Blood grouping, antibodies and pregnancy







Jo Lawrence Transfusion Practitioner

What are blood Groups?



Reactions



Rabbits and Monkeys!













Positive or Negative?



Those who have the D antigen on their red cells are RhD Positive Those who don't are RhD Negative



History of HDFN

First described in 1609 by a French Midwife Louise Bourgeious

1932 Louis K Diamond (et al) recognised a relationship between antibodies in the maternal circulation and foetal erythroblasts.

1937 – early 1940s: "Rhesus" (Rh) blood group system is identified

1953 Link between alloimunisationand HDN established.Cause: trans placental haemorrhage



1957: Kleihauer & Betke describe a method using acid-elution to quantify foetal cells in the maternal circulation.



1960s: USA & UK collaborate to produce "therapeutic antibodies" to remove the antigens from maternal circulation (foetal cells)

First administered on May 29, 1968 to Marianne Cummins in Teaneck, NJ.



1970s routine antenatal care includes screening of all expectant mothers to identify those at risk of HDFN.

Deaths from RhD alloimmunisation pre-1969

46 per 100,000 births (i.e. 1 in 2,200 births) with HDN in 1% of births

Deaths from RhD alloimmunisation 1990

1.6 per 100,000 births (i.e. 1 in 62,500)



18-27% of cases due to sensitisation during 3rd trimester of 1st pregnancy without a recognised sensitising event.

Since the early 1990s Routine antenatal anti-D prophylaxis at around 28/40 weeks introduced. Initially it was 500iu at 28 & 34w Now, better compliance is achieved with just one 1500iu dose @28-30w



Since 1983 ~50% red cell antibodies are not anti-D





Cell Free Fetal DNA

False Negative result 0.1%

Blood and Transplant

Mother's blood test to check her unborn baby's blood group



False Positive result 2.0%



Other Significant Antibodies in Pregnancy



Management of Ladies with clinically significant antibodies







- Antibody identified by local transfusion laboratory
- Sample referred to local RCI laboratory
- Titres / Quantification performed
- Results determine frequency of testing
- Monitoring of baby from ultrasound to intrauterine transfusions

Typical NHSBT Report

Primary Requesting Clinician: x0000001 HEAD OF BLOOD TRANSFUSION EDD: 19-Apr-2017 Gestation: 35 weeks at sampling Charge Code: D032

A RhD positive C+c-E-e+K-

Red Cell Antibody Results

Туре	Specificity	Technique	Sam ple Type
Allo	Anti-E	Enzyme IAT	Plasma

ANTIBODY AND CLINICAL SIGNIFICANCE

The risk of haemolytic disease of the fetus and newborn is low when the anti-E is detected by enzyme technique only.

CUNICAL ADVICE

This woman should be in the care of a hospital obstetric unit.

REPEAT SAMPLING

If gestation is less than 28 weeks, BSH guidelines recommend repeat testing at 28 weeks gestation. If gestation is greater than 28 weeks no further samples are required by NHSBT.

FURTHER ACTIONS At delivery a cord DAT should be performed and, if positive, the baby's Hb and bilirubin monitored.

BLOOD SELECTION Select ABO compatible D+ E- c- K- red cell units for crossmatching by IAT.

OTHER An antibody card for this patient is provided.

Typical NHSBT Report

B RhD negative

Туре	Specificity	Technique	Quantification IU/mL or Titre		Sample Type
				-	
Allo	Anti-D	IAT	Quant	76.3	Plasma
Allo	Anti-C	Previously reported			Plasma
Allo	Anti-G	IAT and enzyme techniques	Titre	32	Plasma

Please provide EDD.

ANTIBODY AND CLINICAL SIGNIFICANCE.

There is a high risk of haemolytic disease of the fetus and newborn when the maternal anti-D level exceeds 15 IU/mL and the anti-G titre is 32 or higher.

The risk of haemolytic disease of the fetus and newborn may increase if gestation proceeds beyond term.

CLINICAL ADVICE Please alert the Consultant Obstetrician.

Refer to / continue to monitor at a specialist Fetal Medicine Unit. As the anti-D level exceeds 15 IU/mL, once serial MCA doppler assessment is in place, the value of quantification is doubtful.

REPEAT SAMPLING

Please consult hospital Obstetric Consultant. If agreed at this consultation, testing at 4 weekly intervals to 28 weeks gestation then every 2 weeks to delivery may be discontinued. However, if gestation is less than 28 weeks, guidelines recommend repeat testing at 28 weeks gestation.

FURTHER ACTIONS

At delivery a cord DAT should be performed and, if positive, the baby's Hb and bilirubin monitored.

BLOOD SELECTION

Select ABO compatible D- C- E- K- red cell units for crossmatching by IAT.

OTHER

Guidelines recommend a current paternal phenotype is performed as it may provide useful information. The NHSBT consultant and the Hospital Transfusion Laboratory were alerted about the result on 04/10/2016. Can you help? Researchers from the NHS Blood & Transplant are seeking pregnant women who have made antibodies against their baby's red cells to join the AIR study. The study aims to discover why some women make these antibodies, to allow better treatment and prevention. Pregnant women who have made antibodies may already have received a letter about the study, but if

Exchange Transfusion

An **exchange transfusion**, also known as *exsanguination transfusion*, *replacement transfusion* or *substitution transfusion*, is a blood transfusion in which the patient's blood (or components of it) are exchanged with (replaced by) other blood or blood products.



The aim of an exchange transfusion is:

- To lower the serum bilirubin level and reduce the risk of brain damage (kernicterus);
- To remove the infants' affected red blood cells and circulating maternal antibodies to reduce red cell
- destruction;
- To correct anaemia and treat any potential for heart failure whilst maintaining euvolaemia.
- Exchange packs ordered directly from Blood Centre
- Expiry = 24 hours
- Predictable PCV
- Crossmatched against Mum's sample.



At Delivery





But what happens if Mum bleeds at delivery and she has antibodies?

