

## The appropriate use of group O RhD negative red cells

### Summary

Recommendations are provided by the National Blood Transfusion Committee for the appropriate clinical use of group O RhD negative red cells to ensure availability of this limited resource for those patients for whom there is no alternative. They are divided into **mandatory**, **recommended** and **acceptable** indications.

Recommendations are provided for the appropriate clinical use of group O RhD negative or positive red cells in an emergency situation where a blood group has not yet been safely assigned to patient(s) requiring immediate transfusion, including both individual and large scale emergency situations.

This guidance is designed to ensure that hospitals and NHSBT can work within a consistent framework across England and North Wales to ensure equal access for patients to available group O RhD negative red cells on the basis of need. This guidance covers both clinical and laboratory management.

### Method

The recommendations are based on a large audit by the National Blood Transfusion Committee of the usage of O RhD negative blood<sup>1</sup>, and practical considerations. They are consistent with the AABB Guidelines for Massive Transfusion<sup>2</sup>, and the BCSH guidelines for Massive Transfusion<sup>3</sup> and Compatibility Testing.<sup>4</sup>

### Background

Demand for red cells may exceed supply. Group O RhD negative is the blood group of choice for transfusion of red cells in an emergency. However, overdependence on group O RhD negative red cells may have a negative impact on blood stock management<sup>5</sup>. Blood services worldwide have encountered recurrent shortfalls of O RhD negative red cells. It is important that NHSBT and hospital users work together to reduce the risk of group O RhD negative red cell shortages through the management of both supply and demand. In the event of blood shortages, the integrated blood shortage plan should be activated.<sup>5</sup>

### General Principles

Although each clinical situation presents a unique challenge, the following general principles exist.

It is accepted that certain groups of patients benefit more than others from the use of group O RhD negative red cells. It is important that patients should be prioritised with respects to their transfusion needs in order to identify those where the use of group O RhD negative red cells is essential.

*RhD selection.* If the patient's RhD status is unknown, it is prudent to supply RhD negative red cells. However, the use of RhD negative red cells should be prioritised on the basis of gender and age according to the following principles:

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- RhD negative females with child-bearing potential (< 60 yrs when unknown) may become alloimmunised to the D antigen if transfused RhD positive red cells and could subsequently be at risk of haemolytic disease of the fetus and newborn. These guidelines aim to ensure continuous supply of group O RhD negative red cells for this patient group.
  - RhD negative patients with immune anti-D are at risk of delayed haemolytic transfusion reaction if transfused RhD positive red cells.
  - *Weak D*. Patients with a weak RhD status (D<sup>u</sup>) should be given RhD positive red cells, and anti-D reagents should be selected so that all RhD positive patients, other than category D<sup>VI</sup> are identified.<sup>4</sup>

*ABO selection.* Group O red cells should be used in the following cases:

- A discrepancy between the ABO group on the current blood grouping sample and a historical blood grouping result.
- Mixed field ABO reactions that are not known to be related to compatible non-ABO identical transfusion.
- Shortages may require transfusion of non group-identical red cells (see below).

### **Selection of red cells in emergency and/or massive transfusion**

Massive transfusion is associated with a variety of serious conditions, including multiple trauma, childbirth, gastrointestinal bleeding, liver transplantation and complex surgery. All may be emergencies requiring the urgent access to red cells. Massive transfusions which may require the use of group O red cells generally involve four scenarios;

- 1) Patients with unknown blood group and serological findings**
- 2) Patients with known blood group without a current blood group sample**
- 3) Patients with a current valid blood group and a negative antibody screen**
- 4) Patients with complex serological problems or with special requirements**

If an RhD negative patient does not have anti-D on antibody screening, RhD positive red cells should be used for immediate blood support if > 8 units are needed for an adult. This should be covered in laboratory standard operating procedures and should be recorded in clinical notes. If a RhD negative patient is found to have anti-D after RhD positive units have started to be used, it is advised that there should be a switch to the use of RhD negative red cells.

The use of red cells should be reduced through the application of massive haemorrhage protocols which address both control of bleeding as well as optimising transfusion support.

### **Stock Management**

Adequate stock management policies should be in place both in hospitals and blood services to minimise wastage of group O RhD negative red cells arising from time expiry, and to avoid the need to electively transfuse group O RhD negative red cells to non-O RhD negative recipients to prevent time expiry.

Adequate stocks of other groups should be maintained by hospital blood transfusion laboratories to avoid the unnecessary use of group O RhD negative red cells for patients of other groups.

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Phenotyped red cell units should be ordered as group specific, and provided as such by blood services, wherever possible.

