



Antenatal case studies

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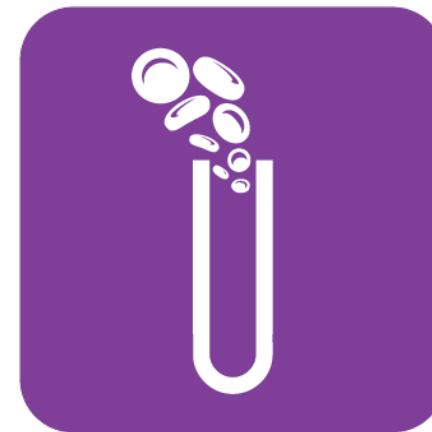
#BBTS2018

Antenatal case study

Case 1

Referral details

- Patient 1
- DOB 01/01/08
- Pregnant EDD 24/09/18
- Tests requested
 - Antibody ID and titre



Initial results

Group = O Positive

$$RHK = R1R1 K-$$

DAT = Negative

NHSBT panel 1

Panel 2

NHSBT panel 2

Cell	Rh	Rh						MNSs				P1	Lu		Kell		Le		Fy		Jk			Tube LISS IAT	Biorad IAT	
		D	C	E	c	e	Cw	M	N	S	s		a	b	K	k	Kp ^a	a	b	a	b	a	b			
1	R1 ^w R1	+	+	0	0	+	+	+	0	+	0	2	0	+	0	+	0	+	0	+	0	+	0		3	3
2	R1R1	+	+	0	0	+	0	+	0	0	+	2	0	+	0	+	0	0	+	+	0	0	+		3	3
3	R2R2	+	0	+	+	0	0	0	+	0	+	0	0	+	0	+	0	0	+	0	+	0	+		3	3
4	r'r	0	+	0	+	+	0	0	+	+	0	0	+	0	+	0	+	0	0	0	0	0	+		3	3
5	r"r	0	0	+	+	+	0	0	+	+	+	3	0	+	0	+	0	0	+	+	0	+	0		3	3
6	rr	0	0	0	+	+	0	+	0	+	0	2	+	+	0	+	+	+	0	0	+	+	+		3	3
7	rr	0	0	0	+	+	0	0	+	0	+	0	0	+	+	+	0	0	+	0	+	+	0		3	3
8	rr	0	0	0	+	+	0	+	+	0	+	0	0	+	0	+	0	+	0	+	0	0	+		3	3
9	rr	0	0	0	+	+	0	+	0	+	+	2	0	+	0	+	0	0	+	+	0	+	0		3	3
10	rr	0	0	0	+	+	0	+	0	+	0	0	0	+	+	+	0	0	+	0	+	0	+		3	3
Auto																								0	0	

Phenotype

Antigen	M	S	s	k	Fya	Fyb	Jka	Jkb
Result	0	0	0	+	0	0	+	0

Group = O Positive

RHK = R1R1 K-

DAT = Negative

Phenotype

Antigen	M	S	s	k	Fya	Fyb	Jka	Jkb
Result	0	0	0	+	0	0	+	0

? Anti-U

? Anti-Fy3

Rare cells

Cell		Results	
		IAT	
1	Fy(a-b-)	3	
2	Fy(a-b-)	3	
3	U-	0	
4	U-	0	
5	Vel-	3	
6	Vel-	3	
7	Lub-	3	
8	Lub-	3	
9	Kpb-	3	
10	Kpb-	3	

Rare cells

Cell		Results	
		IAT	
1	Fy(a-b-)	3	
2	Fy(a-b-)	3	
3	U-	0	
4	U-	0	
5	Vel-	3	
6	Vel-	3	
7	Lub-	3	
8	Lub-	3	
9	Kpb-	3	
10	Kpb-	3	



Anti-U

Antibody titre



High risk of HDFN!

