Annual SHOT Report 2018 – Supplementary information

Chapter 11: Anti-D immunisation in pregnancy

No previous pregnancy (NPP) n=8 (cumulative n=66)

When was the alloimmune anti-D detected?

Table 11.1: Time of detection of alloimmune anti-D

	Number of new cases 2018	Number of cases cumulative to 2018
Before 28 weeks	0	6
At or after 28 weeks, before delivery	4	19
At delivery	4	39
Other	0	1*
No information	0	1
Total	**8**	**66**

**Alloimmune anti-D was detected 6 months postpartum after large FMH of 12.7mL at delivery managed correctly*

What was the booking weight?

Weight is used in place of body mass index (BMI) as weight is more fully reported than BMI. Using average female height in the United Kingdom (UK), 80kg would equate to obesity in most women.

Table 11.2: Booking weight

Weight at booking in kg	Number of new cases 2018	Number of cases cumulative to 2018
<68	3	32
68-80	0	5
>80 (obese)	3	10
No information	2	19
Total	**8**	**66**

Did the women receive appropriate RAADP?

Table 11.3: Details of RAADP for eligible cases

RAADP regimen	Number of new cases 2018	Number of cases cumulative to 2018
Single dose 1500IU at 28-30 weeks	6	50
Two dose regimen 500IU	0	1
Not given	2*	11
Total eligible cases	**8**	**62**

**Alloimmune anti-D detected before RAADP had been given*

The route was intramuscular (IM) in all cases, in 2 cases deltoid was specified.

cffDNA testing

Table 11.4: cffDNA testing

cffDNA test	Number of cases	Details
Not performed	5	3 cases - test not available locally 2 cases - no reason given
Performed	1	Test performed by the International Blood Group Reference Laboratory (IBGRL) at 16 weeks. Fetus D-positive
	1	Test performed by IBGRL at 17^{+5} weeks. Result inconclusive, managed as if fetus D-positive
No information	1	
Total	**8**	

Details of potentially sensitising events (PSE)

Table 11.5a: Details of potentially sensitising events

4 cases had no PSE reported.

Number of PSE	Details	Management
3 cases had PSE reported	1 case had vaginal bleeding at 16 weeks	Not reported by woman
	1 case had antepartum haemorrhage at 12 weeks	Woman grouped D-positive so no anti-D prophylaxis given (Case 11.1)
	1 case had small antepartum haemorrhage at 8-9 weeks	General practitioner (GP) consulted but bleed not thought to be significant (Case 11.3)
4 cases	No PSE reported	
1 case	No information given	

Previous pregnancies (PP) n=31 (cumulative n=196)

When was alloimmune anti-D detected in index (current) pregnancy?

Table 11.6: When alloimmune anti-D was detected

Time of anti-D detection	Number of new cases 2018	Number of cases cumulative to 2018
At booking (if first trimester)	12	80
After booking to 28 weeks (includes late booking)	2	17
At or after 28 weeks	10	60
At delivery	6	30
Other	1*	9**
Total	**31**	**196**

**Alloimmune anti-D found 2 years after last pregnancy*
***2 preoperative assessment following pregnancy, 3 at planned follow up of large FMH at delivery where correct dose of anti-D Ig had been given, 3 unknown, 1 non pregnant*

Information about the pregnancy immediately preceding index (current) pregnancy

Table 11.7: Outcome of the preceding pregnancy

Outcome of preceding pregnancy	Number	Details
Live birth	27	3 babies D-negative, 19 D-positive, 5 D-type not provided
Other	4	• One termination of pregnancy at 11 weeks (no further details) • One miscarriage at 7 weeks, 1500IU anti-D Ig given • One miscarriage at less than 8 weeks • One intrauterine death at 23 weeks due to severe HELLP syndrome. No fetomaternal haemorrhage (FMH) detected. Prophylactic anti-D Ig given

What was the booking weight of preceding pregnancy? (includes only cases where previous pregnancy resulted in live birth)

Table 11.8: Booking weight of preceding pregnancy

Weight at booking in kg	Number of new cases 2018	Number of cases cumulative to 2018
<68	6	54
68-80	4	16
>80 (obese)	2	28
No information	15	74
Total	**27**	**172**

Cumulatively, of the 98 women where booking weight was provided, 28 (28.6%) were obese. National data (Public Health England 2018) report 19% incidence of obesity in pregnant women in the UK.

