ADMINISTERING BLOOD AND BLOOD PRODUCTS

See Transfusion Medicine Protocols for extra details as required

INDICATION FOR BLOOD TRANSFUSION
To give an immediate increase in oxygen delivery to the tissues.

Consider Red Blood Cell (RBC) transfusion if:
1. Haemoglobin <120g/L in extreme illness or unstable Cyanotic Heart Disease to improve vital organ tissue oxygenation.
2. Acute blood loss (>10%) causing hypovolaemic shock with evidence of cardiovascular compromise not resolved with normal saline resuscitation.
3. Haemoglobin <85 g/L in a stable newborn infant.
4. Haemoglobin <90 g/L, low reticulocyte count (<2%) and assisted ventilation/supplementary oxygen.

There is no clear cut evidence based guidelines for the giving of a RBC transfusion. The triggers used are laboratory values and non-specific findings.1-5

REDUCING THE NEED FOR TRANSFUSION

Minimise iatrogenic losses
1. appropriate micro sampling using point of care testing
2. returning unused blood used to clear the line of fluid in central lines
3. removal of umbilical lines as soon as possible
4. using non-invasive monitoring
5. blood testing only when absolutely necessary

Erythropoietin (rhEPO) - it is not possible at present to recommend the routine use of rhEPO. Cochrane reviews show marginal treatment effect. There is an increased risk of retinopathy of prematurity. Consider rhEPO in individual cases.

TRANSFUSION RISKS
BLOOD TRANSFUSION VOLUMES (SUPPLIED AS PACKED CELLS WITH HCT 50-70 IN MINIPACKS)

- In stable preterm infants: give 15-20 mls/kg over 4 hours.
- For acute blood loss: give 20 mls/kg or volume = desired Hct (45%) x 1.6 x Wt (kg)
- Administration time should not exceed 4 hours.
- Frusemide 1 mg/kg intravenously may be given mid-transfusion at the discretion of the SR/Consultant.

BEFORE THE TRANSFUSION

1. Be aware of sensitivities relating to multicultural issues. A WNHS Leaflet ‘Blood Transfusion for your Baby’ is available for the parents to read (order stocks through Blood Bank or view at link below)

2. Inform the parents of the need and reason for transfusion prior to the transfusion. Obtain consent and document on the MR417 “Consent to blood products (neonatology)” If the baby has had previous blood products transfused, check that the previous consent is still current.

3. Refusal to permit blood transfusion should be referred to the consultant neonatologist.

4. If receiving blood products prior to 48hrs of age, ensure Newborn Screening Test (NBST) is obtained prior to commencing blood transfusion. Document on back of NBST (Guthrie) card the reason for early testing.

5. The Blood Bank will normally require samples from both the mother and the infant for the first crossmatch. All labels on the samples should be hand written, pre printed patient labels are NOT acceptable and will be rejected. If no maternal antibodies are detected, further samples are not required up to the age of four months during the current admission. When antibodies are detected, the Blood Bank will advise if and when additional samples are required. If there is a surname change or addition to the name, the labs require the infant to be re-bled.

6. Blood must never be accepted for transfusion without a patient identification compatibility label. In an extreme emergency where uncrossed O negative blood is required, the Transfusion Medicine/Shift scientist must always be notified. The Transfusion Medicine/Shift scientist will issue the emergency blood through the blood bank computer system. A label will be printed with the patient’s details and this will be attached to the O Negative blood bag.

7. All directed donation blood, infants post intrauterine transfusion and infants receiving exchange transfusion must have irradiated blood to prevent graft versus host reaction.

8. In infants thought to be at high risk of NEC cease feeds 4 hours prior to giving a blood transfusion and resume feeds 4 hours after the completion of the transfusion. Replacement IV fluids should be commenced and, if applicable, caffeine prescribed intravenously. Infants post 40 weeks corrected age requiring a blood transfusion generally are not required to fast. This decision remains at the discretion of the attending consultant.

9. An intravenous cannula must be insitu and patent prior to blood being requested from blood bank.
10. On receiving the blood from the blood bank. Check 3 forms of identification on the infant’s ID label - **number, full name and date of birth** against the compatibility label on the unit of blood and the medical records. **Eg. If recorded as ‘Baby Smith’ the labels must reflect this also.** This checking procedure MUST be done at the bedside by two clinical staff one of whom must be a registered nurse or medical officer. Both staff must sign the blood prescription order/Transfusion Record Form MR735.

