10. Adverse Events Relating to Anti-D Immunoglobulin (Anti-D)

Definition

An adverse event relating to anti-D Ig is defined as an event relating to the prescription, administration or omission of anti-D Ig which has the potential to cause harm to the mother or fetus immediately or in the future.

DATA SUMMARY

Total number of cases	**186**	*Implicated components*		*Mortality/morbidity*	
		Red cells		Deaths due to transfusion	**0**
		FFP		Deaths in which reaction was implicated	**0**
		Platelets		Major morbidity	**1**
		Anti-D Ig	**186**	Potential for major morbidity	**127**
		Unknown			

Gender		*Age*		*Emergency vs. routine and core hours vs. out of core hours*		*Where transfusion took place*	
Male	**0**	18 years+	**183**	Emergency		ED	
Female	**186**	16 years+ to 18 years	**3**	Routine		Theatre	
Unknown	**0**	1 year+ to 16 years	**0**	Not known	**186**	ITU/NNU/HDU/Recovery	
		28 days+ to 1 year	**0**			Wards	
		Birth to 28 days	**0**	In core hours		Community	**154**
		Unknown	**0**	Out of core hours		Outpatient/day unit	**32**
		Total	**186**	Not known/applicable	**186**	Not known	

This section describes the main findings from 186 completed questionnaires. However, 1 of the submitted questionnaires refers to a hospital audit involving 11 different patients, so the number of individual cases considered in this chapter is actually 196. The reports are broken down into the reporting categories shown in Table 32. Under current haemovigilance legislation,[2] adverse events related to anti-D immunoglobulin are reportable as 'SHOT-only'. Adverse reactions are reportable under the yellow card system for batched pharmaceutical products.

Table 32
Reporting categories

Category of adverse event	Number of cases
Omission or late administration of anti-D immunoglobulin	127
Inappropriate administration of anti-D immunoglobulin	62
to a RhD positive patient *to a patient with immune anti-D* *to a mother of a RhD negative infant* *to the wrong patient*	*27* *20* *6* *9*
Wrong dose of anti-D immunoglobulin given according to local policy	6
Administration of expired or out of temperature control anti-D Ig	1
TOTAL	**196**

Mortality *n* = 0

There was no known fetal mortality following omission, or delay in administration, of anti-D, but these data have not been systematically reported or collected.

Major morbidity *n* = 128

In 127 of the 196 cases anti-D was administered more than 72 hours following a potentially sensitising event, or omitted altogether, resulting in the potential for sensitisation of the patient to the D antigen. This satisfies the current SHOT definition of major morbidity. There was 1 case in which a baby was reported as suffering from haemolytic disease of the newborn (HDN) following an incorrect assumption by the laboratory that a positive antibody screen was due to prophylactic anti-D (see Case 6, below).

Clinical versus laboratory errors

For 2009, 196 events relating to anti-D immunoglobulin administration are summarised in Table 33 below, with a breakdown of the proportion of clinical and laboratory errors that were primarily responsible.

In past years the distribution of cases reflected the overall SHOT finding that around two-thirds of reports involve errors by clinical staff and one-third by laboratory staff, but this year the proportion of clinical anti-D related errors increased to 80% of the total reports.

Table 33
Adverse incidents involving anti-D Ig administration, with site of primary error

Type of event	Cases	Number of primary errors		
		Midwife	Laboratory	Doctor
Omission or late administration of anti-D Ig	**127**	118	6	3
Anti-D Ig given to RhD positive patient	**27**	7	18	2
Anti-D Ig given to patient with immune anti-D	**20**	13	7	0
Anti-D Ig given to mother of RhD negative infant	**6**	3	3	0
Anti-D given to wrong patient	**9**	9	0	0
Wrong dose of anti-D given	**6**	2	4	0
Anti-D Ig expired or out of temperature control	**1**	1	0	0
Totals	**196**	153	38	5

There were 3 cases in which a positive antibody screen was incorrectly assumed by the laboratory to be due to prophylactic anti-D, so denying the patients appropriate follow-up for monitoring and treatment of HDN.

In addition there were 127 cases in which administration of anti-D Ig following potentially sensitising events was delayed or omitted, placing the patient at risk of developing immune anti-D.

In 62 cases anti-D was inappropriately administered, resulting in unnecessary exposure to a human blood product.

Omission or late administration of anti-D *n* = 127

In 118/127 cases the primary error was made by a midwife. Twenty-five cases occurred in the community, and 102 in a hospital setting.