Obsetetric history

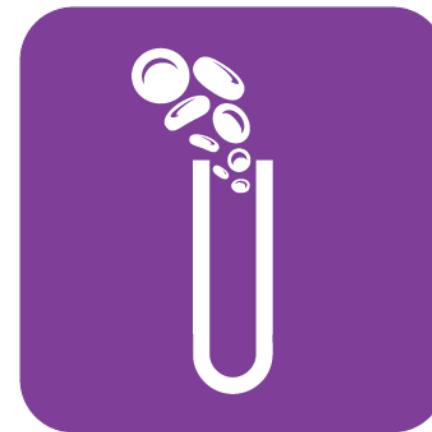
- Known anti-U
- Para-multip
- Pregnancy 2016
 - Anti-U level 1/16
 - Baby required exchange
- Pregnancy 2014
 - Unknown antibody status
 - Baby survived

Obsetetric history

- For spontaneous vaginal delivery (wanted to induce at 39 weeks but patient declined)
- Previous two pregnancies delivered early
- No history of bleeding in previous deliveries
- The patient's last Hb was 127 g/L on 02/07/2018 but no more recent result

Referral details

- Patient 2
- DOB 04/04/86
- Pregnant EDD 20/08/18
- Tests requested
 - Antibody ID and titre



Initial results

Group = O Positive

$$RHK = R1r K-$$

DAT = Negative

NHSBT panel 1

Phenotype

Antigen	M	S	s	k	Fya	Fyb	Jka	Jkb
Result	0	0	0	+	+	0	+	+

Group = O Positive

RHK = R1r K-

DAT = Negative

Phenotype

Antigen	M	S	s	k	Fya	Fyb	Jka	Jkb
Result	0	0	0	+	+	0	+	+

? Anti-U

Rare cells

Cell		Results	
		IAT	
1	Fy(a-b-)	3	
2	Fy(a-b-)	3	
3	U-	0	
4	U-	0	
5	Vel-	3	
6	Vel-	3	
7	Lub-	3	
8	Lub-	3	
9	Kpb-	3	
10	Kpb-	3	



Anti-U

Antibody titre

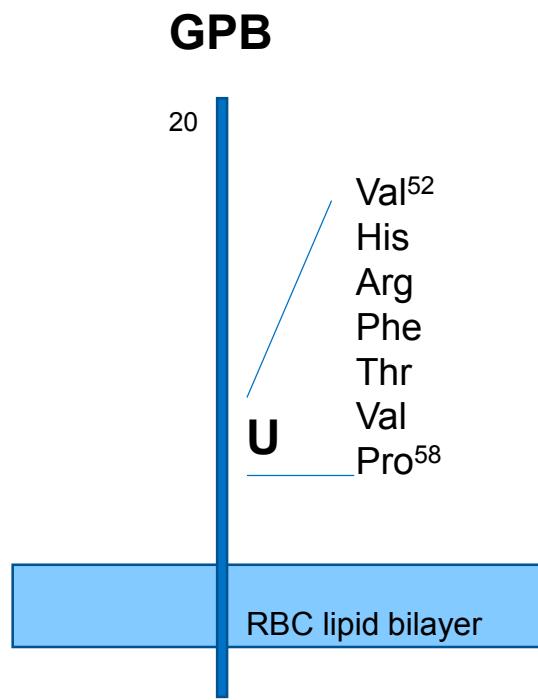
512



High risk of HDFN!

Obsetetric history

- G1, P0
- Mother has SCD
- Last sickle crisis 2 years ago



- Part of the MNS system
 - MNS5
- Clinical significance
 - Haemolytic transfusion reaction
 - HDFN
- IgG
- IAT
- Resistant to enzyme treatment
- Present in 99.9% Caucasians and 99% black

U negative blood availability

- Wet units – 2 x O Ro K- HbS-
- Frozen units -

O R1R1	O R2R2	O Ro	O Pos	O neg	A	B
0	0	13	22	5	7	15

Referral details

- Patient 3
- DOB 18/03/18
- Sickle cell crisis
- Tests requested
 - Antibody ID and 10 unit crossmatch



Initial results

Group RHK DAT

NHSBT panel 1

Phenotype



Problem – Who gets the blood?

