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Should the AABB standard allowing omission of red cell antibody screening for infants under 4 months of postnatal age be extended for infants born prematurely?

A colleague at a hospital in Texas reports that they are treating an infant who was born very prematurely, and who just turned 4 months of age. At the time of this writing the baby is 130 days old. However, because the infant is over four months of age the laboratory believes that they will now need to test for the presence of clinically significant red cell antibodies every three days, if the baby continues to need replacement transfusions. The inquiring Texan wonders if this change in pre-transfusion testing is an appropriate interpretation of current practice standards, because a question was raised by one of the nurses taking care of the infant. The nurse was wondering if it was **really necessary to perform a new red cell antibody detection test on this particular baby**, since in the nurse's opinion, the baby is very premature, not full term, and if one takes into account the infant's gestational age at birth, one could argue that the baby should only be 5 days old!

The following response has been received.

ADDENDA Sept. 23, 2003

1. **A transfusion medicine physician in Philadelphia** struggles with this question when they encounter cases like that described in this discussion. Here is what she has to say (verbatim) "The Standards define a neonate as 'a child less than 4 months of age', and the special considerations described in Standard 5.16 apply only to neonates. **Exceptions seem appropriate for preterm infants**, taking into account their **gestational age at birth** rather than strict interpretation of their postnatal age. The more frequent phlebotomy required after 4 months of age can add up to a significant blood loss for these critically ill premature neonates. There are several papers that demonstrate the failure of newborn infants and preterm infants to generate red cell alloantibodies, even with multiple exposures from a single donor (Strauss RG et al, Transfusion 2000;40:1463-1468; Floss et al Transfusion 1986; 419-422; Ludvigsen CW Jr et al, Am J Clin Pathol 1987;87:250-1). On rare occasions, red cell alloimmunization has been documented in newborn infants (reviewed in the above article by Strauss; Albiero AL et al, Transfusion Medicine 2003;13:93-97). **Careful reevaluation of the probability of alloantibody formation during the first year of life among term and preterm infants will likely provide support for modifying or extending the 4-month period during which abbreviated crossmatch procedures can be performed, or at least for allowing exceptions for prematurely born infants who face an extended hospitalization and lengthy duration of transfusion support.**"

ADDENDA Oct. 2, 2003

2. **M.S. Harvey, Ph.D. of the Laboratory of the Blood Transfusion Service, Leiden University Medical Centre, Leiden, The Netherlands** (attribution used with permission) is of the opinion that when one considers the risk of red cell antibodies to neonates, one must **also consider the risk of passively transferred antibodies from the mother and/or from transfusions**. According to Dr. Harvey (verbatim) "It is sometimes difficult to obtain enough serum or plasma from neonates to carry out even a gel test screen. But we consider that it is more important to screen the MOTHERS of all neonates, whether premature or delivered "at term". We do this even though (in principle) all pregnant women in our country are now screened for irregular antibodies in addition to the Rhesus antibodies during the pregnancy. Infants that are older than a few months should be screened themselves, since you often don't know their true transfusion history and of course there is always the (small) chance of sensibilisation. **We advocate screening until 6 months of age** (see his **COMMENT #1** below) and also carry out an **antiglobulin crossmatch** of all "pedipack" red blood cells for neonatal transfusion with maternal plasma, which RBCs should of course be compatible with infant and mother. (We may modify this if the infant has to receive an allogeneic stem cell transplant from a blood group incompatible donor.) Intrauterine and exchange transfusions will be crossmatched with maternal plasma. **Repeat exchange transfusions** should be crossmatched with plasma from the previous transfusions and the mother (see his **COMMENT #2** below). **Repeat "top-up" RBC transfusions** will be crossmatched with the same maternal plasma

(of course we will try to reserve a number of pedipacks from the same donation). If the child has had a **transfusion of a product containing plasma** (for instance an exchange transfusion, platelets or FFP) we will also screen the infant itself, if possible and try to carry out a LISS/IAGT cross match in gel."

COMMENT #1: "IgG1,2 and 4 have t 1/2's of +/- 21 days . At 4 months (about 5 x t 1/2) a high-titre IgG1 maternal antibody could still be present in the neonatal circulation or intercellular space. We don't think that the maternal immune IgG production during pregnancy shifts only to IgG3 with a t 1/2 of +/- 7 days."

COMMENT #2: "All plasma for neonates should be obtained from **male donors** with a negative transfusion or transplantation (including corneas) history and should be screened for anti-Wright-a."

Dr. Harvey concludes (verbatim) "As far as transfusing plasma is concerned the following case illustrates the **importance of screening donors of neonatal blood products:**

A 3-month-old infant underwent a complex open-heart procedure. During the procedure the infant received a unit of RBCs that were crossmatched as being compatible with mother and child before the operation. After this transfusion the infant received a unit of blood group compatible **plasma**. Even though diagnosis was difficult in the direct post-operative period, it soon became obvious that the infant started to **hemolyse** overtly soon after termination of the operation. There appeared to be no mechanical or surgical cause for the hemolysis. It was found that The mother and infant had no detectable irregular antibodies (including anti wright-a) before the operation. The RBC unit transfused was Wright-a positive. **The transfused plasma unit contained a potent and high-titre (IgG) anti-Wright-a.**"

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Addenda: Sept. 23 & Oct. 2, 2003

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