NHS
Blood and Transplant

An urgent Investigation of a pan-reactive antibody

From referral, testing, appraisal of results and application of clinical significance in the provision of blood for transfusion

Candice Davison BMS Education Day NHSBT Tooting 15/02/17

Referral to RCI

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- Urgent requests are telephoned
  - Patient ID, serological investigation results, urgency, recent Tx status, Hb, Report or XM?
  - Sent via urgent transport
- Sample booked in and grouped by Automation
  - Triage patient (review history on NHSBT LIMS/ Hematos/1A request form)
- Careful appraisal of all information enables efficient and formative investigation of the antibody

Previous Results

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- Full Red Cell Phenotype (FCT)
  - k+ Kp(a-b+) M+N+S+s+ P1-Lu(a-b+) Le(a-b-) Fy(a+b+) Jk(a+b+), In(b+), **Ge-2**
- Referred to the IBGRL in 2002
  - Patient's red cells express the Ge: -2, -3, 4 (Gerbich phenotype)
  - Anti-Ge2 detected, reacting at moderate strength by IAT with untreated cells but NOT with papainised test cells.
  - The presence of additional alloantibody specificities were excluded

Panel 1: Antibody Investigation worksheet:
BD 12.10.16 KCH

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	Rh	M	N	S	s	P1	Lu^a	K	k	Kp^a	Le^a	Le^b	Fy^a	Fy^b	Jk^a	Jk^b		A	B	C
1	$R_1^wR_1$	0	+	0	+	4	0	0	+	0	+	0	+	0	+	0		3	0	0
2	R_1R_1	+	0	+	0	0	0	+	+	0	0	+	0	+	0	+		3	0	0
3	R_2R_2	0	+	0	+	0	0	0	+	0	0	+	0	+	0	+		3	0	0
4	r'r	+	0	0	+	0	0	0	+	0	0	+	0	+	+	0		3	0	0
5	r"r	+	0	+	0	2	0	0	+	0	+	0	+	0	+	0		3	0	0
6	rr	0	+	0	+	3	0	+	0	0	0	+	+	0	+	0		3	0	0
7	rr	0	+	+	0	2	0	0	+	0	0	0	0	+	0	+		/	/	0
8	rr	+	0	0	+	3	0	0	+	+	0	+	0	+	+	0		/	/	0
9	rr	0	+	0	+	3	+	0	+	0	+	0	0	+	0	+		/	/	0
10	rr	+	0	+	0	1	0	0	+	0	0	+	+	0	0	+		/	/	0
A/C																		0	/	0

A Bio-Rad gel IAT

B Bio-Rad gel enzyme IAT

C LISS tube IAT 37^{0}C

B, RhD positive C+c-E-e+ K-

Further Investigations

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- Rare test cell panel
  - Comprised of a selection of rare HFA negative liquid or frozen donor test red cells
    - E.g Yt(a-), Ch-, Rg-, Kna-, U- Yk(a-), JMH-, Fy(a-b-), Lan- etc.
- DTT treatment of plasma
  - Dirupts the J chain of IgM antibodies, enables IgG antbody strength to be determined.
    - The haemolytic potential of the IgG antibody can be estimated by the strength of the anti-IgG antibody detected.
    - Can be helpful to infer clinical significance where in vivo RBC survival data is either unknown or dubious.

