Guidelines for the use of blood components in adult haematology

Requests for blood and blood components

1. Please indicate on the blood transfusion request form exactly what type of blood/blood component is needed. There is a list of each patient's requirements for special blood components in the clinical areas and in the Blood Transfusion laboratories on both sites. Please inform the laboratory at the John Radcliffe by telephone **(x20339)** when changes to patients' special blood requirements are needed.

2. On the John Radcliffe and Churchill sites: Routine orders for platelets for the following day should be given to the Blood Transfusion laboratory **(x20339)** by 13.30 at the latest, and for the week-end by 14.00 on Fridays.

3. On the Horton site: Routine orders for platelets for the following day should be given to the Blood Transfusion laboratory **(x29236)** by 15.00 at the latest and for the weekend by 10.00 on Fridays.

4. Please inform the Blood Transfusion laboratory if any platelets you have ordered are not required, as these platelets may then be used for other patients.

5. Requests for HLA matched platelets must be made directly to the NHSBT centre in Bristol. Inform the JR laboratory that an order has been placed.

6. Orders for top-up red cell transfusions should be provided on the day before the transfusion or by midday if the transfusion is needed on the same day.

7. Requests for urgent transfusion will of course be dealt with as soon as possible.

8. 24 hours notice is required for routine requests for patient's requiring washed cells. In an emergency contact the laboratory who will advise an estimate time for availability. Note: these products are prepared at the NHSBT centre in Bristol.

Prescription and administration of blood and blood components

1. Special blood components e.g. irradiated should be clearly prescribed. As part of the procedure before the transfusion, the units must be checked to make sure they comply with any special requirements on the prescription sheet.

Standard transfusions for haematology patients

1. All red cell and platelet concentrates are leucocyte-depleted.

2. No routine premedication.

Indications for red cell transfusions

Red cell transfusions should only be considered for patients with a haemoglobin concentration (Hb) < 8.0g/dl unless otherwise clinically indicated.

The minimum number of units of red cells should be transfused to maintain the Hb at or just above this concentration.

Indications for platelet transfusions

For patients with temporary thrombocytopenia: -

Clinical Situation	**Threshold Platelet Count**
Active Bleeding **WHO grade 2 bleeding or greater** i.e. more than petechiae, purpura, oropharyngeal bleeding, and epistaxis >1hour in duration	**Therapeutic platelet transfusion (count independent)**
Procedure	**100 x 10^9/L** operation brain/eye **50 x 10^9/L** LP/Epidural Lines Transbronchial biopsy Liver biopsy Laparotomy **20 x 10^9/L** Pre PBSC Harvest threshold (Ref. BCSH guidelines for Platelet Transfusion)
Non-bleeding patient	**Prophylactic Platelet Transfusion if count <10 x 10^9/L**
Non-bleeding patient with fever >38.9°C, treatment with anti-fungals, shock or DIC	**Prophylactic Platelet Transfusion if count <20 x 10^9/L**

Indications for CMV-seronegative blood components

It has been agreed that CMV-seronegative blood components are no longer required for haematology patients.

There is lack of an evidence base for the additional safety of CMV seronegative blood when blood is pre-storage leucocyte-reduced. All the trials have been of non-leucocyte-reduced CMV seronegative blood v leucocyte-reduced non-CMV tested blood. The only randomised controlled trial compared post-storage leucocyte-reduced with CMV tested blood, and produced equivocal results. The question of any additional safety of CMV seronegative blood when blood is pre-storage leucocyte-reduced is unlikely to be answered definitively.

The advantages of abandoning any requirements for the use of CMV-seronegative blood components for haematology patients include:-

1) Simplification of decision-making about special requirements for junior doctors and nurses.

2) Enabling the extension of electronic remote blood issue to haematology patients which will speed the provision of blood for urgent transfusions and for day case patients.

3) Simplification of stock holding, reducing blood wastage.

4) Cost saving for the Trust as NHS Blood & Transplant add a surcharge for the provision of CMV seronegative blood components.

Indications for gamma-irradiated blood components

1. The indications for the use of gamma-irradiated blood are provided in the Table below.

   When seeing a patient where gamma-irradiated blood components are now indicated, carry out the following actions:-

   - give the patient an information leaflet and card and answer any questions the patient may have. Supplies of the leaflets and cards will be held on the Haematology Ward, the Day Therapy Unit – Haematology (DTU-H), and in the blood bank at the JR and Horton sites. Additional supplies can be obtained by ringing ex20339.
   - attach another copy of the card to the front of the patient's notes,
   - inform the hospital Blood Bank that the patient now needs gamma-irradiated blood. Failure to do this increases the risk that the patient will receive non-irradiated products.

Acute leukaemia	- only needed for HLA-matched platelets or donations from relatives
Autologous haemopoietic cell (bone marrow/peripheral blood stem cells) transplants	• from 7 days before harvest until the harvest is completed • from the initiation of conditioning therapy until 3 months post-transplant (6 months if TBI is used)
Allogeneic haemopoietic cell transplants	- from start of conditioning therapy indefinitely
Allogeneic haemopoietic cell donors	- from 7 days before harvest until harvest is completed
Aplastic anaemia	- patients on ATG until the lymphocyte count recovers to $>1{\cdot}0 \times 10^9$/l - patients treated with alemtuzumab (anti-CD52)
Hodgkin's disease	- indefinitely from the time of diagnosis
Patients treated with purine analogues e.g. fludarabine,cladribine, deoxycoformycin, clofarabine and bendamustine	- indefinitely from the time of prescription
Patients with congenital immunodeficiency states	- indefinitely from the time of diagnosis

Indications for HLA-matched platelets

1. If a patient has poor responses to 2 or more platelet transfusions (a poor response is defined as an increase in the platelet count < 5 x 10^9/L on the day after the transfusion): -

   - the patient should be assessed for 'clinical factors' e.g. infection, splenomegaly, DIC which may cause non-immune platelet consumption.
   - if 'clinical factors' are not present, the patient should be tested for HLA antibodies. Samples (7-10mL clotted blood plus 7-10 mls EDTA) should be sent to the NHSBT Histocompatibility and Immunogenetics laboratory in Bristol, via the JR blood transfusion laboratory on level 4 and typed for HLA-A,B antigens.
   - if HLA antibodies are detected, request HLA-matched platelets by contacting the NHSBT H&I laboratory in Bristol (0117 912 1561), and inform the JR Blood Transfusion laboratory. In urgent cases the H&I lab may be able to issue HLA-matched platelets based on the results of an HLA type performed in a non-NHSBT laboratory. In this case, they will need a copy of the patient's HLA type faxed to H&I in Bristol.
   - Because of the clinical information required, it is the prescribing SpRs responsibility to ensure that the HLA matched platelets are ordered the H&I laboratory in Bristol.
   - The platelets are issued with a follow up form to record the incremental data, it is essential this is returned promptly to the H&I laboratory in Bristol. Failure to do so may cause delays in subsequent orders.

Selection of Appropriate Blood Products for Recipients of ABO/Rh Mismatched Stem Cell Transplants

Approximately 15-25% of HLA identical sibling donor/recipient pairs differ for ABO blood groups. The figure is higher for non-related donor transplants. Haemolysis may occur immediately on stem cell infusion or be delayed and may be life-threatening. Delayed haemolysis in cases of minor ABO mismatch occurs because of a secondary (anamnestic) immune response mediated via memory B cells in the graft against recipient ABO antigens, the so-called passenger lymphocyte syndrome.

Pre-transplant samples should be taken from both donor and recipient for ABO and RhD grouping and antibody screen, anti-A and anti-B titres by indirect anti-globulin test (where indicated) and direct antiglobulin test. Post-transplant, recipients should be monitored for immediate and delayed haemolysis as appropriate.

The Table below shows the blood components which should be selected for transplant patients where there is a ABO/RhD mismatch. Pre transplantation and until the recipient's blood groups have totally converted to the donor's, blood components should be compatible with both the donor and recipient. The supply of platelets with the more unusual combinations of ABO and RhD groups are often limited and it may be necessary for an alternative group to be selected.

For a major ABO mismatch (e.g. A donor, O patient): use red cells of recipient's ABO type until recipient ABO antibodies are undetectable and the direct antiglobulin test is negative, and platelets and plasma from donors of donor's ABO type.

For a minor ABO mismatch (e.g. O donor, A patient): use red cells of donor ABO type throughout, and plasma and platelets of recipient type until recipient type red cells are no longer detectable.

For a major and minor ABO mismatch: use group O red cells until recipient ABO antibodies are undetectable, and then switch to donor type red cells. Use group AB plasma and recipient group platelets until recipient type red cells are undetectable.

For major RhD incompatibility (i.e. RhD positive donor, recipient RhD negative): use RhD negative blood components until RhD positive cells are detected

For minor RhD incompatibility (donor RhD negative, recipient RhD positive): use RhD negative components indefinitely.

Following graft rejection: revert to recipient-type red cells and platelets.

Changing ABO and RhD groups to donor type:
Patients are recorded as changing ABO/RhD group to donor type once they are transfusion independent and show no evidence of recipient-type cells or recipient-type ABO antibodies. If further blood component support be required after this point, donor type components will be issued.

Recipient	Donor	Red Cells	FFP	Platelets in order of preference			
				Ideal	Suitable Alternative(s) ALL HT NEG		
A Pos	A Neg	A neg	A neg	A neg	O Neg		
	O neg	O neg	A neg	A neg	O Neg		
	O Pos	O pos	A pos	A pos	O Pos		
	B Pos	O pos	AB pos	AB pos	A Pos	B Pos	O Pos
	B neg	O neg	AB neg	AB neg	A neg	B neg	O neg
	AB pos	A Pos	AB pos	AB pos	A pos	B Pos	O Pos
	AB Neg	A neg	AB neg	AB neg	A neg	B neg	O neg
A neg	A pos	A neg	A neg	A neg			
	O neg	O neg	A neg	A neg	O Neg		
	B neg	O neg	AB neg	AB neg	A Neg	B Neg	O neg
	AB neg	A neg	AB neg	AB neg	A neg	B neg	O neg
	O Pos	O neg	A neg	A neg	O Neg		
	B Pos	O neg	AB neg	AB neg	A neg	B Neg	O neg
	AB Pos	A neg	AB neg	AB neg	A neg	B Neg	O neg
O pos	A pos	O pos	A pos	Apos	O Pos		
	B pos	O pos	B pos	B pos	O Pos	A pos	
	AB pos	O pos	AB pos	AB pos	A pos	B Pos	O Pos
	O neg	O neg	O neg	O neg	O Neg		
	A neg	O neg	A neg	A neg	O Neg		
	B neg	O neg	B neg	B neg	O neg	A neg	
	AB neg	O neg	AB neg	AB neg	A neg	B Neg	O neg
O neg	O pos	O neg	O neg	O neg	A neg		
	A pos	O neg	A neg	A neg	O Neg		
	B pos	O neg	B neg	B neg	O Neg		
	AB pos	O neg	AB neg	AB neg	A neg	B Neg	O neg
	A neg	O neg	Aneg	A neg	O Neg		
	B neg	O neg	B neg	B neg	A neg	O neg	
	AB neg	O neg	AB neg	AB neg	A neg	B Neg	O neg
B pos	O pos	O pos	B pos	O pos HT neg	B Pos		
	A pos	O pos	AB pos	AB pos	A pos	B Pos	O Pos
	O neg	O neg	B neg	O neg HT neg	B neg		
	AB pos	B pos	AB pos	AB pos	A pos	B Pos	O Pos
	A neg	O neg	AB neg	AB neg	A pos	B Pos	O Pos
	B neg	B neg	B neg	B neg	O Neg		
	AB neg	B neg	AB neg	AB neg	A pos	B Pos	O Pos
B neg	O pos	O neg	B neg	B neg	O Neg		
	A pos	O neg	AB neg	AB neg	A neg	B Neg	O neg
	O neg	O neg	B neg	B neg HT neg	A neg	O neg	
	AB pos	B neg	AB neg	AB neg	A neg	B Neg	O neg
	A neg	O neg	AB neg	AB neg	A neg	B Neg	O neg
	B pos	B neg	B neg	B neg HT neg	A neg	O neg	

	AB neg	B neg	AB neg	AB neg	A neg	B Neg	O neg
AB pos	O pos	O Pos	AB pos	AB pos	A pos	B Pos	O Pos
	A pos	A pos	AB pos	AB pos	A pos	B Pos	O Pos
	O neg	O neg	AB neg	AB neg	A pos	B Pos	O Pos
	B neg	B neg	AB neg	AB neg	A pos	B Pos	O Pos
	A neg	A neg	AB neg	AB neg	A pos	B Pos	O Pos
	B pos	B pos	AB pos	AB pos	A pos	B Pos	O Pos
	AB neg	AB neg	AB neg	AB neg	A pos	B Pos	O Pos
AB neg	O pos	O neg	AB neg				
	A pos	A neg	AB neg	AB neg	A neg	B Neg	O neg
	O neg	O neg	AB neg	AB neg	A neg	B Neg	O neg
	B neg	B neg	AB neg	AB neg	A neg	B Neg	O neg
	A neg	A neg	AB neg	AB neg	A neg	B Neg	O neg
	B pos	B neg	AB neg	AB neg	A neg	B Neg	O neg
	AB Pos	AB neg	AB neg	AB neg	A neg	B Neg	O neg

Management and prevention of febrile reactions

(Defined as a > 1- 1.5^{0}C rise in temperature during transfusion)

Standard Transfusions

Leucocyte-depleted red cells and leucocyte-depleted platelets

No routine premedication

If there is a FEBRILE REACTION, follow the management plan below:-

Management

1) Mild reaction
   Slow the transfusion
   Keep the patient warm
   Administer paracetamol
   Complete the transfusion if no progression of symptoms

2) Severe reaction
   Stop the transfusion. Seek medical Advice and inform the Blood Transfusion laboratory (also see ORH Blood Transfusion Policies and Procedures).

