Better Blood Transfusion
&
anti-D Immunoglobulin

- an analysis of adverse events reports from the Serious Hazards of Transfusion scheme

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SERIOUS HAZARDS OF TRANSFUSION SHOT

Anti-D - the background....

- To prevent Haemolytic Disease of the Newborn (HDN)
- Offered to all RhD negative pregnant women who are not known to be sensitised to the RhD antigen
- 500iu of anti-D Ig is capable of suppressing immunisation by 4ml of RhD positive red cells

Anti-D Prophylaxis

- Post-delivery anti-D prophylaxis began in the UK in 1969
- The programme has been a huge success
- Deaths fell from **46 / 100,000** births pre-1969 to **1.6 / 100,000** births by 1990

  but.....

- RhD alloimmunisation continues to occur

‘Better Blood Transfusion’ *HSC 2007/001*

- Ensure the safe and appropriate use of blood components, and the use of alternatives where available
- Reporting of adverse events and feed back learning
- Ensure procedures for prescription and administration of anti-D are risk-assessed and monitored

- Ensure that clinicians are trained to carry out antenatal testing and prescribe anti-D appropriately
- Ensure that staff in blood transfusion laboratories are trained and assessed on an annual basis in the prevention and laboratory management of HDN
- Ensure that national guidance from NICE relating to anti-D prophylaxis is implemented and monitored
- Ensure that anti-D follows the same rigorous requirements for patient ID, recording and traceability as other blood components

