Consensus statement on use and allocation of Kell negative red cells

Background

The Kell blood group system is complex and contains antigens that are highly immunogenic. Kell system antibodies should be considered clinically significant and are known to cause both transfusion reactions and haemolytic disease of the newborn.

The K antigen is expressed in approximately 10% of Caucasians and 2% of African-Americans but is more common in those of Arab descent.

Anti-K is described as being the next most prevalent antibody after those in the ABO and Rh systems. Anti-K is commonly IgG and non-complement binding. Transfusion reactions due to extravascular haemolysis may be severe. Anaemia resulting in hydrops fetalis may arise from intra-uterine immunological suppression of erythroid precursors in a Kell positive fetus of an immunised female. The fetus may be compromised early in development, and antibody titres are not often reflective of disease severity. For these reasons alloimmunisation is best avoided, particularly in females of childbearing potential.

To avoid alloimmunisation, laboratories may have a policy to select K negative red cells from their inventories for transfusion to females of childbearing potential, without knowing their K phenotype.

However, the practice of laboratories preferentially requesting K negative units for stock is unjustified and unfairly burdens some laboratories with an excess inventory of K positive units thereby increasing the likelihood of wastage and the need for further individual patient orders.

The ANZSBT *guidelines for transfusion and immunohaematology laboratory practice* (2016) recommend that females of childbearing potential should receive red cells matched for K, and that the use of K negative red cells for women who are K positive is unnecessary.

Red cell phenotyping for common red cell antigens is a basic laboratory technique that should be within the capability and testing repertoire of laboratories that hold red cell inventory. Laboratories should consider including K phenotyping in the pre-transfusion testing of samples from females of childbearing potential to enable appropriate issue of K compatible red cells, rather than just selecting K negative units for this group.

Patients who will be undergoing daratumumab therapy should, wherever possible, be phenotyped (and/or genotyped) for K prior to commencing treatment. Where immunohaematology methods that are known to denature the K antigen (i.e. dithiotreitol (DTT) or trypsin-treated cells) are used to perform the red cell antibody screen or identification, blood compatible with the patient's K phenotype (or genotype) should be selected for transfusion. If the patient is unable to be K-phenotyped (or genotyped) prior to transfusion, K negative blood should be selected.

Recommendations

Clinical scenarios where K negative units are indicated (listed in priority order) include:

1. Any patient with (or a history of producing) anti-K
2. Transfusion of pregnant females or females of child bearing potential **who have a K negative phenotype** (~90% of women)
3. Transfusion of pregnant females or females of child bearing potential who are unable to be phenotyped prior to transfusion. The clinical urgency of transfusion should be considered and emergency transfusion should not be delayed by attempts to source K negative units. *
4. Patients who will be undergoing daratumumab therapy who are K negative or unable to be K phenotyped (or genotyped)

K negative units may be clinically indicated in the following scenario:

- Transfusion dependent patients who are shown to have a K negative phenotype (~90% of patients). Laboratories may choose to phenotype but may elect to retain the option of transfusing K negative units only if the patient subsequently develops anti-K or if necessary to meet other phenotype requirements.

The Australian and New Zealand Society of Blood Transfusion (ANZSBT), supported by the National Blood Transfusion Committee (NBTC), believe a mixed inventory of K positive and negative units, reflecting the local population distribution of the antigen, can be managed effectively without unnecessary red cell wastage if appropriate patient selection and/or K phenotyping is employed. The ANZSBT and NBTC support the Blood Service issuing red cells without regard to their K type unless fulfilling a patient specific order where K negative red cells are requested. * The maintenance of emergency stocks of red cells that are exclusively K negative at sites that do not regularly provide blood components to paediatric or pregnancy and birth services is unnecessary.

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