11. Next check the infant’s blood group on the compatibility label on the pack with the blood group on the bag of blood. **Note:** The blood group on the bag may not be the same as the patient’s blood group. If you need advice contact the Blood Bank scientist.

12. Check the expiry date of the blood product.

13. Check that the blood product pack number on the compatibility label match those on the pack.

14. Blood and blood products must be clearly labelled as CMV negative.

15. The infusion line should be flushed with normal saline to remove glucose solutions (including TPN) from the line immediately before commencing the transfusion and again after the transfusion is finished, and before recommencing glucose.

16. Medications must never be put in blood bags.

17. Check the prescribed volume and infusion rate is correct with a second person before starting infusion.

**DURING TRANSFUSION**

**REMEMBER TO DOCUMENT:**

**Pre:** HR, RR, temp, BP and O2 Sats

**At 15mins:** HR, RR, temp, BP and O2 Sats

**Hourly:** HR, RR, temp, BP and O2 Sats

**Post:** HR, RR, temp, BP and O2 Sats

1. All blood and blood products (RBC, FFP, Platelets, Cryo, sandoglobulin) should be transfused through a standard blood filter (170 - 200 microns) designed to remove blood clots and large aggregates formed during storage. Sets should be used and primed according to manufacturer’s instructions. Commercially available Albumin (4% & 20%) does not need to go through a blood filter, it can be withdrawn from the vial with a vial spike. Blood should be set up for infusion within 30 minutes of removing from the blood fridge and infusion time should not exceed 4 hours. For advice on administration and associated giving sets see Transfusion Medicine Protocols Section 7.1 Standard Giving Sets and Filters (link below)


2. Continuous cardiopulmonary monitoring.

3. At 15mins recheck heart rate, respiratory rate, axilla temperature, blood pressure and O2 Sats against baseline. If a transfusion reaction is occurring, this set of observations may indicate a reaction to the transfusion and the transfusion may need to be stopped. It is therefore important to document the time of this set of observations precisely.
4. ADVERSE REACTION TO BLOOD OR BLOOD PRODUCT
   a. Stop the infusion.
   b. Recheck the identity of the patient against the compatibility label on the pack.
   d. The Clinical Haematologist must be notified of all transfusion reactions except where a low-grade fever is the only clinical feature.
   e. For further information laboratory investigation of a suspected transfusion reaction see appropriate section of Transfusion Guidelines.

5. If ordered, administer diuretic at the half way point of the infusion.

6. For the rest of the transfusion continue to monitor for signs of transfusion reaction by documenting heart rate, respiratory rate, axilla temperature, blood pressure hourly and O₂ Sats.

7. Document a full set of observations including a blood pressure at the completion of the transfusion and document completion time.

POST TRANSFUSION
1. Flush the cannula with normal saline and remove if no longer required.
2. Remove compatibility label from the blood bag and place it in infants records on Transfusion Record Form MR735. Ensure the associated signatures and start and stop times are recorded on the form.
3. Discard closed blood transfusion system as per guidelines.

EQUIPMENT SET-UP
It is usual to use the Syringe pump method but the Infusion pump method can be used for large volumes.

**Syringe pump method**
- Luer lock syringe
- Blood filter
- Dressing tray
- Long extension
- 3-way tap

1. Attach blood giving set to blood bag and 3-way tap
2. Attach luer lock syringe to one end of the 3-way tap and the long extension to the other end of the 3-way tap.
3. Turn 3-way tap off to long extension. Open clamp on giving set and slowly withdraw into the syringe the required volume (+ 1ml).
4. Gently expel any air back into the blood giving set, clamp the blood giving set. Turn the 3-way tap off to the giving set and on to the long extension. Leave the blood bag and the giving set attached to the 3-way tap.
5. Prime the long extension and place syringe into syringe pump.
6. Flush cannula with normal saline, if required.
7. Connect long extension to infant, turn 3-way tap on and commence infusion. Place compatibility label on syringe.

**Infusion pump method**

An empty minipack weighs 15grams. Therefore to determine whether there will be a sufficient amount of blood to deliver it via the infusion pump, weigh the minipack and subtract 15grams from the volume (allowing 30 mLs to prime infusion set).

- Blood giving set
- Dressing tray

1. Attach blood giving set to blood bag.
2. Prime the giving set.
3. Turn clamp off, swab the connection port on the intravenous line, flush intravenous cannula with normal saline, connect blood giving set and commence infusion.

**REFERENCES**


