Clinical pathology selected abstracts

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Association of hemostasis activation biomarkers with poor outcomes in patients with COVID-19

August 2021—The primary target organ of the SARS-CoV-2 virus is the lung. The virus invades endothelial cells through angiotensin-converting enzyme 2 receptors, which are found throughout the body. There are multiple markers of abnormal coagulation and hemostasis activation in patients with COVID-19 that signal a risk of thromboembolic complications. Among the markers that define the risk of thrombosis are D-dimer, prothrombin time, fibrinogen, fibrinogen-degradation products, prothrombin fragment 1.2 (PF1.2), thrombin-antithrombin complexes (TATs), and platelet count. The authors conducted a study in which they analyzed their institution's panel of markers of coagulation and hemostasis activation (MOCHA) to assess the risk of thrombosis in COVID-19 patients. This panel included PF1.2, TATs, fibrin monomers, and D-dimers. The authors performed a retrospective chart review of MOCHAs in patients from three hospitals within the health care system who had COVID-19. They compared the markers to those of patients with thrombosis who also had poor outcomes. Of the 81 COVID-19 patients studied, nine (11 percent) experienced an acute thrombotic event (four pulmonary embolism, three venous thrombosis, and two stroke). The MOCHA markers were elevated, with PF1.2 elevated in 32 (39 percent) COVID-19 patients, TATs in 54 (67 percent), fibrin monomers in 49 (60 percent), and D-dimer in 76 (94 percent). Statistically significant elevations of PF1.2 and TATs were found in all of the COVID-19 patients admitted to the ICU, and D-dimer and fibrin monomers were significantly elevated in patients with COVID-19 who had poor outcomes, such as death or discharge to hospice. Other laboratory parameters associated with ICU admission and poor outcome included abnormal WBC count and elevated C-reactive protein. The authors noted that underlying comorbidities, including hospital immobilization, are known risk factors for thrombosis. Therefore, the risk of thrombosis in patients with COVID-19 is likely multifactorial. The authors concluded that a MOCHA panel with three or more increased biomarkers is significantly associated with a higher likelihood of ICU admission. This suggests that additional laboratory biomarkers, in lieu of only D-dimer, are useful for defining severe COVID-19 thrombotic disease and may help predict prognosis and guide treatment.

Moosavi M, Wooten M, Goodman A, et al. Retrospective analyses associate hemostasis activation biomarkers with poor outcomes in patients with COVID-19. *Am J Clin Pathol*. 2021;155:498–505.

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Implementation of a novel electronic consult system by a laboratory medicine service

Electronic consult systems can help meet the increasing time and resource demands of health care systems and provide a mechanism for primary care providers to request input from specialty services to improve patient care management. When e-consults are embedded in the electronic health record (EHR), the provider can easily access patient information and provide formal recommendations for patient treatment and care. Several academic medical centers have established an e-consult system. The authors assessed an e-consult system for the pathology and laboratory medicine service (PLMS) implemented in 2015 at the Veterans Administration health care facility in Connecticut. Prior to using the system, consults were made through direct provider communication and were not documented in the medical record. The authors evaluated the utilization trends of the laboratory e-consult system at VA Connecticut during the first two years after implementation. The system was based on pathology and laboratory medicine resident review, followed by an attending pathologist review, and co-signature. The study recorded the type of consult, requesting department, patient location, and turnaround time. The PLMS received 351 e-consults from 2015 to 2017. The volume by subsection was 61 percent for hematology and coagulation, 31

percent for chemistry, six percent for blood bank, and two percent for microbiology/virology. Most consults were requested by primary care (80 percent), hematology/oncology (11 percent), and psychiatry (eight percent). The e-consults were completed in 1.2 days. Over the two-year span, the number of consults changed from 8.6 per month in 2015 to 25.3 per month in 2017. All of the hematology/coagulation e-consults were for peripheral smear interpretation, most likely because the PLMS had a joint hematology rounds weekly conference in which some of the more complex questions that would routinely come up in a hematology service were answered. A future goal of the PLMS is to directly survey providers to determine user satisfaction with the e-consult system and areas that need improvement. The authors concluded that e-consults can help provide a bridge between clinicians and laboratory medicine physicians and demonstrate clinical pathologists' value in clinical care. They plan to study outcomes-based measures in the future to more fully assess the clinical impact of the PLMS e-consult service.

Stendahl K, Siddon AJ, Peaper DR, et al. The development and implementation of a novel electronic consult system by a laboratory medicine service: Experience from the first 2 years of use. *Arch Pathol Lab Med*. 2021;145:75–81.

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