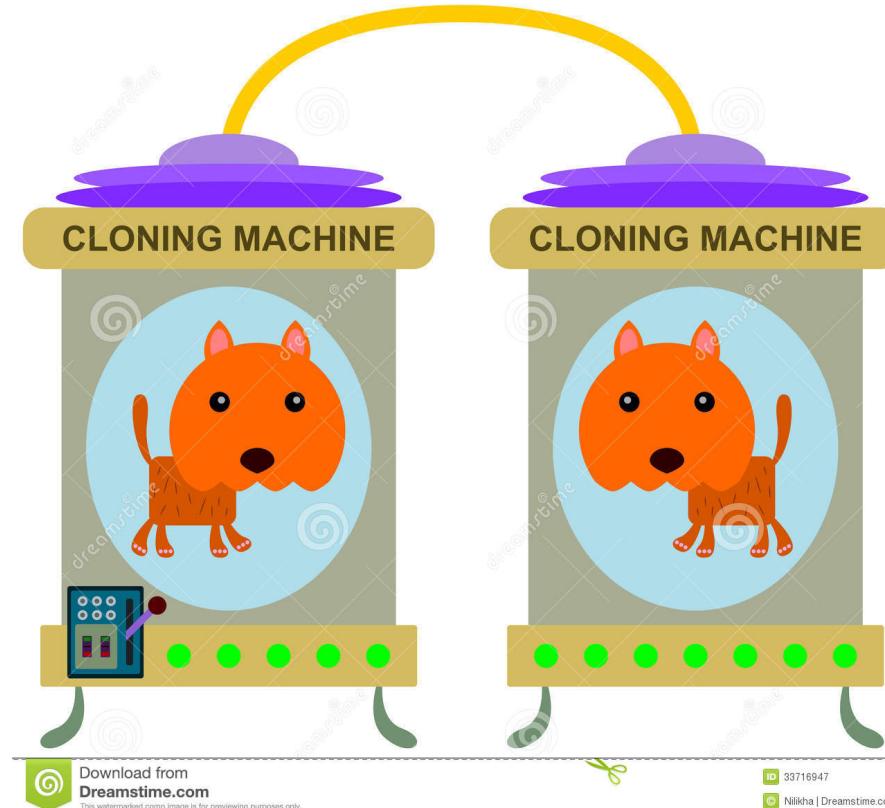
Patient 1	Patient 2	Patient 3
Pregnant	Pregnant	Sickle Crisis
Antibody titre 1/32	Antibody titre 1/512	-
Low risk of bleeding	Low risk of bleeding but previous sickle crisis	-
Baby required exchange in previous pregnancy	No history	-

U Negative blood availability

- Wet units – 2 x O Ro K- HbS-
- Frozen units -

O R1R1	O R2R2	O Ro	O Pos	O neg	A	B
0	0	13	22	5	7	15

Solution



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Patient 3

- Two wet unit given
- Managed with hydroxycarbamide
- Hydroxycarbamide raises the amount of fetal haemoglobin in red blood cells, thereby reducing sickling.
- Crisis subsided however clinicians still keen to start on regular series of exchange transfusion for management

Patient 2

- Delivered at 32 weeks
- Baby initially well
- DAT weakly positive for IgG
- However at 21 days Hb dropped to 46g
- One frozen unit given to baby

Patient 2

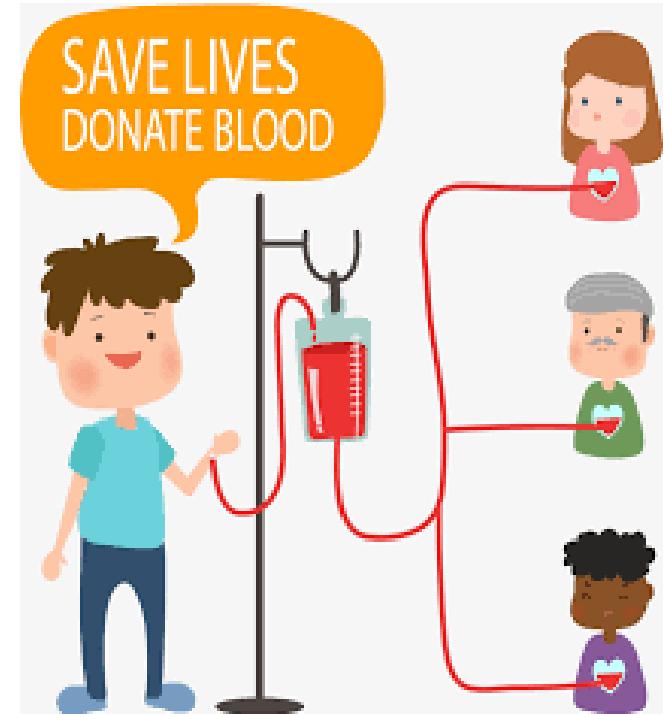
- The baby was readmitted with anaemia two weeks later
- Bilirubin not raised
- No evidence of haemolysis on blood film
- Later confirmed as iron deficiency

