THE CHALLENGES FACING PROVISION OF RARE BLOOD GROUPS FOR PATIENTS FROM ETHNIC MINORITIES IN IRELAND

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Introduction

- Increasing ethnic diversity of the Irish population poses a challenge for blood product provision.
- Three patients referred with antibodies against high frequency antigens for whom compatible blood from the Irish donor population could not be sourced are described.
- Importation of rare blood was required for these patients

Patient One – Antenatal patient, G2P1

Presentation

- Panreactivity on antenatal booking antibody screen (enzyme and IAT)
- Auto test cell negative
- Antibody to HFA was suspected
- **Anti-Jra** identified with rare reference cells, titre = 8 (IAT)

What is the significance of this?

- Jra is a HFA seen in all populations
- Jra- phenotype is most common in Japan, though still rare (0.03-0.12%)
- Presence of anti-Jra antibody:
  - Can cause haemolytic transfusion reaction if Jra+ units transfused
  - Potential to cause HDFN in rare cases with one fatal case reported

Maternal management and outcome

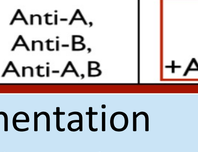
- Pre-delivery optimisation of maternal Hb with iron supplementation
- Screening of Irish donor population for Jra- donors
- Importation of rare blood group compatible red cell components from Valencia to be available if need for peri-delivery transfusion arose
- Emergency delivery but with no need for maternal transfusion

Fetal management and outcome

- Paternal blood assessment indicated Jra+ phenotype
- Pregnancy monitored in high-risk fetal assessment unit with MCA dopplers for complications of HDFN
- ADCC assay to assess for haemolytic potential was persistently <10%, indicating low risk of fetal haemolysis
- Mild neonatal haemolysis but no neonatal transfusion required

Patient Three – Elective Surgery

Presentation



- Pre-operative forward group was O RhD positive
- Panreactivity antibody panel by IAT and enzyme
- Auto test cell negative
- **Bombay phentotype** confirmed with rare antigen negative (Oh) cells and **Anti-H** detected in plasma

Why is this significant?

- Patients with Bombay phenotype have no H antigen and cannot receive Group O, A, B or AB blood
- Transfusion of H+ components risks potentially fatal haemolytic transfusion reaction
- Prevalence is 1/10,000 in India and 1/million in Europe

Clinical Approach

- Optimisation of pre-operative Hb with iron supplementation
- Siblings should be screened as potential donors and autologous pre-donation and intraoperative cell salvage considered
- Surgical techniques to minimise blood requirements
- In this case perioperative red cell transfusion was avoided

Patient Two - Antenatal patient, G1P0

Presentation

- Panreactivity on antenatal booking antibody screen
- Antibody to HFA was suspected
- **Anti-PP1PK** identified with rare reference cells, titre = 32 (IAT)

What is the significance of this?

- Potential blood donors are rare as incidence of p phenotype (absence of P, P1, PK) is 5.8/million
- Can cause miscarriage with 50-72% occurring in first 20 weeks
- Potential to cause HDFN, and more likely at titres >32
- Potential to cause maternal haemolytic transfusion reactions

Maternal management to date

- Pre-delivery optimization of maternal Hb with iron supplementation
- Screening of siblings as potential donors – none compatible
- Consideration of autologous pre-donation during pregnancy – typically difficult
- Blood conserving techniques at delivery and consideration of intra-operative cell salvage if appropriate
- PP1PK red cell components sourced from overseas donors in case transfusion at delivery is required

Fetal management to date

- Paternal blood assessment indicated P1 positivity
- Pregnancy monitored in high-risk fetal assessment unit with four weekly MCA dopplers for complications of HDFN and antibody titres measured four weekly until 28/40, and now every 2 wks until delivery
- ADCC assay to assess for haemolytic potential:
  - 10% at 18/40, low risk of fetal haemolysis
  - 30% at 32/40, moderate risk of foetal haemolysis

This case is ongoing

(Fig1) Antibody identification showing panreactive results Auto cell suggesting antibody against a HFA.

Conclusion

- The IBTS frequently encounters high frequency red cell antibodies in patients for whom local donors are not available
- Close coordination and communication between clinical and laboratory teams is required for optimal management of these cases
- To adequately provide suitable donations, these patients themselves, and their siblings, can be recruited as donors in the future if eligible.
- The IBTS is considering establishing cryopreserved repository of rare blood group red cell components from donors recruited from ethnic minority groups to further mitigate risks to these patients.

Abbreviations

ADCC: Antibody-dependent cell-mediated cytotoxicity
HDFN: Haemolytic disease of fetus and newborn
HFA: High frequency antigen
IAT: Indirect antiglobulin test

References:

1. Lépine, MS, Goua, V, Debouverie, OS, et al. Multidisciplinary management of anti-PP1Pk or anti-P alloimmunization during pregnancy: A new case with anti-P and a literature review. Transfusion. 2021; 61: 1972– 1979.
2. Bombay Phenotype image, available at https://labmedicineblog.com/2015/01/27/the-bombay-phenotype/. Accessed 14th Sept 2021
3. Talukder, B., Datta, S. S., Mukherjee, S., & Mukherjee, K. (2014). Prevalence of bombay group blood in southern bengal population. Indian journal of hematology & blood transfusion : an official journal of Indian Society of Hematology and Blood Transfusion, 30(3), 149.
4. Kwon, M.Y., Su, L., Arndt, P.A., Garratty, G. and Blackall, D.P. (2004), Clinical significance of anti-Jra: report of two cases and review of the literature. Transfusion, 44: 197-201.