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Managing Anaemia in Pregnancy

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CNS Haematology and Transfusion Medicine

Haemoglobin

- Anaemia = haemoglobin < "normal"
- 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 =11)**

Iron

Increased requirements in pregnancy	
Fetus	- 270mg
Placenta and cord	- 90mg
Delivery	- 150mg
Normal loss (1mg per day)	- 280mg
↑RCM	- 450mg
Total	-1240mg

Iron

- BUT + gain 240-480mg
  (no menses)

Net requirement (aprox) 700 – 1400mg(2.5-5mg/d.)

Therefore……

Aim of Prophylaxis : to get to 3 months post partum with normal iron stores. It is possible!

It starts at booking……

- A careful history
  - General health
  - Family history
  - Bleeding history – Obstetric and otherwise
  - Any previous history of anaemia?
- Beliefs and wishes and fears concerning blood transfusion
- Drug history
- Allergies

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[redacted]
Ante Natal Booking.
[redacted]

Request Reason : ANTENATAL

White Blood Cell Count	9.80	x10^9/L	(4 to 10)	Auth
Auto Neutrophil Count	7.00	x10^9/L	(1.8 to 7.7)	Auth
Auto Lymphocyte Count	2.10	x10^9/L	(1.5 to 3.5)	Auth
Auto Monocytes	0.32	x10^9/L	(0.2 to 1.0)	Auth
Automated Eosinophils	0.10	x10^9/L	(0.02 to 0.5)	Auth
Automated Basophils	0.19	x10^9/L	(0.02 to 0.1)	Auth
Red Blood Cells	3.62	X10^12/L	(3.8 to 4.8)	Auth
Haemoglobin	8.2	g/dL	(12.5 to 16.5)	Auth
Haematocrit	0.267	L/L	(0.36 to 0.46)	Auth
MCV	74.0	fL	(83 to 101)	Auth
MCH	22.6	pG	(27 to 32)	Auth
MCHC	30.6	g/dL	(31.5 to 34.5)	Auth
Platelet Count	340	x10^9/L	(150 to 400)	Auth

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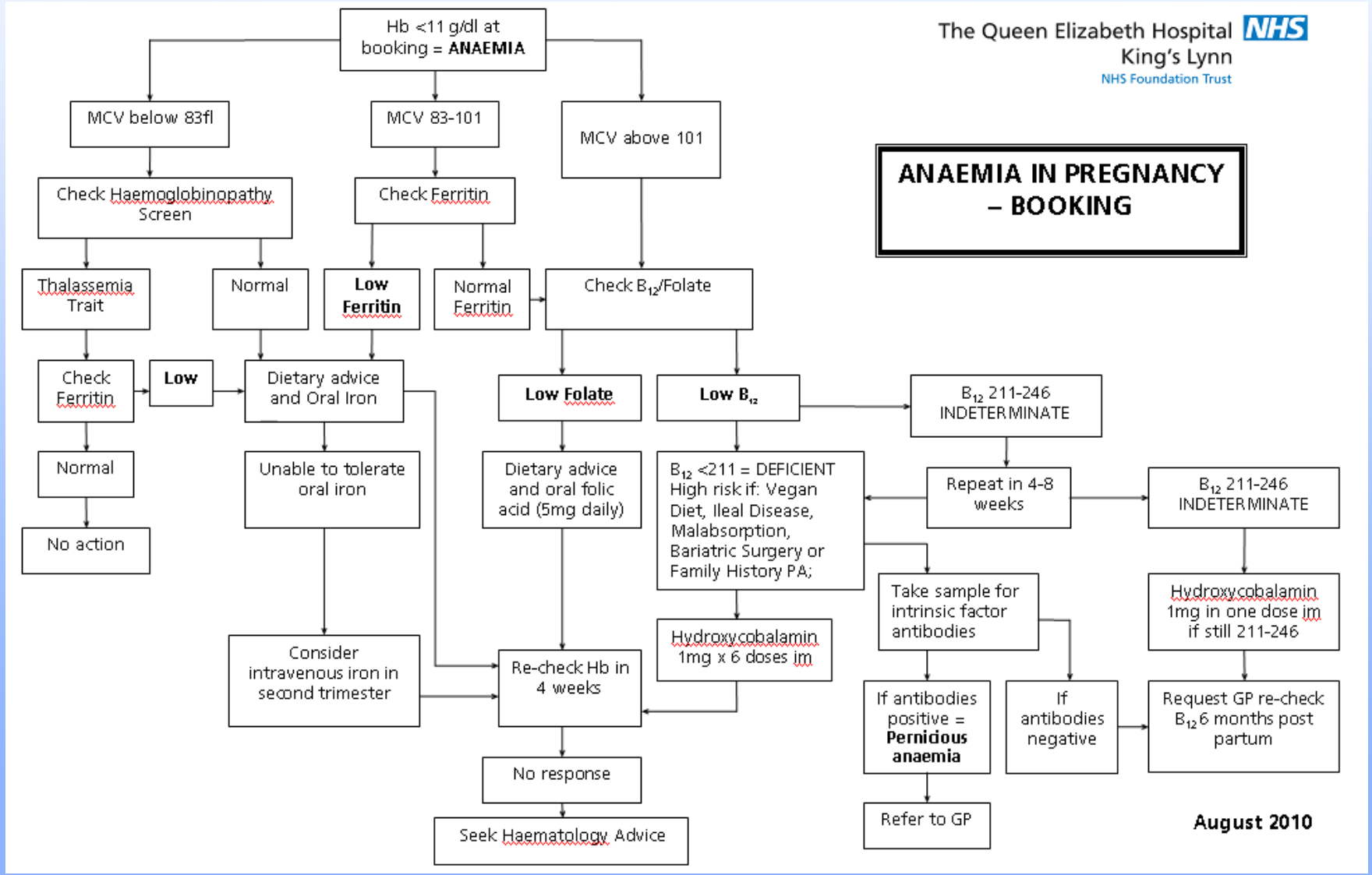

