Mums, Babies and Blood

Case Studies

Cambridge University Hospitals NHS Foundation Trust

Together
Safe
Kind
Excellent

Author's name: Ruth Smith

Author's title: Transfusion Practitioner for the Rosie Hospital.

February 2025

Case Study 1

Booked in for her 4th pregnancy

Blood Group: O RhD Positive

1st pregnancy: Stillbirth-no cause established

2nd pregnancy (5 years earlier). Uncomplicated pregnancy. No antibodies detected up to and including delivery. Minimal blood loss. (300mL)

3rd pregnancy (4 years earlier) Booking bloods showed positive antibody screen, due to anti-c. Baby delivered early (34 weeks) due to high risk of HDFN, as anti c level had risen to 23.1 IU/mL. Baby required phototherapy.

Partner was tested and found to be homozygous for the c antigen, therefore all children from this partnership would be c positive.

So, when she returned with her 4th pregnancy, the Fetal Medicine Unit, Obstetricians and transfusion teams knew what to expect!

Booking level at 13 weeks gestation: 5.3 IU/mL. (Low risk)

Foetal genotyping confirmed that the baby was c positive.

By 24 weeks gestation, the anti c level had risen to 11.3 IU/mL (Medium risk), and by 32 weeks to 18.8 IU/mL. (Still medium risk).

At 34 weeks, a routine Middle Cerebral Arterial Doppler showed a Peak Systolic Velocity of 1.86 MoM indicating there was a high risk that the baby was anaemic.

The following day, mother was admitted, and steroid injections given in preparation for IOL.

Scenario- double trouble!...

Baby:

At risk of severe HDFN, possibly requiring top up/exchange transfusion

Mum:

Increased risk of bleeding due to:

IOL

Multiparity

Age

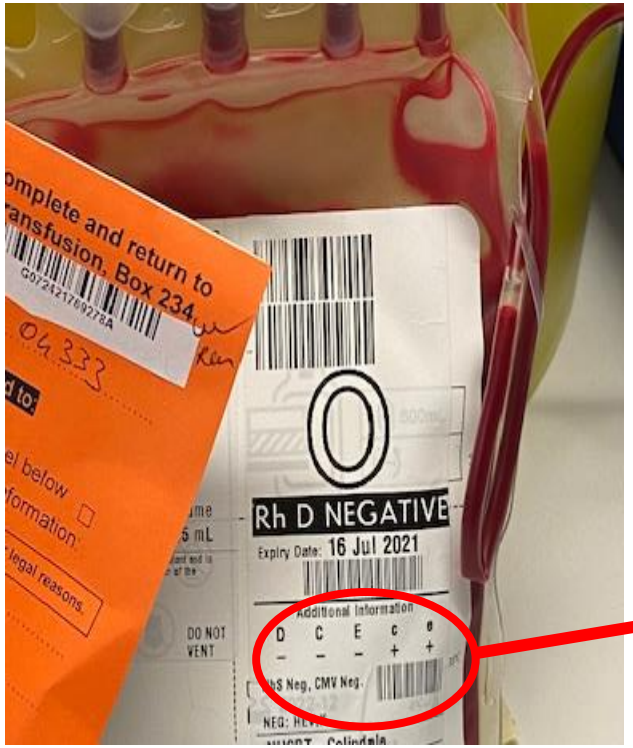
Obstetric history

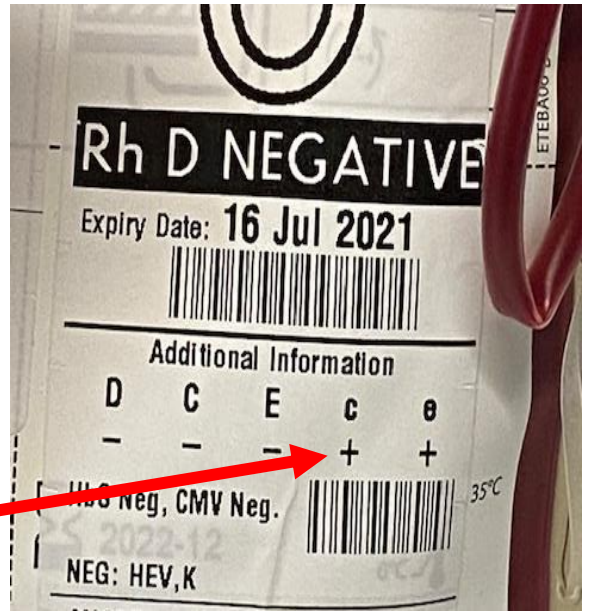
Requires full serological cross match due to antibody.