RAADP in preceding pregnancy (for women who carried to a live birth in preceding pregnancy)

Table 11.9: Details of RAADP in preceding pregnancy

RAADP	Number of new cases 2018	Number of cases cumulative to 2018
Single dose	19	104
Two doses	0	10
Not given	2*	23**
No information	6	35
Total	**27**	**172**

**1 case typed incorrectly as D-positive, 1 case refused*
***Learning difficulties, concealed pregnancy, needle phobic, prior to RAADP introduction (3), delivered abroad (3), no reason given (5), declined 6), typed incorrectly (1), midwife error (2)*
Note: these numbers are different from Table 11.8 as mothers with early fetal loss will not receive RAADP

In 6 cases the route was specified as deltoid, no cases were given anti-D intravenously.

cffDNA testing

Very few cases had cffDNA testing in the preceding pregnancy as the test has only recently been recommended by NICE.

Details of PSE in preceding pregnancy reported in 2018

Table 11.10: Details of PSE

Number of PSE	Details
9 PSE reported	**Appropriate management** • Miscarriage at 7 weeks, no further information on management but given 1500IU anti-D Ig • Miscarriage at <8weeks. No instrumentation. No anti-D Ig indicated • Fall at 13 weeks. Given1500IU anti-D Ig • Intrauterine death due to severe pre-eclampsia at 23 weeks Kleihauer performed and correct dose of anti-D Ig given • Fall at 24 weeks. Kleihauer performed and correct dose of anti-D Ig given • Fall at 26 weeks. Kleihauer performed and correct dose of anti-D Ig given • APH at 35 weeks. Given 500IU anti-D Ig but not tested for FMH. Delivered later that day and Kleihauer performed (<2mL). Further 500IU anti-D Ig given **Errors in management (or insufficient information provided)** • Termination of pregnancy (TOP) at 12 weeks, no further information • APH at 39 weeks and delivered same day. Kleihauer performed after APH and 500IU anti-D Ig given. No test for FMH after delivery and no further anti-D Ig given
13 cases had no PSE reported	
9 cases had no information on PSE	

Since reporting began in 2013, a total of 53 PSE have been reported in the preceding pregnancies of which 34 (64.2%) were managed correctly.

Method of delivery of preceding pregnancy

Table 11.11: Delivery details

Type	Number of new cases 2018	Number of cases cumulative to 2018
No information	3	47
Vaginal	14	74
Instrumental	1	8
Elective caesarean section (El CS)	4	17
Emergency CS (Em CS)	5	26
Total	**27**	**172**

Gestation at delivery of preceding pregnancy

Table 11.12: Gestation at delivery of preceding pregnancy

Gestation at delivery (weeks)	Number of new cases 2018
40 weeks or less	15
More than 40 weeks	9 of which 4 cases were >41weeks
No information	3
Total	**27**

Cumulatively (data collected from 2015 onwards), 30 out of 128 previous pregnancies (23.4%) lasted longer than 40 weeks. NHS maternity statistics 2014-2015 indicate 17.5% pregnancies extended beyond 40 weeks. *http://content.digital.nhs.uk/catalogue/PUB19127*

Postpartum management in preceding pregnancy

Table 11.13a: Test for postpartum FMH

FMH test performed postpartum	Kleihauer test (K)	Flow cytometry (F)	K+F	Method not specified	No	Notes on cases where FMH test not done	Unknown
20	14	2	1	3	4	One case grouped as D-positive 3 D-negative babies	3

