Red cell alloimmunisation in patients with sickle cell disease

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Background

Patients with sickle cell disease are at increased risk of forming red cell alloantibodies after transfusion. This can result in haemolytic transfusion reactions, particularly when patients are transfused at other hospitals where their antibody history is not known. It can also create challenges in sourcing compatible blood and cause delays when patients require transfusion in an emergency.

In 1997, UK blood banks adopted a policy for issuing extended Rh (CcEe) and K matched red cells to patients with sickle cell disease to reduce exposure to these highly immunogenic antigens.

We examined the transfusion records of all patients transfused at our centre to assess the effectiveness of this intervention in reducing alloimmunisation to Rh antigens.

Method

The National Haemoglobinopathy Register (NHR) was used to identify all patients with sickle cell disease registered through Royal London Hospital. Data regarding past transfusions and Rh phenotype were recorded from the Laboratory Information Management System (LIMS). Where available, information on red cell genotype was obtained from the International Blood Groups Reference Laboratory (IGBRL) via the Sp-ICE database.

Results

727 patients were registered on the NHR via our centre.
405 had received a blood transfusion in our Trust and 97 (24%) of these had formed alloantibodies. Half had more than one antibody specificity (Figure 1).
A total of 26 different antibodies were recorded, 14 of which would necessitate antigen-negative units for transfusion. The commonest specificities are shown in table 1.

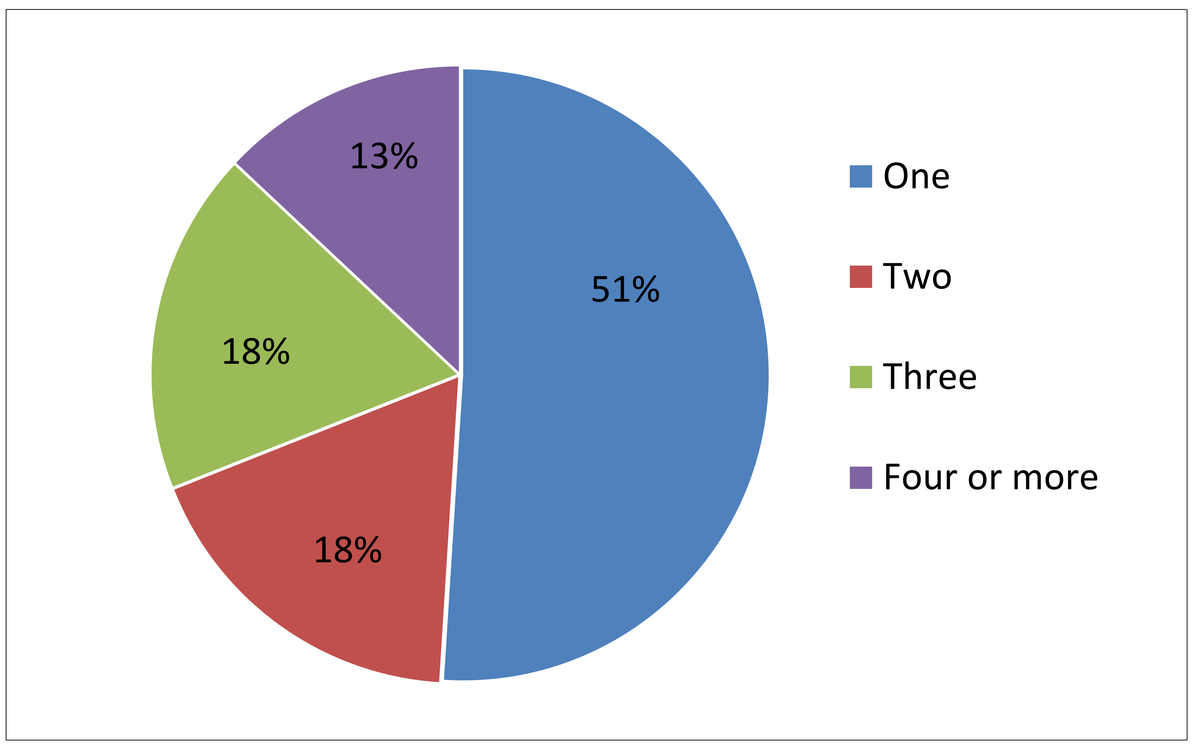

Figure 1: Number of antibodies detected in alloimmunised patients

Antibody specificity	Number of patients	Antigen negative units required?
C	23	Yes
Kpa	23	No
S	19	Yes
Jkb	17	Yes
E	17	Yes
M	14	If active at 37°C
K	9	Yes

Table 1: Commonest antibody specificities in alloimmunised patients

Rh antibodies

48 (50%) of alloimmunised patients had formed antibodies to Rh antigens:

- 28 of the 48 (58%) patients born in 1997 or earlier.
- 20 of the 49 (40%) patients born after 1997.