As in last year's report, there are multiple cases where anti-D has been issued by the laboratory, only to be found days or weeks later in maternity fridges, indicating a failure of the discharge checklist.

Case 1

Failure to prescribe anti-D resulting in omission of prophylaxis

Anti-D was requested and issued from the transfusion laboratory on a named patient basis for a patient who was going to theatre for removal of an ectopic pregnancy. The anti-D was not written up on a prescription chart so was not given to the patient, and was found in a ward fridge some 4 months later.

Case 2

Poor advice from the laboratory results in omission of prophylaxis

A group B RhD negative patient who was 9 weeks pregnant had a miscarriage with surgical evacuation, and according to policy should have received 250 iu anti-D injection. It was noted on the ward 4 days later that the patient had not received anti-D; it was subsequently reported that the hospital transfusion laboratory advised that no anti-D was required, > 72 hours having elapsed since the event.

Learning point

- Anti-D Ig may still be at least partially effective if given up to 10 days following the potentially sensitising event and should not be withheld even if 72 hours have already elapsed.

Inappropriate administration of anti-D *n* = 62

This group is further subdivided into four categories.

Anti-D Ig given to D positive patients *n* = 27

Overall 9 primary errors were clinical, 7 made by midwives and 2 by a doctor; 18 primary errors arose in the laboratory. Twenty-four of 27 errors were made in a hospital setting, and 3 in the community.

Seven of 18 cases reported as originating in the laboratory involved patients who had been previously reported as RhD negative, and who subsequently tested as 'weak D' positive either in different laboratories or using different test systems in the same laboratory.

Six of 18 cases involved the issue of anti-D by the laboratory despite there being a record on the laboratory system that the patient was either RhD positive or weak D positive.

Five of 18 cases involved testing errors in some form: either the test was not performed correctly; or results were misinterpreted; or there were transcription errors when recording the results.

Case 3

Anti-D issued to a patient on the basis of an old result

Anti-D was issued by clinical staff from remotely held stock on the basis of a result from 15 years earlier which stated the patient was RhD negative. A current sample showed that the patient was weak D positive.

Case 4

Failure to check group results in inappropriate administration of anti-D Ig

A patient had been sent to the RAADP clinic where midwives requested anti-D without checking grouping results. Laboratory staff issued anti-D on request, also without checking the grouping result. The anti-D was then administered by the midwives, again without any check being made as to the blood group of the patient, who was RhD positive.

Case 5

RhD testing by rapid manual technique results in inappropriate administration of anti-D

A BMS, during a routine working day but under 'intense pressure' from clinical staff, performed RhD testing by a rapid manual technique and issued anti-D on the basis of a RhD negative result. Later testing by the routine laboratory methodology showed the patient to be RhD positive.

Anti-D Ig given to patients with immune anti-D *n* = 20

Of these 20 reported cases 13 resulted from a primary clinical error and 7 from a laboratory error.

Three of the 7 laboratory errors involved failure to consider that a strongly positive antibody screen could have been caused by immune anti-D rather than prophylactic anti-D.

Case 6

Assumption that positive antibody screen is prophylactic anti-D results in further administration and failure to monitor the mother

An antenatal sample at 28 weeks gestation showed the presence of anti-D and a BMS reported 'anti-D of probable prophylactic origin'. However, there was no record that the patient had been given any prophylactic anti-D. As a result of the report, further anti-D was administered, the mother was not closely monitored during the remainder of the pregnancy and the baby was born suffering from HDN.

Case 7

Failure of communication results in inappropriate administration of anti-D

A patient was transferred to another hospital, where a positive antibody screen was noted. A message from the referring hospital indicated that the patient had been given anti-D, so further anti-D was administered. The patient had, however, developed their own immune anti-D. The outcome for the infant was not recorded.

Anti-D Ig given to mothers of D negative infants *n* = 6

Three of these errors originated in the clinical area, and 3 in the laboratory. All 6 occurred in the hospital setting.

Case 8

Poor communication and involvement of multiple staff fail to prevent basic error

Mother and cord samples were received and grouped by a BMS on night duty, but no written results were recorded and the case was not handed over to day staff. A Kleihauer test was performed by the day shift and found to be positive. Results were validated by a senior BMS and anti-D was issued by the laboratory, and administered by the midwives. At no point in the process was the infant's blood group checked.

