



## Double Volume Exchange Transfusion

### Author Disclosure

Drs, Moeckel, Julian, and Vachharajani have disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

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Please watch the video below depicting the performance of an exchange transfusion. Think first, then answer the question below.



Figure. [Click here to view the video.](#)

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After watching the accompanying video, what is your opinion about the time out performed?

- It was suboptimal. Not all the recommended elements of time out were included.
- It was ideal. All the recommended elements of time out were included.
- It could have been better. Some of the recommended elements of time out were included.
- It was poor. None of the recommended elements of time out were included.

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## Critique and Discussion

The review article by Falciglia and Greenwood in this issue and the accompanying video cover many of the concerns surrounding the performance of an exchange transfusion. The performance of an exchange transfusion is not dissimilar to performing a surgical procedure.

Use of a surgical safety checklist is recommended by the World Health Organization. (1) The elements of the checklist include items to be checked before induction of the anesthesia, before the incision, and before the patient leaves the operating room. It is not comprehensive, and modifications are encouraged. It is not tailored for an exchange transfusion, but the principles are noteworthy. The preinduction of anesthesia checklist includes identifying the patient, marking the site of the incision, checking the presence of a functioning pulse oximeter on the patient, checking for allergies, and assessing risk for difficult airway or aspiration and risk for blood loss. The preincision checklist includes team members identifying themselves by name and declaring their role; confirming the patient's identity; administration of antibiotic prophylaxis within the last 60 minutes; checking the specifics of the procedure with the surgeon, anesthesiologist, and nurse; and display of critical imaging. Announcing the completed procedure, specimen labeling, and key concerns during recovery are the checklist elements before the patient leaves the operating room.

A single study (2) examined the efficacy of single versus double volume exchange transfusions in 20 term neonates who had ABO incompatibility. They were randomly allocated to single versus double volume exchange transfusion. Baseline characteristics and pre-exchange bilirubin levels were similar in the two groups. The groups were treated similarly except for the method of volume exchange transfusion (single versus double). Total serum bilirubin level and the length of time under phototherapy were not significantly different in the two groups immediately after the exchange transfusion. The Cochrane Collaboration review concluded that there was insufficient evidence to recommend single volume exchange transfusion based on a single study. (3)

Multiple methods of warming fluids for intravenous administration used in clinical practice were examined. (4) The fluids were warmed either by infusion through a fluid warmer with temperature-controlled coaxial tubing (group I), immersion in a water bath at 37°C (group II), placing prefilled syringes (10 and 20 mL) between a circulating water mattress and a forced-air warming blanket (group III), or placing the same syringes between the water mattress and cotton towels (group IV). The study

concluded that warming of intravenous fluids in small volumes is accomplished most rapidly by using a fluid warmer with temperature-controlled coaxial tubing.

In NICUs, ~33,000 infants suffer from health care-associated infection (HAI) each year. (5) Neonates who develop HAI are also at higher risk of neurodevelopmental impairment. Central line-associated bloodstream infection (CLABSI) is one type of HAI. Several interventions are known to reduce the CLABSI rates. "Scrub the hub" demonstrated in the video is supported by a high level of evidence and is recommended by the Centers for Disease Control and Prevention (CDC). (5)(6) Several studies have shown the efficacy of this protocol in reducing CLABSI. (7)(8)(9) Chlorhexidine or alcohol swabs were used in these studies.

Hypocalcemia was discussed in the video and the review article. In our institution, the majority of the packed red cells are available with ADSOL as the preservative. The preservative increases the shelf life of the packed red cells to 42 days, and it exposes the neonates to high levels of dextrose, adenine, and mannitol. Studies have shown that this preservative is safe in neonates. (10)(11) ADSOL would prevent hypocalcemia because it lacks the calcium chelating effect of citrate found in other anticoagulant agents. The high dextrose content of the preserved red cells may allow better glucose homeostasis during transfusion. (11)

**Correct Response: C.** It could have been better. Some of the recommended elements of time out were included.

All the points in the checklist are not applicable to the performance of an exchange transfusion. The patient was identified, and the team members were identified by name. Presence of a functional pulse oximeter probe, risk assessment for difficult airway and/or aspiration risk (eg, determining whether the neonate is nil per os), and displaying the radiographs confirming the positioning of the umbilical arterial and venous catheters would be desirable and could be easily accomplished.

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**Answer Key for the October 2013 Issue:**  
**Predictive Value of Neonatal Magnetic Resonance Imaging in Preterm Infants:** 1. C; 2. A; 3. B; 4. D. 5. C.  
**Neonatal Biomarkers of Brain Injury:** 1. C; 2. A; 3. E; 4. B; 5. B.

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