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Editor: Deborah Sesok-Pizzini, MD, MBA, professor, Department of Clinical Pathology and Laboratory Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, and chief, Division of Transfusion Medicine, Children's Hospital of Philadelphia.

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Effects of red cell storage duration on patients undergoing cardiac surgery

Patients who undergo cardiac surgery often receive multiple units of red blood cells and may be at risk for end-organ injury because of compromised cardiac output or a proinflammatory state that follows cardiopulmonary bypass. At least one large study has shown an increase in adverse outcomes in patients receiving RBCs stored longer than 14 days compared with those receiving RBCs stored less than 14 days. The authors designed the Red-Cell Storage Duration Study (RECESS) to compare clinical outcomes after cardiac surgery in patients who received RBCs stored for 10 days or less compared with 21 days or more. The RECESS trial was a multicenter, prospective, randomized clinical trial that involved patients 12 years of age or older who were scheduled for complex cardiac surgery with planned median sternotomy. The primary outcome was the change in multiple organ dysfunction score (MODS), for which a higher number indicated more severe organ dysfunction. The 1,908 study participants received RBCs with a median storage time of seven days (shorter-term storage group) or 28 days (longer-term storage group). The authors reported no significant difference in the change in MODS in these two groups. The RECESS trial concluded that the fresher RBCs stored for 10 days or less were not superior to the older RBCs stored for 21 days or more. This is consistent with the conclusion of another larger randomized trial, Age of Red Blood Cells in Premature Infants, which showed no significant difference in outcomes with fresher versus older stored RBCs.

Steiner ME, Ness PM, Assmann SF, et al. Effects of red-cell storage duration on patients undergoing cardiac surgery. *N Engl J Med.* 2015:372;1419–1429.

Correspondence: Dr. Marie E. Steiner at stein083@umn.edu

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A cost-effective approach to managing microbiologic send-out test use

Uterine smooth muscle tumors constitute a group of histologic, genetic, and clinical heterogeneous tumors that include at least six major histologically defined tumor types: leiomyoma, mitotically active leiomyoma (MALM), cellular leiomyoma, atypical leiomyoma, uncertain malignant potential (STUMP), and leiomyosarcoma. Apart from leiomyoma and leiomyosarcoma, the nature of these variants is not well defined. For the study, 167 cases of uterine smooth muscle tumor variants were collected, reviewed, and diagnostically confirmed based on the World Health Organization and Stanford schemes. These included 38 cases of leiomyosarcoma, 18 cases of STUMP, 42 cases of atypical leiomyoma, 22 cases of cellular leiomyoma, seven cases of MALM, and 40 cases of leiomyoma. Molecular analysis included selected microRNAs, oncogenes, and tumor suppressors that are highly relevant to uterine smooth muscle tumors. Overall, 49 percent (17 of 35) of the study subjects with leiomyosarcoma and seven percent (one of 14) with STUMP died due to their uterine smooth muscle tumors, but no deaths were attributed to atypical leiomyosarcoma. MicroRNA profiling revealed that atypical leiomyosarcoma and

leiomyosarcoma share similar microRNA signatures. P53 mutations and PTEN deletions were significantly higher in leiomyosarcoma, atypical leiomyosarcoma, and STUMP compared with other uterine smooth muscle tumor variants ($P<0.01$). In contrast, MED12 mutations were extremely common (greater than 74 percent) in leiomyoma and MALM but were significantly less common (less than 15 percent) in cellular leiomyoma, atypical leiomyoma, STUMP, and leiomyosarcoma ($P<0.01$). The authors concluded that the six types of uterine smooth muscle tumors studied have different gene mutation fingerprints. Atypical leiomyoma shares many molecular alterations with leiomyosarcoma. The findings suggest that atypical leiomyoma may be a precursor lesion of leiomyosarcoma or undergo similar genetic changes during its early stage.

Zhang Q, Ubago J, Li L, et al. Molecular analyses of 6 different types of uterine smooth muscle tumors: emphasis in atypical leiomyoma. *Cancer.* 2014;120:3165–3177.

Correspondence: Beihua Kong at kongbeihua@sdu.edu.cn or Jian-Jun Wei at jianjun-wei@northwestern.edu