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Red cells for neonates on ECMO - Questions about the study by Eder et al. suggesting that additive RBC are as safe as CPD/A RBC

A transfusion medicine colleague who reviewed the study entitled 'Comparison of CPDA vs. AS red cell transfusion to infants on ECMO' authored by **Anne F. Eder, MD PhD et al** ([PDF](#)) from the Children's Hospital of Philadelphia ([CBBS Fast-Breaking News, October 24, 2002](#)) was concerned about the conclusion that blood with additive solution is as safe as CPD/CPDA. The inquiring colleague had the following **questions** about this study.

- The introduction says that the cardiologist and anesthesiologists prefer AS because of the **lower potassium**. The inquiring colleague is not convinced that this is supported by the study. He interprets the data to show that the CPD/A had a higher (minus) delta factor of -0.7 vs -0.2 K for the AS blood.
- The inquiring colleague was concerned that babies were receiving **ABO/Rh type specific AS blood**. He wonders if we really want to do that?
- He did not see any mention in the report about **the age of the blood**. He wondered why AS-5 was not mentioned; was there a reason?
- The CPD/A blood gave a higher delta factor for the increase in the **Hct**. The neonatologists at the inquiring colleague's hospital are very sensitive about the Hct of the blood they use.
- Lastly, does a study of **this few babies** enable one to make a change in policy?

Dr. Eder provides the following response.

"Thank you for your interest and thoughtful comments on our poster. In response to your questions:

1. The preference for AS over CPDA red cell units in neonatal cardiology is based on the level of **potassium in the donor unit**, not the post-transfusion potassium level of the patient. AS units have lower supernatant potassium concentrations than CPDA units.
2. We transfuse type-specific components to infants with no demonstrable, red cell antibodies. Pretransfusion testing is performed in accordance with all applicable AABB Standards (eg. 5.15.2). If anti-A or anti-B is detected in the infant's plasma or eluate, type O red cells are transfused. There are over 600 red cell transfusions per year to infants in our NICU alone, and many more to infants in other areas of the hospital (eg. CICU). **Use of type-specific components, rather than O-negative red cells for all infants, is a safe and judicious use of the resource.**
3. In the **NICU** protocol, CPD/A units were **less than 10 days old**. The **CICU** protocol does not set an age limit, but specifies units "as fresh as possible." For the transfusions studied, the oldest AS unit was 17 days old.
4. **We do not transfuse AS-5 units** to infants at our institution, which is simply a reflection of the evidence that was available at the time the policy decision was made. AS-5 units were not evaluated in the initial clinical studies of the safety of AS red cells for small volume transfusions to infants (reviewed by Strauss in *Transfusion* 2000;40:1528-1540). Given the composition of AS-5 units, however, their safety is likely comparable to AS-1 units.
5. The greater increment in **Hct** with CPDA (3.4%) vs AS (2.8%) transfusion was not statistically or clinically significant.
6. This was the first step in an effort to standardize transfusion practices for infants on ECMO at our institution. The possibility that CPD/A units will become less available and more expensive in our region in the near future also prompted us to systematically evaluate our practices. We recognize the limitations of a retrospective review and the small sample size, but the **conclusions are consistent with our accumulated experience** that transfusion of AS-1/3 units are tolerated as well as CPD/A units by infants on ECMO, suggesting removal of AS supernatant or washing is unnecessary."

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Addenda: