Adverse Events Related to Anti-D Immunoglobulin (Ig): Prescription, Administration and Sensitisation n=350

21

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Definition:

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

Key SHOT messages

- A total of 350 case reports were reviewed this year, of which 271 (77.4%) related to the omission or late administration of anti-D Ig. This is a continuing worrying situation, putting a significant number of women at risk of potential sensitisation to the D antigen with associated mortality and morbidity in affected neonates
- There was one case where immune anti-D was wrongly assumed to be present due to prophylaxis and so the pregnancy continued unmonitored, resulting in a severe case of haemolytic disease of the fetus and newborn (HDFN) requiring exchange transfusion, during which the baby died
- As in last year's report there were 3 cases where a woman developed an immune anti-D following delay or omission of prophylaxis during the current pregnancy

Common themes in this year's reports include:

- Misunderstanding of national guidance, specifically that anti-D Ig should be offered for sensitising events, regardless of whether the woman has received routine antenatal anti-D prophylaxis (RAADP) (and vice versa), and that diagnosis and delivery of intrauterine deaths (IUD) should be treated as separate sensitising events as they may be some days apart
- There persists a culture of transcribing blood grouping results onto maternity notes and care plans, often incorrectly, resulting in omission or inappropriate administration of anti-D Ig
- Failure to consult computer records before issuing anti-D Ig from the laboratory
- Putting the onus on the woman to return for anti-D Ig when she is variously frightened, traumatised, too ill, or has her hands full with a new baby, instead of issuing it at presentation, and then putting the blame for failure onto the woman for not answering her mobile rather than an inadequate system
- Comments that 'nobody would take responsibility for dealing with this issue'
- Community midwives often do not have access to the electronic patient record, and therefore do not see the most recent or updated reports related to D status or antibody titres, relying instead on what may be outdated versions in the hand-held notes
- Poor (and unsubstantiated) advice that there is no point in administering anti-D Ig once 10 days have passed since a sensitising event

It is disappointing to read a comment from one case, that 'the onus on checking reports from the reference laboratory should be on clinical staff', when the hospital laboratory has such an important role to play in interpreting and conveying often complicated messages to clinical colleagues whose concerns are 'Should I be worried by this?', or 'Do I need to do anything because of this report?'

There is however one excellent example of implementation of good practice following reported errors, and this is to be applauded:

Case 21.1: Laboratory report misinterpreted

Anti-D Ig was issued for routine prophylaxis at 28 weeks from clinical stock, after midwives misinterpreted 'Antibody Screen Negative' as 'D negative'. The laboratory has changed the wording on their grouping reports to; 'No antibodies detected' in an attempt to stop this happening again.

As ever, SHOT's main message about anti-D (use of anti-D Ig and recognition of immune anti-D antibodies) is to encourage consistency of practice within hospitals, with robust policy formulated as a partnership between obstetricians, midwives and the laboratory, regardless of which professional guideline may influence the finer detail.

A total of 414 case reports involving anti-D Ig were submitted via the SHOT online reporting database in 2015. Of these 53 were withdrawn because they did not meet the criteria for anti-D reporting, or were perfectly reasonable decisions made on the information available at the time, and 11 were transferred to anti-D immunisation questionnaires.

350 case reports, each involving 1 individual, were considered in the final analysis.

The reports are divided into the reporting categories shown in Figure 21.1 and Table 21.1.

Adverse events related to the prescription and administration of anti-D Ig are not required for the European Union (EU) and so are reportable as 'SHOT-only' (BSQR 2005). Clinical reactions to anti-D Ig are reportable to the Medicines and Healthcare Products Regulatory Agency (MHRA) 'Yellow Card' system.