Investigations based on your findings

- 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 and MCHC.

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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.

Into the 3rd 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

[redacted]

Request Reason : Antenatal (28 weeks)

White Blood Cell Count	10.10	x10^9/L	(4 to 10)	Auth
Auto Neutrophil Count	6.54	x10^9/L	(1.8 to 7.7)	Auth
Auto Lymphocyte Count	2.50	x10^9/L	(1.5 to 3.5)	Auth
Auto Monocytes	0.74	x10^9/L	(0.2 to 1.0)	Auth
Automated Eosinophils	0.20	x10^9/L	(0.02 to 0.5)	Auth
Automated Basophils	0.03	x10^9/L	(0.02 to 0.1)	Auth
Red Blood Cells	3.76	X10^12/L	(3.9 to 4.8)	Auth
Haemoglobin	9.3	g/dL	(12.5 to 16.5)	Auth
Haematocrit	0.270	L/L	(0.36 to 0.46)	Auth
MCV	74.0	fL	(83 to 101)	Auth
MCH	24.8	pG	(27 to 32)	Auth
MCHC	33.5	g/dL	(31.5 to 34.5)	Auth
Platelet Count	342	x10^9/L	(150 to 400)	Auth

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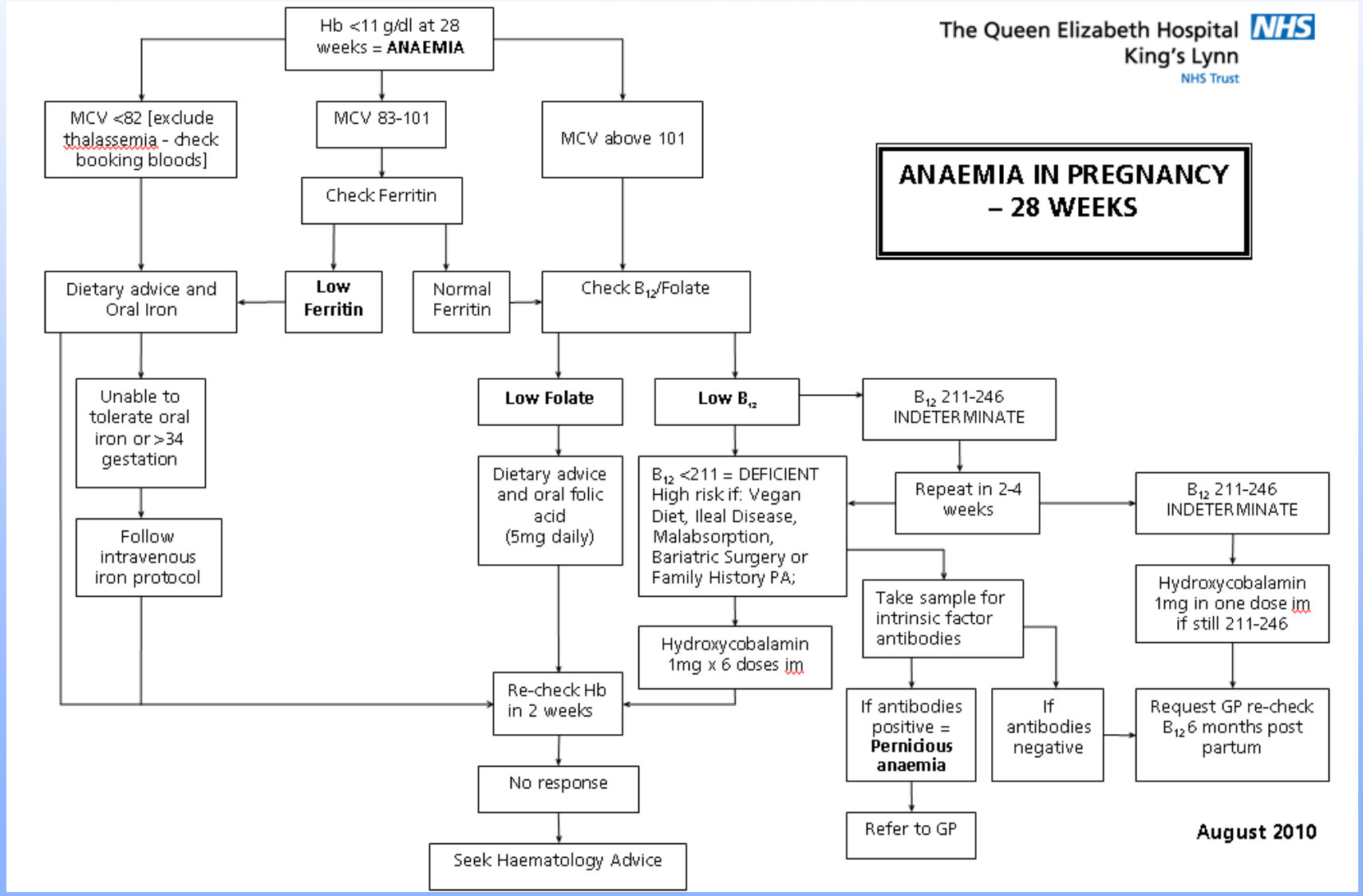

Adverse effects/risks of Iron deficiency in Pregnancy, Delivery and Post partum to Mum

- 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……..??!!