One further problem:

Neither can receive the Emergency O RhD Negative units should they require an urgent transfusion

Why????





What did we do??

Plan put in place involving Obstetricians, transfusion team, NICU.

For Mum:

Prior to IOL, 4 units cross-matched and sent over to delivery unit.

Alert put in place that emergency O RhD negative units NOT to be used.

On IOL, a further 4 units of red cells cross-matched and sent over.

Laboratory aware to monitor blood use, so more blood could be made available in a timely manner.

For Baby:

Full paedipack cross-matched against mums plasma, labelled as compatible for “baby of patient 1” and sent over to delivery unit should baby require an urgent transfusion

National blood service alerted to hold a suitable unit in case an exchange transfusion was required.

Outcome:

Baby boy delivered by caesarean section (failed IOL) at 34+2 weeks gestation.

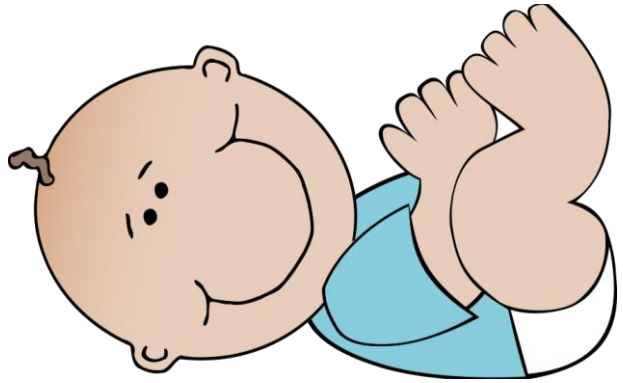
Haemoglobin 165g/l, Bilirubin 56µmol/l

Baby received double phototherapy, which was reduced to single on day 2.

Bilirubin under treatment threshold by end of day 2, so treatment stopped and levels monitored.

Baby discharged home on day 17.

No blood required by mother or baby!



Case Study 2

Presented for booking 3rd pregnancy at 9 weeks gestation.

Blood group : A Negative, Antibody screen : Positive – Anti D detected. Unable to quantify. Repeat requested.

At 13 weeks cffDNA predicted baby to be D positive, so vital confirmation of passive/immune required.

Repeat sample at 14 weeks, anti D level <0.1IU/mL

Patient history

New patient – no history on file and no evidence of anti D administration.

Limited information as lady refugee from Ukraine.

Apparently had 2 children aged 12 and 9 both uncomplicated SVD.

Unable to determine whether any recent terminations/miscarriages requiring anti D administration.

Requested next sample in 4 weeks.

Next sample (18 weeks) level had risen to 14.4 IU/mL (Definitely immune – moderate risk for HDFN – referred to FMU)

22 weeks – 44.9 IU/mL- High risk

23 weeks – Evidence of hydrops seen on scan

Sent to Kings College London for IUT

Report from Kings stated that baby had received 40mls blood raising the Hb from

16g/L – 69g/L

24 weeks – Repeat IUT. Baby again received 40mls blood raising the Hb from 67g/L – 125g/L

Mums anti D level 59.4IU/mL

Brain scan done on baby at 26+5 for damage due to severe hypoxia – structurally normal.

27 weeks – Doppler again shows ↑PSV, so referral made for further IUT

Baby received 70mls blood which raised the Hb from 65g/L-162g/L

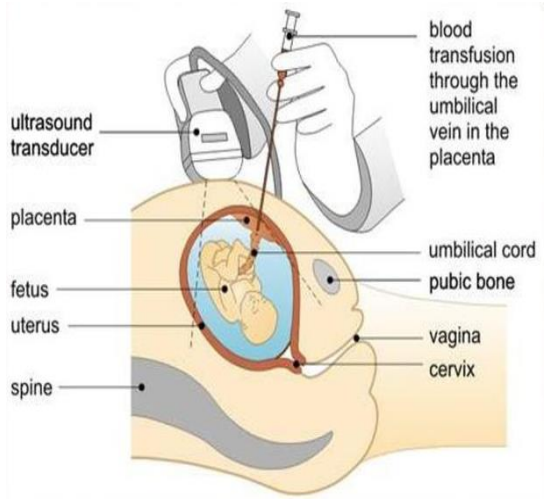
Mums antibody level continued to rise:

28 weeks 131.5 IU/mL

29 weeks 157.4 IU/mL

31 weeks – Further IUT. 100mls given Hb 78g/L – 165g/L

Doppler scans at 32,33,34 & 35 weeks all normal.



Delivery

Delivery planned for ELCS at 35 + 5 weeks.

Blood required for Mum as major placenta praevia.

Laboratory:

Cross matched 4 units blood for mum

6 Irradiated paedipacks available cross matched against Mum’s sample (O Negative)

2 Exchange units held at Cambridge NHSBT

Outcome

Mum – Delivery fine – no blood required. EBL 550mls

Baby – Male born “Flat, floppy and pale” with respiratory distress. Hb 87g/L Bilirubin just above exchange transfusion line.

Biliblanket, double phototherapy, IVIg given and top up transfusion.

Day 2 Phototherapy stopped

Day 4 Further top up transfusion

Day 10 De-escalated to SCBU

Day 14 Discharged.

However…..

Haemolysis not resolved.

4 weeks – Follow up clinic Hb 70g/L – booked to come back for top up transfusion following week

But…2 days later – ED “pale” Hb 55g/L – top up given (Group still indeterminate – Antibody screen positive)

Hb continuing to drop

8 weeks – Hb 55g/L – further top up given. Antibody screen still positive

Hb checked fortnightly and began to rise – by 4 months HDFN resolved.

Also…will require brain scan/further monitoring to check for neurological impairment between 6 and 12 months.

Case study 3 – A very rare antibody

Booking bloods (7 weeks) –

A RhD Negative with a positive antibody screen.

After much testing and confirmation at NHSBT, the antibody was determined to be anti k (not K) at a titre of 2.

Background:

Previous delivery at a different hospital – forceps delivery with a PPH of 1.5L, and 1 unit of red cells transfused. (A RhD negative, K negative as per protocol)

K vs k

K and k are co-dominant alleles of the Kell blood group system.

91% of the Caucasian population are K-k+ (kk)

8.8% are K+k+ (Kk)

0.2% are K+K+ (KK)

Anti K is very immunogenic, causing fetal anaemia, hence women ≤50 are routinely given K negative red cells (k positive)

1:4000 units – 6 units available in the country at any one time!

Double trouble!

Baby – Potential of fetal anaemia.

Mother – Lack of available compatible blood should she require it.

Referred to FMU.

Dad's sample sent to NHSBT and found to be kk, so 100% chance baby will be k+

Protocol for k same as K

Good news - Titres remained low (4) & Dopplers normal.

Bad news – At 25 weeks Mum found to have a full Placenta Praevia, so high risk of bleeding!

Getting organised?

34 weeks – Dopplers still normal

Delivery planned by CS at 38 weeks

Blood to be sourced and ordered in for delivery.

4 units in the country – 2 reasonably close, 2 further afield

Haemoglobin 118g/L, Ferritin 8.5µg/L

2 doses IV iron planned for 35 & 36 weeks to maximise level ready for delivery at 38 weeks

35+3 weeks – First dose given.

Next dose planned for 36+3 weeks

However……..

36+1 – (3.30am) Patient presented with PV bleeding

This settled, but steroids given to prepare for delivery once blood had been called in from NHSBT and cross-matched, as Emergency O D negative units not suitable as also K negative (k positive).

Blood available by mid morning.

Took 4 units blood into theatre in a cold box ready for delivery.

Outcome….

Baby girl safely delivered.

Mum’s EBL 500mL, so no blood required.

Baby had 2+ Direct Antiglobulin test ? Anti k/passive anti D (Mum RhD Negative, so Prophylaxis given)

Following birth, Bilirubin level rose, and phototherapy required.

Discharged on Day 7

Thank you for listening….

……Any Questions???

ruth.smith31@nhs.net Tel: 01223 217072