LETTERS TO THE EDITOR

ALLOGENEIC CORD BLOOD RED CELLS FOR TRANSFUSION

To the Editor:

The review by Strauss and Widness[1] (2010) about the role of placental blood for autologous red blood cell (RBC) transfusions in prematures addresses an important issue for neonatal transfusion practice. Newborns are currently transfused with RBCs from adults, which mainly contain adult hemoglobin (HbA). HbA has a lower affinity for oxygen than fetal hemoglobin (HbF); therefore, adult RBC transfusions could be responsible for increased oxygen delivery to the immature retina. Repeated RBC transfusions in the first month of life of prematures presently are one of the major risk factor for developing retinopathy.[2] Strauss and Widness suggest that umbilical cord blood RBCs represent the only alternative source for newborn transfusions. Previous studies, however, have demonstrated that autologous cord blood transfusions in newborns, although feasible, are not sufficient to entirely cover the early neonatal blood requests.[3-5] Because no experience with allogeneic cord blood (ACB) RBC transfusion has been described so far, we would like to report the preliminary results of our study carried out to assess the feasibility of an ACB transfusion program for prematures in terms of preparation and yield of valid transfusion ACB RBC units.

ACB units collected at the Cord Blood Bank but not suitable for processing and storage for allogeneic transplant cord blood (ie, for low total nucleated cell counts) were evaluated. Eligible criteria for cord blood collection were more than 37 weeks of gestation, absence of infection in the mother, or fever within 24 hours of the delivery, and no staining of the amniotic fluid. ACB units eligible for our study contained more than 60 mL of cord blood, with no clots or hemolysis. We prepared buffy coat–depleted ACB RBC units by automated separation (Compomat G4; Fresenius HemoCare, Bad Homburg, Germany) in a processing set (Compoflex, Fresenius HemoCare). Suspension in saline, adenine, glucose (SAG)-mannitol and poststorage filtration was performed to obtain a leukocyte-depleted RBC unit. Resuspended units were stored for 14 days after manipulation (2°C-6°C). We recorded data about the collection and the postprocessing volumes as well as the hematocrit and hemoglobin content of each unit. Cultures for bacterial contamination were done immediately after manipulation and after 14 days.

We collected 76 ACB RBC units. Thirty-three were discarded because of insufficient volume or the presence of clots. The median collection volume of the 43 remaining units was 90 mL with an SD of ±15 mL. After fractionation, 43 ACB RBC units were obtained with a median volume of 31.2 mL (SD, ±8.2 mL) and a median hematocrit of 59 (SD, ±2%). Microbial contamination was absent in all units after manipulation and also after 14 days; viral tests carried out on mother's blood at the time of cord blood collection were negative.

To assess the potential use of ACB RBC, we calculated the transfusion requirement in a series of 66 preterm neonates (≤30 weeks of gestational age) admitted at our neonatal intensive care unit. For each patient, the median transfusion number during the first month of life was 3 (range, 1-7), with a median volume of transfused RBCs of 17 mL (range, 11-23 mL). One or 2 of the ACB RBC units prepared in this study, thus, appeared to be adequate to cover the transfusional need of most premature patients, during the first month of life.

Our data highlight that ACB is a promising source of RBCs for transfusion in preterm infants. Besides the reduction of waste of not validated ACB units collected in the Cord Blood Bank, transfusional use of ACB RBCs can overcome several problems of ACB transfusion. For example, insufficient volume is less frequent in ACB from term newborns. Moreover, the incidence of clots, which is one of the more frequent causes of ineligibility of cord blood units, is substantially reduced when collection is performed by trained staff in term neonates and using blood shakers. Microbial contamination is prevented by adopting strict eligibility criteria and appropriate aseptic collection technique adopted by the Cord Blood Bank. The search for antibodies against cytomegalovirus, always performed on serum from the

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mother, may also reduce the incidence of post-transfusion cytomegalovirus infection in the first days of life.

In conclusion, the preparation of transfusionally valid RBCs from ACB is possible and convenient. Clinical studies are needed to evaluate the efficacy and safety of this new transfusion practice as well as its potential role in decreasing the incidence and severity of the retinopathy of prematurity.

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AUTOLOGOUS OR ALLOGENEIC: CORD BLOOD RED BLOOD CELLS STILL ARE INVESTIGATIONAL

The following is our reply to the letter by Bianchi et al[1] that was prompted by our earlier article reviewing use of autologous/placental red blood cell (RBC) transfusions for the anemia of prematurity.[2]

At the outset, it is important to clarify that although Bianchi et al[1] define the abbreviation "ACB," as pertaining to "autologous cord blood transfusions," it undoubtedly refers to "allogeneic cord blood transfusions"—as will become evident by our comments—which we make paragraph-by-paragraph in our response below.[1]

Paragraph 1: We agree that repeated RBC transfusions have been implicated as a risk factor for retinopathy of prematurity but acknowledge that the clinical management of these very immature neonates is very complex and includes many other potential risk factors (eg, mechanical ventilation with oxygen)—making it difficult to establish a cause-and-effect relationship to RBC transfusion per se. Moreover, the possibility of diminishing the risk of RBC transfusions by the use of cord blood RBCs (containing hemoglobin F) rather than adult donor RBCs (containing hemoglobin A) is a hypothesis that still needs testing. We agree that although it is feasible to collect autologous cord blood, the volume collected often is insufficient to supply all RBCs needed by the neonate from whom the RBCs were collected. We disagree that "no experience with ACB has been described" (when "ACB" refers to autologous RBC transfusions) and refer to the several studies cited in our article.[2] We assume that Bianchi et al[1] have switched the definition of "ACB" from "autologous" to mean "allogeneic cord blood" RBCs transfusions for the remainder of their letter.

Paragraph 2: It is crucial to note that the cord bloods that Bianchi et al collected, processed, tested, and studied further were from neonates older than 37 weeks gestation (ie, close to term) with no maternal/fetal/neonatal complications. It is literally certain that the degree of success that they reported in obtaining useful RBC units would have been much lower for preterm neonates of lesser gestational age.[2] This is important because term neonates only uncommonly need RBC transfusions (ie, the RBCs collected likely will not be used) in contrast to the frequent need for RBC transfusions in small