10.3: Transfusion of infants and children

Transfusion is performed much less often in older infants and children. The most commonly transfused groups are children on paediatric intensive care units (PICUs), those undergoing cardiac surgery, transfusion-dependent children with inherited conditions such as thalassaemia major, and those following intensive chemotherapy for haematological malignancy or cancer. Transfusion guidelines and blood components for older children are similar to those for adult patients (see appropriate sections of the handbook). Blood transfusion for children with haemoglobinopathies is covered in Chapter 8.

The dose of blood components for infants and children should always be carefully calculated and prescribed in mL, rather than as ‘units’ to prevent errors and avoid potentially dangerous circulatory overload. Dedicated paediatric transfusion charts or care pathways can also reduce dosing and administration errors. It is recommended that:

- Red cells are transfused at up to 5 mL/kg/h (unless there is active major bleeding) and the transfusion should be completed within 4 hours (see Chapter 4).
- Apheresis platelets should be used for all children <16 years old to reduce donor exposure. The typical dose for children weighing less than 15 kg is 10–20 mL/kg. Children above 15 kg may receive a single apheresis donation (approximately 300 mL). The recommended rate of administration is 10–20 mL/kg/h. Platelets should be ABO-compatible to reduce the risk of haemolysis caused by donor plasma. RhD negative girls should receive RhD negative platelets if at all possible. If RhD positive platelets have to be given, anti-D immunoglobulin should be administered (a dose of 250 IU intramuscularly or subcutaneously should cover up to five apheresis platelet donations given within a 6-week period).
- FFP should not be administered prophylactically in non-bleeding patients or to ‘correct’ minor abnormalities of the PT or APTT before invasive procedures. When indicated, a dose of 12–15 mL/kg should be administered at a rate of 10–20 mL/kg/h with careful monitoring for acute transfusion reactions or circulatory overload. FFP should not be used to reverse warfarin anticoagulation unless prothrombin complex concentrate (PCC) is unavailable.

10.3.1: Paediatric intensive care
The TRIPICU randomised controlled trial in stable critically ill children by Lacroix et al. in 2007 found that a restrictive Hb transfusion trigger (70 g/L) was as safe as a liberal Hb trigger (95 g/L) and was associated with reduced blood use. It remains uncertain whether this can be extrapolated to unstable patients.

Expert opinion now generally favours an Hb transfusion trigger of 70 g/L in stable critically ill children, which is the same as the recommendation for adult patients (see Chapter 7). A higher threshold should be considered if the child has symptomatic anaemia or impaired cardiorespiratory function.

There is little high-grade evidence to underpin guidelines for the administration of platelets and FFP in this group. In general, guidelines developed for adult patients are used (see Chapter 7).

**10.3.2: Haemato-oncology patients**

Children undergoing treatment for malignancy are generally transfused in a similar manner to adult patients. A red cell transfusion trigger of 70 g/L is appropriate for clinically stable patients without active bleeding. Platelet transfusion guidelines are also similar to those developed for adult practice, although a higher rate of bleeding in children with haematological malignancies has been reported. The 2004 BCSH Transfusion Guidelines for Neonates and Older Children recommend a standard platelet transfusion threshold of $10 \times 10^9$ /L in non-infected, clinically stable children. A threshold of $20 \times 10^9$/L is recommended in the presence of severe mucositis, DIC or anticoagulant therapy. Patients with DIC in association with induction therapy for leukaemia and those with extremely high white cell counts may be transfused at $20–40 \times 10^9$/L and a similar level is appropriate for performance of lumbar puncture or insertion of a central venous line.