Case 9

Anti-D issued without waiting for results

A baby was born to an RhD negative mother. Anti-D was administered by midwifery staff 90 minutes later from stock held in the clinical area without knowledge of the baby's blood group, even though samples had been sent to the laboratory. The baby was RhD negative.

Anti-D Ig given to the wrong patient *n* = 9

These were exclusively clinical errors, involving failure to identify the correct patient.

Eight of 9 cases occurred in the hospital setting, and 1 in the community.

Case 10

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.

Case 11

Failure of bedside check results in administration to a different patient

The transfusion laboratory issued anti-D to maternity for a postnatal RhD negative woman, labelled with correct patient details and accompanied by a correctly completed issue form. The midwife on the maternity ward failed to check any patient details at the bedside, and administered the anti-D to the wrong patient (who was RhD positive).

Wrong dose of anti-D given *n* = 6

Two of the 6 errors were by midwives, and 4 errors occurred in the laboratory. Five of 6 cases occurred in hospital and 1 in the community.

Case 12

Incomplete information and incorrect assumptions result in inadequate dose of anti-D

A 1250 iu dose of anti-D was issued by the laboratory on a verbal request for a post-delivery patient. The request form was sent retrospectively but contained no clinical details nor the dose required. The BMS did not associate this request with the previous issue, but assumed it was a sensitising event and sent 250 iu to the ward. The midwife then returned the 1250 iu dose already issued and administered the 250 iu dose instead, resulting in the patient receiving inadequate prophylaxis.

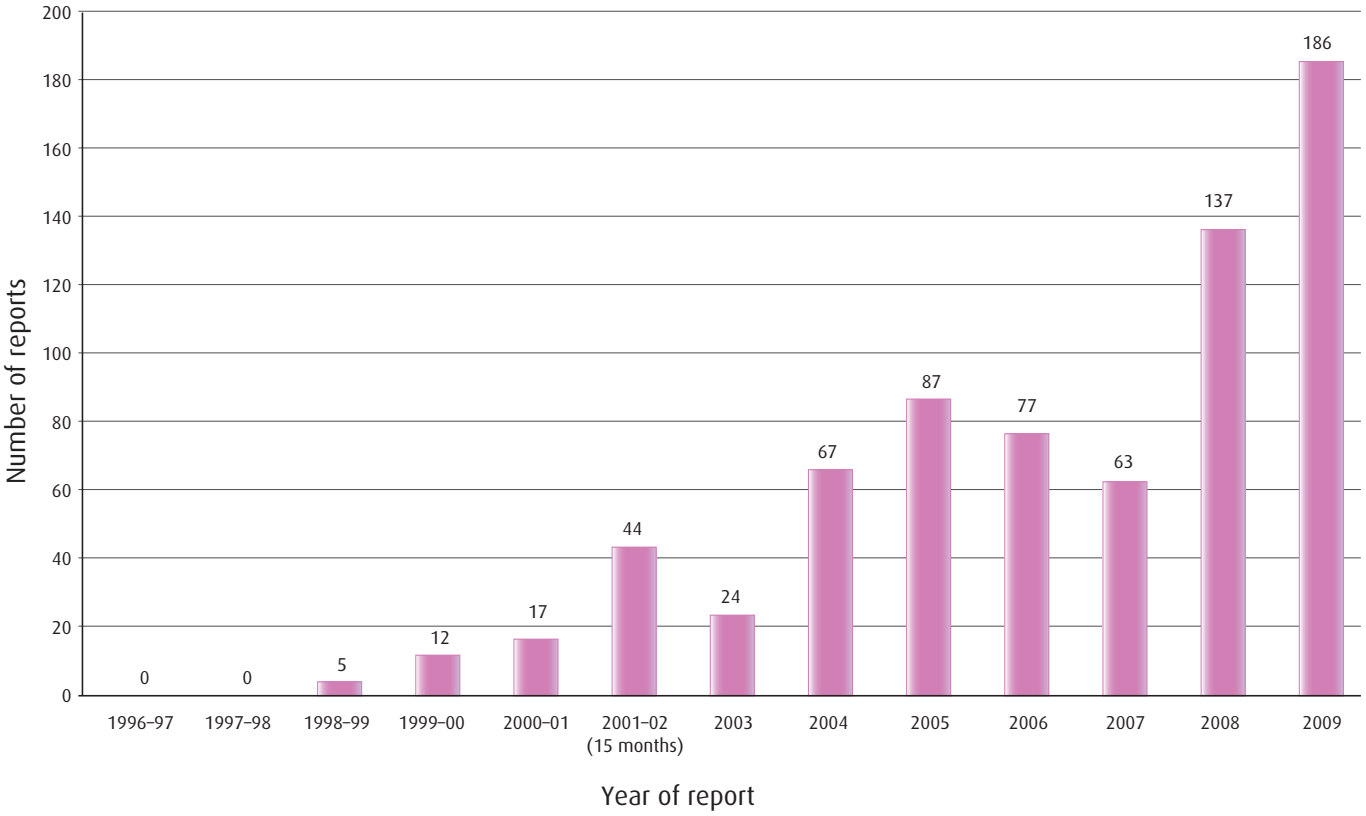
Anti-D expired or out of temperature control *n* = 1

