterminate

Repeat in 2-4 weeks

Low B₁₂

B₁₂ NORMAL

Seek Haematology advice if Hb<10.5

Hydroxycobalamin 1mg one dose IM if still indeterminate

B₁₂ INDeterminate

Request GP re-check B₁₂ 3 months post partum
Post-Partum Anaemia or Iron Deficiency following >500ml bleed.

>500ml estimated blood loss

Check FBC and Iron studies

Hb <100g/l and/or Transferrin Saturation of <20% = Anaemic

Breast Feeding

Give Ferinject as per policy
Use booking weight to calculate the dose

Yes

Severe symptoms such as shortness of breath, fainting, extreme emotion

No

Give 3 months of Ferrous Fumarate. And review at GP surgery with bloods

Yes

Give Ferinject as per policy
Use booking weight to calculate the dose