Patient 1

- Continued to not attend clinic appointments regularly
- Booked for induction today!
- A further 2 wet units have been donated and are being kept at NHSBT on standby for this lady

Discussion

- Blood components are not a infinite resource
- For rare phenotypes problem is worse
- Sometimes you just have to do the best that you can



Antenatal case study

Case 2

Referral details

- Patient 4
- DOB 06/09/1977
- Pregnant 24/40
- Tests requested
 - Confirmation of antibody and quantitation

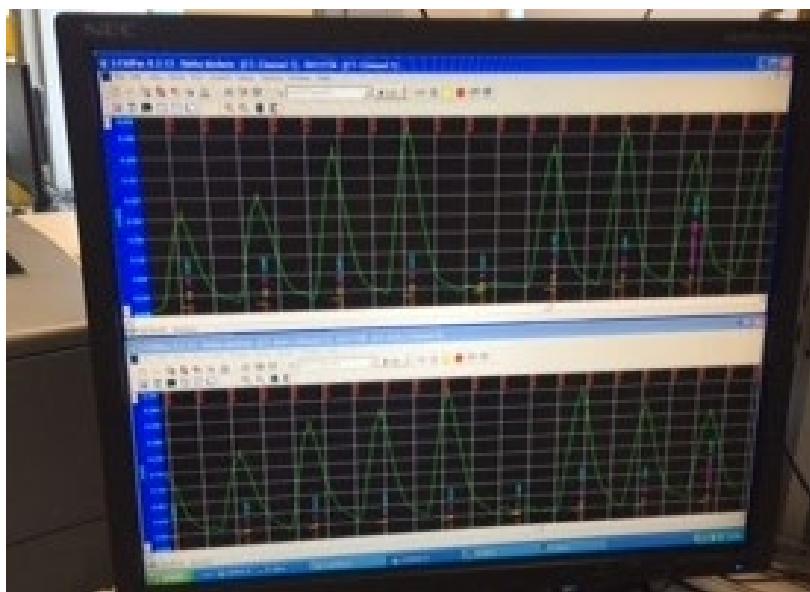


Initial results

Group A Negative
RHK rr K-

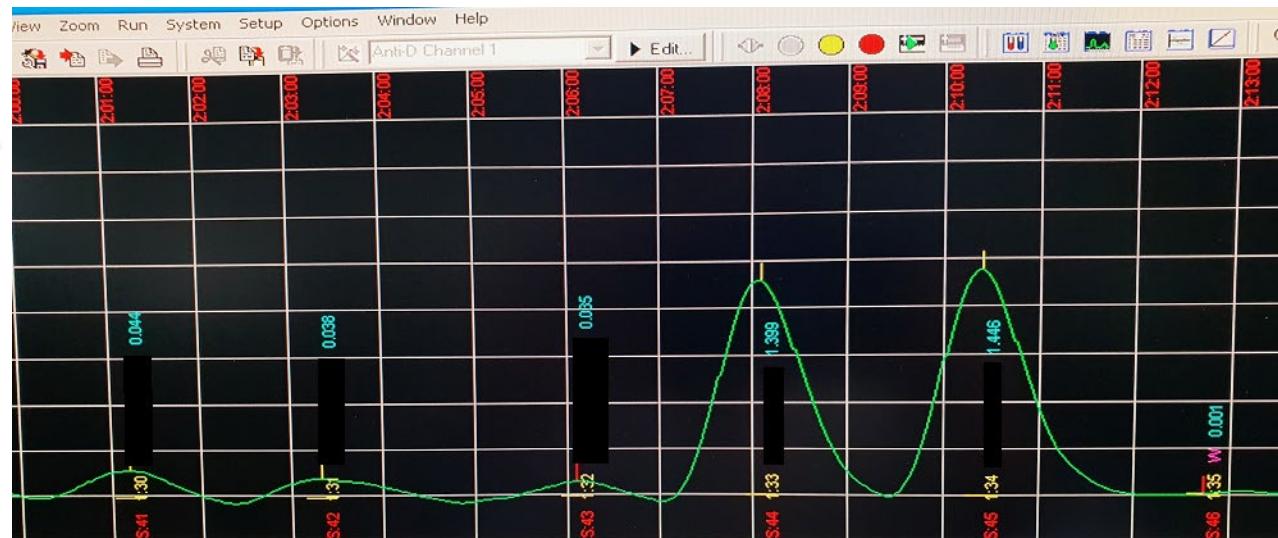
NHSBT panel 1

Quantitation



Quantitation results

