Back to Basics: Anti-D

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Anti-D

Objectives for Today..

- Describe the mechanisms that lead to haemolytic disease of the fetus and newborn (HDFN)
- Explain the role of anti-D in the prevention of HDFN
- Describe the potentially sensitising events (PSEs)
- How fetal genotype screening can help midwives
Before we get started....

QUIZ TIME!
The purpose of routine anti-D Ig prophylaxis (RAADP) is.....?

⭐ To prevent haemolysis in the mother and immunisation in the foetus

⭐ To prevent immunisation in the mother and haemolysis in the foetus

⭐ To prevent haemolysis in both mother and foetus

⭐ To prevent immunisation in both mother and foetus
At what stage of gestation is prophylactic anti-D administered if given as a single dose regime?

- Booking (12-16 weeks)
- 20 – 22 weeks
- 28 – 30 weeks
- 34 – 38 weeks
Under what circumstances would you give anti-D to RhD positive women?

- If this is the second pregnancy and the first one was complicated by bleeding in the newborn
- Only at delivery if the baby is Rh negative
- Only if there is a miscarriage and the baby’s Rh type cannot be established
- Never
When contacting the laboratory to confirm if anti-D is required, what do you need to ask for?

- The blood results
- Kleihauer result
- Does the patient need Anti-D?
- Mother’s blood group
When would you request a Kleihauer test?

- For any sensitising event before 20 weeks
- For any sensitising event after 20 weeks and postnatally
- To identify the mother’s blood group
- To decide if Anti-D should be given or not
A dose of 1500IU anti-D given IM neutralises how many mL of fetal blood in maternal circulation?

- 2 mL
- 4 mL
- 12 mL
- 20 mL
The window period for administering anti-D after a sensitising event is...?

- 24 hours
- 36 hours
- 48 hours
- 72 hours
What is the minimum standard dose of anti-D for a sensitising event before 20 weeks gestation?

- 250 IU
- 500 IU
- 1500 IU
- Doesn’t need to be given before 20 weeks
What is the minimum standard dose of anti-D given for a sensitising event after 20 weeks gestation?  (BCSH and RCOG guidance)

- 250 IU
- 500 IU
- 1500 IU
- Does not need to be given if has had routine prophylaxis
When should Anti-D Ig be given before 12 weeks gestation in Rh negative women (You can choose more than one answer)

- A. Medical termination of pregnancy
- B. Surgical termination of pregnancy
- C. Ectopic pregnancy
- D. Routinely at booking
- E. To any mother who has had haemolytic disease of the newborn in a previous pregnancy
- F. Recurrent PV bleeding
Is anti-D a Blood Component?

• No!

• Anti-D is prescription-only medicine made from blood (pooled, non UK plasma) rather than a blood component.

• It is covered by the Medicines Act rather than BSQR.

• Clinical adverse reactions to anti-D are reported via the MHRA yellow card scheme

• Procedural errors associated with anti-D are SHOT reportable
Serious Hazards of Transfusion (SHOT)

- Haemovigilance Scheme

- Collects and analyses data on adverse events and reactions in blood transfusions

- Produces recommendations to improve patient safety
SHOT 2015

- anti-D continues to be a problem
- 350 cases reported and investigated
- 271 cases were due to omission or late administration of anti-D
- 53 inappropriate administration
- 18 Wrong dose according to local policy
- 8 handling and storage errors
Who makes errors?

• 350 cases looked at...
• 28 cases originated from doctor (double from 2014)
• 52 cases originated from the lab
• 270 cases originated from nurse / midwife

There was one death attributed to anti-D error.
Haemolytic Disease of the Fetus and Newborn

• Happens when maternal antibodies cause destruction of fetal red cells

• Can cause hydrops and fetal death

• Can be caused by different antibodies but Anti-D is the most important. Anti-c and Anti-K are also causes
Potentially Sensitising Events

- PV bleeding
- Abdominal Trauma
- Termination of Pregnancy
- Diagnosis of IUD
- Invasive antenatal procedures
- Stillbirth
- Miscarriage
- Ectopic Pregnancy
- External Cephalic Version
- Delivery of RhD positive baby
- Intra-operative cell salvage
Anti-D Ig prophylaxis

- Post-delivery anti-D prophylaxis for RhD negative women began in the UK in 1969
- The programme has been a huge success
- Deaths due to haemolytic disease:
  - 320/100,000 in the 1940s
  - 46/100,000 births pre-1969
  - 18.4/100,000 births by 1977
  - 1.6/100,000 births by 1990
The impact of Anti-D Ig

- Introduction of Anti-D prophylaxis
- Improved obstetric care
- Currently 15-25 deaths per year
What Guidelines are there?
When and What should midwives be doing?

