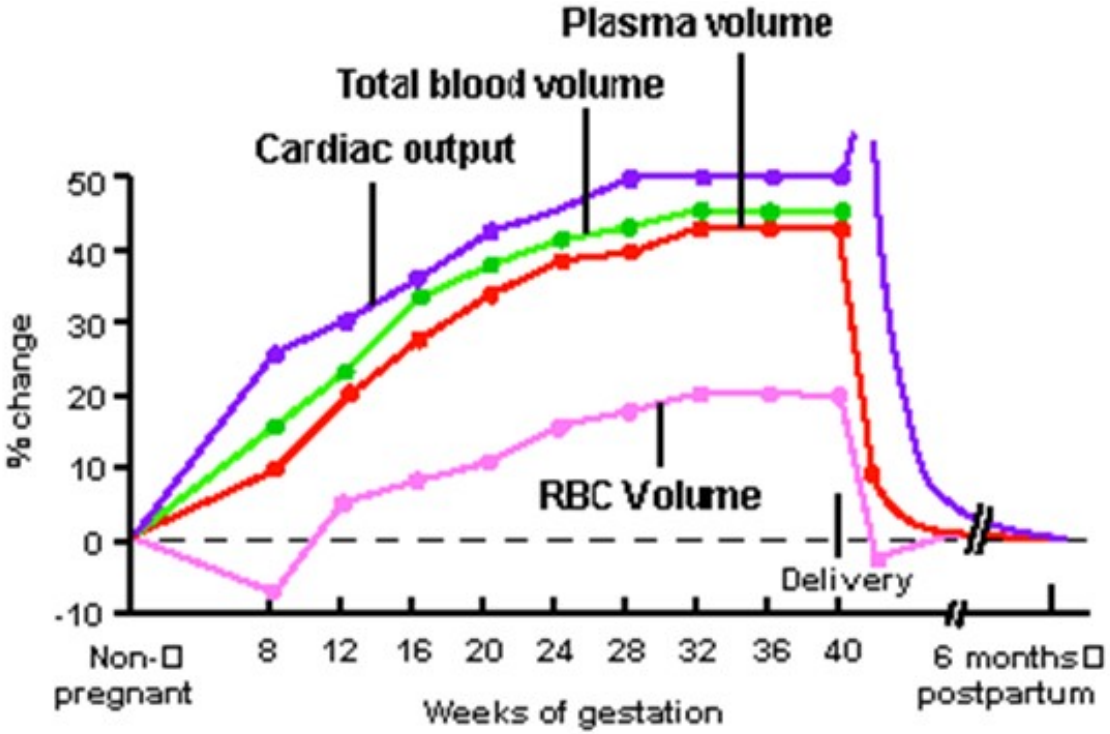
Anaemia in pregnancy

Dr Sarah Allford
Consultant Haematologist

Definition of anaemia in pregnancy

- Red cell mass increases 20%
- Plasma volume increases 40%



- Hb < 11 g/dl in first trimester
- Hb < 10.5g/dl in second and third trimester
- Hb < 10g/dl post-partum

Prevalence

- Very common: 15% pregnant women in UK had Hb < 11g/dl

  (WHO global database on anaemia 1993 – 2005)

- Iron deficiency
  - 85% cases of anaemia in pregnancy are due to iron deficiency

Iron

- Healthy adult woman: 3,500 – 4500mg iron
  - 75% Hb
  - 20% BM and reticuloendothelial system
  - 5% muscles and enzyme systems

- 2mg iron lost per day
- Diet = 12mg iron per day (14 – 20% absorbed)

- 20% women have iron stores > 500mg

Increased iron requirements

- Increase from 2mg to 8mg per day by term
  - Average requirement of 4.4mg per day during entire gestation
  - Additional 1000mg iron required during pregnancy
    Expansion of red cell mass
    Uterus and placenta
    Fetus
    Replace blood loss at delivery

- 40% non pregnant women have small or depleted iron reserves (serum ferritin < 30μg) = unfavourable iron status with respect to pregnancy

Those at most risk

- Previous history of anaemia
- Grand multiparity
- Short gaps between pregnancies (< 12 months)
- Teenager
- Vegetarian
- Low (and possibly high) BMI
- Eating disorders
- Absorption problems
- Multiple pregnancy

Does it really matter?

- Maternal effects
  - Increased susceptibility to infection
  - Reduced physical capacity
  - Poor tolerance of blood loss – increased probability blood transfusion
  - Increased post-partum depression
  - Hb < 8.9g/dl associated with two-fold increase in mortality

- Pregnancy outcome
  - Increased rates of prematurity and IUGR
  - Increased risk placental abruption

- Fetal effects
  - Impaired psychomotor/mental development

Standard of care: NICE clinical guideline 62 - antenatal care

- All women should be offered screening for anaemia. Screening should take place early in pregnancy (at booking) and at 28 weeks

- Hb levels outside the normal UK range for pregnancy should be investigated and iron supplementation considered if indicated

Better Blood Transfusion 3

- “Ensure the establishment of procedures for identification and management of maternal anaemia in particular correction of iron deficiency anaemia in the antenatal and postnatal period.”