0.2IU



Report

- No record of prophylactic anti-D provided
- NS anti-D
- Blood group warning card not issued
- Follow up samples requested at 4 weekly intervals until 28 weeks then 2 weekly
- Continue to give prophylaxis

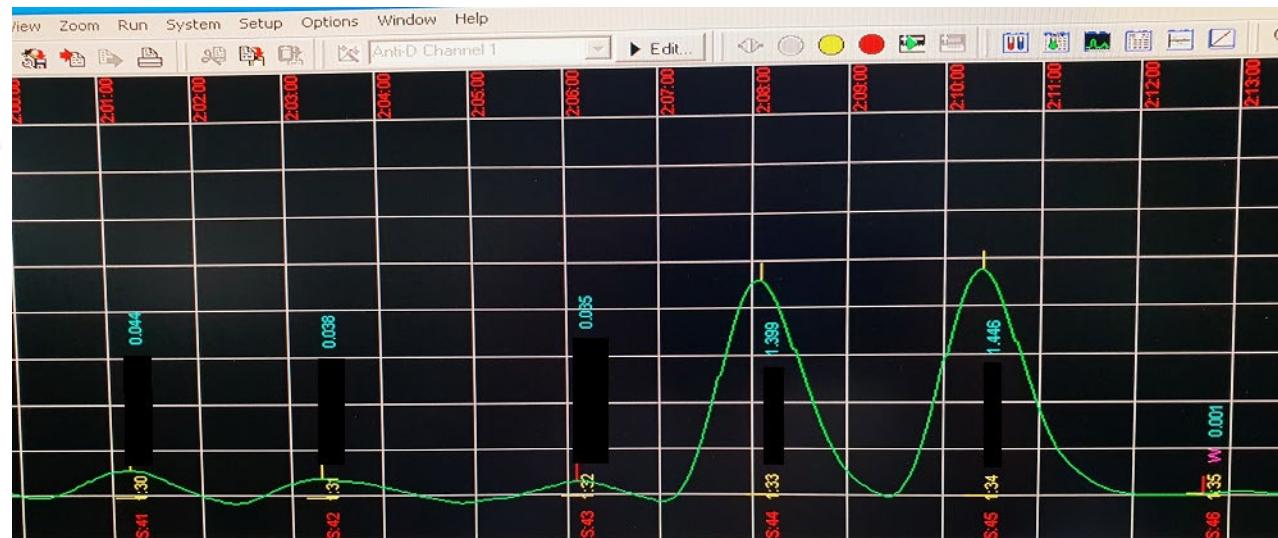
Next sample

- Patient 4
- DOB 06/09/1977
- Pregnant 28/40
- Tests requested
 - Antibody quantitation
- Other information provided
 - Anti-D given 16/05/18 (5 weeks previously)



Quantitation results

0.5IU



Report

- There has been a raise in anti-D level
- Allo anti-D
- Blood group warning card issued
- Follow up samples requested at 2 weekly intervals
- Advised to refer to a specialist foetal maternal unit

However.....