- **<12/13 weeks.** Give **at least 250IU** anti-D for surgical interventions (ectopics, molar, TOP) or persistent, painful bleeding within 72 hours of event.

- **12/13 – 20 weeks.** Give **at least 250IU** anti-D for PSEs

- **>20 weeks.** Give **at least 500IU** anti-D for PSEs and perform Kleihauer in case more is required

- **28 – 34 weeks.** Prophylaxis is either: at least 500IU at 28 and 34 weeks or **1x 1500IU** between 28-30 weeks

- **At birth** If baby is Rh positive (or unknown) give **at least 500IU** anti-D and perform Kleihauer in case more required.

- If in doubt – speak with your lab or senior!
What Dose should be used?

• Anti-D given IV
  - **100 IU** will clear 1 mL of foetal red cells
  - is instantly available

• Anti-D given IM
  - **125 IU** will clear 1 mL of foetal red cells
  - will take hours to get into bloodstream via muscle, much longer (if at all) via fat and will lose some on the way
Kleihauer test

• What does it do?
  – Detects foetal cells in maternal blood

• How is it tested?
  – Mothers blood sample is spread on a slide, put through a series of washing and staining in acids
  – Adult cells are ghosted, foetal cells are stained
  – 10,000 cells are then counted and estimated bleed volume then determined on number of foetal cells present
Kleihauer test

- Note the slightly pink cells against the ‘ghost’ ones.
- Kleihauers are counted manually by at least two trained Biomedical Scientists – very labour intensive!
Common misconceptions around anti-D

• “We have sent a Kleihauer test postnatally”
  – No you haven’t, you have sent Mother and Cord samples for grouping – the Kleihauer is a reflex test dependent on results of the grouping

• “The Kleihauer Test was negative, so we don’t need anti-D”
  – Yes you do - the Kleihauer Test (or FMH Test) is not meant to decide whether or not you give anti-D, only if you need MORE than the standard dose for the event you are dealing with
Common misconceptions around anti-D

• “We have given anti-D recently for a PSE, so we don’t need to give routine prophylaxis”
  – Yes you do – you have NO IDEA how much of that anti-D is left in the system, and whether there is enough to cover the woman through the third trimester

• “The antibody screen is positive following prophylaxis, so we don’t need to give any more”
  – Yes you do - the positive antibody screen only tells you that SOME anti-D is there – not how much, or whether there will be enough to cover the event
Common misconceptions around anti-D

• “We only need to give anti-D at delivery of a fetal death”
  – No you don’t - you should give anti-D Ig at DIAGNOSIS of the fetal death AND at delivery – the two events may be days apart

• “You can give too much anti-D”
  – You would need to give 15,000 IU anti-D at once, IV, and more than 20,000 IU IM, to get to a maternal plasma level which MIGHT cause problems in the baby
Further Testing

- Determination of Foetal-Maternal Haemorrhage
  - Used to confirm Kleihauer counts of >2mL
  - Results used to recommend further dose of anti-D in large bleeds, with consultant advice

But what about detecting the group of the baby before birth?
Foetal Genotype Screening

• Sample taken from mother at 11+2/40 to determine foetal RhD status

• Results within 14 days of receipt in laboratory

• Benefits to mother, midwives, laboratory staff
  – Time, cost, focus on those having RhD pos babies

• Recommended by NICE in November 2016

• Further information available from your Customer Service Manager, or Erika Rutherford at NHSBT

Anti-D Summary

• Effective anti-D prophylaxis is a *partnership* between the laboratory and the clinical area

• Requests for anti-D should be driven by the clinicians, especially in early pregnancy

• The clinical area must be responsive to requests for follow-up from the laboratory, and the lab must not assume that action will be taken purely because they have issued a report