Investigation of anaemia

- FBC and parameters
  - Classical hypochromic microcytic picture may be obscured by physiological changes in pregnancy

- Serum ferritin
  - Accurately reflects iron stores
  - Initial rise early in pregnancy then progressive fall to 32 weeks
  - Level < 15μg/l indicative of iron deficiency at any stage of pregnancy (98% specificity, 78% sensitivity)

Differential diagnosis

- Iron deficiency – 85% all pregnancy associated anaemia

- Haemoglobinopathy
- Megaloblastic anaemia
- Haemolytic anaemia
- Anaemia of chronic disease
- Leukaemia/ lymphoma

Management

- Explain anaemia, why and how it needs to be treated
- Trial of oral iron therapy (whilst awaiting ferritin)

- Ferrous salts better absorbed than ferric salts
- Dose: 100 – 200mg elemental iron per day

- Repeat FBC in 2 – 4 weeks
  - Response typically seen in 2 weeks
  - Increase of 1g/dl demonstrates effective treatment and compliance

Those at most risk

- Previous history of anaemia
- Grand multiparity
- Short gaps between pregnancies (< 12 months)
- Teenager
- Vegetarian
- Low (and possibly high) BMI
- Eating disorders
- Absorption problems
- Multiple pregnancy

- Serum ferritin < 30μg/l indicated iron deplete: start iron supplementation (65g elemental iron per day)

	Dose per tab	Elemental iron
Ferrous fumarate	200mg	65mg
Ferrous gluconate	300mg	35mg
Ferrous sulphate	200mg	65mg
Ferrous feredetate (Sytron)	190mg/5ml	27.5mg/5ml
Pregaday	Fumarate 305mg	100mg

Taking oral iron - advice

- Improve efficacy
  - Take 1 hour before or after food
  - Single tablet without food as effective as tds dosage with meals (estimated 80% requirement)
  - Absorption increased by vitamin C – take with a glass of orange juice
  - Do not take with milk, tea or coffee
  - Avoid antacids

- Improve compliance
  - Gastric side effects are dose dependent can be minimised by slow dosage escalation
  - Constipation not dose dependent – bran, lactulose
  - Compliance improved with od or bd dosage

The iron isn't working....

1. Not taking the tablets (40% non-compliance in retrospective audits)
2. Not taking the tablets
3. Failing to take correct preparation eg. Pregnacare not Pregaday
4. Failing to absorb
5. Not iron deficient

Don't be tempted by sustained release preparations

What would you do?

- Third trimester (34/40) Hb8.4g/dl and serum ferritin 10μg/l

Parenteral iron

- Circumvents natural GI regulatory mechanisms to deliver non protein bound iron to rbc
  - Absolute non-compliance
  - Intolerance
  - Proven malabsorption

- Contra-indicated
  - History of anaphylaxis or reactions to parenteral iron
  - First trimester of pregnancy
  - Active acute or chronic infection
  - Chronic liver disease

	Cosmofer Iron (III) hydroxide dextran complex	Venofer Iron (III) hydroxide sucrose complex	Ferinject Iron (III) carboxymaltose	Monofer Iron (III) isomaltoside
Dose of elemental iron	50mg/ml	20mg/ml	50mg/ml	100mg/ml
Test dose required	Yes – before every iv dose	First dose – new patients only	No	No
Able to administer total dose	Yes – up to 20mg/kg over 4 – 6 hours	No	Yes – up to 20mg/kg maximum of 1000mg/week over 15 mins	Yes – 20mg.kg over 1 hour
Cost	£79.70	£90.35	£191.80	£169.50

Dosing practicalities

- Iron deficit

  (Target Hb – actual Hb) x weight x 0.24 + 500

  g/l g/l kg

- Use pre-pregnancy weight in calculation
- If > 90kg use ideal body weight
- Target Hb 11g/dl

Red cell transfusion

- In clinical emergency
  - Massive obstetric haemorrhage
- Inappropriate indications
  - To top up
  - To raise Hb prior to delivery despite adequate time to correct haematinic deficiency
  - Post partum to elevate Hb levels prior to discharge

Why not?

- £125 per unit
- Oral iron: £2 per month
- Parenteral iron: £100 - £200 for 1000mg

- Valuable limited resource
  - Donor numbers falling
  - Population changes

Recipient risks of transfusion

- TTI (risks January 2011)
  - 1 in 83 million HCV
  - 1 in 5 million HIV
  - 1 in 670,000 HBV
- Development of alloAbs
  - Risk of future HDN
- Unable to give blood following transfusion
- Informed consent (SaBTO guidance 2011)

Anaemia in pregnancy

- Common but shouldn't be ignored
- Screen high risk group
- Initiate appropriate oral iron early with advise to improve compliance and efficacy
- Parenteral iron should be used in preference to red cell transfusion

- 15% UK pregnancies are complicated by anaemia and most (85%) of these due to iron deficiency
- Trial of oral iron should be given if
  - Hb < 11g/dl in first trimester
  - Hb < 10.5g/dl in second or third trimester
- Consider screening for iron depletion (ferrritin < 30) if
  - Recent (< 12 months) pregnancy
  - Twin pregnancy
- Oral iron must be taken on an empty stomach an hour before food preferably with vitamin C
- Check Hb after 2 weeks – lack of response suggests non-compliance
- Parenteral iron indicated in event of intolerance