NHS Blood and Transplant

Blood Administration

All blood components (excluding granulocytes) in the UK are leucocyte depleted within 48 hours of collection to minimise the theoretical risk of transmission of vCJD. No supplemental micro aggregate filters are required for any blood component transfusions (including granulocytes)

Component/ Product	Instructions for adult administration. (For paediatric administration see page 2)
Red Cells	• 170 - 200 micron filter is required (standard blood administration set) • Either gravity or electronic infusion pumps may be used. Electronic infusion pumps should only be used if the manufacturer verifies them as safe for that purpose. • The transfusion must be completed no more than 4 hours after the component has been removed from temperature controlled storage.
Platelets	• 170 - 200 micron filter is required (either a blood or platelet administration set may be used). • Platelet concentrates should not be transfused through administration sets which have already been used for blood. • Platelet administration sets have a smaller priming capacity than a blood administration set. • A unit of platelets is usually administered over 30 minutes.
FFP (Fresh Frozen Plasma)	• 170 - 200 micron filter is required (blood administration set) • Once thawed, FFP must not be re-frozen and should be transfused as soon as possible as post-thaw storage will result in a decline in the content of labile coagulation factors. - For products kept at 22 ^{o}C post thawing, the transfusion must be completed within 4 hours of thawing. - For products stored at 4 ^{o}C in the blood transfusion laboratory post thawing, the transfusion must be completed within 24 hours of thawing. • A unit of FFP is usually administered over 30 minutes.
Granulocytes	• 170 - 200 micron filter is required (standard blood administration set). • The whole dose should be transfused over 1-2 hours
Cryoprecipitate	• 170 - 200 micron filter is required (standard blood administration set). • Once thawed, cryoprecipitate must not be re-frozen and should be used immediately. If delay is unavoidable, the component should be stored at ambient temperature and used within 4 hours.
Stem cells	• Administer using a standard intravenous fluid administration set.
Human Albumin Solution (HAS)	• 15 micron filter vented giving set (most standard intravenous fluid administration sets have a 15 micron filter).
I/V Immunoglobulin	• 15 micron filter vented giving set (some manufacturers supply a giving set in the product packaging).

Priming the line

The line must be primed to remove air before attaching it to the patient. It is unnecessary to prime with anything other than the blood component, however 0.9% Sodium Chloride may be used for this purpose. Dextrose should never be used in a giving set before or after blood, as it can cause haemolysis.

There are a variety of blood administration sets available. Manufacturers instructions for priming the line should always be followed.

Changing the administration set

If multiple units are being transfused, the administration set should be changed at least every 12 hours to prevent bacterial growth.
Some administration sets may be supplied with different instructions, or your hospital policy may vary. In these cases you should follow the manufacturer's instructions or your hospital policy, as appropriate.

On completion of the transfusion

Flushing through the remainder of the blood in the line with 0.9% Sodium Chloride is unnecessary and is not recommended because it may result in particles being flushed through the filter. If another IV infusion is to take place after the blood transfusion, it is good practice to use a new administration set to reduce the risk of incompatible fluids or drugs causing haemolysis of any residual red cells which may be left in the administration set.

Drugs

Drugs must not be added to any blood component pack. It is generally advised that an infusion line that is being used for blood should not be used to administer any other drugs. Dextrose solution (5%) can cause haemolysis and must not be mixed with blood components. Calcium-containing solutions may cause clotting of citrated blood. The topics of compatible IV fluids and co-administration of drugs and blood components are currently under review by BCSH transfusion task force. (The Handbook of Transfusion Medicine 4th edition 2007)

Blood warmers

Hypothermia impairs haemostasis and reduces red cell oxygen delivery to the tissues. Rapid transfusion of blood at 4ºC can lower the patient's core temperature by several degrees. Cold blood infused faster than 100 ml/minute has been reported to cause cardiac arrest in adults. Rapid infusion devices may be used when large volumes have to be infused rapidly. Rapid infusers usually incorporate a blood warming device.

Blood should only ever be warmed using a specifically designed commercial device with a visible thermometer and audible warning. Only CE marked commercial blood warmers should be used and the manufacturer's instructions strictly followed. Some blood warmers are designed to operate up to and including 43°C but are safe, provided they are used and maintained according to manufacturers instructions. Blood and blood components should not be warmed using improvisations such as putting the pack into hot water, in a microwave or on the radiator. Fatalities have occurred due to haemolytic transfusion reactions and/or bacterial contamination of the blood component following the use of inappropriate blood warming procedures.

Paediatric administration

The principles are the same as for adult administration. Blood administration sets containing an integral 170-200 micron filter should always be used. Paediatric blood administration sets are appropriate for small volume transfusions. These come with an integral 3 way tap which can then be used to attach a syringe driver if required. The component bag should be left attached during the transfusion even if using a syringe driver.
It is vital for the doctor to specify both the volume in mls and the time over which the transfusion should take place when prescribing paediatric transfusions.

Intra Uterine Transfusions

Red cell preparations for Intra Uterine Transfusion (I.U.T) should not be transfused straight from 4ºC storage. As no specifically designed warming system exists for the small volume of blood used for I.U.T any active warming must be carried out with great care and the blood product not exposed to temperatures more than 30ºC. Active warming may not be necessary if the blood component is removed from 4ºC storage in a timely manner and the infusion is given at an appropriate rate.

References

McClelland DBL (Ed) (2007) Handbook of Transfusion Medicine. 4th edition. The Stationary Office ISBN 0-11-322677-2
Also available to download at www.transfusionguidelines.org.uk

BCSH 1999 Guidelines for the Administration of Blood and Blood Components & the Management of Transfused Patients. Transfusion Medicine 9, 227-239

BCSH 2004 Transfusion Guidelines for Neonates & Older Children. British Journal of Haematology 2004; 433-453

Rennie I, Rawlinson PSM, Clark P. (2002). Best Practice in the Use of Blood Warmers. Nurse 2 Nurse. Vol. 2, 11

Rennie I, Rawlinson PSM, Gray S. (2000). An Audit of Blood Warmers. Transfusion Medicine, 10, supplement 1, 36

Rennie I, Rawlinson PSM, Gray A. (2000). An Audit of Blood Warmers. British Journal of Haematology, 108, Supplement 1, 41

The Royal College of Nursing (2004) 'Right blood, right patient, right time', RCN pub. code 002 306

At the time of writing, new BCSH Guidelines for the Administration of Blood and Blood Components are being compiled.

For more information regarding the practice of transfusion of blood and blood components please consult your Hospital Transfusion Policy.