

# Duration of RBC storage does not affect short-term pulmonary, immunologic, or coagulation status

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There is no difference in early measures of pulmonary function, immunologic status or coagulation status after fresh versus standard issue single-unit red blood cell (RBC) transfusion, according to a new study from the Mayo Clinic.

"Longer duration of RBC storage is thought to increase the risk of transfusion-related pulmonary complications," said Daryl J. Kor, assistant professor of anesthesiology at the Mayo Clinic College of Medicine. "In our study of 100 intubated, mechanically ventilated patients, we did not see evidence for an increased risk associated with RBC storage duration, at least not in the early post-transfusion period."

The findings were published online ahead of print publication in the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*.

In the double-blind trial, 50 patients were randomized to receive fresh (median storage duration = 4.0 days) RBC and 50 were randomized to receive standard issue RBC (median storage duration = 26.5 days). The primary outcome measure was change in pulmonary gas exchange, as measured by the partial pressure of arterial oxygen to fraction of inspired [oxygen concentration](#) ratio ( $\Delta PaO_2/FiO_2$ ). Post-transfusion measurements were performed upon completion of the transfusion and within two hours of the transfusion (median 1.9 hours in the fresh RBC

group and 1.8 hours in the standard issue RBC group).

No significant differences between groups were seen in the primary outcome measure of change in PaO<sub>2</sub>/FiO<sub>2</sub> ratio (2.5 +/- 49.3 vs. -9.0 +/- 69.8; fresh RBC vs. standard issue RBC; p = 0.22). Similarly, no significant differences were seen for any of the other outcome measures of [pulmonary function](#) (fraction of dead space ventilation, dynamic and static pulmonary compliance), immunologic status (tumor necrosis factor-alpha, interleukin-8, C-reactive protein) or coagulation status (fibrinogen, anti-thrombin consumption).

"Our data do not support a significant effect of RBC storage duration on respiratory, immunologic or coagulation parameters in the immediate post-transfusion period," said Dr. Kor. "Previous observational studies linking RBC storage duration and respiratory complications may have suffered from bias and unmeasured confounding, which were more effectively addressed in our double-blind, randomized trial study design."

The study did have some limitations, including the short duration of follow-up, the study's limited sample size and the single center, tertiary-care setting, which may limit the generalizability of the results.

"Given the lack of an association between RBC storage duration and evidence of transfusion-related pulmonary complications in our study, randomization to fresh versus longer storage duration RBC in clinical trials would clearly seem ethical," said Dr. Kor. "Further study will need to clarify the impact of RBC storage duration on other patient-centered outcomes."

Provided by American Thoracic Society

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