Blood transfusion on the Neonatal unit

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Approved by:	Paediatric Quality Improvement Meeting	
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Key Amendments

Date	Amendment	Approved By
5/8/19	Remove references to Alexandra hospital NNU Include volume required for priming of infusion line Remove suggestion to ask for recently donated blood Remove reference to transfusion of a relative's blood	

The need for blood transfusion will depend upon the infant's clinical status. The sicker the infant, the greater the need for oxygen carrying capacity. Therefore target haemoglobin levels for sick ventilated infants will be different to those for healthy preterm infants. Preterm babies may undergo frequent blood sampling, so sample volumes should be kept to a minimum in all cases. Transfusion itself is not without risk so the decision on whether to transfuse should always include an assessment of the risks and benefits, and whenever possible informed verbal consent should be obtained from the parent(s). If a transfusion is clinically indicated and the parents will not give consent the senior (consultant) paediatrician on call must be informed.

Patients covered
All infants on the neonatal unit at Worcestershire Royal Hospital.

When to Transfuse

Discuss all decisions to transfuse with a the baby's consultant and parents
Ideal target haematocrit levels are :

Ventilated infants **Haematocrit 40%**

Infants who need >30% supplementary oxygen* or CPAP **Haematocrit 30%**

Low dependency, well infants **Haematocrit 20%**

If the haematocrit is lower than these target levels, a transfusion should be considered.

* for infants receiving nasal cannula oxygen the table below gives the flow rates of 100% oxygen that will equate to an inspired oxygen concentration of 30%. Alternatively put the baby into an incubator and increase the oxygen level until satisfactory saturations are obtained

Baby's Weight	Oxygen flow that will deliver FiO_2 of 30%
1.0 -1.25 Kg	0.125 L/Min
1.25 – 1.5 Kg	0.15 L/Min
1.5 – 2.5 Kg	0.25 L/min

If low dependency infants have symptoms suggestive of anaemia (i.e. persistent tachycardia, persistent tachypnoea, poor feeding, frequent apnoeas, and weight gain of less than 10g/day for 4 days, and the reticulocyte count suggests an inadequate marrow response from the baby ($<100x10^9$ or <4%) then a transfusion may be required at a haematocrit level higher than 20.

Discussion with parents

Discuss all decisions to transfuse with a the baby's consultant and parents

Explicit consent should be obtained from parents before transfusion. This means that parents should be told that a transfusion is required, why it is required and the possible risks of transfusion. Their consent should be recorded in the medical notes. Explicit consent can be either written (parents sign a consent form) or verbal (a member of staff records that he/she has had a discussion with the parents about the risks and benefits of transfusion and that the parent has consented to transfusion for their infant).

Risks of transfusion that should be discussed with parents:

- Transfusion reactions
- Transmission of viral and prion infections

- Necrotising Enterocolitis. Extensive and often fatal NEC has been seen on our unit and reported in the medical literature following top up transfusion in the stable growing neonate. The incidence of this complication is uncertain but low. In one study of 751 transfusions NEC occurred in 6 recipients i.e. 0.8% of transfusions. All affected infants both locally and in this study have been stable growing premature infants weighing <1750g. We have tried to reduce the risk of post transfusion NEC by "resting " the gut over the transfusion period. This intervention is not evidence based and we cannot be confident that it will reduce the risk of NEC.

Parents should also be told that transfusion may or may not improve oxygen requirement, weight gain or frequency of apnoea/desaturation episodes. There is no way of knowing which infants will have improvement in these parameters after transfusion.

Ordering Blood

Crossmatching is not required on infants of under 4 months providing the maternal antibody screen and the infants Coombs test are negative. If maternal blood is not available then a full antibody screen and crossmatch is required on the baby using the baby's blood. A positive Coombs test on the baby without a positive antibody screen in the mother would need further investigations to determine the cause.
For repeat transfusions on the baby, there is no need to retest the mother unless her antibody screen was positive initially. Local policy requires a repeat group and Coombs test on the baby prior to repeat transfusions.

Specially selected CMV negative donors are used to prepare paediatric packs. Multiple packs are prepared from a single donation and can be used throughout the life of the packs (up to 5 weeks), to minimise the patients exposure to different donors.

Irradiated products are required for infants who have had an intrauterine transfusion (IUT), require an exchange transfusion, when the child has a suspected or proven immunodeficiency or requires HLA matched products.

What to order :
Request packed cells 15ml/kg PLUS 20ml (required for priming of the infusion set)

The Transfusion

Following the decision to transfuse, which should be discussed with the relevant consultant paediatrician, the care pathway for blood transfusion should be followed by medical and nursing staff.

Where clinically safe to do so, the transfusion should be prescribed and administered within normal working hours (09.00-17.00 hrs). This will improve the availability of medical support should an adverse reaction occur.

The volume of blood to give is 15 mls per kg body weight.

The infusion should be completed within 4 hours of leaving the fridge.

The blood should be infused via a peripheral venous or umbilical venous line, NOT via a percutaneous long line or arterial line (see separate nursing guideline).

Furosemide should not be given routinely. However, for infants with heart failure, fluid overload or patent ductus arteriosus an I.V. dose of Furosemide 0.5 to 1 mg/kg I.V. may be indicated half way through the transfusion.

Feeds should be stopped for a total of 12 hours, i.e. 4 hours before the transfusion, for the duration of the transfusion and for 4 hours afterwards.

If baby is not already on intravenous fluids these should be commenced with 0.9% saline + 5% glucose. Feeds should be stopped. Intravenous fluids using 0.9% saline and 5% dextrose should have been given for **4 hours before** transfusion commences, and stopped when the transfusion commences. If the blood sugar half way through the transfusion is low (<2.6) a separate I.V. cannula should be sited to allow concomitant administration of blood and 10 % glucose. If the blood sugar is satisfactory, simply recommence I.V. 0.9% saline + 5% glucose for **4 hours after** completion of the transfusion. As long as the baby remains well, 4 hours after the transfusion finishes, feeds can be restarted at pre transfusion rates and volumes.

The baby should be monitored closely throughout the transfusion, which should be discontinued if there is any sign of a reaction (e.g. tachycardia, pyrexia). Monitoring should include **continuous ECG, oxygen saturation and hourly temperature**.

Any serious adverse reaction should be reported to the serious hazards of transfusion (SHOT) local co-ordinator.

REFERENCES

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Association of Necrotizing Enterocolitis with elective packed red blood cell transfusions in stable growing premature neonates. Am J Perinatology 2006; 23:451 -458

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MONITORING TOOL

How will monitoring be carried out? Retrospective Audit

Who will monitor compliance with the guideline? SHO

STANDARDS	%	CLINICAL EXCEPTIONS
Compliance with volume of blood	90%	Heart failure/hydrops
Minimise donor exposure (< 3)	90%	Extreme prematurity

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