Working Party on Rare Donors Case Studies 2023 - #2

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Clinical History

- 2003: 62-year-old Caucasian female, laparotomy
- Group and screen request, then: 3 red blood cell (RBC) units requested during the procedure and issued
- 23/07/2008: Pre-Coronary Artery Bypass Graft (CABG), 4 RBC issued
- 26/07/2008: CABG, 3 RBC issued
- 2015: Haematemesis, 8 RBC issued
- 2017: Low Haemoglobin (Hb) 2 RBC issued
- 2018: Gastrointestinal tract (GIT) bleed, 3 RBC issued
- 2021: Upper GIT bleed, 3 RBC issued

Serologic History

- 2003: Gr A D negative (neg), Antibody screen neg
- 2008: Referred to Immunohaematology (IH) lab, Anti-D detected
- 2015: 8 Gr A D neg RBC transfused
- 2017: Referred to IH lab; Antibody to high prevalence antigen suspected
- Anti-Lu^b suspected and partially confirmed when patient was tested with an array of antisera to high prevalence antigens and typed negative for Lu^b antigen
- 2017 and 2018 compatible blood ordered from the Rare Donor file of South Africa
- 2018: Anti-Lu^b, Lu(b–) type predicted by genotyping on ID Core ^{XT}

Genotyping Results

Lu(b–)

Sample Presentation Data

ABO/Rh: A D neg

DAT: negative with polyclonal anti-human globulin reagent

Antibody Screen Method: Grifols Serascan Diana3 and 3P on WaDiana

Antibody Screen Results: All positive, autocontrol negative at antiglobulin phase

Antibody Identification Method: Identsera Diana and Diana P

Antibody Identification: Anti-D + anti-Lu^b

Challenges

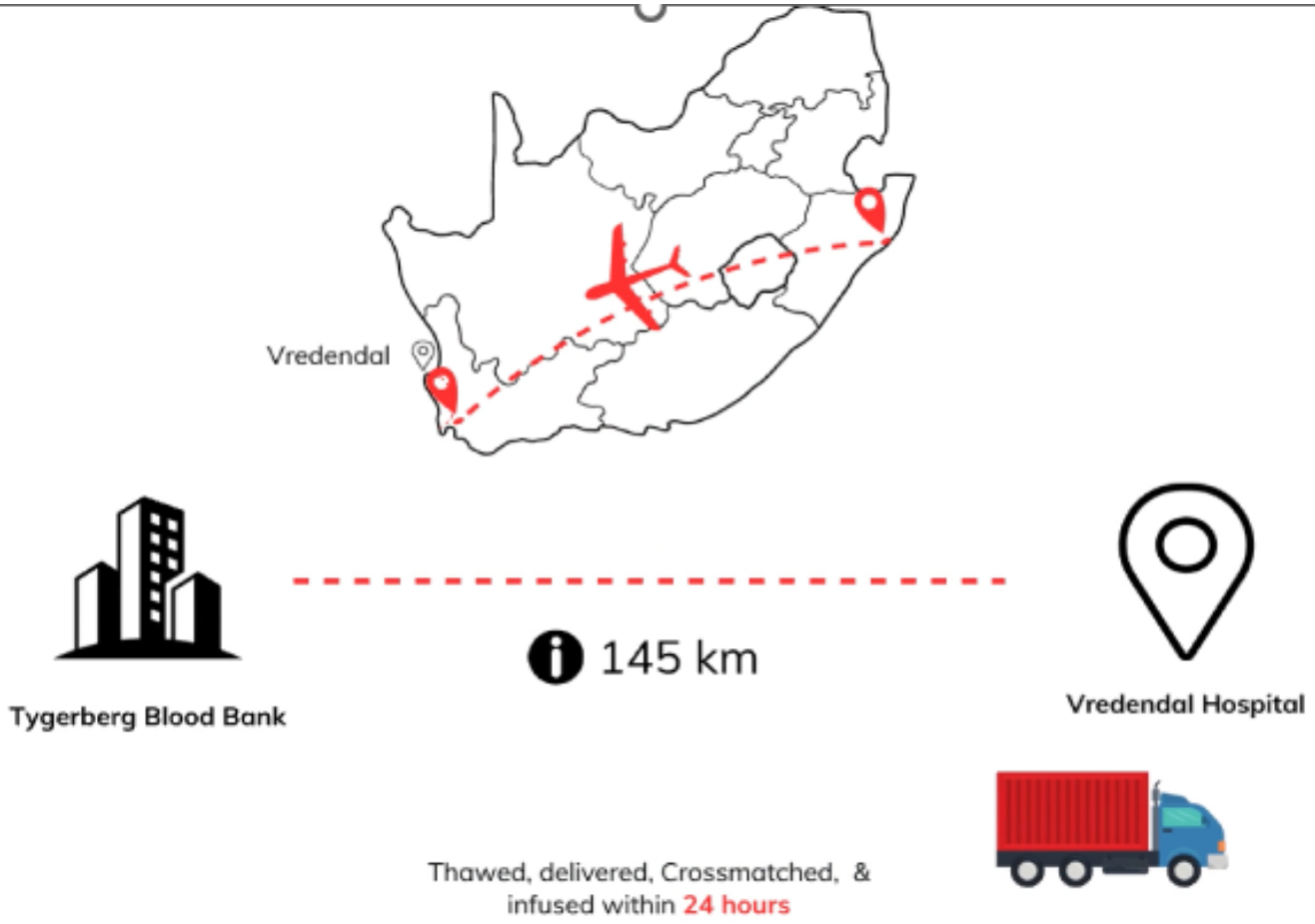
The patient needs Gr A/O D neg Lu(b–) red cells

