

Clinical Pathology Abstracts

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Association of perioperative RBC transfusions with venous thromboembolism

August 2018—Hospital-associated venous thromboembolism is a major cause of morbidity and mortality, resulting in 100,000 to 200,000 deaths annually. Surgery can lead to a proinflammatory state and be a prothrombotic stimulus for venous thromboembolism (VTE). General anesthesia, as well as red blood cells transfused in the perioperative setting, is considered an independent risk factor for VTE. The authors conducted a study in which they used a large prospective, multicenter registry to examine the association between perioperative RBC transfusions and the development of postoperative VTE within 30 days of surgery. They analyzed data from the American College of Surgery National Surgical Quality Improvement Program (ACS-NSQIP) database, a registry of 525 teaching and nonteaching hospitals in North America. The primary outcome was the development of postoperative VTE (deep venous thrombosis [DVT] and pulmonary embolism [PE]) within 30 days of surgery that warranted therapeutic intervention. The study also examined DVT and PE separately as secondary outcomes, with subgroup analyses performed by surgical subtype. Of 750,937 patients in the study, 47,410 (6.3 percent) received at least one perioperative RBC transfusion. The results showed that postoperative VTE occurred in 6,309 (0.8 percent) patients, DVT in 4,336 (0.6 percent), PE in 2,514 (0.3 percent), and both DVT and PE in 541 (0.1 percent). Perioperative RBC transfusion was associated with higher odds of VTE (adjusted odds ratio [aOR], 2.1), DVT (aOR, 2.2), and PE (aOR, 1.9), independent of other risk factors. A significant dose-response effect was noted, with increased odds of VTE as the number of intraoperative or postoperative RBC transfusion events, or both, increased. Furthermore, the association of perioperative RBC transfusion and postoperative VTE remained statistically significant across all surgical subspecialties analyzed. The results of the study suggest that perioperative RBC transfusion may be significantly associated with the development of new or progressive postoperative VTE. The authors concluded that this study reinforces the importance of strict perioperative management of blood transfusion practices.

Goel R, Patel EU, Cushing MM, et al. Association of perioperative red blood cell transfusions with venous thromboembolism in a North American registry [published online June 13, 2018]. *JAMA Surg*. doi:10.1001./jamasurg.2018.1565.

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Testing for heparin-induced thrombocytopenia in cancer patients

Heparin-induced thrombocytopenia occurs in patients who receive heparin therapy and then develop antibodies directed against a molecular complex when heparin associates with endogenous platelet factor 4. This creates a hypercoagulable state in patients that can cause severe venous and arterial thromboembolic events. The incidence of heparin-induced thrombocytopenia (HIT) is 0.1 to five percent in hospitalized patients receiving unfractionated heparin. The diagnosis of HIT depends on laboratory documentation of heparin-PF4 antibodies and clinical assessment. In patients exposed to heparin, immune reactions to heparin-P4 complexes vary from eight to 50 percent. The authors conducted a study to evaluate the use of a pretest probability score (4Ts score) for cancer patients to guide the ordering of screening tests for HIT to avoid overdiagnosis. They performed a retrospective chart review of 140 patients for whom laboratory testing for HIT was available. They then calculated 4Ts scores and correlated those scores with heparin-endogenous platelet factor 4 antibody ELISA test results. The 4Ts score is based on the degree of thrombocytopenia, timing of platelet count decline relative to heparin exposure, presence of thrombosis, and absence of other explanations for thrombocytopenia. The results showed that all patients with a high pretest probability of HIT (4Ts score of 6–7) had positive ELISA results, compared to 26.1 percent of patients

with intermediate (4Ts score of 4-5) and 4.3 percent of patients with low (4Ts score of 3 or less) pretest probability. None of the patients with a 4Ts score of 2 or less had positive ELISA results. The authors concluded that a 4Ts score of 2 or less, which results in a negative predictive value and sensitivity of 100 percent, is a cutoff value for ruling out HIT in cancer patients. The use of this cutoff will significantly reduce the need for laboratory testing in this patient population.

Fenelus M, Peerschke EIB. Testing for heparin-induced thrombocytopenia in cancer patients. *Am J Clin Pathol*. 2018;00:1-5. doi:10.1093/ajcp/aqy040.

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