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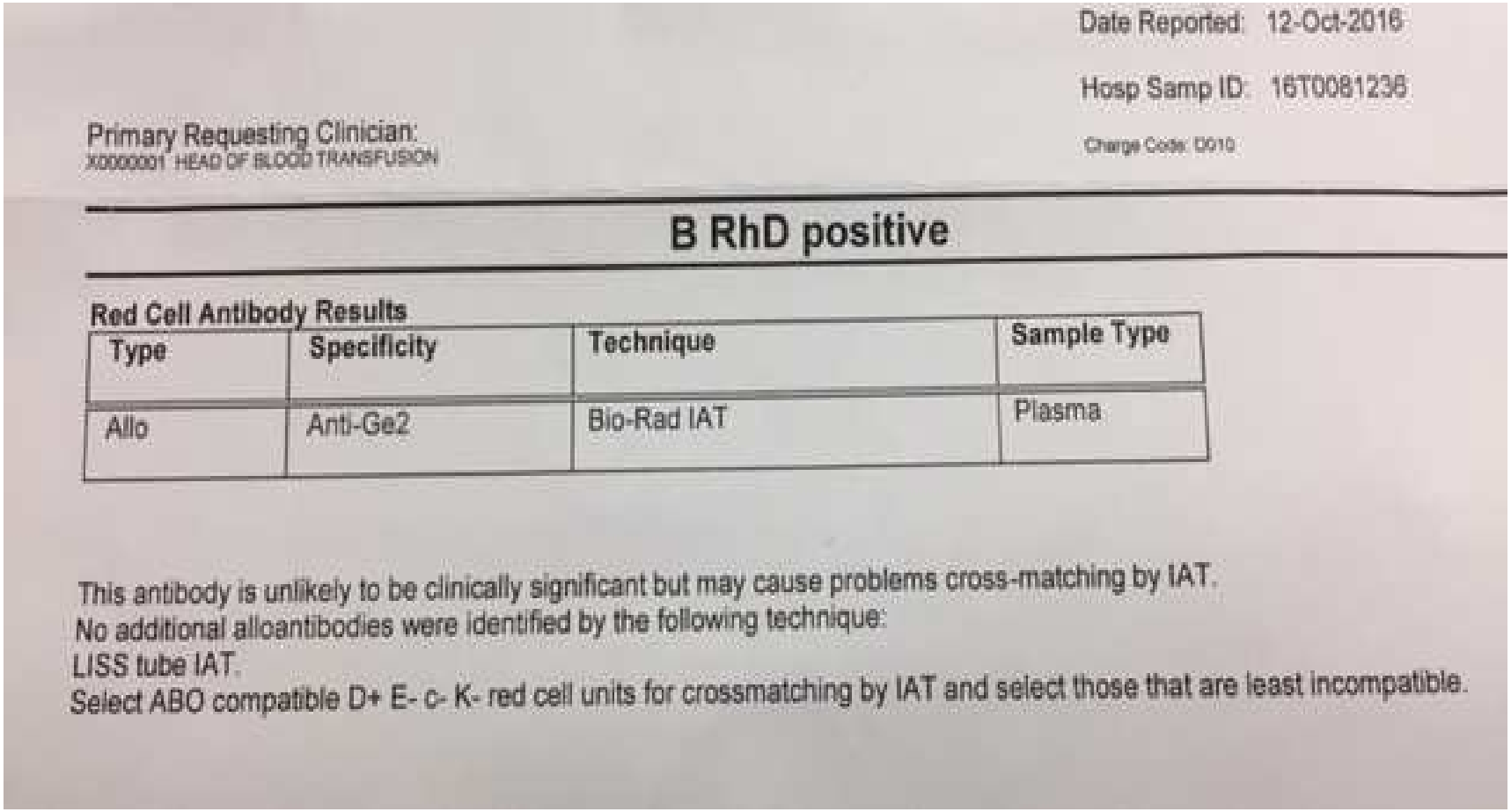
Report



Date Reported: 12-Oct-2016

Hosp Samp ID: 16T0081236

Primary Requesting Clinician:
X0000001 HEAD OF BLOOD TRANSFUSION

Charge Code: D010

B RhD positive

Red Cell Antibody Results

Type	Specificity	Technique	Sample Type
Allo	Anti-Ge2	Bio-Rad IAT	Plasma

This antibody is unlikely to be clinically significant but may cause problems cross-matching by IAT.
No additional alloantibodies were identified by the following technique:
LISS tube IAT.
Select ABO compatible D+ E- c- K- red cell units for crossmatching by IAT and select those that are least incompatible.

Gerbich: Anti-Ge2

- 12 antigens located on either or both sialoglycoproteins (GPC and GPD).
  - Produced by *GYPC*
- Population Frequency (Ge+)
  - >99.9%
  - 3 rare Ge negative phenotypes
    1. Ge: -2, 3, 4 (Yus)
    2. Ge: -2, -3, 4 (Gerbich) 50% Melanesian Population
    3. Ge: -2, -3, -4 (Leach)