The patient needed 3 more units, and none were available

If units were available locally:

- These units have to be thawed, put on a plane for 2.4 hrs (1,635 km away)
- Couriered 7km from the airport to the Cape Town Blood bank for crossmatching
- Then, couriered another 1.5 hrs from the Blood Bank to the patient in a hospital in a rural town 145 km away and transfused before the 24 hour expiry

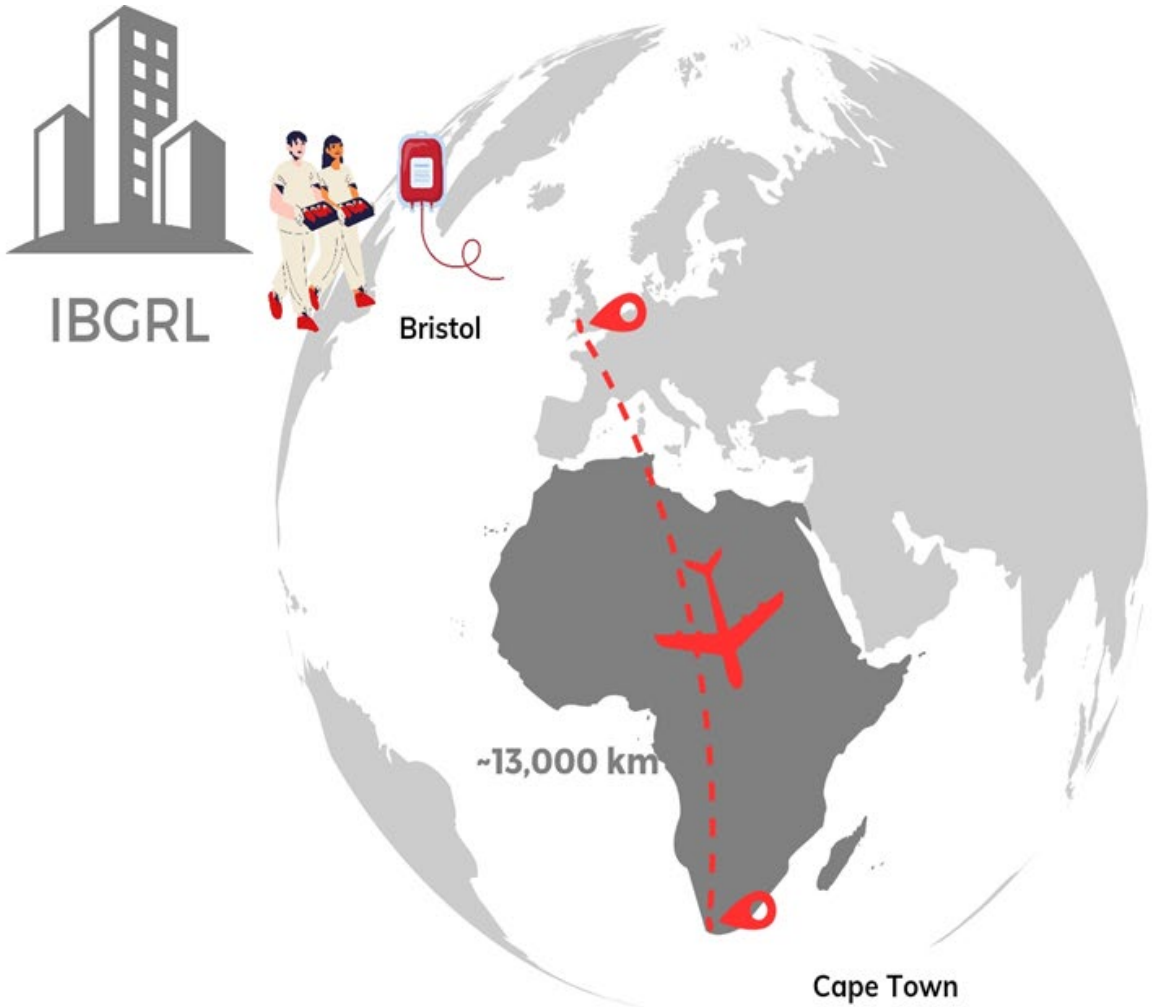
Transport dilemmas



Further challenges

- Gr A D neg Lu(b+) unit was crossmatched, was compatible in tube Coombs technique but incompatible in Column Agglutination technique to a degree of 2+
- MMA (Monocyte Monolayer Assay) test performed.
  To our dismay, test result was very strongly positive, 64%, suggesting incompatible transfusion would result in RBC destruction
- Working Party on Rare Donors members contacted, single units were available in Australia, Italy, Switzerland and UK
- Our centre tried to limit courier expenses by importing from only one location
- NHS Blood and Transplant (NHSBT) in the UK, had a liquid unit available and were able to call 2 more donors to donate within 3 days of receiving our request
- All units transported to Cape Town South Africa on the fourth day and transfused on arrival at the hospital

International transport



ISBT Terminology of the System

LU (ISBT 005) Blood Group Alleles.

- The Lutheran blood group system consists of 28 antigens carried on a single pass type 1 membrane glycoprotein, CD239
- There are two glycoprotein isoforms, the longer isoform consists of 628 amino acids whilst the shorter one consists of 588 amino acids
- Gene name: BCAM (LU)
- Number of exons:15
- Initiation codon: Within exon 1
- Stop codon: Within exon
- 15 Entrez Gene ID:4059

See ISBT Working Party on Red Cell Immunogenetics and Blood Group Terminology

Family Study information

Patient had one Lu(b–) nephew who was eligible and available, but unfortunately, was D positive

Solution to Blood Needs

- Try to increase our Rare Donor Rh negative Lu(b–) pool by…
  - Screening O D neg donors serologically for Lu^b
