Blood components and storage and handling requirements

Blood Transfusion Guideline

Purpose

This guideline describes the different blood components that are available for adults, children, infants and neonates. It also outlines the required storage and handling requirements.

This information is adapted from that provided in the Handbook of Transfusion Medicine.

Blood Components Used in the Transfusion of Adults

Component	Comment
All blood components	**All blood components should be administered using a blood component administration set which incorporates a 170-200 micron filter**
Red Cells Volume: 220-340 mL	- red cells have a shelf life of 35 days - must be stored in a designated blood refrigerator at +2 to +6°C and linked to an alarm system - must never be stored in a domestic or drug fridge - all red cells must be transfused within 4 hours of removal from temperature-controlled storage (i.e. within 4 hours of removal from blood fridge or within 4 hours of breaking seal on blood transit box) - if no longer required, or if it is foreseen that transfusion will not be possible within the required 4 hour timeframe, red cells must be returned to the transfusion laboratory within 30 minutes of initial removal from storage (to avoid the blood having to be discarded) - for routine transfusion a unit of red cells may be administered over 90-120 minutes - patients at risk of fluid overload should be transfused more slowly with careful haemodynamic monitoring. It may be appropriate to give a diuretic (e.g. furosemide 20 mg – 40 mg orally)

Platelets Volume: Apheresis: 200 mL (approx) Pooled: 300 mL (approx)	- platelets have a shelf life of 7 days - must not be refrigerated and are stored in the transfusion laboratory at +20 to +24°C with gentle agitation - platelets should **not** be transfused through an administration set which has already been used to administer other blood components - should be administered over 30-60 minutes as soon as possible after the component arrives in the clinical area - if no longer required, platelets should be returned as soon as possible to the transfusion laboratory - platelets should not be transfused through a blood warmer
Fresh Frozen Plasma (FFP)	- FFP has a shelf life of 36 months - stored in the transfusion laboratory at < -25°C - prior to transfusion, FFP must be thawed in the transfusion laboratory. Thawing usually takes 15-30 minutes (RIE lab keeps a small stock of pre-thawed *standard* FFP) - FFP is typically transfused at a rate of 30 – 60 minutes per unit or more rapidly in bleeding patients - transfusion must be complete within 4 hours of issue from transfusion laboratory (time of issue will be written on pack) - if no longer required, FFP should be returned as soon as possible to the transfusion laboratory - typical dose 12-15 ml/kg
Standard FFP *Volume: 274 mL (approx)*	- single donor FFP is the component of choice for most adult patients except for large volume plasma exchange e.g. TTP use SD-FFP
SD-FFP (Octaplas LG™) *Volume: 200 mL (standardised)*	- pooled solvent detergent (SD) treated FFP stored in the transfusion laboratory at <-18°C with a shelf-life of 48 months - sourced commercially from 'low prevalence BSE regions' with an additional prion filtration step

	- indicated for large volume plasma exchange e.g. TTP
Cryoprecipitate Volume: 189 mL (approx) (pooled unit)	- cryoprecipitate has a shelf life of 36 months - stored in the transfusion laboratory at < -25°C - prior to transfusion, cryoprecipitate must be thawed in the transfusion laboratory. Thawing usually takes approx 15-30 minutes - typical adult dose is two five-donor pools. This will raise fibrinogen concentration by approximately 1 g/L in average adult. Typically administered at 10-20 ml/kg/hr (30-60 minutes per five-donor pool) - transfusion must be complete within 4 hours of issue from transfusion laboratory (time of issue will be written on pack) - if no longer required, cryoprecipitate should be returned as soon as possible to the transfusion laboratory

