Managing Anaemia in Pregnancy

Claire L J Atterbury
CNS Transfusion Medicine
Is this important?
Is it just about reducing the amount of components used?

Anemia doubles risk of death for pregnant women, study finds

By Huizhong Wu, CNN
Updated 2331 GMT (0731 HKT) March 20, 2018
What am I going to talk about?

• Iron
• $B_{12}$
• Folate
• Increasing women’s wellbeing
• Reducing midwives’ workload
• A bit about the babies.
Iron

Increased requirements in pregnancy

- Fetus: 270mg
- Placenta and cord: 90mg
- Delivery: 150mg
- Normal loss: 280mg
- (1mg per day)
- RCM: 450mg

Total: 1240mg
Iron

- BUT + gain 240-480mg (no menses)
- Total loss 1240mg – 240/480 = 1000/760

Net requirement for all in 280 days 700 – 1400mg (2.5-5mg/d.)
Most women end their pregnancy low in iron but not necessarily anaemic

Therefore where are ....
- Primips?
- Multips?

Aim of Antepartum treatment - to get to 3 months post partum with normal iron stores. It is do-able.
Patient blood management in obstetrics: management of anaemia and haematinic deficiencies in pregnancy and in the post-partum period: NATA consensus statement


UK guidelines on the management of iron deficiency in pregnancy

Sue Pavord Bethan Myers Susan Robinson Shubha Allard Jane Strong Christina Oppenheimer on behalf of the British Committee for Standards in Haematology
It starts at booking........

• A careful history
  – General health
  – Family history
  – Bleeding history – Obstetric and otherwise (menses, surgery)
  – Any previous history of anaemia?
• Beliefs and wishes and fears concerning blood transfusion
• Drug history (legal and other)
• Allergies
**Ante Natal Booking:**

**Request Reason:** ANTENATAL

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1 Data 2 Harold 3 Janet 4 rep seq 5 Spec 6 Wnt 7 matches 8 Options 9 Exit X

Cursor Down for more
Flow Chart 1a – Anaemia at Booking

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
    - Low
      - Dietary advice and Oral Iron
    - Normal
      - No action
  - Normal

- Normal Ferritin
  - Low
    - Re-check Hb in 2 weeks
  - Normal
    - 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
        - Ferritin above 30
          - Re-check Hb in 4 weeks after IV Iron
            - No response
            - Seek Haematology Advice
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

Thalassaemia Trait

Check Ferritin

- Normal
  - Dietary advice and Oral Iron
  - Check Hb in 2 weeks
  - Unable to tolerate oral iron or failure to show rise in Hb after 2 weeks oral iron

- Below 30
  - Check Ferritin (if not previously done)
  - Ferritin below 30
  - Consider intravenous iron in second trimester
  - Re-check Hb in 4 weeks after IV iron
  - No response
  - Seek Haematology advice

Check B12/Folate

- Low Folate
  - Follow flow chart 1d
  - Reschedule FBC in 2 weeks
  - Hb less than 11 (or less than 10.5 if above 12 weeks gestation)
  - Seek Haematology advice
Flow Chart 1d - Anaemia at Booking and MCV above 99

**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

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

- B12 INDETERMINATE
  - Repeat in 4-8 weeks

**Normal**

- Reschedule FBC in 2 weeks

**Hb less than 110, seek Haematology advice**
Investigations based on your findings

- Anaemia screen as baseline if there are concerns
  - Repeat FBC
  - U&E and LFT
  - Clotting
  - $B_{12}$, Folate and Ferritin
  - CRP

- Do a look back, if possible, to previous non pregnancy results – particularly the MCV, MCH

- Remember to ask them to tell you if they get any infections such as a UTI, chest infection, common cold, norovirus etc. More than one could mean they have become deficient.
Haemoglobin

- Anaemia = haemoglobin < 120g/l for all women (WHO)
- Haemoglobin concentration determined by:
  - Red cell mass (RCM)
  - Plasma volume (PV)
- True anaemia = fall in RCM
- During pregnancy:
  - PV rises by 1 litre (max. at 24 – 30/40)
  - RCM rises by 300ml (max. at 30/40)
  - Overall fall in Hb, max at 30/40 = dilutional anaemia
    (min. Hb =110g/l)
Into the 3\textsuperscript{rd} Trimester

- Look again at their blood
- Has the MCV dropped?
- Think about Iron, $B_{12}$ and Folate.
- If Iron is low use a treatment dose of oral iron
- But they are on Pregaday....?