This case was a clinical error in the antenatal setting, where expired anti-D Ig was selected and administered from a remotely held stock.

COMMENTARY

The number of cases reported to SHOT under the anti-D category has dramatically increased again in 2009, presumably because of increased awareness of the need to report adverse events associated with the administration of this blood product. This represents the continuation of an upward trend in reporting since SHOT reporting commenced in 1996 (see Figure 10, on the following page).

Figure 10
Cumulative data



While it is encouraging to note the increase in willingness to report cases, it is unfortunate that many of the reports contain insufficient detail to allow a good analysis of exactly where and when things are going wrong.

What is apparent, however, is that exactly the same mistakes are being made by all staff groups this year as in previous years. They centre around failure to follow basic protocols, failure to take into account laboratory computer records, poor communication and poor decision making, underpinned by poor understanding.

It is disconcerting to note that a number of reports imply that clinicians are waiting for the results of assessment of transplacental haemorrhage before deciding whether or not to request anti-D to cover potentially sensitising events, rather than giving an initial dose of anti-D and then requesting more if indicated. This is symptomatic of the distinct lack of 'seamless' protocols developed between laboratory and clinical areas, where clear guidance can be included and areas of responsibility can be clarified.

A recommendation in the 2007 SHOT report related to the follow up of potentially sensitised patients, stating that the outcome should be reported to SHOT. It is anticipated that active follow-up of these cases by SHOT will become possible in future as the new web-based data collection system evolves.

There were 3 case reports, not included in the total figures, in which women had become sensitised and developed immune anti-D even though testing and relevant prophylaxis had been carried out correctly. SHOT will continue to take this type of report, even though no 'error' has occurred.

RECOMMENDATIONS

New recommendations from this report

Trusts must ensure that there is representation from midwives and obstetricians on hospital transfusion committees, with the aim of jointly drawing up straightforward local protocols for the request, issue and use of anti-D Ig based on well established national guidance.

Action: HTCs

Cases of late administration, omission, or inappropriate administration of anti-D immunoglobulin must be the subject of internal follow-up within Trusts/hospitals via established governance mechanisms.

Action: HTCs, Trust/hospital CEOs

Recommendations still active from previous years

Year first made	Recommendation (Previously Learning Points)	Target	Progress
2008	Trusts should ensure that robust systems under overall control of the hospital transfusion laboratory are in place, to ensure that anti-D Ig is issued on a named patient basis, to ensure appropriate use and to meet traceability requirements.	**HTCs**	The NHSBT Appropriate Use of Blood Anti-D Working Group has developed anti-D modules for both clinical and laboratory staff as part of the Learn Blood Transfusion e-learning programme.
2007	D-typing should be performed by the routine methodology available in the hospital transfusion laboratory, not by emergency techniques which may not be as robust.	**Consultant haematologists with responsibility for transfusion, HTCs, HTTs**	
2007	Obstetricians and midwives must be familiar with the national guidance for routine antenatal anti-D prophylaxis and the rationale behind it. National guidance regarding all anti-D prophylaxis should be standardised. There is a need for clear and unambiguous advice to ensure that all hospitals are able to develop local guidelines that reflect national consensus.	**NBTC, NHSBT Appropriate Use of Blood Group, IBMS, BBTS, BCSH, Royal Colleges of Midwives, O&G, GPs**	
2007	There should be clinical follow up and retesting in six months of patients in whom anti-D administration has been delayed or omitted. The outcome should be reported to SHOT as well as internally within the Trust.	**Trust CEOs, consultant haematologists with responsibility for transfusion, HTCs, HTTs**	The new SHOT online reporting system will be collecting this data from 2010.