

7 Paediatric transfusion products

The clinical indications for transfusion in neonates and infants may differ from those for adults, as infants are more susceptible to some of the harmful effects of transfusion. For the purpose of these guidelines, neonates are considered to be babies within 4 weeks of their normal gestational age. Infants are babies within the first year of life.

Most neonatal paediatric transfusions are small volume, given to replace the blood losses of investigative sampling or to alleviate the anaemia of prematurity.

Larger transfusions are needed for replacement during surgery or pathological blood loss. Replacement in excess of blood volume may occur during cardiac bypass surgery or total blood volume exchange.

Only blood that has been donated by voluntary donors and subjected to stringent testing may be transfused. The practice of the “walk-in donor” and collection of small amounts of blood from selected special panels of donors is no longer condoned. Donations by relatives have not been shown to be microbiologically safer than that from the general donor population and are not encouraged. Under certain circumstances, blood from the mother may be used.

All blood donated from relatives must be irradiated prior to transfusion to prevent “graft versus host” disease.

1 TESTING

- i. During the first 4 months of life the pretransfusion testing differs from adults in that, provided there are no atypical antibodies in the maternal or infant’s serum, and the direct anti-globulin test is negative, the traditional crossmatch is not necessary. However, the ABO and Rh group should be reconfirmed prior to all transfusions.
- ii. For infants older than 4 months the compatibility testing procedures should be the same as for adults.

2 PRETRANSFUSION TESTING FOR NEONATES

- i. ABO and Rh group.

- ii. Preferably samples from the mother and neonate.
- iii. Screen for the presence of atypical antibodies.
- iv. Conventional crossmatch not necessary if no antibodies present.
- v. Small volume replacement transfusions from the same donor can be given repeatedly during the first 4 months without further serological testing.

3 OTHER CONSIDERATIONS

- i. The age of the unit does not matter for small volumes such as top-up transfusions. For larger volume transfusions such as exchange transfusions or resuscitation of an actively bleeding infant, blood up to 5 days old may be given without causing any metabolic complication due to potassium or reduced 2,3 DPG.
- ii. Potential hazards include hypocalcaemia (citrate toxicity), particularly when whole blood is transfused, hyperkalaemia, rebound hypoglycaemia, CMV infection, GvHD, transfusion overload and haemolytic transfusion reactions in infants with necrotising enterocolitis.

4 INDICATIONS FOR RED CELL TRANSFUSION

a) Top-up transfusion

- i. Consider for any symptomatic neonate whose haemoglobin is <10 g/dl.
- ii. Neonates requiring supplemental oxygen should be maintained at a higher haemoglobin concentration.
- iii. The rate of transfusion should not exceed 5 ml/kg/h and for no longer than 5 hours. This is to minimise the risk of bacterial proliferation which may occur as a result of the blood warming to room temperature.

b) Exchange transfusion

- i. Exchange transfusions are mainly indicated in the treatment of alloimmune haemolytic disease of the new born. The object of the transfusion in this instance is to remove Rhesus (D) red cells and reduce bilirubin levels and maternally derived antibody. The bilirubin level at which an exchange transfusion is indicated varies according to the weight of the baby although under no circumstances should the bilirubin concentration exceed a concentration of $340 \mu\text{g/l}$. Note that in pre-term babies the threshold is considerably lower and specialist paediatric advice should be taken.
- ii. Blood for exchange transfusion may be plasma reduced to haematocrit between 0.5 and 0.6.
- iii. The age of blood for exchange transfusion should be within 120 hours (5 days) from collection.
- iv. Blood should be warmed only during rapid transfusion and during exchange transfusion. Only approved and properly maintained blood warming equipment should be used.

5 TREATMENT OF HYPOVOLAEMIC SHOCK.

- i. Initial treatment in adults is usually carried out with crystalloid solution. However, in paediatric patients, the initial replacement fluid recommended is 4-5% albumin solution. FFP should not be used unless there are co-existing coagulation abnormalities.
- ii. Indications for Platelets and Fresh Frozen Plasma.
 - The usual adult guidelines pertain to paediatric patients for both products. However, thrombocytopenia is potentially more hazardous in the neonate and a threshold of $30-50 \times 10^9/\text{l}$ may justify transfusion. In general, one random donor concentrate will constitute a single dose in an infant, but in neonates, the volume may need to be reduced.
- iii. In cases of neonatal alloimmune thrombocytopenia, specialist advice should be sought. Emergency treatment of unexpected and symptomatic cases can usually be provided by transfusion of a unit of washed maternal platelets.

6 SPECIFIC PAEDIATRIC PRODUCTS

The use of an adult unit of red cell concentrate or FFP results in significant wastage since the volumes required in paediatric patients are generally small. Many blood banks have specific small volume red cell concentrate and FFP units available on request.

a) Red cell concentrate

- Infant: 120 to 140 ml volume.
- Neonate: 80 ml volume.

b) FFP

- Infant: 130 ml volume

The volume of blood component must be specifically measured when transfusing neonates and small infants, and not estimated.

7 LIMITED DONOR EXPOSURE PROGRAMME

Certain centres with busy paediatric units have arrangements with the blood bank to ensure that any paediatric patient with extended transfusion needs is included in their "limited donor exposure" programme.

This programme ensures that the transfusion requirements of one child are catered for by reserving units bled from one donor for a specific infant. This ensures that the child is exposed to only one or two sets of donor risk factors and antigens during its treatment period.

Contact your Transfusion Service to find out what products they have available.