Practical aspects of blood component administration

Blood Transfusion Guideline

Purpose

This guideline describes the practical aspects of blood component administration including:

- Intravenous access
- Administration sets
- Compatibility of other infusion fluids
- Infusion devices
- Blood warmers
- Pressure devices and rapid infusers

Practical aspects of blood component administration

Medicines should never be added to blood components. No other labels should be attached to a transfusion pack.

Intravenous cannulae

Blood components can be transfused through most peripheral or central venous catheters, although the flow rate is reduced by narrow lumen catheters and long peripherally inserted central catheters (PICC lines).

The minimum diameter of cannula recommended for infusion of blood in adults is 18G (green) although smaller gauge may be used. For rapid transfusion, large bore cannulae e.g. 14G (orange) are required. All blood components can be slowly infused through smaller gauge cannulae or needles. Needles as small as 23G (blue) have been used successfully for transfusion in paediatric practice. 24G (yellow) cannulae are used for neonates.

If a SmartSite® needle-free valve is in situ this **must be removed prior to rapid / emergency transfusion**. This is to ensure the required flow-rate is not impeded.

Central lines

Central lines are generally suitable for transfusion of blood components.

Blood and other solutions can be infused through the separate lumens of multi-lumen central venous catheters as rapid dilution occurs in the bloodstream. Where possible, one lumen should be reserved for the administration of blood components

Administration sets

All blood components must be transfused through a sterile blood giving set with an integral mesh filter (170-200 micron pore size). The practice of priming or flushing administration sets used for the transfusion of blood components with crystalloid fluid is unnecessary. However, crystalloid fluid may be used to check patency of the cannula prior to transfusion. Following completion of the transfusion a new administration set should be used if blood components are to be followed by another infusion fluid. For patients requiring on-going transfusion, the giving set should be changed at least every 12 hours to reduce the risk of bacterial infection.

Paediatric administration sets with a smaller prime volume are available for small volume transfusions.

FFP and cryoprecipitate must be administered through a normal blood-giving set. Platelets may be transfused through a normal blood-giving set or a platelet-giving set. Platelets should not be transfused through a set that has been used for red cells or other components as some platelet loss will occur.

Blood components transfused during a major haemorrhage must be administered via a wide-bore blood giving set (as opposed to a blood giving set designed to be used with an infusion pump). This is to ensure the required flow-rate is not impeded. Wide bore blood giving sets are stored in every resuscitation trolley.

Compatibility of other infusion fluids

Usually, no other intravenous fluids or medication should be co-administered via an infusion line that is being used for a blood component (when multi-lumen central venous access devices are used it is generally safe to co-administer other therapeutic solutions through a different lumen as rapid dilution occurs in the bloodstream).

Intravenous solutions which contain calcium such as Ringer Lactate or Hartmann's solution, and calcium-containing colloids, may antagonise citrate anticoagulant and allow clots to form in the blood component. Hypotonic intravenous solutions, such as 5% dextrose in water, may cause haemolysis of red cells. Blood components should not be given through an infusion set immediately before or after calcium-containing solutions. Also red cells should not be given through an infusion set immediately before or after hypotonic solutions. The giving set may be flushed with crystalloid fluid between blood components and incompatible solutions.

Infusion devices

Infusion devices are commonly used to achieve optimal flow rates.

The manufacturer's specification should be checked to ensure that the infusion device used is suitable for the blood component to be given and that the giving set is a dedicated blood component giving set that incorporates a 170 micron filter.

Blood warmers

Some patients require blood to be warmed prior to transfusion. This is most commonly required in the following circumstances:

- Large volume rapid transfusion i.e.

  >50ml/kg/hour for adults

  >15ml/kg/hour for infants

- Exchange transfusion in infants
- Patients with cold-agglutinins requiring transfusion

Blood should be warmed using a commercial blood warmer. The person responsible for the transfusion must follow the manufacturer's guidelines closely. Blood must NOT be warmed by any other means.

A blood warmer should always be considered if the patient is hypothermic or at risk of becoming so. Platelets should not be transfused through a blood warmer. Blood warmers are stored in selected clinical areas (not the transfusion laboratories).

Use of pressure devices and rapid infusers

In large volume rapid infusions, the use of a pressure device is recommended (rather than manual squeezing of blood bags).

External pressure devices should exert pressure evenly over the entire bag, have a gauge to measure the pressure, not exceed 300 mmHg of pressure and be monitored at all times when in use.

Rapid infusers usually incorporate a blood warmer and can be used when large volumes have to be infused quickly.