Fresh whole blood reduces possible complications in pediatric heart surgery patients

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Using fresh whole blood from single donors is better than using component blood from multiple donors in pediatric heart surgery patients, according to an article in the May 2015 issue of The *Annals of Thoracic Surgery*.

Key points

- Fresh whole blood reduces the number of individual blood donors that pediatric heart patients are exposed to, which reduces the risk of acquiring transfusion-related illness.
- Study results show the youngest patients having complex procedures were exposed to the highest number of donors, while older patients having simpler procedures were exposed to the fewest.
- The researchers said their findings should prompt officials to re-examine current blood storage practice and make whole blood more readily available for pediatric patients.

Patients receiving blood or blood components face allergic and febrile (having symptoms of a fever) reactions, as well as serious complications such as lung injury and infectious disease.

"The risk for disease transmission in pediatric patients is essentially the same as the risk for adults, but may be more costly over the long term

because infants and young children may live longer with chronic illness stemming from transfusion," said David R. Jobes, MD, from The Children's Hospital of Philadelphia and Perelman School of Medicine at the University of Pennsylvania, who led the study.

Dr. Jobes and colleagues examined the effectiveness of a program at The Children's Hospital that was intended to reduce transfusion by using a standard order of two units of fresh whole blood for elective cardiac surgery in patients 2 years of age or younger. As defined in the study, fresh whole blood has not been separated into individual components (red blood cells, platelets, plasma) and was collected less than 48 hours prior to being used in surgery.

"Currently, whole blood is not generally made available to hospitals for use in pediatric heart surgery," said Dr. Jobes. "Blood centers separate donated blood into component parts which are then stored for use in medical transfusions as needed."

The researchers analyzed surgical registry data and blood bank records from 1995 to 2010 on 4,111 patients; fresh whole blood was available for 3,836 patients, while 252 received only blood components when no whole blood was available. The median age of the study patients was 94 days.

They found that the youngest patients who had complex heart surgery procedures were exposed to the highest number of donors, while older patients who had simpler heart surgery procedures were exposed to the fewest number of donors.

"Many congenital heart conditions require multiple surgeries over a lifetime necessitating additional transfusion, and previous exposure can cause cross-match incompatibility, reducing the availability of suitable blood for transfusion and cause problems later if heart transplantation is

necessary," said Dr. Jobes. "We hope that our research helps to re-examine current blood storage practice and make whole blood more readily available for pediatric patients."

Reducing the risk of transfusion reactions

In an invited commentary in the same issue of *The Annals*, Julie Cleuziou, MD, from the German Heart Center in Munich emphasized the importance of the findings noting, "the risk of possible life-threatening transfusion reactions is dependent on the number of donors patients are exposed to, which is the endpoint of this study by Jobes et al."

"The paper demonstrates very nicely that using fresh whole blood reduces the number of blood donors that patients are exposed to compared to the use of blood components as stated in previous research," said Dr. Cleuziou. "Use of fresh whole blood in pediatric surgery, however, will be dependent upon the cooperation and meticulous communication between the blood center and the surgical team to ensure the blood meets all necessary requirements."

More information: "Reduced Transfusion Requirement With Use of Fresh Whole Blood in Pediatric Cardiac Surgical Procedures." DOI: 10.1016/j.athoracsur.2014.12.070 *The Annals of Thoracic Surgery* published by Elsevier. www.sciencedirect.com/science/ … ii/S000349751500065X

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