Blood Components used in the Transfusion of Neonates, Infants and Children

Component	Comment
All blood components	**All blood components should be administered using a blood component administration set which incorporates a 170-200 micron filter.** **All blood components must be calculated and prescribed in mL (not units) to avoid overtransfusion**
Red Cells for neonates and infants	<u>All red cell transfusions:</u> - red cells have a shelf life of 35 days - must be stored in a designated blood refrigerator at +2 to +6°C and linked to an alarm system - must never be stored in a domestic or drug fridge - all red cells must be transfused within 4 hours of removal from temperature-controlled storage (i.e. within 4 hours of removal from blood fridge or within 4 hours of breaking

	seal on blood transit box) NB It is recognised that in neonatal units the transfusion itself may take four hours if the maximal top up red cell transfusion volume is given at recommended safe infusion rates. Therefore, additional time is required to allow for the preparation of the transfusion in the clinical area and the final administration check. In this situation, it is recommended that there should be no more than 30 minutes between removing the component from controlled temperature storage and starting the transfusion and the transfusion itself should be completed within four hours in all cases (BSH, 2017) - if no longer required, or if it is foreseen that transfusion will not be possible within the required 4 hour timeframe, red cells must be returned to the transfusion laboratory within 30 minutes of initial removal from storage (to avoid the blood having to be discarded)
Volume: 324 mL (approx)	<u>Neonatal exchange transfusion</u> - plasma reduced whole blood in citrate phosphate dextrose (CPD) anticoagulant - Haematocrit 0.5 - 0.6 - irradiated (unless this would unduly delay transfusion and there has been no prior intrauterine transfusion) - blood will be < 5 days old, < 24 hours post-irradiation - administration rate depends on stability of baby - refer to exchange transfusion guidelines as per local policy (see links in Blood Transfusion Guideline: Neonatal transfusion practice)
Volume: depends on size of paedipak split	<u>Top-up transfusions</u> - red cells in additive solution - shelf life of 35 days - each paedipak is split into 4 aliquots each with a volume of approx 50 – 70 ml - all paedipaks are from accredited repeat donors

	- typical dose: 10-20 mL/kg - typical administration rate 5 mL/kg/h
Red cell transfusion for children > 1 year age Volume: 220-340 mL	- typical dose: 10-20 mL/kg but usually not more than 1 unit of red cells - typical administration rate 5 mL/kg/h (usual max rate: 150 mL/hr)
Platelets Volume: Neonatal: (apheresis) 55 mL (approx) Full packs: Apheresis: 200 mL (approx) Pooled: 300 mL (approx)	- platelets have a shelf life of 7 days - must not be refrigerated, are stored in the transfusion laboratory at +20 to +24°C with gentle agitation - platelets should **not** be transfused through an administration set which has already been used to administer other blood components - if no longer required, platelets should be returned as soon as possible to the transfusion laboratory - typical dose: children <15 kg: 10-20 mL/kg - children >15 kg: single apheresis concentrate (approx 200mLs: actual volume recorded on pack label) - typical administration rate 10-20 mL/kg/h - platelets should not be transfused through a blood warmer
Fresh Frozen Plasma (FFP)	- FFP has a shelf life of 36 months - stored in the transfusion laboratory at < -25°C - prior to transfusion, FFP must be thawed in the transfusion laboratory. Thawing usually takes 15-30 minutes (RIE lab keeps a small stock of pre-thawed *standard* FFP) - FFP is typically transfused at a rate of 30 – 60 minutes per unit or more rapidly in bleeding patients - transfusion must be complete within 4 hours of issue from transfusion laboratory (time of issue will be written on pack)

	- if no longer required, FFP should be returned as soon as possible to the transfusion laboratory - typical dose: 10-20 mL/kg - typical administration rate: 10-20 mL/kg/h
Neonatal ('small volume') FFP Volume approx 74 mL	- suitable for use for infants up to one year of age. The size of children less than one year determines the need for small volume components
Cryoprecipitate Volume of cryoprecipitate: 1 unit 50 mL (approx)	- cryoprecipitate has a shelf life of 36 months - stored in the transfusion laboratory at < -25°C - prior to transfusion, cryoprecipitate must be thawed in the transfusion laboratory. Thawing usually takes 15-30 minutes - once thawed, cryoprecipitate cannot be re-frozen. Transfusion must be complete within 4 hours of issue from transfusion laboratory (time of issue will be written on pack) - if no longer required, cryoprecipitate should be returned as soon as possible to the transfusion laboratory - typical dose: 5-10 mL/kg - typical administration rate: 10-20 mL/kg/h – i.e. over approx 30 minutes - single unit cryoprecipitate is available for use in infants up to one year of age. The size of children less than one year determines the need for small volume components - children older than one year of age should receive standard pooled cryoprecipitate