Management and prevention of urticarial and anaphylactic reactions

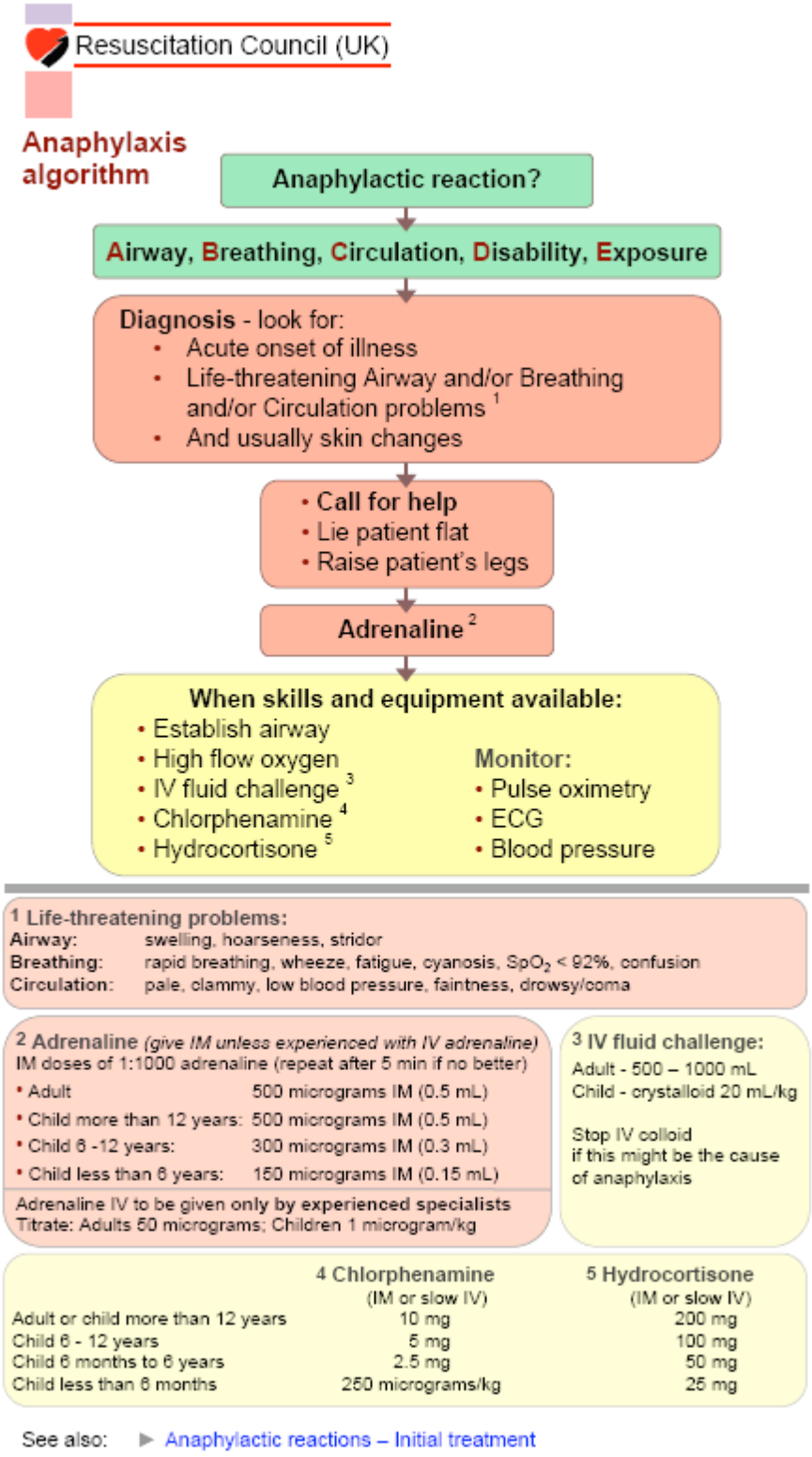
Urticarial Reactions

Management	Prevention
Slow the transfusion Administer Piriton 10mg o/i.v. Complete transfusion if no progression of symptoms	If recurrent reactions (3 or more), administer Piriton 10mg o/i.v. 30 minutes or more before the transfusion

Patients rarely need hydrocortisone

Anaphylactic Reactions

Management (also see algorithm on next page)	Prevention
Stop the transfusion Maintain venous access with 0.9% saline Maintain airway and give oxygen Give adrenaline 0.5mg i.m. and consider repeating every 5 minutes until improvement occurs in pulse and blood pressure If clinical manifestations of shock do not respond to drug treatment, give 0.5-1 litre of i.v. fluid. Give chlorpheniramine 10mg i.m. Contact duty Intensive Care Registrar For all severe reactions, and in asthmatic patients, give hydrocortisone 200 mg i.m. or slowly i.v.	Detailed investigations should be carried out e.g. IgA, anti-IgA Special blood components may be needed Please contact one of the haematologists through the Blood Transfusion laboratory for advice



Resuscitation Council (UK). Anaphylaxis algorithm. http://www.resus.org.uk/pages/anaalgo.pdf

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Version Control

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