Advancing Pediatric Transfusion Medicine

MARCH 2018
Vol. 20 No. 2

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Addressing the Specific Needs of Pediatric Patients

Health care providers know that infants and children are not merely miniature adults. They are a unique set of patients that have specific health requirements that vary with age. As the field of personalized medicine advances, the need for evidence-based treatments for pediatric patients has never been clearer.

For those of us in the fields of transfusion medicine, cellular therapies and patient blood management, a dearth of pediatric-specific research has hindered progress in treatment advances for these patients. We know that treating a pediatric patient requires more than an adjustment of the volume of blood or CT products, but we need more data to continue to ensure that we treat pediatric patients in the most optimal manner.

Thankfully, in recent years, the medical community has recognized this need and made pediatric transfusion medicine research a higher priority. I am grateful to those researchers who are working to fill the gaps in our knowledge base to help us provide data-driven treatments to pediatric patients at every stage of development.

This month, AABB News explores topics relevant to treating pediatric patients. Several pediatric experts have generously contributed articles for the issue. In our first feature article, which begins on page 6, guest contributors Ruchika Goel, MD, MPH, and Cassandra D. Josephson, MD, describe current pediatric transfusion medicine research priorities.

Yunchuan Delores Mo, MD, and Cyril Jacquot MD, PhD, contributed a second feature article, beginning on page 12, that examines extracorporeal membrane oxygenation (ECMO) in pediatric patients. The article describes how clinicians are using the procedure to treat the youngest of patients, such as neonates born with damaged hearts, and particularly how physicians are managing coagulation in infants and children on ECMO.

This issue also includes an interview with Naomi Luban, MD, and Jennifer Webb, MD, two experts in sickle cell disease (SCD). In this article, which begins on page 18, Luban and Webb discuss new and experimental treatments for patients with SCD, including several drugs recently approved for infants and children by the Food and Drug Administration.

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Like any blood bank, St. Louis Children’s Hospital (SLCH) Blood Bank provides blood and blood components to the rest of the hospital for transfusions, both planned and emergency. It also performs serologic compatibility testing to match products to patients; performs on-site blood product modifications, including irradiation and washing; and diagnoses blood disorders; and transfusion reactions. But there is also a difference between SLCH Blood Bank and those that serve adult patients, namely its focus on infants and children, patients for whom evidence-based standards are often lacking. AABB News recently spoke with Ronald Jackups, Jr., MD, PhD, the medical director of SLCH Blood Bank and Hematology Laboratory. Jackups said that the greatest challenge facing the blood bank is the lack of standardization in blood bank policies and transfusion practices. “While many of these decisions are well-established in adults, there is still a need for more research in pediatric transfusion,” he said.

Pediatric Patients’ Needs Differ From Those of Adults

To address this gap, the blood bank relies on a transfusion committee made up of laboratory leadership and clinical stakeholders to provide answers to such questions as “What are the appropriate transfusion indications and thresholds for each stage of development?” and “What are the optimal strategies to detect and prevent transfusion reactions in children?”

In addition to qualitative differences, there are quantitative issues, as well. “To transfuse neonates and small children,” Jackups said, “we must use smaller components of adult-sized products or perform sterile aliquoting into syringes. This not only increases the manual work to prepare blood, but also to carefully document how much volume is left in each component, for future transfusions.” These are some of the tasks that differ between pediatric and adult blood banks.

In addition, pediatric blood banks tend to be more specialized and more personalized than those serving adult patients. At SLCH Blood Bank, “the medical director and technical staff work closely with clinical services, like hematology/oncology
and critical care, to develop transfusion care plans for patients with diagnostic and therapeutic challenges,” said Jackups. “They also collaborate to develop policies to improve blood management and transfusion safety.” He added that he feels fortunate to work with clinicians whom he views as partners rather than simply clients.

When asked what makes SLCH Blood Bank special, Jackups said, “Two things stand out in my mind: the level of engagement from clinical leaders in the hospital, including on our transfusion committee, and the dedication of our technical staff.” Notably, the facility has not had turnover in the blood bank staff for over a decade, preserving employees’ expertise in treating pediatric patients. Jackups said the continuity has also build a spirit of teamwork and friendship.

SLCH Blood Bank collaborates with external institutions, as well. It borders Barnes-Jewish hospital, a large academic tertiary hospital. The institution recently finished constructing the Women & Infants Center, which connects directly to SLCH’s neonatal intensive care unit. Jackups sees this connection as an opportunity to foster a “continuity of care from the womb to the crib,” including collaborating on procedures like intrauterine transfusion and urgent neonatal care.

SLCH Blood Bank has a patient blood management (PBM) program in which Jackups expressed pride. “Spearheaded by leaders in the laboratory, critical care, hematology, nursing and other services, we have developed innovative solutions to optimize transfusion indications and clinical decision support for blood utilization,” he said. “Not only have we reduced excessive blood transfusion, but we have educated the next generation of pediatricians and pediatric nurses in effective transfusion practice.” Jackups also conducts research relevant to PBM. He focuses on clinical decision support — the use of electronic interventions such as blood order alerts and utilization reviews — to improve transfusion decision making throughout the hospital.

As to the future of the blood bank and hospital, Jackups said there are two major projects planned for this year. The first is to implement a single electronic health record system throughout the regional hospital network. This plan, said Jackups, “has given us an incredible opportunity to modernize every step in the transfusion process, from ordering to administering blood.” The institution has also developed a clinical laboratory standardization committee to improve the consistency and effectiveness of care across the same network of hospitals. Jackups expects that SLCH will provide the bulk of the expertise on pediatric blood banking and transfusion practice. He concludes, “It’s definitely a great time to be a pediatric blood banker!”

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— Ronald Jackups, MD, PhD