Figure 21.1: Reporting categories for all anti-D Ig errors

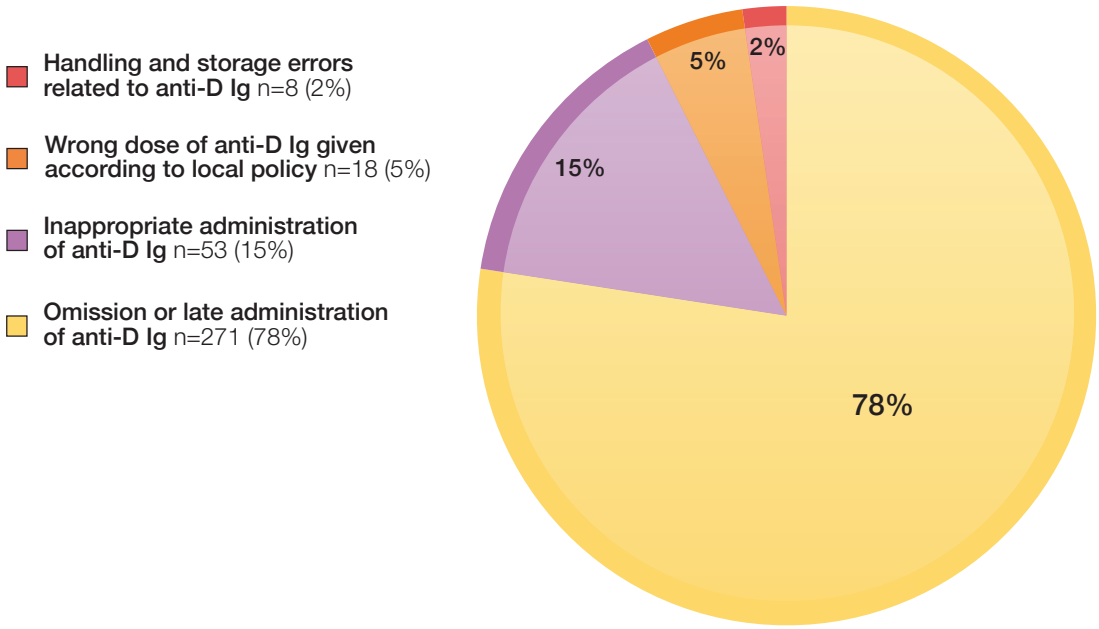


Table 21.1: Reporting categories for inappropriate administration

Inappropriate administration category	Number of cases
Anti-D Ig given to a D-positive woman	15
Anti-D Ig given to a woman with immune anti-D	22
Anti-D Ig given to a mother of a D-negative infant	7
Anti-D Ig given to the wrong woman	9
Total	**53**

Deaths n=1

There was one death of a baby reported in a case where unmonitored maternal anti-D antibody led to a severe case of HDFN. The baby developed complications while undergoing exchange transfusion. Although the cause of death has not been unequivocally related to the HDFN it is likely that appropriate diagnosis, monitoring and treatment during pregnancy would have improved the outcome (Case 21.5 below and Case 1 in the Error Reports: Human Factors section in the main 2015 Annual SHOT Report).

Major morbidity n=3

In 3 cases women developed an immune anti-D following delay or omission of prophylaxis during the current pregnancy.

Potential for major morbidity n=268

In a further 268 cases anti-D Ig was administered more than 72 hours following a potentially sensitising event, or omitted altogether, resulting in the potential for sensitisation of the woman to the D antigen. This satisfies the current SHOT definition of potential major morbidity. It is not known whether any of these events resulted in the production of immune anti-D.

Clinical versus laboratory errors

For the reporting year 2015, 350 events related to anti-D Ig administration are summarised in Table 21.2 below, with a breakdown of the proportion of clinical and laboratory errors that were primarily responsible.

		Staff primarily involved		
Type of event	Cases	Nurse/midwife	Laboratory	Doctor
Omission or late administration of anti-D Ig	271	227	20	24
Anti-D Ig given to a D-positive woman	15	13	0	2
Anti-D Ig given to a woman with immune anti-D	22	7	14	1
Anti-D Ig given to a mother of D-negative infant	7	0	7	0
Anti-D Ig given to the wrong woman	9	9	0	0
Wrong dose of anti-D Ig given	18	10	7	1
Anti-D Ig handling and storage errors	8	4	4	0
Totals	**350**	**270**	**52**	**28**

Table 21.2: Staff groups primarily involved in anti-D Ig process failures

The proportion of reports related to prescription, requesting and administration of anti-D Ig involving midwives, nurses and doctors is similar to last year, accounting for 298/350 (85.1%) of the total, with laboratory cases accounting for 52/350 (14.9%).

Omission or late administration of anti-D Ig n=271

In 227/271 (83.8%) cases the primary error was made by a nurse or midwife, and in 24/271 (8.8%) cases by a doctor (double that of last year). Twenty of 271 (7.4%) cases resulted from failures in the hospital laboratory.