Table 11.13b: Postpartum anti-D Ig prophylaxis

What happened?	Number of new cases 2018	Number of cases cumulative to 2018
FMH test and appropriate dose of anti-D Ig	18	105
No prophylaxis	2*	12**
Incorrect dose/timing of anti-D Ig	0	3***
No information	4	40
D-negative baby	3	12
Total	**27**	**172**

**1 case typed in error as D-positive, 1 case refused*
***2 from overseas, 1 learning difficulties, 1 needle phobic, 3 declined,2 case typed in error as D-positive, 2 cases missed anti-D Ig in error*
****1 dose 250IU, 2 doses given late*

Two cases had FMH greater than 2mL in preceding pregnancy:

Anti-D detected at first trimester booking of index pregnancy n=12

The details of the preceding pregnancy may provide information on the cause of immunisation in these cases.

Table 11.14: Details of management in previous pregnancy (- =no information/unknown)

Case	Obese (booking weight >80kg)	RAADP	PSE	Delivery gestation (weeks)	Delivery route	PPP	Risk factors identified
1	-	-	-	39	Vaginal	-	No useful data available. Pregnancy was in Zimbabwe
2	-	-	-	40	Vaginal	-	No useful data available. Pregnancy was in Africa
3	No	Yes	No	31	Em CS	Flow cytometry <2mL 1500IU anti-D Ig	Delivered early for severe pre-eclamptic toxaemia (PET) Apparently 'ideal' care
4	-	Yes	No	40^{+4}	Vaginal	No information on FMH test. 1500IU anti-D Ig	
5	No	Yes	Yes- given anti-D Ig	35	Em CS	Kleihauer <2mL 500IU anti-D Ig	Apparently 'ideal' care
6	Yes	Yes	Yes- given anti-D Ig	40^{+6}	-	Kleihauer <2mL 1500IU anti-D Ig	Apparently 'ideal' care but obese
7	No	Yes	No	40^{+5}	Vaginal	Kleihauer <2mL 500IU anti-D Ig	Apparently 'ideal' care apart from gestation >40 weeks
8							TOP at 12 weeks. No further details known
9	-	Yes	Yes- given anti-D Ig	39	Vaginal	No	APH just prior to delivery on same day Kleihauer performed after APH and 500IU anti-D Ig given. No test for FMH after delivery and no further anti-D Ig given
10	No	Yes	No	41	Em CS	Kleihauer 2.7mL 500IU anti-D Ig	No flow to confirm size of FMH Gestation >40 weeks
11	Yes	-	-	-	Vaginal		Intravenous drug user booked at 40 weeks
12	-	Unknown	No	-	Em CS	Kleihauer no cells 500IU anti-D Ig	

Gaps in data in these cases make analysis difficult, but as in NPP reports, there are cases where apparently 'ideal' management with no risk factors still resulted in immunisation, including cases where management of PSE was correct.

Alloimmune anti-D detected after first trimester in index (current) pregnancy n=18

Further information is requested on the index pregnancy when alloimmune anti-D is detected after the booking (first trimester) sample, as it may be that the sensitisation occurred in the index pregnancy rather than in the preceding pregnancy.

What was the booking weight of index pregnancy?

Table 11.15: Booking weight

Weight at booking in kg	Number of new cases 2018	Number of cases cumulative to 2018
<68	5	43
68-80	1	19
>80	6	20
No information	6	25
Total	**18**	**107**

Cumulatively, 83 women where booking weight was provided, 20 (24.1%) were obese.

RAADP in index pregnancy:

Table 11.16: Details of RAADP

RAADP given or not	Number
Single dose 1500IU	11
Not given	7
Alloimmune anti-D present prior to RAADP	*3*
Delivered at 28 weeks prior to RAADP	*1*
Refused	*1*
Failed to attend	*1*
Managed as D-positive (D-variant)	*1*

cffDNA testing

Table 11.17: cffDNA testing

cffDNA test	Number of cases	Details
Not performed	9	
Performed	7	Test performed by IBGRL
	1	Test performed by the local laboratory
No information	1	