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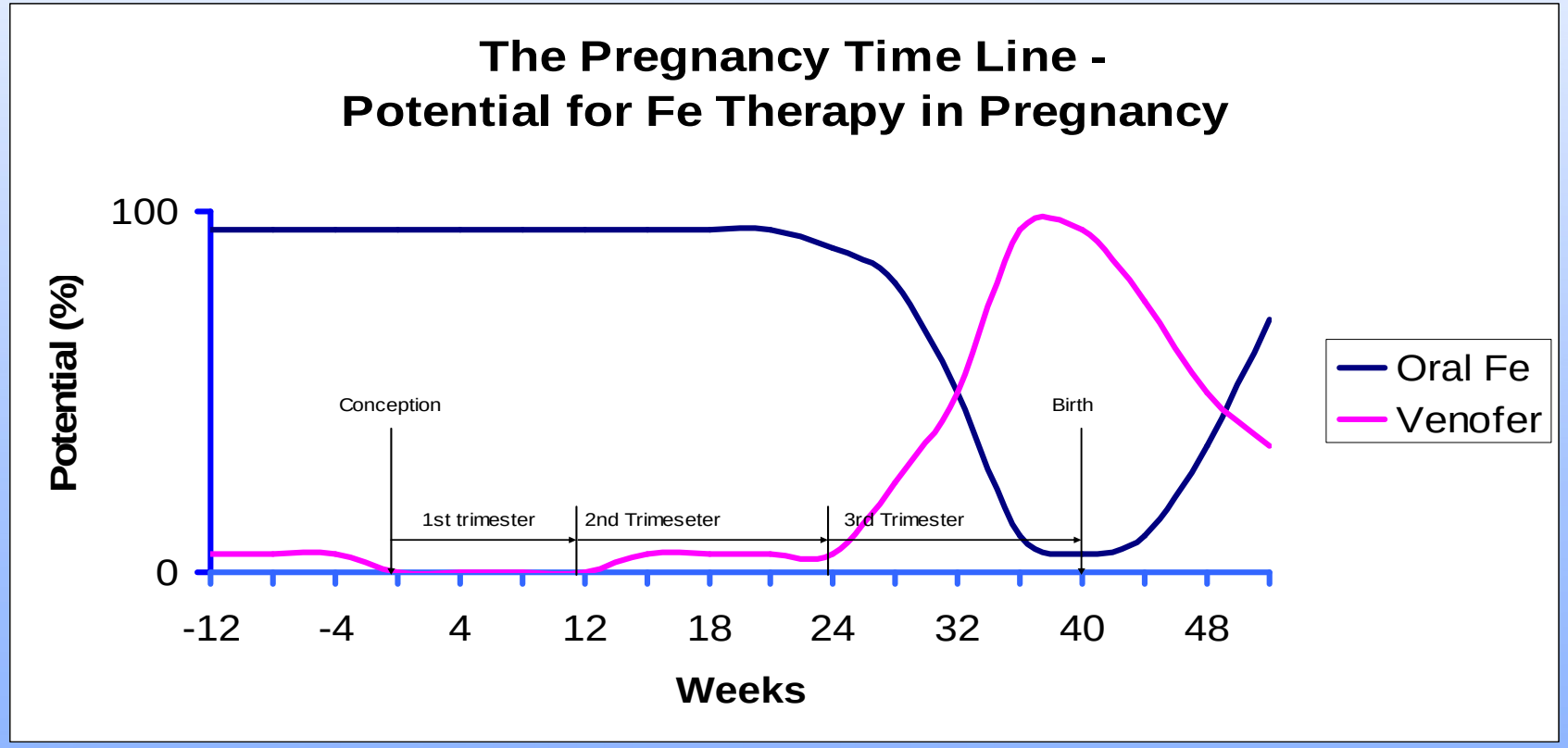
Iron Therapy Timeline in Pregnancy



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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.

Intravenous

- Rapid (almost as fast as a transfusion).
- Can target an exact level of Iron and Hb.
- Licensed in 2nd and 3rd Trimester.
- Side effects?
- New product? Which product?

