Red Cell Serology Case Studies

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Background

The Diagnostic Laboratory at the Irish Blood Transfusion Service receives approximately 2500 samples per year, of which 92% are serologically complex. The majority of the department's work involves the resolution of these complex cases and the provision of blood to these patients. This poster discusses in detail three complex cases that were encountered in early 2016.

Case 1: Anti-Ge2

30 year old female patient of Asian (Non – Chinese) ethnicity and was post delivery. Initial investigation: Pan reactivity was observed by IAT only. The auto test cell and direct antiglobulin test (DAT) were negative, suggestive of a high incidence antibody which was papain sensitive. The patient's phenotype was: Fy(a+b-) Jk(a+b+) M+ S+s+. Based on these results, a panel of rare antisera were selected for testing including anti-Ge2. The patient's red cells typed negative against four anti-Ge2 antisera. Two rare Ge:2 negative frozen red cells were recovered and the patient's plasma tested negative against these cells. Exclusion of other underlying allo-antibodies was performed following allo-adsorption of the anti-Ge2.

The Gerbich blood group system is characterized by 11 antigens, 6 of which are high frequency including the antigens Ge2 and Ge3. The Ge2 antigen negative phenotype is mainly associated with Melanesians, especially Papua New Guineans. Anti-Ge2 has not been associated with HDFN but can be associated with moderate transfusion reactions. The standard transfusion protocol for patients with anti-Ge2 is 'serological least incompatible' (Daniels *et al*, 2002). As per the International Blood Group Reference Laboratory (IBGRL), a request for antigen negative units would be warranted if a "if the patient had not tolerated previous Ge+ transfusion, or if it is a particularly strong example of the antibody".

Case 2: Anti-Kpb

83 year old female of Czech origin. Initial investigation: Auto test cell and DAT were negative. Reactivity by IAT was variable and no reactivity was observed with papain treated cells. Initial antibody investigation was suggestive of a high titre low avidity (HTLA) type antibody. However, neutralisation did not remove the reactivity and the patient tested positive against a panel of HTLA negative cells. The patient typed as: Fy(a-b+) Jk(a+b+) M+ S+ s+. Following elimination of a HTLA type antibody, an antibody to a high incidence antigen was suspected. A panel of rare antibodies which are prevalent in the Caucasian population (anti-Kp^b, Lu^b, Co^a, Lan, PP1PK) were tested (Fig.1). The patient typed as Kp^b-. Two rare Kp^b- frozen red cells were recovered (Fig.2) to confirm the presence of anti-Kp^b. To determine if additional antibodies were present, the anti-Kp^b was inhibited with a recombinant Kp^b protein (Fig.3).

Kp^b is a high incidence antigen of the Kell blood group system and is present on the red cells of >99.9% of Caucasians and virtually 100% of Africans. The anti-Kp^b in this patient did not present classically as a Kp^b. In the majority of cases, anti-Kp^b is resistant to papain and reactivity by IAT is of equal strength. Anti-Kp^b has been implicated in HDFN and in transfusion reactions. Currently there is only one Kp^b- blood donor in Ireland, therefore, assistance from the rare donor panel would be required if the patient required more than one unit of blood. Siblings of patients with anti-Kp^b should be considered for donation and these units cryogenically stored.

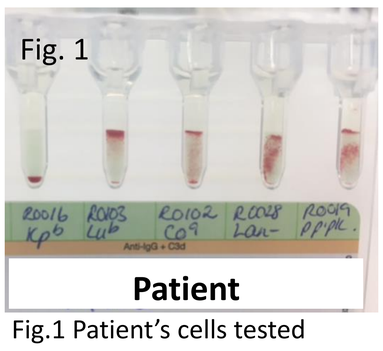

Fig.1 Patient's cells tested against rare antisera.

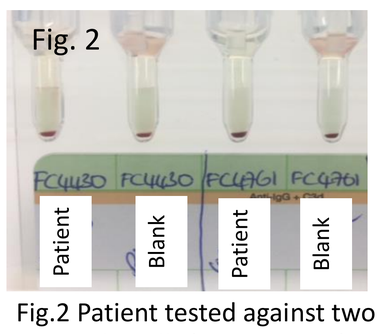

Fig.2 Patient tested against two rare Kpb- cells (4430 + 4761)

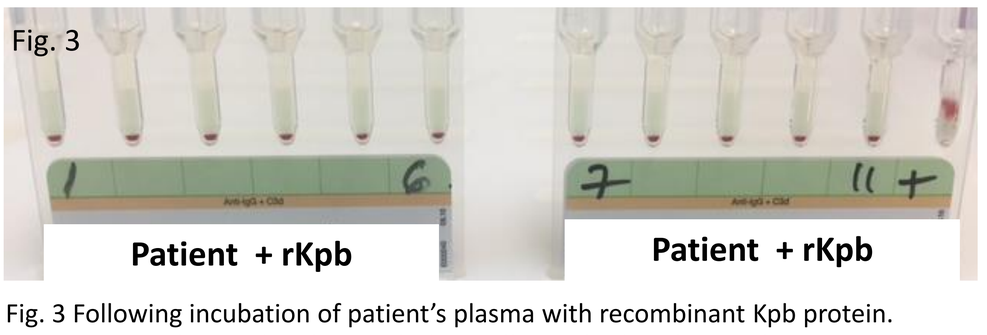

Fig. 3 Following incubation of patient's plasma with recombinant Kpb protein. No reactivity observed and no underlying allo-antibodies detected.

Case 3: Anti-JMH

78 year old female, most likely Caucasian. Initial antibody investigation showed 1+ reactivity by IAT and no reactivity was observed with enzyme treated cells. The auto test cell was weakly positive and the DAT was positive with IgG. A HTLA-type antibody was suspected. C4 coated cells were negative and the antibody remained following neutralisation (ruling out possible Anti-Ch/Rg). Patient's plasma tested positive against Csa-, Yta-, Kna-, Sla-, Yka- and McCa- cells. A JMH- cell tested negative and the patient's cells typed at JMH-. Weaker reactivity was observed against cord cells which have known weakened expression of JMH. The presence of anti-JMH was confirmed by IBGRL and the sequencing of the *SEMA7A* gene is to be performed.

JMH stands for John Milton Hagan, in whose serum one of the early examples of anti-JMH was discovered. This antibody is considered to be 'HTLA type' and is usually found in elderly patients. This patient was 79 years old. It is widely accepted that JMH antigen expression reduces later in life and anti-JMH can be stimulated . This is the case for the majority of JMH antibodies that are detected. There has only been one case of the JMH- phenotype being directly inherited (Sabo *et al.,* 1978) and was inherited for three generations, suggesting dominant inheritance.

Conclusion

All three samples reacted with the majority of reagent red cells tested. Cases 1 and 2 discuss the investigation of an clinically significant antibodies to a high frequency antigens - anti-Ge^2 and anti-Kp^b. However, the reactivity pattern of these antibodies could easily be mistaken for a less clinically significant allo-antibody such as anti-JMH or anti-Yt^a. Case 3 discusses the serological presentation of an anti-JMH. Whilst these antibodies may not be clinically significant, their resolution can complicate the provision of blood.

References

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