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Blood transfusions for brain bleeding: Large trial in aneurysmal subarachnoid hemorrhage patients adds to debate about optimal threshold

Blood is one of the oldest drugs in the world, but after many decades of research, it is still not always clear when a blood transfusion should be given. A large trial published in the *New England Journal of Medicine* is adding to the debate for patients who have had a kind of brain bleeding called aneurysmal subarachnoid hemorrhage (aSAH). Although the randomized controlled trial found no major difference in clinical outcomes between a restrictive compared to a liberal transfusion strategy in critically ill patients following an aSAH, the authors emphasize the potential value of integrating these results with other research to provide a deeper understanding.

An aSAH occurs when a blood vessel on the surface of the brain bursts and leaks blood around the surface of the brain. It can be devastating, with less than a third of survivors achieving a full recovery. During the initial recovery phase, people with aSAH also frequently suffer from anemia (low red blood cell levels), which is associated with worse outcomes.

In the last 25 years, many studies have helped to define when patients should receive blood transfusions, based on their red blood cell (hemoglobin) level, but there has been debate about the need for a more customized approach for different conditions, especially those that affect the brain.

Researchers at The Ottawa Hospital and the University of Ottawa designed the SAHARA trial to address this uncertainty in patients with aSAH. In collaboration with the Canadian Critical Care Trials Group and working with collaborators at 23 centres in Canada, Australia, and the United States, they enrolled more than 700 aSAH patients with anemia and randomly assigned them to either a liberal blood transfusion strategy (mandatory transfusion at a hemoglobin level of ≤100 g/l) or a restrictive transfusion strategy (optional transfusion at a hemoglobin level of ≤80 g/l).

After a year, the researchers assessed how patients had recovered neurologically. The results showed that blood transfusions in this group of patients were safe, and that there were no major differences in how well patients recovered regardless of whether they were in the liberal or the restrictive transfusion group. While more patients in the liberal transfusion group had higher levels of recovery, the results were not statistically significant.

“While our results were not statistically significant, the study is informative and adds to the body of evidence that is available to guide the treatment of patients with aneurysmal subarachnoid hemorrhage,” said Dr. Shane English, lead investigator on the study and a critical care physician and senior scientist at The Ottawa Hospital and assistant professor at the University of Ottawa. “Our results, along with the results of recently published studies, add important additional information to help guide clinicians trying to help people recover after aSAH, and we look forward to putting the results of all these trials into clinical practice, to help our patients achieve their best recovery.”

The Australian arm of the trial was led by Dr. Anthony Delaney, associate professor and senior intensive care specialist at the Royal North Shore Hospital and professorial fellow at The George Institute for Global Health in Sydney, Australia.

“In addition to providing valuable information for clinicians who care for patients with aSAH, the successful completion of the trial also demonstrated that international collaborations are possible in this vulnerable population,” said Dr. Delaney.

The SAHARA trial is part of a research program that is co-designed with aSAH survivors and family members, and these interactions have resulted in many benefits, including the development a brain aneurysm recovery guide at The Ottawa Hospital.

“We thank the patients and families who contributed selflessly to this research, as well as the exceptional bedside and research teams at the participating centers,” said Dr. English.

The SAHARA trial was funded by the Canadian Institutes of Health Research, and the Medical Research Futures Fund of Australia. It was sponsored by the Ottawa Hospital Research Institute and coordinated by the Ottawa Methods Centre, with a regional coordination center at the George Institute for Global Health. Results were presented at the Critical Care Reviews Down Under meeting on December 10, simultaneous with publication in the New England Journal of Medicine.

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