Neonatal transfusion practice

Blood Transfusion Guideline

Purpose

This guideline describes specific considerations for the preparation for, and administration of, blood component transfusion of neonates.

Please also refer to Simpsons Centre for Reproductive Health (SCRH) transfusion guidelines:

- Haematology > "Use of blood products"
- Haematology > "Exchange transfusion"
- Haematology > "Administration of blood components"

These can be accessed here: http://rie-neodss/NNUIntranet/

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The need for rigorous identification procedures and a strict sample labelling process, as well as robust procedures for collection and administration of blood components, applies to neonates just as it does to children and adults. Please refer to the NHS Lothian Blood Transfusion Policy and the relevant associated procedures.

Pre-transfusion sampling and completing the request form for neonates

Sample tube labelling

Transfusion samples taken from neonates must be handwritten with the baby's own details only: the tube must not bear any of the mother's identification details (e.g. do not label as 'baby of ….' or write the mother's unique identification number on the tube).

The hospital transfusion laboratory will reject samples that do not correctly show the minimum patient identification data set (surname, forename ('baby' is acceptable in place of forename if the baby has yet to be named), date of birth, unique identification number* and sex), the signature of the individual who has drawn the sample and the date that it was drawn. Samples that are completely unlabelled or show evidence that they have borne details of another patient will be discarded, even if these details have been completely obliterated and overwritten. Sample tubes labelled with addressograph labels will be discarded.

Sample tubes or forms contaminated with blood will also be discarded.

* The baby's unique hospital identification number is acceptable until their CHI number has been generated. This number must always be used to identify this patient until full personal details including the CHI number are available.

Request form

In dealing with neonates who have not yet been named, it is vitally important to state on the request form the baby's sex, surname, date of birth and unique hospital identification number (CHI number must be used when available) and the mother's surname and first name; "baby" should be stated as baby's forename. If the baby is from a multiple birth, s/he should be identified as Twin 1 or Twin 2 etc. and this should be applied consistently to each request, even if one of the babies dies. When the child is named, the hospital transfusion laboratory should be informed that, for example, Twin 1 Smith is now Jack Smith. This will enable the staff to link the baby's previous results with the new identity.

It is important to advise the laboratory of the mother's details, via the request form, at the time of sending the first sample from a child under 4 months of age (e.g. add comment 'baby of Jennifer Smith, DOB 12.12.82') as the laboratory may have relevant details of the mother's antibody status. If you know from the antenatal notes that the mother has a red cell antibody, state this on the request form.

Administering blood and blood components to neonates

Particular care should be taken in the identification of neonates. The sex of an infant lying in an incubator may not be immediately apparent and the identification band may not carry a first name. Twins and triplets may differ only in their hospital identity number. The unique hospital identity/CHI number on the baby's identification band (in addition to the baby's surname, first name (if present), date of birth and sex) should be checked against the blood pack and accompanying documentation when undertaking the pre-administration checking procedure.

In neonatal units, transfusion may take four hours if the maximal top up red cell transfusion volume is given at recommended 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.

Any infusion device used must be suitable for transfusion of blood components. Syringe drivers are suitable for neonatal transfusion. A suitable macroaggregate filter with a mesh size of 170-200 micron must be incorporated. This may be inserted between the bag and the syringe during the syringe filling or between the syringe and the IV access device. Microaggregate filters (pore size 40 micron) are also suitable but unnecessary if a 170-200 micron is available.

Paedipaks

Infants can receive up to four transfusions from a single donor. This reduces the risk of disease transmission by reducing the number of donor exposures.

Paedipaks are made by sterile docking four satellite packs onto the primary blood component. This yields a total of four packs (aliquots), which will have the same donation number, but also with individual product codes with a subscript of 1-4. When the hospital transfusion laboratory is requested to allocate an infant to the paedipak system a divided donation which is within the first 7 days of its shelf-life will be selected. Aliquots will continue to be issued from this time until the

normal expiry date (35 days). Each aliquot will have a volume of approximately 50-70 mL. If the remainder of the donation is not required for a particular infant after the first one or more aliquots have been issued the remainder of the donation will be discarded.