Details of potentially sensitising events in index pregnancy

Table 11.18: Details of potentially sensitising events

Number of women	Details
4 cases where PSE reported before allo anti-D detected	• APH at 24 weeks, Kleihauer <2mL, 1500IU anti-D Ig • APH at 10 weeks, no anti-D Ig given, fall at 31 weeks, Kleihauer negative, 1500IU anti-D Ig • Event at <20 weeks. No details given. Anti-D Ig administered • No details
11 cases no PSE reported	
4 cases no information on PSE	

Outcomes of pregnancies reported in 2018

Table 11.19: Outcome of pregnancies reported in 2018

Number of cases	Outcome
29	Live births
17	No treatment
5	Required phototherapy
2	Required exchange transfusion
2	Required phototherapy and transfusion
1	Required intrauterine transfusion and transfusion after delivery
2	No information
1	Anti-D detected on sample two years after last pregnancy
1	Intrauterine death at 36 weeks

Case studies

Case 11.8: Anti-D Ig not given post delivery - a dose had been given earlier that day for APH

A woman in her 30s was found to be immunised at booking in her index pregnancy. In the preceding pregnancy she received RAADP and experienced an APH at 39 weeks gestation, Kleihauer showed <2mL fetal cells and she received 500IU anti-D Ig. She delivered vaginally 2 hours later and Kleihauer showed <2mL fetal cells. She did not receive a further dose of anti-D Ig postpartum.

Comment: A dose of anti-D Ig had been given 2 hours prior to delivery for APH. Kleihauer was <2mL after APH and after delivery and no further anti-D Ig was given after delivery. Whilst the logic in this case can be understood, the guidelines do recommend postpartum prophylactic anti-D Ig and the woman did not receive this.

Case 11.9: D-variant

A woman in her 30s typed (and managed) as D-positive in her previous 6 pregnancies (3 live births, 1 termination, 2 miscarriages). Found to have anti-D at delivery at 37 weeks gestation. The

baby required no interventions for HDFN. Subsequent investigations confirmed that the woman was DIV variant.

Case 11.10: Anti-D prophylaxis refused

A woman in her 30s managed by independent midwife refused anti-D Ig prophylaxis in preceding and index pregnancies (both previous babies D-negative). Was found to have alloimmune anti-D at delivery in index pregnancy. The baby required no interventions for HDFN.

Case 11.11: Alloimmune anti-D 1 year after large FMH

A woman in her 30s whose preceding pregnancy resulted in a D-negative baby. Appeared to receive ideal management during index pregnancy but sustained a large FMH at delivery (38mL). 1500IU anti-D Ig issued and a further 4500IU issued following flow cytometry results. Follow up sample lost in transit. Repeat sample sent 3 days later confirmed bleed now <4mL and recommended a further 500IU dose of anti-D Ig (1500IU administered). 3-month post-delivery sample regarded as non-informative at this stage due to large dose of anti-D Ig administered within the last 3 months. Suggested repeat taken in a further 3 months. 3 repeat samples all rejected due to sample labelling errors. Further repeat sample at one year showed alloimmune anti-D now present (quantified at 0.3IU/m).

Comment: In such cases, the FMH detected at delivery may have been an acute event on a background of chronic bleeding and this would explain why, despite apparently ideal management, the woman became immunised.

Case 11.12: Implanted D-positive egg, father D-negative

A woman in her 30s whose previous pregnancy, complicated by severe PET and HELLP syndrome terminated in intrauterine death at 23 weeks, following which the woman received anti-D Ig. The index pregnancy used a donated egg (which was D-positive) and alloimmune anti-D was found at 27^{+5} prior to delivery at 28 weeks for severe PET. The father was D-negative. The baby was D-positive (CcDee) but did not require any interventions for HDFN and was identified as a donor egg pregnancy. The IVF clinic confirmed that the donor egg was D-positive. This was not recorded in the patient notes and the patient was not aware of this or the possible risks of D-positive egg.

Comment: This possibility must be considered in IVF pregnancies and the woman appropriately counselled.