All transfused patients born after 1997 had a full Rh phenotype and appropriate flags for special requirements on our LIMS, but some may have been transfused in countries without access to Rh matched products, or at hospitals whose laboratories were not informed of their diagnosis of sickle cell disease.

9 of the 20 patients born after 1997 who had formed Rh antibodies had been phenotyped as positive for the corresponding antigens, i.e. apparent autoantibodies. The antibodies were further classified by correlating with the patient's genotype, where available (Figure 2).

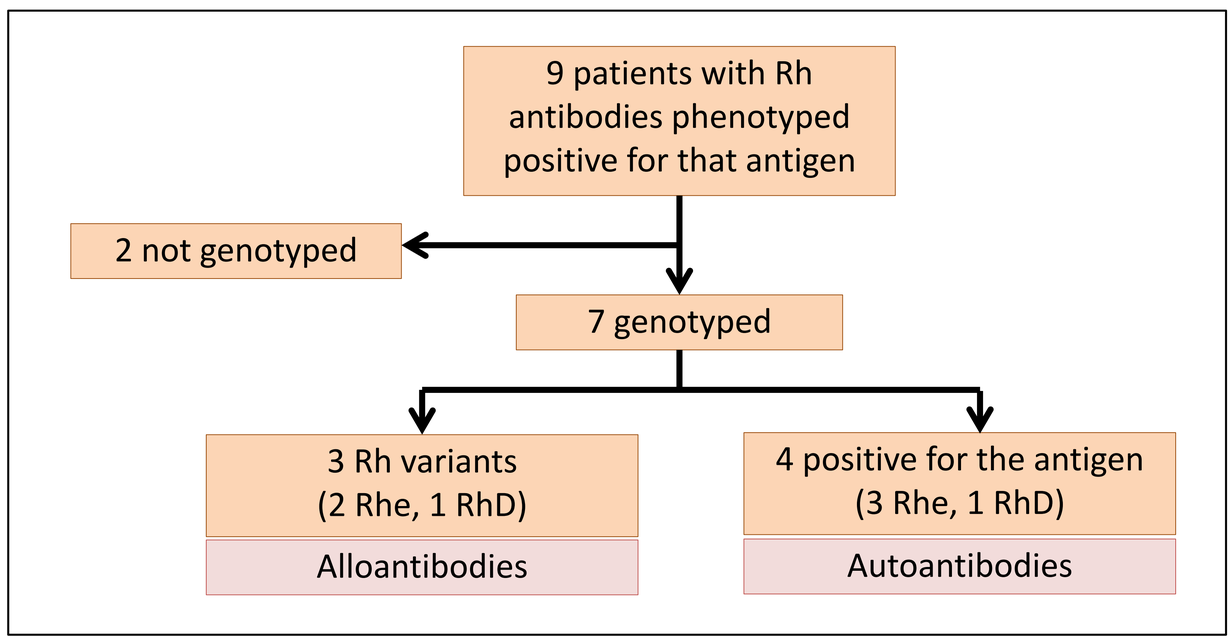

Figure 2: Results of genotyping in patients with apparent autoantibodies

Conclusions

Alloimmunisation remains a challenge in patients with sickle cell disease. Antibodies to Rh antigens are common in spite of extended Rh matching.

- Good communication between clinical teams and laboratories is essential to ensure all special requirements are met.
- Patients should be empowered to remind clinicians they need 'special' blood, particularly when receiving a transfusion at a hospital for the first time.

Red cell genotyping can help provide insight into unexpected antibodies where patients have variant Rh alleles and may influence decision-making around selecting most compatible products.

Barts Health NHS Trust