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## Review and commentary of key non-JVS-VL articles

### Incidence of Thrombotic Complications in COVID-19: On Behalf of ICODE: The International COVID-19 Thrombosis Biomarkers Colloquium



Jenner WJ, Corog DA. *J Thromb Thrombolysis*. doi:10.1007/s11239-021-02475-7. Published online ahead of print: May 28, 2021.

**Key Finding:** High rates of both venous and arterial thromboembolic events were observed early during the global COVID-19 pandemic, with severity of illness and need for intensive care unit admission correlating with increased thrombotic risk.

**Study Summary:** This paper is a review of several observational studies that document the relatively high rates of thrombosis seen in hospitalized patients with COVID-19. Overall, the aggregate data demonstrate that the rates of arterial and venous thrombotic complications in patients with COVID-19 were low in nonhospitalized individuals with asymptomatic or mild disease. Also, thrombotic risk increased with severity of COVID-19 illness (up to 31%), with patients needing intensive care being at greatest risk. Caveats were the retrospective nature of the reports, variable reporting of types of thrombosis, the variable use or availability of screening or imaging studies in symptomatic patients, and resource utilization such as extracorporeal membrane oxygenation. Venous thrombotic events were much more commonly seen than arterial thromboses, and the risk of thrombosis did not disappear at hospital discharge.

**Commentary:** This was a frightening year. The guidance from medical colleagues around the world as they experienced surges in SARS-CoV2 infections at differing time points helped others be better prepared. Most facilities had to triage patients, redeploy physicians, limit use of technicians, support persons, and scanner in attempts to spread resources and prevent exposure. The ongoing multisystem inflammatory state of COVID-19 beyond the acute illness has made the development of thromboprophylaxis guidelines, best practices for treatment, and therapy strategies paramount.

### SARS-CoV-2 and Finding of Vein Thrombosis: Can IMPROVE and IMPROVEDD Scores Predict COVID-19 Outcomes?



Greco S, Zenunaj G, Bonsi B, Bella A, Lopreiato M, Luciani F, et al. *Eur Rev Med Pharmacol Sci* 2021;25:2123-30.

**Key Finding:** Risk prediction scoring highly correlated with in-hospital and 30-day mortality rates in patients with COVID-19 and venous thromboembolic events (VTE).

**Study Summary:** This single-center retrospective study looked at a small cohort of patients who had positive testing for SARS-CoV-2 infection. IMPROVE weighted VTE predictive scores (four independent risk factors) as well as IMPROVEDD (addition of D-dimer) scores were tabulated. Lower extremity venous ultrasounds were performed to assess for superficial or deep venous thrombosis. Patients with high D-dimer levels or the presence of a deep venous thrombosis received therapeutic low-molecular-weight heparin. Others received prophylactic low-molecular-weight heparin. Higher risk prediction scores were statistically significantly associated with the need for intensive care unit admission, and both higher in-hospital and 30-day mortality rates.

**Commentary:** It has been a long year with the COVID-19 global pandemic. My tremendous appreciation to the frontline pulmonary and other hospital workers who provided countless hours of care in high-risk environments. Unfortunately, the need to triage or ration care due to limited resources or personnel was all too real. Risk prediction tools are not necessarily used on a daily basis. The IMPROVE score is a simple validated VTE assessment tool used to risk stratify hospitalized,

medically ill patients based on clinical variables. Tools such as these are so useful to set expectations of staff and family members, and help guide care in the face of this novel deadly infectious threat.

### Association Between Previous Anticoagulant Use and Mortality Among Hospitalized Patients With COVID-19



Gülcü O, Aksakal E, Aydemir S, Doğan R, Saraç İ, Aydın SŞ, et al. *J Thromb Thrombolysis*. doi:10.1007/s11239-021-02489-1. Published online ahead of print: June 2, 2021.

**Key Finding:** patients with COVID-19 who had previously taken either warfarin or a direct oral anticoagulant had a lower risk of in-hospital death than those who did not.

**Study Summary:** This large retrospective cohort study included 5575 patients diagnosed with COVID-19 beginning March 21, 2020, and required hospitalization. Patients were followed until death or the end date of November 20, 2020. The main variable associated with all-cause death was previous anticoagulant usage. The adjusted survival curve showed a hazard ratio of 0.62, 95% confidence interval: 0.42-0.92,  $P = .03$ . There was no association with gender, heart failure, or coronary artery disease and all-cause mortality.

**Commentary:** Another fascinating and large cohort study on the effects of the COVID-19 disease. Although mainly a respiratory virus, it was quickly recognized in the early phase of the pandemic that the rates of thromboembolic events were high. Mechanisms behind this are rigorous anti-inflammatory response, active coagulopathy, and endothelial damage and dysfunction. Although the COVID-19 hypercoagulable state can be controlled, much has been learned about the treatment and needs in hospitalized severely ill patients, including the need for prophylactic or continuation of anticoagulation.

### Incidence, risk factors, clinical characteristics and outcomes of deep venous Thrombosis in patients with COVID-19 attending the emergency department: Results of the UMC-19-S8



Jiménez S, Miró Ö, Llorens P, Martín-Sánchez FJ, Burillo-Putze G, Piñera P, et al. *Eur J Emerg Med* 2021;28:218-26.

**Key Finding:** The presence of a deep venous thrombosis (DVT) in patients with COVID-19 disease was associated with a worse prognosis.

**Study Summary:** This study included 74,814 patients with COVID-19 seen in 61 Spanish emergency departments. Although the presence of a DVT was low (1.5%) and similar to non-COVID control patients, DVT occurred in older patients who had a history of venous thromboembolism or surgery or immobilization during the prior month. Disease severity and higher D-dimer levels were also associated with the presence of DVT in patients with COVID-19. Up to 40% of DVT were asymptomatic.

**Commentary:** We learned many lessons and approaches. Thrombotic complications, albeit still considered an unusual manifestation, are higher in patients with COVID-19 than non-COVID cohorts. Screen patients with COVID-19 for DVT, especially those who are older. Pay attention to severe headaches or seizures in younger persons. Control anticoagulation when appropriate. Prophylax. The presence of a DVT alone in a patient with COVID-19 may necessitate hospitalization, depending on resources and close follow-up. As we move into the endemic phase of the SARS-CoV2 pandemic, the toolbox has grown and more data are emerging.