Iron deficiency anaemia in obstetrics

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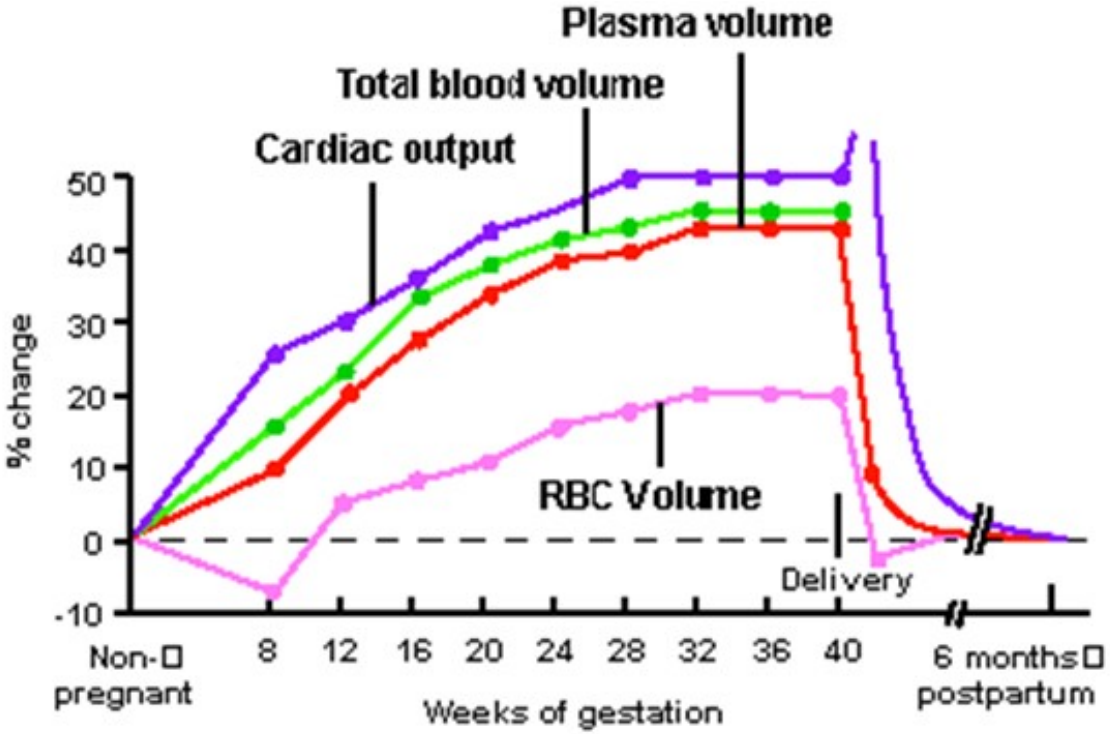
Definition of anaemia in pregnancy

- 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)

- 40% non pregnant women have small or depleted iron reserves (serum ferritin < 30microg) = unfavourable iron status wrt pregnancy

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

- 20% women have iron stores > 500mg

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
  - 1958 UK study: Hb < 8.9g/dl associated with two-fold increase in mortality

- Pregnancy outcome
  - Increased rates of prematurity
  - IUGR
  - 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.”

- How can we do this?

MPH snapshot

- 3000 deliveries per year (250 per month)
- Feb 2012 107 patients identified (labour ward)
  - n = 12 Hb < 10.5g/dl at delivery (11%)
- Recent cases where women routinely transfused pre CS

What are we doing?

- Lab comment (28 weeks)

  Hb < 10.5g/dl: needs oral iron. Please repeat FBC and check ferritin in 4 weeks. If Hb rise < 1g/dl consider parenteral iron.

- Education
  - Midwives - guideline
  - Patients - patient leaflet: how to take oral iron

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

	Dose per tab	Elemental iron
Pregnacare		17mg
Ferrous fumarate	200mg	65mg
Ferrous gluconate	300mg	35mg
Ferrous sulphate	200mg	65mg
Ferrous feredetate (Sytron)	190mg/5ml	27.5mg/5ml
Pregaday	Fumarate 305mg	100mg

Follow-up bloods

- Standard care follow-up: nullips 31 weeks; multips 34 weeks

- FBC and parameters
  - Efficacy demonstrated if Hb risen by > 1g/dl
  - 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
  - Treat at level < 30μg/l – indicates early iron depletion (especially in high risk groups)

Targeted screening?

- 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

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	£79.90	£9.35	£191	

Oral iron: £4 per month
2 unit red cell transfusion: £250.

Patient blood management

- High quality transfusion practice and measures for avoidance of transfusion
  - Pro-active
- Pragmatic practical approach – dovetailing with pre-existing routine antenatal checks to improve compliance
- Audit

- 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