The location was in the community for 59 cases, and in a hospital setting for 212:

- There is a persistent theme of failure to collect anti-D Ig that has been issued by the laboratory, or where it has been collected but is not administered and is found days or weeks later in maternity refrigerators. This was reported in 65/271 (24.0%) cases of delayed or omitted anti-D Ig
- In 50 cases it was noted at a later antenatal clinic appointment or at delivery that a woman had not received routine antenatal anti-D Ig prophylaxis (RAADP) and 27 of these cases were in the community

- There were 6 cases where midwifery staff had transcribed maternal or cord blood groups incorrectly into the antenatal notes
- There were 4 cases where the laboratory entered an erroneous grouping result manually to the laboratory information management system (LIMS)
- There were 11 cases where anti-D Ig was not given for sensitising events because the clinical staff erroneously thought that RAADP would be sufficient
- There were 3 cases where the laboratory staff or transfusion practitioner advised that anti-D Ig should not be given as it was more than 10 days after the event, and one case where the laboratory advised anti-D Ig should not be given as it was more than 96 hours after the event. This is poor advice. Although these are the suggested time limits, there is some evidence* that giving anti-D Ig after these limits may offer some protection

**Note: Experimental evidence is quoted (in Klein and Anstee 2005) 'there is evidence that in a proportion of subjects the response to D can be suppressed by giving antibody [anti-D Ig] as late as 2 weeks'. The experimental evidence was from a study by Samson and Mollison following development of anti-D in volunteer male blood donors injected intravenously with 1mL D-positive red cells (Samson and Mollison 1975).*

Case 21.2: Poor advice from the laboratory

A woman did not receive anti-D Ig for a sensitising event after the laboratory advised that free anti-D was detectable following RAADP and no further anti-D Ig was indicated. This is contrary to national guidance that states further anti-D Ig should be given regardless of detectable (prophylactic) anti-D in a woman's sample.

Case 21.3: System failure

It was noted when a woman was admitted for delivery with spontaneous rupture of membranes that she had received no appointments with her midwife since her booking blood tests had been taken, and had therefore missed anti-D Ig for RAADP and any sensitising events during her pregnancy.

Case 21.4: Poor decision following intrauterine death

A doctor advised that anti-D Ig was not required following an intrauterine death 'unless the woman is actively bleeding'.

Inappropriate administration of anti-D Ig n=53

This group is further subdivided into four categories.

Anti-D Ig given to D-positive women n=15

All cases involved clinical staff, 13 errors were made by a nurse or midwife, and 2 primary errors were made by doctors.

8/15 (53.3%) cases originated in the hospital setting, with 7 cases in the community.

- There were four cases where a negative antibody screen report was misread as a negative D-type
- There were two cases in the community where the woman stated she was D-negative, and the midwife failed to check the blood group before giving anti-D Ig

Anti-D Ig given to women with immune anti-D n=22

More than a third, 8/22 (36.4%), resulted from clinical errors and 14/24 (63.6%) from laboratory errors.

Nineteen cases occurred in the hospital setting with three in the community.

- Five involved issue of anti-D Ig from stocks held in the clinical area to women known to have immune anti-D
- Nine cases involved issue of anti-D Ig by the laboratory to women who were clearly marked on the laboratory system as having immune anti-D. The anti-D Ig was issued without reference to the LIMS

- In one case the laboratory issued a card to the woman saying she was eligible for anti-D Ig prophylaxis, even though she was known to have immune anti-D
- In one case, a pregnant woman pointed out that she should not receive an anti-D Ig injection as she had confirmed anti-C+D antibodies, but the midwife insisted, telling her it was 'protocol'

Case 21.5: Assumption coupled with poor handover leads to unmonitored pregnancy

(This case is described in detail in the Error Reports: Human Factors section of the main report, Case 1)

A biomedical scientist (BMS) tested a woman's sample and found anti-D to be present. A message was left for the next shift to ask maternity whether anti-D Ig had been administered. The message was misinterpreted as meaning that the detectable anti-D was prophylactic, and the pregnancy continued unmonitored, along with further prophylaxis. The baby was born extremely jaundiced, requiring immediate exchange transfusion, but developed complications leading to death.

Case 21.6: Poor decision by obstetric doctor

Anti-D Ig was requested for a woman confirmed to have immune anti-D. When the BMS challenged the request, the obstetric doctor insisted it was issued and administered.

Anti-D Ig given erroneously to mothers of D-negative infants n=7

All seven of these errors originated in the laboratory, and all occurred in the hospital setting.

- 2/7 cases involved the cord blood group being manually entered (incorrectly) onto the LIMS
- 5/7 cases involved issue of anti-D Ig without reference to LIMS results

Case 21.7: Anti-D Ig issued without reference to grouping results

During the on-call period, the duty BMS issued 1500IU anti-D Ig to the mother of a baby confirmed to be D-negative. The BMS was 'very busy' and did not check the LIMS to confirm blood groups before issuing the anti-D Ig.

Anti-D Ig given to the wrong woman n=9

All cases were clinical errors, involving failure by nurses and midwives to carry out positive patient identification. Eight cases occurred in the hospital setting, and one in the community

Case 21.8: Bedside checking means 'at the bedside'

Anti-D Ig was issued by the laboratory for a post-natal woman. The anti-D Ig was checked by two qualified midwives away from the woman and then taken to the wrong woman for administration.

