ICU
MANAGEMENT & PRACTICE

Transfusions Using Fresh Red Blood Cells vs Older Cells

In critically ill children, transfusion is quite frequent. A 2009-2010 study reports that approximately 10 to 20% of critically ill children received a blood cell transfusion. The primary goal of transfusions in critically ill patients is to improve oxygen delivery and to prevent shock, organ failure, and death.

Hospitals store red blood cells in case there is a need for transfusion. Over the past few decades, novel addictive substances have permitted the blood bank services to process and store blood for an extended period of time. Getting fresh blood for routine transfusions is not realistic because the blood donation process is both time-consuming and requires careful scrutiny of the donor and evaluation of the blood for type and potential contaminants. Today, with modern-day preservatives, red blood cells can be stored for up to 42 days. To decrease the wastage of red blood cells, most hospitals have a practice where the oldest compatible red cell unit is made available first for transfusion. However, it is important to know that during storage, there are many biochemical and physical processes that occur to the red cells. These cells undergo biochemical, structural and metabolic changes that are often evident by the second week of storage.

Most studies to date do not mention the age of the blood during a transfusion. Also, the consequences of transfusing of old versus fresh blood are often not reported. In this study, researchers asked the question: ‘What is the effect of fresh red blood cells on organ dysfunction in critically ill pediatric patients?” The study was conducted with 1461 critically ill children in the PICU from 50 medical centers from the USA, Israel, France, Canada, and Italy. The children (50% girls and 50% boys) were between three days and 16 years. Half of the participants received transfusion with fresh red blood cells that had been stored for less than 7 days, and the other half received transfusion of older red blood cells that had been stored for 12-25 days. The researchers then observed the children for the development of progression or new development of multi-organ impairment (dysfunction of one or more organs) for four weeks or until the patient was discharged from the hospital or died.

What they observed was that transfusion of fresh red blood cells did not lower the incidence of new or progression of multiple organ dysfunction or death compared to the transfusion of older red blood cells. The overall clinical outcomes between the two groups were not significantly different at the end of 4 weeks. The actual results revealed that 20.2% of children who received fresh red blood cells experienced new or progressive organ impairment, whereas 18.2% of those who were administered older red blood cells also experienced similar multi-organ impairment.

Overall, findings suggest that the use of fresh red blood cells did not reduce the incidence of new or progressive multiple organ dysfunction syndrome compared with standard-issue red blood cells.

Source: JAMA
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