Carrier Molecule - Ge2 antigen

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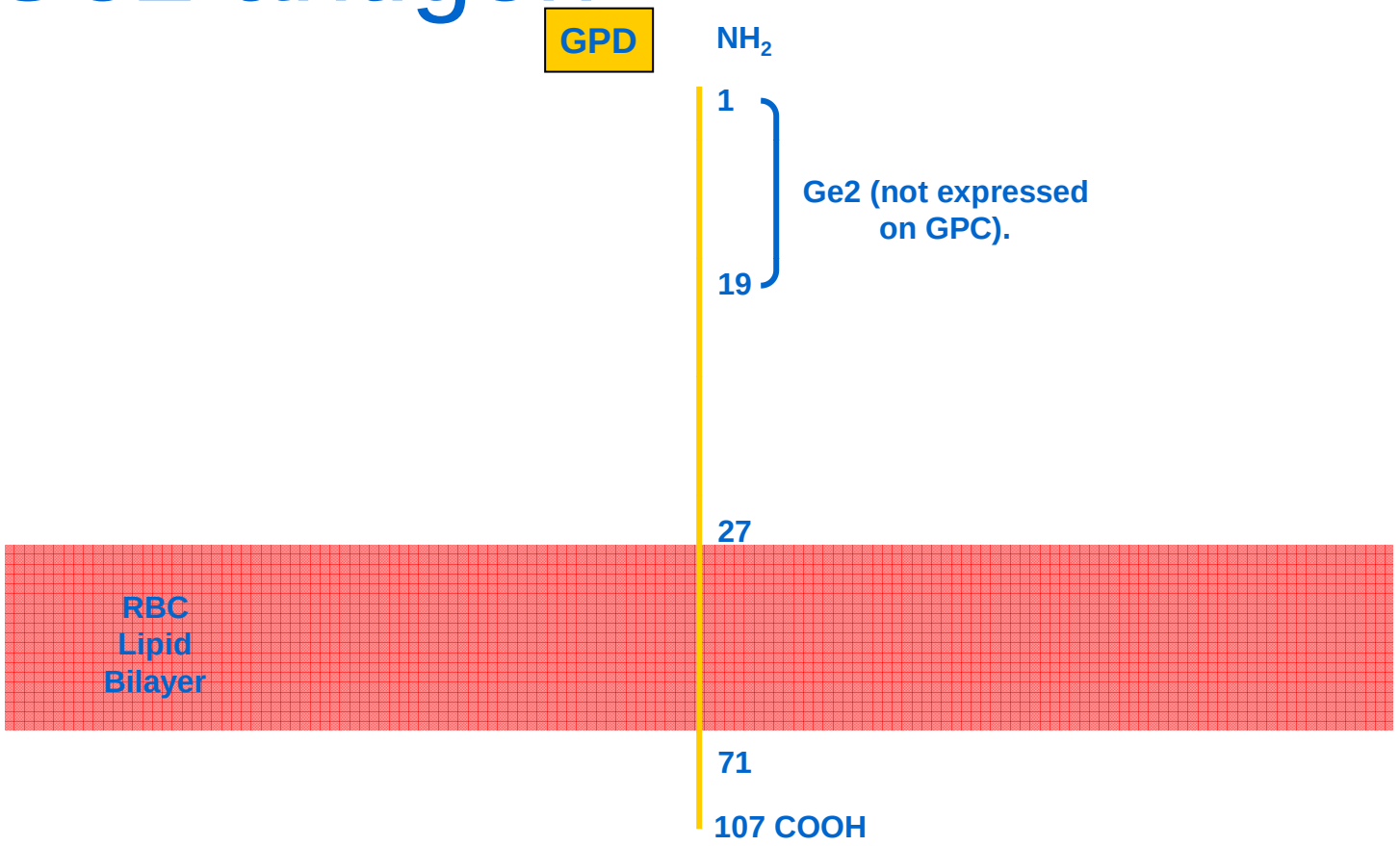

Image courtesy of M.Needs adapted from The Antigen Facts Book 2004

Clinical Significance

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- Transfusion Reaction
  - No to moderate/immediate/delayed
    - However there is no FIRM evidence that this antibody has caused a HTR (SPN214)
  - Anti-Ge2 (IgG1)
  - The antibody strength is considered moderate by Bio-Rad IAT, undetectable by LISS tube IAT.
  - NHSBT recommendation
    - Select ABO compatible D+ E- c- K- for cross-matching and select the least incompatible by IAT.

Summary

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- Effective communication is vital in resolving complex antibody cases in a timely manner
- Review of historical and current results enables a more efficient investigation process
- Anti-Ge2 is a rare antibody
- Understanding the clinical significance is not always straightforward
  - Antigen negative blood is not always indicated

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References

- Daniels G (2013) Gerbich Blood Group System in *Human Blood Groups* 3rd Edition. Oxford: Blackwell Publishing Limited 182-207.
- Reid ME and Lomas-Francis C (2004). *The Blood Group Antigen Facts Book* 2nd Edition. London: Elsevier Ltd.
- Daniels G (2015) NHSBT SPN214/3: The clinical significance of Blood Group alloantibodies and the Supply of Blood for Transfusion.