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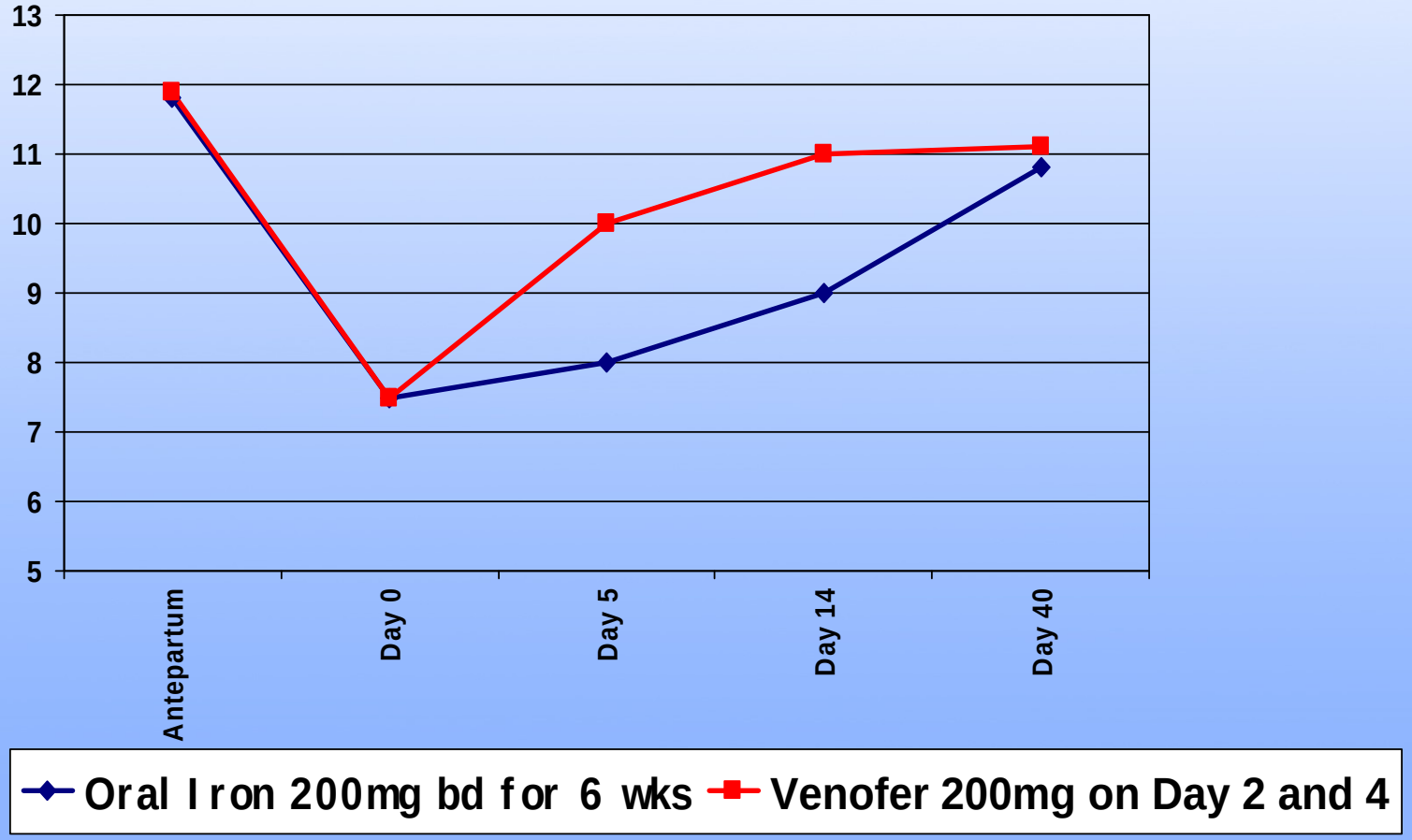
Oral Iron vs Venofer in the Postpartum

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



Don't forget Folate deficiency (or B_{12})

- Pregnancy requires extra 200 micro grams per day

- **Increased risk of deficiency**:
  - ❖ Poor nutrition
  - ❖ Twins
  - ❖ Haemolysis
  - ❖ Malaria
  - ❖ Infection
  - ❖ Drugs

- Diagnosis:

1. Haemoglobin↓
2. MCV↑
3. Serum folate
4. Red cell folate

- Treatment
  - ❖ Folic acid 5mg OD throughout pregnancy

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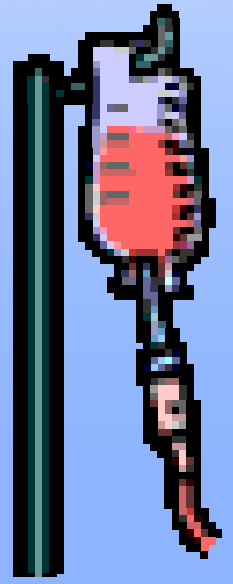
Blood is more dangerous than you might think……

Mini transplant of live cells from the donor to the recipient including some antibodies in plasma.

Consequences now?

In the future?