- Hospital clinician phoned NHTSB medic for advise
- Patient had been having repeated PV bleeds
- During the discussion the patient's recent clinic attendance was discussed
- Antenatal screen negative at booking

Actual history

- The patient had been attending both the community clinic and the local hospital antenatal clinic for her repeated PV bleeds
- Prophylaxis given

13/04/18	27/04/18	03/05/18	09/05/18	11/05/18	16/05/18
	22/05/18	31/05/18			

- 1500iu had been given on each occasion due to the shortage of 250IU and 500IU product

Alloantibody or prophylactic anti-D?



Alloantibody or prophylactic anti-D?



Allo anti-D	Prophylactic anti-D
Regular monitoring	Prophylactic continued to be anti-D given
Prophylactic anti-D not given	No monitored as closely

Alloantibody or prophylactic anti-D?



- Unable to tell the two apart serologically
- Unable to tell the two apart by quantitation

Management

- Continued to monitor
- Continued to give prophylactic anti-D as required
- Manage PV bleed as a continuous bleed



Outcome of pregnancy

- Baby born 13/09/18
- Grouped as O negative
- DAT negative

Discussion

- Anti-D probably was prophylactic
- Follow up samples requested 3 months post delivery to see if the anti-D is still detectable
- Unusual for prophylactic anti-D to give result on quantitation greater than 0.5IU

Antenatal case study

Case 3

Referral details

- Received 07/08/18
- Patient 5
- DOB 03/06/1992
- Diagnosis not provided
- Request form stated 'in patient'
- Tests requested
 - Antibody investigation and titration



Initial results

Group = A Positive

RHK = R2R2 K-

DAT = Negative

NHSBT panel 1

Cell	Rh	Rh						MNSs						P1	Lu		Kell			Le		Fy		Jk	
		D	C	E	c	e	C ^w	M	N	S	s		a		b	K	k	Kp ^a	a	b	a	b	a	b	
1	R ₁ ^w R ₁	+	+	0	0	+	+	+	0	+	0	0	0	0	+	0	+	0	+	0	+	0	+	0	
2	R ₁ R ₁	+	+	0	0	+	0	+	0	0	+	2	0	0	+	+	0	0	0	0	+	+	0	0	
3	R ₂ R ₂	+	0	+	+	0	0	0	+	0	+	3	0	0	+	0	+	0	0	0	+	0	+	0	
4	r'r	0	+	0	+	+	0	0	0	+	+	0	0	+	+	0	+	0	+	0	0	0	0	+	
5	r"r	0	0	+	+	+	0	0	0	+	+	3	0	0	+	0	+	0	0	0	+	+	0	0	
6	rr	0	0	0	+	+	0	+	0	+	0	1	0	0	+	0	+	0	+	0	0	+	+	+	
7	rr	0	0	0	+	+	0	0	0	+	0	0	0	+	+	+	0	0	0	+	0	+	+	0	
8	rr	0	0	0	+	+	0	+	+	0	+	0	0	0	+	0	+	+	0	0	+	0	0	+	
9	rr	0	0	0	+	+	0	+	0	+	+	1	0	0	+	0	+	+	0	+	+	0	+	0	
10	rr	0	0	0	+	+	0	+	0	+	0	4	0	0	+	+	+	0	0	0	+	0	+	0	
Auto																									

	Biorad		
RT	ENZ/IAT	IAT	
0	0	3	
0	0	3	
0	0	3	
0	0	3	
0	0	4	
0	0	4	
0	0	3	
0	0	3	
0	0	3	
0	0	3	
0	NT	0	