  - Confirming Lu^b status by molecular methods
  - Using the patient's plasma to screen donors

Conclusions

This case highlights the benefits of international collaboration.

We are so thankful for the support of the NHSBT International Blood Group Reference Laboratory and the Working Party on Rare Donors, without whom our patient would not have had any blood

Rarity of D-negative phenotype amongst rare donors*

WHERE IN THE WORLD ARE RARE DONORS?

Number of Rare Donors of the 19 types with Group O and O neg Numbers – by 22 Countries Responding to Survey

Data not previously presented

TYPE	NUMBER	Type O	Type O neg
Di(b–)	3,835	1384	33
Jr(a–)	3,617	1114	20
Yt(a–)	1,583	1046	279
U – *	1,353	914	77
Co(a-)	892	588	177
Vel –	521	345	87
Jk(a–b–)	285	130	8
Lu(a–b–)	279	190	34
D – –	136	55	0
PP1P^{k}–	128	62	4

TYPE	NUMBER	Type O	Type O neg
K_0	116	41	4
GE:–3	36	25	3
Rh_{null}	19	4	1
Rh:–46	15	3	0
Gy(a–)	15	6	0
At(a–)	11	5	1
En(a–)	8	3	0
SC:–1	7	4	1
M^{k}M^{k}	2	1	0
TOTAL of 19	**12,858**	**5,926**	**729**

46% of reported donors were Type O, 5.6% were O negative

* U types not determined by molecular methods in all countries

* S Nance, C Lomas-Francis, ISBT Working Party on Rare Donors. Where in the World are Rare Donors? Vox Sanguinis 2021;Supplement:9

Summary of Case Challenges

- This was the first time we could not provide blood for a patient, it was very stressful indeed
- Government officials responsible for issuing the blood import permits were working from home
  It took many hours to reach them
- It happened toward the end of the COVID pandemic, so there was a chance that flights might not be available

Lessons Learned by the Case

- Be alert to specific patient uses that could skew the predicted needs
- Track the specific requests vs availability of donors and age of stored units
- To increase our D neg rare donors, especially Lu(b–)
- To educate the patients about autologous donations, keep in contact and motivate them to become donors as soon as they are healed

References

ISBT Working Party Immunogenetics and Blood Group Terminology

ISBT Working Party on Rare Donors