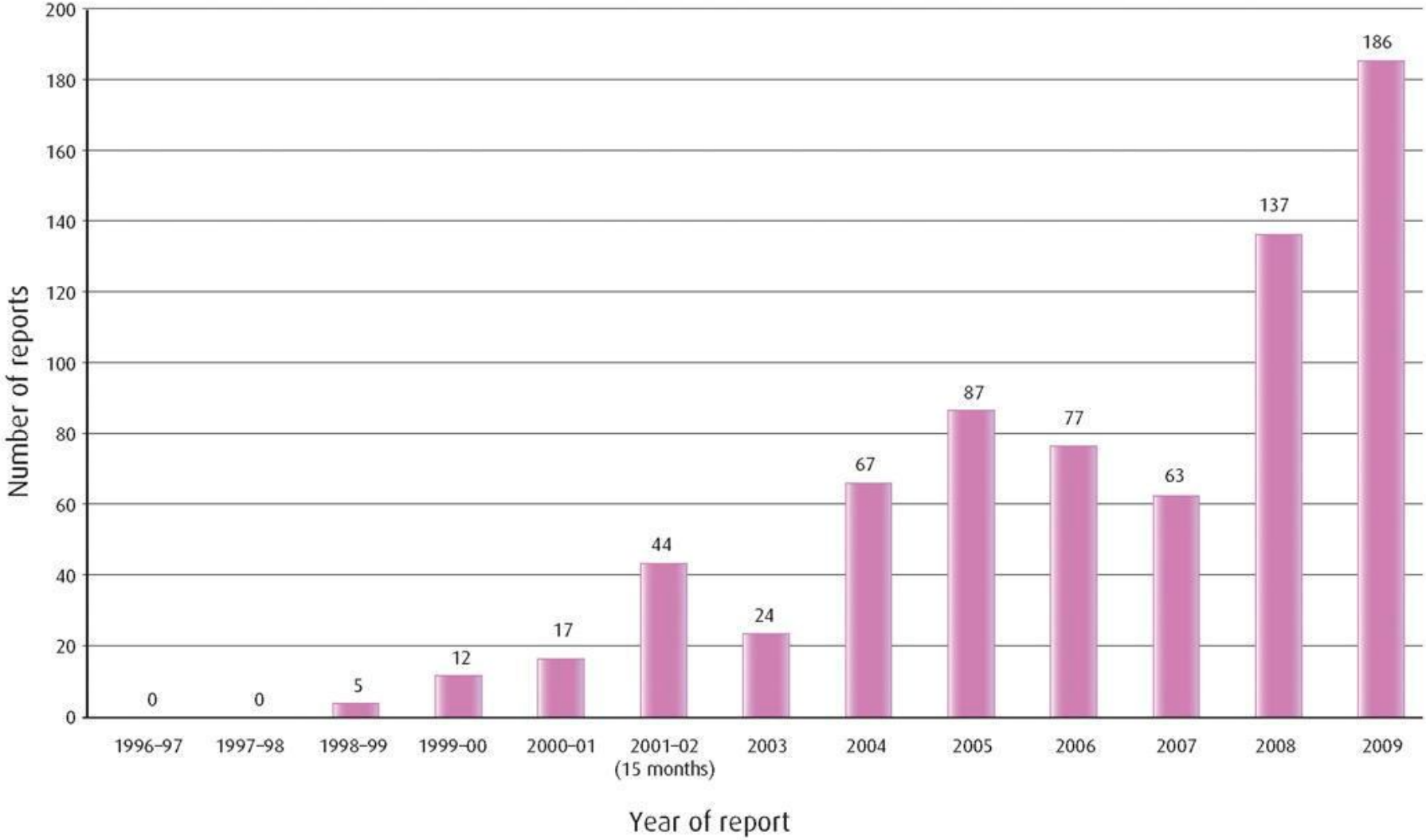
Serious Hazards of Transfusion scheme

- UK Confidential Enquiry www.shotuk.org
- Production of annual report, summary, recommendations and learning points
- 'Voluntary' reporting, but a requirement of NPSA, DoH, CQC
  - adverse transfusion reactions
  - adverse events including clinical errors and near-misses

Anti-D Reporting Categories

- Omission or late administration of anti-D immunoglobulin
- Inappropriate administration of anti-D immunoglobulin to:
  - a RhD positive patient
  - a patient who already has immune anti-D
  - a mother of a RhD negative infant
  - a different patient from the patient it was issued for
- Handling and storage errors
  - an incorrect dose of anti-D immunoglobulin according to local policy
  - administration of expired, or otherwise out of temperature control, anti-D immunoglobulin

Anti-D cases 1996 - 2009



Anti-D Events in 2009 n = 196

- **62** cases where anti-D was inappropriately administered - *unnecessary exposure to a human blood product*
- **127** cases where anti-D was delayed or omitted, putting patient at risk of sensitisation to the D antigen - *potential Major Morbidity*
- **6** cases where the wrong dose of anti-D was administered
- **1** handling and storage error

Anti-D….who made the errors ?

- Midwives	153	(78%)
- Laboratory	38	(20%)
- Medical staff	5	(2%)

Lack of knowledge of when it is appropriate to issue anti-D

Two midwives separately checked the hospital computer system, which clearly showed the patient to be RhD positive, yet still proceeded to issue anti-D Ig to the patient from a stock held in the clinical area

Use of laboratory issue form in bedside check

In two cases, midwives checked patient identification details on the anti-D against those on the accompanying laboratory issue form, away from the bedside, before administering the anti-D to a completely different patient.

Anti-D administered on the basis of a different patient's grouping report

An RhD positive patient was given anti-D in error, as a result of the wrong patient's blood group report being filed in her notes. The incorrect group was subsequently transcribed onto other paperwork, and the patient was administered anti-D following an amniocentesis.

Anti-D Summary

- Many of the cases involve:
  - failure to follow basic clinical and laboratory protocols
  - clerical / testing errors
  - ignoring / overriding hazard flags on IT systems
  - lack of understanding
- Getting it wrong can lead to death or major morbidity
- More routine antenatal screening in hospitals rather than blood centres means good local SOPs and practice are even more important

Anti-D Recommendations

- Obstetricians / midwives / lab staff must be familiar with national guidance for RAADP
  - HTC / lab must engage with obstetricians and midwives to produce local guidelines
- There should be clinical follow-up and retesting in 6 months of patients in whom anti-D administration has been delayed or omitted

- If outside 72 hrs still give anti-D, as a dose within 9-10 days may provide some protection
- Give RAADP **in addition** to prophylaxis for sensitising events, and *vice versa*

SERIOUS HAZARDS OF TRANSFUSION SHOT

Contact your local Transfusion Practitioner

learnbloodtransfusion

e-learning for safe, effective and appropriate transfusion practice

Anti-D Clinical and Laboratory e-Learning Courses - Available now!

Designed to support the safe and appropriate administration of anti-D immunoglobulin

Anti-D Clinical Course (6 sessions)

Covers: Pathophysiology, management of routine and non-routine care during pregnancy, informed decision making and administration of anti-D immunoglobulin

Anti-D Laboratory Course (5 sessions)

Covers: Routine laboratory testing in pregnancy and the role of the laboratory in anti-D prophylaxis and anti-D sensitised pregnancies

Target Audience:

Clinicians, midwives, nurses, general practitioners, and biomedical scientists working in haematology and transfusion laboratories

Access the e-learning via the learnProNHS learning management system at www.learnbloodtransfusion.org.uk
the National Learning Management System (NLMS) at www.esrsupport.co.uk/nlms/index.html,
or the e-Learning for Healthcare (e-LfH) the project web pages at www.e-lfh.org.uk/learnbloodtransfusion
for more information, including how to access the e-learning.