- If time is marching on (32/40+) consider IV Iron for complete stores replacement
Request Reason: Antenatal (28 weeks)

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ANAEMIA IN PREGNANCY – 28 WEEKS

Hb <11 g/dl at 28 weeks = ANAEMIA

MCV <82 [exclude thalassaemia - check Haemoglobin B]

MCV 83-101

MCV above 101

Check Ferritin

Low Ferritin

Normal Ferritin

Check B₁₂/Folate

Dietary advice and Oral Iron

Unable to tolerate oral iron or >34 gestation

Follow intravenous iron protocol

Low Folate

Low B₁₂

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

Dietary advice and oral folic acid (5mg daily)

Hydroxycobalamine 1mg x 6 doses (m)

Re-check Hb in 2 weeks

No response

Seek Haematology Advice

B₁₂ 211-246 INDETERMINATE

Repeat in 2-4 weeks

Take sample for intrinsic factor antibodies

Hydroxycobalamine 1mg in one dose (m)

If antibodies positive = Pernicious anaemia

If antibodies negative

Request GP re-check B₁₂ 6 months post partum

August 2010
Adverse effects/risks of Iron deficiency in Pregnancy, Delivery and Post partum to Mum

- Unpleasant symptoms
  - Lethargy, dyspnoea, fatigue, **insomnia**, light headedness, dizziness and disorientation
- Increased susceptibility to **infection**
- Decrease in thermoregulation
- Ante partum **haemorrhage** ++
- Post partum **haemorrhage** ++
- Delayed wound healing
- Reduced quality and quantity of **Lactation** or even halted
- **Excessive fatigue and failure to cope**
And for the wee ones...........

- Poor uterine growth
- Decreased liquor
- Asymmetrical growth patterns
- Small for dates
- Premature delivery
- Low birth weight
- Failure to thrive (poor lactation)
- And if it continues - poor concentration and reduced scholarly achievements

- And for the Midwife..................??!!
Iron Therapy Timeline in Pregnancy

The Pregnancy Time Line - Potential for Fe Therapy in Pregnancy

- Conception
- 1st trimester
- 2nd Trimester
- 3rd Trimester
- Birth

Potential (%)

Weeks

Oral Fe
Venofer
Oral Iron

• Very cheap
• Get the right dose and length of treatment.
• Slow to work but will raise Iron stores within 1/52.
• Side effects!
• Patient and practitioner confidence.
• Every day or every other day?
Intravenous

- Rapid (almost as fast as a transfusion, ~ 4-5 days).
- Can target an exact level of Iron and Hb.
- Licensed in 2nd and 3rd Trimester.
- Side effects?
  - Minor and rare but can be frightening. Most gone within 30 minutes.
  - Nausea (may last 24 hours)
  - Facial and limb flushing
  - Hypertension
  - Anaphylaxis is extremely rare in the product we use (1: 800 000 doses here)
  - All patients must be observed for 30 minutes
- Which product is available to you? Venofer, Cosmofer, Ferinject, Monofer
Oral Iron vs Venofer in the Postpartum

(Dr Nav Bhandal, John Radcliffe, Oxford, personal communication)

- Oral Iron 200mg bd for 6 wks
- Venofer 200mg on Day 2 and 4
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

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

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

Yes

No

Yes

No
Don’t forget Folate deficiency (or $B_{12}$)

- Pregnancy requires extra 200 micro grams per day

- **Increased risk of deficiency:**
  - Poor nutrition
  - Twins
  - Haemolysis (autoimmune, viral)
  - Malaria
  - Infection
  - Drugs

- **Diagnosis:**
  1. Haemoglobin↓
  2. MCV↑
  3. Serum folate
  4. Red cell folate

- **Treatment**
  - Folic acid 5mg OD throughout pregnancy
  - Hydroxycobalamin as per antenatal policy
  - Patients should be checked
Blood is more dangerous than you might think............

