NHSBT Board
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Patient Story

Requests for rare red cells from Hong Kong and USA

Introduction

There are many rare blood groups that are present in less than 1 in 1000 people. Blood from these donors has required national and international systems of support that have been developed over decades. NHS Blood and Transplant has played a central role in establishing and maintaining these essential services for patients.

The International Rare Donor Panel was established in 1965 by the International Society of Blood Transfusion (ISBT) and is maintained by the International Blood Group Reference Laboratory (IBGRL) at Filton. In 1968, the IRDP had 300 donors listed from 10 countries but now contains over 11,200 donors from 27 contributing countries, as well as frozen unit inventories from blood banks around the world.

Requests are submitted via the International Rare Donor Panel and the International Rare Donor Working Group – the UK has two representatives on this group. Recently there has been two requests for rare red cells from Hong Kong and USA.

Rare red cell request from Hong Kong

NHSBT received a request from the Hong Kong Red Cross Blood Transfusion Service. Red cells of the very rare "McLeod" phenotype were required for a 2-year-old patient with chronic granulomatous disease (CGD). This is an inherited primary immunodeficiency disease, which increases the body's susceptibility to infections caused by certain bacteria and fungi. The patient had undergone chemotherapy conditioning and stem cell infusion, and transfusion was required as soon as possible.

NHSBT has only one McLeod donor on the entire donor database. The McLeod phenotype is very rare (0.5-1 per 100, 000 of the population). Colleagues in Hong Kong became aware of this donor via the International Rare Donor Panel (IRDP). NHSBT's McLeod donor is a 77-year-old regular whole blood donor with 110 credits on his record.

Birmingham Medical staff contacted the donor using NHSBT's well established special call-up procedure and a donation was collected and issued to Hong Kong for transfusion.

Rare red cell request from USA

A request was received for red cells lacking the common Inb (Indian) antigen. One unit was required as soon as possible to support an antenatal patient at risk of bleeding at delivery.

Inb is a clinically significant antigen, present in 99% of Caucasians and 96% of Indians (South Asians). There are currently 8 Inb negative donors on the IRDP database – only one donor was a suitable match for the patient and eligible to donate.

Again, Birmingham Medical staff contacted the donor using NHSBT's well established call-up procedure and they donated successfully. Colleagues at Tooting Blood Centre arranged the courier, and the unit was issued on 5th October.

The US requires confirmation of the screening information, along with a photograph of the unit. All this was transferred to colleagues in the US and the unit arrived safely at the hospital on 7th October for transfusing to the patient.

The Identification of Rare Donors

Genotyping for blood donors - Next Generation Sequencing (NGS) and Microarrays

There are over 360 defined red blood cell antigens and 33 platelet antigens encoded by genetic changes genes at specific blood group loci. DNA-based genotyping and other genotyping methods such as microarrays are now being used as an alternative to serological antibody-based methods to determine blood groups for matching donor to recipient.

Genotyping identifies patients and donors who lack high-prevalence antigens, and although prophylactic prevention is often not possible, having this information avoids misdiagnosis. Genotyping patients and donors also can indicate incompatibilities in specific blood group systems, where the respective antibodies can be clinically significant, even life-threatening, but difficult to identify by serology. No methods were previously available to type the large numbers of donors to find compatible units. We can now consent donors and have established methods for large-scale genotyping of 80,000 donors in the STRIDES BioResource. The inventory of blood from these donors will very significantly enhance our capacity to find units with rare blood groups for difficult-to-match patients. Furthermore, in the next two years we will genotype hundreds of thousands of donors by collaboration with Our Future Health.

It is also possible that we can use these large stocks of typed blood units to provide better matched blood for patients who already make antibodies to one or more blood groups and so have an increased risk of making antibodies to more blood groups. Finding enough matched blood and rare blood groups is only possible by high-throughput low-cost genotyping. NHSBT is leading an international consortium to establish these methods of genotyping donors and will also collaborate with NHSE to provide genotyping of vulnerable patient groups. These are real areas of innovation that will enhance patient outcomes.

Conclusion

Both cases illustrate the value of the International Rare Donor Panel in identifying donors to meet the needs of patients with incredibly rare blood types and the international collaboration that secures rare blood for patients around the world. It also demonstrates the willingness and commitment of UK blood donors to help patients across the world.

It is an exciting time in transfusion medicine because the field is poised to benefit from a genomics approach not only for recipient and donor compatibility determination, but for donor recruitment, donor health, characterising products and optimising their storage. The ability to test for antigens for which there are no serologic reagents is a major medical advance to help identify antibodies. Large-scale donor typing will significantly improve our ability to find compatible donor units. These advances will be life-enhancing and in some cases, lifesaving.

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