### **Use of O RhD Negative Red Cells**

#### **Mandatory Indications for use of O RhD Negative Red Cells**

- O RhD negative patients with anti-D.
- O RhD negative females with child-bearing potential.
- In an emergency to pre-menopausal (<60years) females of unknown blood group.

#### **Recommended Indications for the use of O RhD Negative Red Cells**

- O RhD negative patients who will receive repeated transfusions, or are likely to become transfusion-dependent, for example patients with haemoglobinopathies, aplastic anaemia, myelodysplasia.

#### **Acceptable Indications for use of O RhD Negative Red Cells**

- In an emergency situation, O RhD negative red cells should be given while the patient's blood group is being established. Blood grouping should be carried out as quickly as possible to minimise the 'blind' use of O RhD negative red cells, and this can be limited to **no more than two units** in most instances. Once the patient's blood group has been determined, a switch to group specific red cells should be made.
- If red cells for neonatal use are required and suitable group specific red cells are unavailable
- If the specific phenotyped red cells provided

### **Use of O RhD Positive Red Cells for O RhD Negative Patients**

- In order to conserve stocks of group O RhD negative red cells, O RhD positive red cells should be used in large volume blood replacement (e.g. more than eight units of red cells) in females with no child-bearing potential and adult males in whom no anti-D is detectable.
- When O RhD negative red cells are unavailable or in extremely short supply, it is acceptable to use O RhD positive red cells for O RhD negative female patients with no child-bearing potential and unimmunised males, provided no anti-D is detected on pre-transfusion testing. It should be noted that, although there is a theoretical possibility that, in a sensitised RhD negative patient the level of anti-D could fall after many years to an undetectable level; this is highly unusual with current sensitive screening techniques.
- If RhD positive red cells are given to a female of childbearing potential, consideration should be given to the use of anti-D immunoglobulin (plus exchange transfusion for large scale transfusion) to reduce the risk of alloimmunisation to the RhD antigen. Guidelines for the route of administration and dosage of anti-D are given in the BCSH Anti-D guidelines.<sup>6</sup>

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| All are grade C recommendations based on level IV evidence (see below). |
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## References

1. Audit of the usage of group O RhD negative red cells, December 2008  
<http://www.transfusionguidelines.org.uk/Index.aspx?Publication=NTC&Section=27&pageid=7544>
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3. BCSH Guidelines on the Management of Massive Blood Loss *British Journal of Haematology* 2006; 135(5): 634-41 [http://www.bcsguidelines.com/pdf/bloodloss\\_2006.pdf](http://www.bcsguidelines.com/pdf/bloodloss_2006.pdf)
4. BCSH Guidelines for compatibility procedures in blood transfusion laboratories. *Transfusion Medicine* 2004; 14(1): 59-73  
<http://www.bcsguidelines.com/pdf/transfusionlabs.pdf>
5. Development of an integrated blood shortage plan for the National Blood Service and hospitals. Department of Health. 2004. Gateway reference 3344.  
[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4085662](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4085662)
6. BCSH Guidelines for the use of prophylactic anti-D immunoglobulin 2006.  
[http://www.bcsguidelines.com/pdf/Anti-D\\_070606.pdf](http://www.bcsguidelines.com/pdf/Anti-D_070606.pdf)

### GUIDELINE REVIEW AND STATUS

First approved by the Transfusion Medicine Clinical Policies Group in September 1999, and published in *Blood Matters*, Issue 2, September 1999.

Revised by the Transfusion Medicine Clinical Policies Group in June 2000.

Second revision September 2002

Guidelines for the Use of Group O D Negative Red Cells including contingency planning for large scale emergencies INF/MED/CM/024/01 April 2003 D Stainsby and MF Murphy for the NBS Transfusion Medicine Clinical Policies Group and made available to hospital transfusion laboratories in England and North Wales.

Reviewed January 2009 by H Doughty and M Rowley for the NHSBT Patients Clinical Team and National Blood Transfusion Committee following the National Blood Transfusion Committee Audit of the Usage of Group O RhD negative red cells.

### STATEMENTS OF EVIDENCE

- Ia Evidence obtained from meta-analysis of randomised controlled trials.
- Ib Evidence obtained from at least one randomised controlled trial.
- IIa Evidence obtained from at least one well-designed controlled study without randomisation.
- IIb Evidence obtained from at least one other type of well-designed quasi-experimental study.
- III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
- IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

### GRADES OF RECOMMENDATIONS

- A Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation.**  
(Evidence levels Ia, Ib)
- B Requires the availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.**  
(Evidence levels IIa, IIb, III)
- C Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates an absence of directly applicable clinical studies of good quality.**  
(Evidence level IV)