Mini transplant of live cells from the donor to the recipient including some antibodies in plasma. What consequences may happen now? In the future?
Anita Roddick: I've had hepatitis C for more than 30 years

Helen Nugent

Anita Roddick, the founder of the Body Shop, known for her ethical business ethics and clear living, announced yesterday that she is suffering from hepatitis C.

Dame Anita, 64, said that she contracted the disease through an infected blood transfusion in 1971 during the birth of her youngest daughter, Sam. The condition was undiagnosed for more than 30 years until a blood test in 2005.

She wrote in a posting on her website that she also has cirrhosis of the liver, one of the effects of hepatitis C. Now, at 64, she has the virus.

Dame Anita, who founded the Body Shop from a single store in Brighton in 1976, told The Times, "If I was 20 years old and just found out that I had passed this on to one of my kids, I would have been frantic. But you can't be angry with things you didn't know existed. I just think it's a bugbear, you groan and you move on." She said that with no discernible symptoms for so long, she had not taken her condition seriously until recently.

"The one symptom I had was itching skin on my ankles and wrists," she said. "I had a little bit of trouble concentrating, as well but I thought I'm 64, there's nothing unusual in that. I just wasn't educated about it."

She now has tests every three months to monitor the disease. "The next tests are to check for tumours. I'm taking it more seriously now."

"I could still have a good few years — even decades — of life left, but it's hard to say. I could be feeling fine tomorrow. What I can say is that having C means that I have a sharp awareness of my mortality, which in many ways makes life more vivid and immediate."

Dame Anita, who became a patron of the Hepatitis C Trust, will campaign for better awareness of the condition.
Transfusion

• What component?
• Any special requirements?
  – Irradiation /CMV negative?
  – Antibodies?
  – Childbearing age females - Kell negative (can be a precursor to HDN – rarely)
What if they tell you they REALLY don’t want blood?

• Find out why.
• What do they mean by blood?
• Are there fears or questions you can explain and answer?
• Get advice from the hospital transfusion team.
• Get an anaemia management and bleeding plan into the notes.
• Inform the Consultant Obstetrician, Anaesthetist and Haematologist (I always tell the lab too).
• Ask that they complete an Advanced Directive.
• If they are Jehovah’s Witnesses suggest they discuss what to include in the AD with their Hospital Liaison Elder.
Case study 1

- 37 yr Jehovah’s Witness – G5 P4
- Delivered at 39/40
- Hb at delivery 10.1g/dl
- Previous PPH x3
  (no one though uh-oh or told anyone)
- Massive bleed
- Hb dropped to 4.5
Plan

• Take her to Theatre – ASAP (ligation not TAH).
• Ventilate on ITU.
• Check and recheck Advance Directive.
• Give 200mg Venofer TIW
• Give 3x doses 40K Eprex
• Hb dropped to 1.9 (eek!)
• Haematologists dash off to Athens to conference
• Hold nerve (mostly by phone)
• Hb 5.6 @1 week post delivery
• Hold debriefing meeting post discharge
What did we learn?