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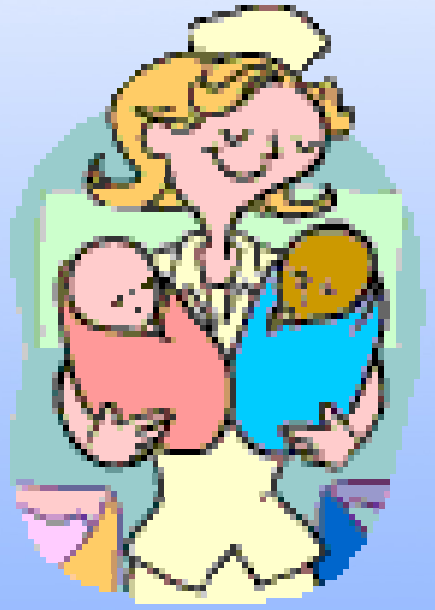
Transfusion

- What product?
- Any special requirements?
  - Irradiation /CMV negative?
  - Antibodies?
  - Childbearing age females – think!



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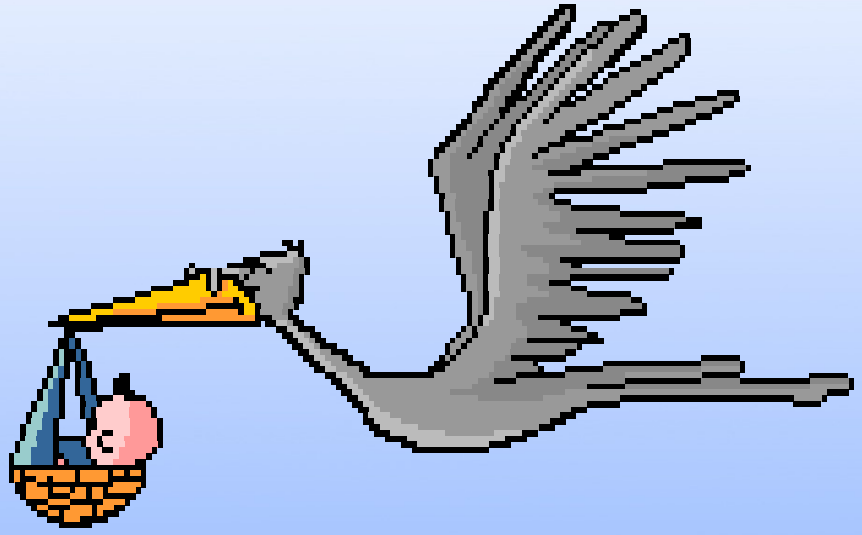
Case study1



- 37 yr Jehovah's Witness – 5th pregnancy
- Delivered at 39/40
- Hb at delivery 10.1g/dl
- Previous PPH x3
  (no alert)
- Massive bleed
- Hb dropped to 4.5

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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

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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.

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Case Study 2

- 22 year old – 2 other children
- 37/40
- Admitted to Castleacre with Norovirus
- Christmas.
- Septic
- Distressed baby → Section
- Hb 3.1g/dl, Platelets 41 $x10^9$/l , Neutrophils 0.3 $x10^9$/l
- B_{12} 99, Folate 1.6, CRP 280

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Then…

- 14 days as inpatient
- Septic shock
- 8 units of Red cells
- 1 unit of Platelets
- IV antibiotics
- Lots of stress and anxiety for everyone…….

Back up a bit…….

- 30.9.08 - 28 week bloods showed MCV **109** and film comment "macrocytic anaemia. Probable B_{12} deficiency"
- 6.11.08 MCV 116. Hb 9.0 Film comment "Macrocytic picture ?Liver ?B_{12} /Folate deficiency."
- 13.11.09 B_{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
- 27.12.09 Admitted with diarrhoea. Baby distressed.

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Case study 3

- 36 year old Journalist
- Best friend a Specialist Transfusion Nurse
- Not keen on blood transfusion
- On Pregaday
- Hb 9.0 at 28weeks
- MCV slightly lower than pre-pregnancy (91→85)
- Asked for advice

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 10g/dl

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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.

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THANK YOU!