Further tests

Group = A Positive

RHK = R2R2 K-

DAT = Negative

NHSBT panel 1

Cell	Rh	Rh						MNSs						P1	Lu		Kell			Le		Fy		Jk	
		D	C	E	c	e	C ^w	M	N	S	s		a		b	K	k	Kp ^a	a	b	a	b	a	b	
1	R _{1w} R ₁	+	+	0	0	+	+	+	0	+	0	0	0	0	+	0	+	0	+	0	+	0	+	0	
2	R ₁ R ₁	+	+	0	0	+	0	+	0	0	+	2	0	0	+	+	0	0	0	0	+	+	0	0	
3	R ₂ R ₂	+	0	+	+	0	0	0	+	0	+	3	0	0	+	0	+	0	0	0	+	0	+	0	
4	r'r	0	+	0	+	+	0	0	+	+	0	0	+	+	0	+	0	0	+	0	0	0	0	+	
5	r"r	0	0	+	+	+	0	0	+	+	+	3	0	0	+	0	+	0	0	0	+	+	0	0	
6	rr	0	0	0	+	+	0	+	0	+	0	1	0	0	+	0	+	0	+	0	0	+	+	+	
7	rr	0	0	0	+	+	0	0	+	0	+	0	0	0	+	+	+	0	0	0	+	0	+	0	
8	rr	0	0	0	+	+	0	+	+	0	+	0	0	0	+	0	+	+	0	0	+	0	0	0	
9	rr	0	0	0	+	+	0	+	0	+	+	1	0	0	+	0	+	+	0	0	+	+	0	0	
10	rr	0	0	0	+	+	0	+	0	+	0	4	0	0	+	+	+	0	0	0	+	0	+	0	
Auto																									

	Biorad	
Sal contr ol	IAT - AB serum	IAT- KNIR
3	3	3
3	3	4
3	3	3
3	3	3
3	3	4
3	3	3
3	3	3
3	3	3
3	4	3
3	4	3
4	3	3

Report

- Please provide EDD
- Insufficient sample to complete investigation
- Please send further samples

Repeat sample

- Received 22/08/18 16:06
- Patient 5
- DOB 03/06/1992
- Diagnosis PV bleed
- No EDD provided
- Tests requested
 - Antibody investigation and group



Additional challenge

- 22/08/18 16:38
- Patient bleeding and being taken for a C-section!



Immediate action

- Short panel to confirm reaction pattern
- Extended phenotype
- Titre
- Call in the expert!
- Request further samples for referral to IBGRL
- Refer to NHTSBT medic

Phenotype

Antigen	M	S	s	k	Fya	Fyb	Jka	Jkb
Result	+	0	+	+	0	+	+	+

Group = A Positive

RHK = R2R2 K-

DAT = Negative

Titre = 32

Clinical consultation

- Hospital BMS asked to request their medic phone NHSBT medic
- NHSBT medic stressed that blood should be given if needed
- Recommended group compatible R2R2 K- blood with IgG cover

'The expert'



CE marked reagents?

- ‘The expert’ suspected anti-Inb
- Frozen example of polyclonal anti-Inb tested against patient cells

Negative!



© Can Stock Photo

How to confirm?

- No Inb negative cells available in Colindale
- No CE marked anti-Inb reagent available
- Samples for IBGRL not arrived yet
- No Inb negative cells available in Tooting

Inb negative units

- No wet units
- 2 x O positive C-e+ K- units
 - Autologous donations but donor has given consent for allogenic transfusion
 - But not leucodepleted and no donor health check
- 2 x A positive C+e+ K- units
 - 24 hour shelf life
- 2 x O positive C+e+ K- units
 - 3 day shelf life

Inb negative units



None of the units labelled as Inb-

Further samples still not arrived!

- Had been given to an NHSBT driver who was mid-round and still had deliveries to make before he would return to Colindale



Outcome

- Samples couriered urgently to IBGRL
- IBGRL arranged staff to come in to investigate sample
- However baby delivered before investigation complete



Outcome

- IBGRL confirmed antibody as anti-Inb
- Presence of anti-C, -e, -K, -Fya excluded
- Unable to exclude anti-S

Anti-Inb

- Part of the Indian blood group system
 - IN2
- Clinical significance
 - Haemolytic transfusion reaction
 - No reports of clinical HDFN
- IgG
- IAT
- Present in 99% Caucasians and 96% South Asians (Indians)

Summary

- Antibody identification can be challenging
 - Rare cells
 - Clinical significance or noise
 - Lack of cells
 - Time pressures
- But provision of blood can be equally challenging
 - Availability
 - Time