

Whole fresh blood for transfusions may have a longer shelf life than now assumed

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In a finding that may potentially improve survival from war injuries and disasters, laboratory researchers report that refrigerated whole blood may have a shelf life well beyond the current standard of 24 to 48 hours.

"We have found that whole blood retains its clotting properties at least 11 days under standard refrigeration," said the study leader, David Jobes, M.D., a cardiothoracic anesthesiologist in the Cardiac Center at The Children's Hospital of Philadelphia. "If this lab discovery can be confirmed in human subjects, it may lead to a change in clinical practice, and possibly to improved survival for massively transfused patients."

The study appears in the January 2011 issue of the journal *Transfusion*.

The majority of patients receiving blood transfusions only require specific components of whole blood, such as red blood cells, plasma and platelets. However, whole blood may be preferable in specific situations such as infant [heart surgery](#) and combat casualties.

The definition of freshness of whole blood with respect to its clotting properties has not been systematically studied. The current practice at The Children's Hospital of Philadelphia assumes a fresh whole blood shelf life of 48 hours when refrigerated. After that point, the [red blood cells](#) may be recovered from the whole blood, but the other components, such as plasma and platelets must be discarded. "In any case, postponed surgeries currently waste resources," said Jobes.

Based on reports from military clinicians and on the authors' own observations in pediatric cardiac surgery, Jobes and colleagues did a laboratory study to measure the duration of blood coagulation properties in refrigerated whole blood.

The researchers used 21 units of whole blood from healthy volunteer donors, performing the study in the hematology and coagulation laboratory led by Long Zheng, M.D., Ph.D., in the clinical laboratory at The Children's Hospital of Philadelphia. They found that thromboelastography (TEG) and platelet aggregation levels, which measure the efficiency of blood coagulation, remain normal at least 11 days under standard refrigerated conditions.

If these results hold up under follow-up studies in human subjects, a change in current practice could increase the availability and usefulness of whole blood, especially in military or disaster relief situations, and in remote locations. "Trauma patients could potentially benefit, as well as others needing a large volume of blood replacement, such as patients undergoing liver transplant or children who need craniofacial reconstruction," said Jobes.

Furthermore, Jobes added, more efficient use of donated whole blood, besides reducing wastage, could lower the number of donors needed, and thus increase safety by reducing the risks of inadvertently transmitting blood borne viruses.

In all, said Jobes, "Our results strongly suggest that clinical trials should proceed to test the value of whole blood beyond a 48-hour period."

More information: "Toward a Definition of 'Fresh' Whole Blood: An In Vitro Characterization of Coagulation Properties in Refrigerated Whole Blood for Transfusion," *Transfusion*, January 2011.

Provided by Children's Hospital of Philadelphia

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