Wrong dose of anti-D Ig given n=18

Fourteen of these cases occurred in hospital, and 4 in the community setting. Eleven cases involved a primary clinical error, and 7 were errors in the laboratory.

Case 21.9: Confusion over availability and correct dosage of anti-D Ig

Two doses of anti-D Ig were available in the refrigerator at the general practitioner (GP) surgery for the same woman. A 500IU dose had been issued in response to a potentially sensitising event (PSE) some weeks earlier, but never given, the other was a 1500IU dose for RAADP. The midwife administered the 500IU dose at the 30-week RAADP appointment and returned the 1500IU dose to the laboratory unused.

Handling and storage errors related to anti-D Ig n=8

Four of these eight errors occurred in the clinical area and four in the laboratory. Six occurred in the hospital setting and two in the community.

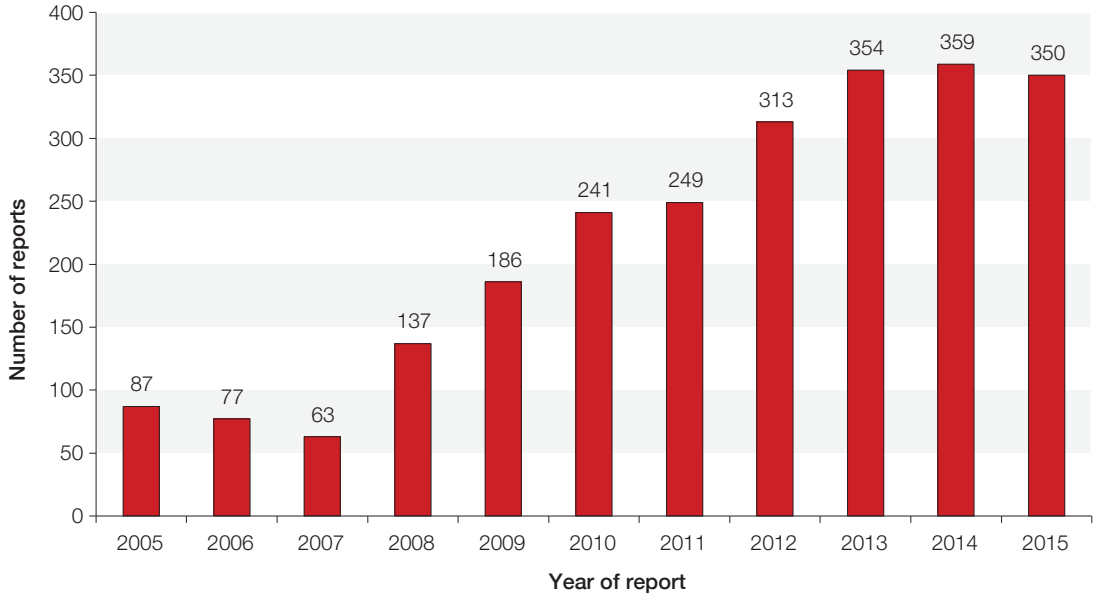
Case 21.10: Lack of stock control at GP surgery

Anti-D Ig was administered by a community midwife from stock held at the GP surgery. On receipt of the traceability record, the laboratory noted that it had expired three months prior to administration.

Case 21.11: Inappropriate use and questionable storage of previously issued anti-D Ig

Anti-D Ig was administered to a woman undergoing a surgical termination of pregnancy. On receipt of the compatibility tag, the laboratory realised that the anti-D Ig had been issued for a completely different woman six months earlier. There was no indication of how the anti-D Ig had been stored in the meantime.

Figure 21.2: Cumulative data for anti-D Ig events 2005–2015



Near miss Anti-D cases n=23

Table 21.3: Near misses that could have led to errors related to Anti-D Ig n=23

Point in the process	Type of error made	Number of cases	Percentage of cases
Sample receipt	Wrong identifiers entered into the LIMS	1	4.3%
Testing	Misinterpretation	1	30.5%
	Incomplete testing prior to issue	6	
Component selection	Wrong volume issued	5	34.8%
	Issued to a woman with immune anti-D	2	
	Issued to the mother of D-negative baby	1	
Component labelling	Anti-D Ig mislabelled	4	26.1%
	Transposition of labels for different patients	2	
Administration	Inappropriate storage in the clinical area	1	4.3%
Total		**23**	**100%**

Good practice points from previous years, a suggested standardised anti-D Ig dosing flowchart and examples of system failures are available in the 2014 Annual SHOT Report and on the SHOT website.

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