Department of Health in partnership with Professional Bodies and the NHS

NHS

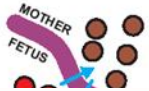
WHAT IS HDN?

Haemolytic Disease of the Newborn (HDN) occurs when antibodies made by the mother bring about the destruction of red cells in the fetus and / or neonate.

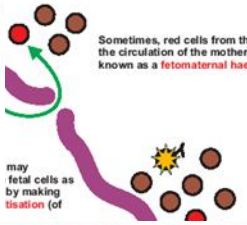
Different Blood Groups

There are lots of different blood groups on our red cells - half of them inherited from our father and half from our mother. Therefore a fetus will have some blood groups which are the same as the mother's and some (inherited from the father) which could be different.

Mother Father Baby



At the placenta the blood supplies from mother and fetus meet but usually do not mix. Nutrients and oxygen cross the placenta from mother to fetus and waste products and carbon dioxide pass from the fetus to mother.



Sometimes, red cells from the fetus can enter the circulation of the mother and mix - this is known as a fetomaternal haemorrhage (FMH).

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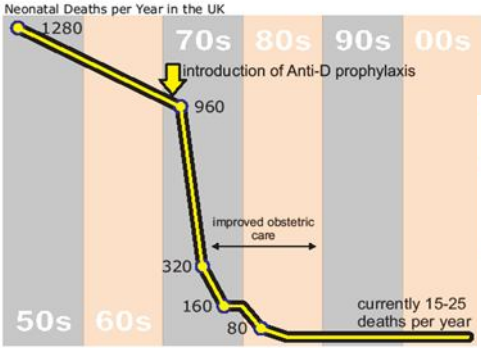
REDUCING THE IMPACT OF HDN

Several advances in the investigation and treatment of HDN have greatly reduced the risk of death from this condition



early 1950s	mid 1950s	early 1960s	late 1960s	early 1970
exchange transfusion	early delivery	amnio-centesis	intra-uterine transfusion	Anti-D prophylaxi
Replacing baby's blood shortly after birth greatly reduced the risk of death from HDN and brain damage from kernicterus.	Delivering babies up to eight weeks early can reduce the impact of haemolysis.	Testing the amniotic fluid can measure the amount of red cell destruction so that appropriate action can be taken.	Transfusing the fetus in the womb reduces the impact of anaemia during pregnancy. This can be done from 20 weeks gestation onwards.	The introductio of anti-D prophylaxis greatly reduce maternal sensitisation a HDN in subsequent pregnancies.

HDN AWARENESS

reducing the impact of haemolytic disease of the (fetus and) newborn

POSTER 3

SENSITISED PREGNANCIES & RhD HDN - CURRENT MANAGEMENT

If the mother has been found to have immune red cell antibodies then she requires close monitoring and *must* be referred to a Consultant Obstetrician.

Close liaison is required between the obstetric, midwifery, neonatal and haematology teams, the hospital transfusion laboratory and specialist laboratory at the Blood Service.

Blood tests

The antibody level must be monitored at 4-weekly intervals until 28 weeks and then 2-weekly until birth.
It is important to determine if the mother has had previous pregnancies affected by HDN.
The father's RhD type may help assess if the baby is at risk of HDN.

It may be possible to test the fetal RhD type using molecular techniques on free fetal DNA (ffDNA) present in a maternal sample

Assessment and treatment during pregnancy

Invasive tests such as amniocentesis to assess severity of HDN have been replaced by non invasive tests such as Middle Cerebral Artery (MCA) doppler and ultrasound.

If the MCA doppler shows severe anaemia then fetal blood sampling is undertaken followed by an intra-uterine blood transfusion if needed.

Assessment and treatment after delivery

Cord blood samples must be taken to check the baby's haemoglobin, bilirubin and Direct Antiglobulin Test (DAT) to check if the baby's red cells are coated with maternal anti-D antibodies.

If mild HDN then the baby may need phototherapy only to reduce the level of bilirubin in the blood.

If severe HDN then the baby will need exchange transfusion which replaces the baby's blood with transfused blood, removing harmful bilirubin and anti-D antibody, while at the same time treating the anaemia.

HDN AWARENESS

reducing the impact of haemolytic disease of the (fetus and) newborn

POSTER 7 OF 7

Resources from your regional Transfusion Liaison Nurse/Practitioner

- Will I need a blood transfusion?
- **Iron in your diet**
- Information for patients needing irradiated blood
- Receiving a plasma transfusion
- **Blood group and red cell antibodies in pregnancy**
- Children's leaflets
- Educational posters

http://hospital.blood.co.uk

Thanks to;

- The SHOT Team
- The Better Blood Transfusion Team
- Hospital Transfusion Teams for reporting
- **You for listening !**