• Alert Consultant, Hospital Transfusion Team (HTT) and Anaesthetist at booking if refusing blood.
• Refer to CNS Transfusion (HTT) to make a plan and communicate clearly and widely to cover several eventualities.
• If PPH occurs out of hours call in the consultants (Obs, Haem and Anaesthetics) even if minor to start with.
• ITU were fantastic – ask for review early if bleeding.
• Advance directives are VERY useful especially in an emotionally charged situation.
Bleeding plan

CARE PLAN FOR WOMEN IN LABOUR REFUSING A BLOOD TRANSFUSION

This document is an aid for medical staff and provides guidance on managing a woman’s desire to refuse blood transfusion. It includes principles and procedures for managing a woman who refuses blood transfusion, including the management of active haemorrhage.

Risk management

- If the patient is bleeding, intravenous access should be established and blood should be administered as soon as possible.
- If bleeding is controlled, haemoglobin levels should be monitored and blood transfusion should be considered if necessary.
- If bleeding continues, the patient should be transferred to a higher level of care for further assessment and management.

Management of active haemorrhage

- If bleeding is controlled, the patient should be transferred to a higher level of care for further assessment and management.
- If bleeding continues, the patient should be transferred to a higher level of care for further assessment and management.

APPENDIX II

Bleeding plan for patients refusing blood

Patient Details:

- Name:
- Age:
- Blood group:
- History of previous transfusions:
- Allergies:

Procedure:

- If the patient is refusing blood transfusion, the healthcare team should provide support and guidance.
- If the patient is refusing blood transfusion, the healthcare team should provide support and guidance.

Clinical Details:

- Minor bleeding:
  - Management:
    - Monitor the patient for signs of bleeding.
    - Provide reassurance to the patient.
    - Offer additional support and guidance.
- Significant bleeding:
  - Management:
    - Monitor the patient for signs of bleeding.
    - Provide additional support and guidance.
    - Offer additional support and guidance.

The Queen Elizabeth Hospital
King’s Lynn
NHS Trust Foundation

Management of active haemorrhage

- If bleeding is controlled, the patient should be transferred to a higher level of care for further assessment and management.
- If bleeding continues, the patient should be transferred to a higher level of care for further assessment and management.

The Queen Elizabeth Hospital
King’s Lynn
NHS Foundation Trust

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Case Study 2

- 22 year old – G3 P2
- 37/40
- Admitted to Castleacre with Norovirus
- Christmas.
- Septic
- Distressed baby → crash section
- Hb 31g/l, Platelets 41 x10⁹/l, Neutrophils 0.3 x10⁹/l
- B₁₂ 99, Folate 1.6, CRP 280
Then...

• 14 days as inpatient
• Septic shock – removal to ITU
• 8 units of Red cells
• 1 unit of Platelets
• IV antibiotics
• Lots of stress and anxiety for everyone.........she didn’t sue us
Back up a bit..........

- 30.9.08 - 28 week bloods showed MCV **109** and film comment “macrocytic anaemia. Probable B\textsubscript{12} deficiency”

- 6.11.08 MCV 116. Hb 90 Film comment “Macrocytic picture ?Liver ?B\textsubscript{12} /Folate deficiency.”

- 13.11.09 B\textsubscript{12} 117, Folate 0.9 (3-20) Red Cell Folate 48 (93-641)

- Patient given oral iron. Usual Midwife on AL. Patient moved house.

- 10.12.09 UTI – E-Coli

Case study 3

• 36 year old Journalist
• Best friend a Transfusion Nurse Specialist (woohoo)
• Not keen on blood transfusion
• On Pregaday
• Hb 90 at 28 weeks
• MCV lower than pre-pregnancy (91→85)
• Asked for advice by midwife
Plan

- Increase oral Iron to FeSO$_4$ 200mg BD from week 28
- Continue folic acid to delivery

- Delivered at 42/40
- 1400 ml bleed
- Hb at 2 days PP 100g/l
Remember - No blood needs planning (and nerve!)

• Assessment of anaemia for all patients at booking.
• Get advice and a plan from the HTT (it’s all in the planning and preparation).
• Find out if your patient really is immovable if refusing blood.
• Blood should only be used in Obstetrics to save a life
• Advance Directives help.
• Use an appropriate product that is safe and cost effective.
THANK YOU!