Infants who will benefit from this system are those receiving more than one transfusion within a 4-5 week period. Generally these are infants with a birth weight of less than 1.5 kg or conditions such as necrotizing enterocolitis (NEC), sepsis, etc. The requesting doctor should specify the need for paedipaks for those infants judged to be in one of the above groups. Infants can be entered into the system even if they have already had a transfusion which has not been from a paedipak system – it may only become clear at a later date that the transfusion requirements were likely to be high. At the time of the initial request, a sample from the infant (and another sample from the infant's mother, if possible) should be sent to the hospital transfusion laboratory specifying on the request form that the infant is to receive a paedipak (please see sample tube labelling).

As infants who have been allocated to a paedipak system will be receiving group O red cells, further samples for group and screen will only be required if the child is over four months old. Requests for further units can be made by telephone to the transfusion laboratory giving the patient's details. The units supplied will be CMV-negative and leucodepleted: these special requirements therefore do not need to be specified on the associated request form.

A second sample from the infant may be required prior to the selection of a new donation (e.g. once all four aliquots have been used).

Paedipaks can be issued for children up to one year old or approx 10 kg.

All paedipaks are from accredited repeat donors.

T-antigen activation

Infants with necrotising enterocolitis (NEC) can develop exposure of a normally hidden red cell antigen (T-antigen) and this may lead to a risk of haemolysis if adult plasma (which contains anti-T) is given. The precise link between T-antigen exposure (T-activation) and haemolysis is uncertain. There is currently no consensus either with respect to the frequency of T-activation or the clinical significance of this finding in infants. These babies can receive red cells in optimal additive solution as very little plasma is present in these. Platelets, FFP and/or cryoprecipitate should only be administered when clearly indicated. Any patient with NEC who develops haemolysis should be investigated to determine the cause of this. This should include a lectin test to look for T-activation. Where it is felt the T-activation is the likely cause, then an exchange transfusion may be necessary. In babies with probable T-activation and evidence of haemolysis then low titre anti-T components should be used. Access to these components is very limited.

Requirements for blood components, particularly platelets, FFP and cryoprecipitate, in patients with probable T-activation MUST be discussed with the transfusion specialist on-call as soon as possible as special components may be needed.

Intrauterine transfusion

This procedure is carried out at the Queen Mother's maternity unit in Glasgow; all patients requiring intrauterine transfusion are transferred to this unit.

Exchange transfusion

The British Society for Haematology (BSH) recommends that neonates undergoing an exchange transfusion should receive plasma-reduced red cells in citrate phosphate dextrose (CPD) with a haematocrit of 0.50-0.60. The component should be 5 days old or less, CMV-negative and irradiated. The irradiated red cells should be transfused within 24 hours of irradiation. A blood warmer should be used as red cells should not be transfused straight from 4°C storage in this situation.

Exchange transfusion must be performed according to the Simpsons Centre for Reproductive Health (SCRH) "Exchange transfusion" guidelines accessed at http://rie-neodss/NNUIntranet/

Blood for exchange transfusion should always be irradiated if the patient has already had intrauterine transfusion.

Irradiated blood should also be used in other neonates who are receiving an exchange transfusion unless delay in obtaining irradiated blood would cause clinically significant delay (refer to Blood Transfusion Guideline: Special requirements in blood transfusion).

Monitoring the transfused infant

Monitoring of infants during transfusion is similar to adult practice. The baseline and early checks must be undertaken. Restlessness, crying, or unexpected lethargy may be signs of an early transfusion reaction. If in doubt, the transfusion must be stopped and the patient assessed.

Neonates rarely develop simple, non-haemolytic, febrile transfusion reactions. Their temperature may rise or fall in response to a septic event and this type of reaction should be regarded as possibly septic in nature. The transfusion should be stopped and the IV access kept open until the patient can be fully assessed.