

EDITORIAL

Necessity of thromboembolic risk scoring systems in the management of critically ill: especially in a new disease with an unexpected clinical course

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Venous thromboembolism (VTE) is frequently seen in the intensive care unit (ICU) and is associated with an increased risk of morbidity and mortality. Besides known risk factors (such as immobility, underlying disease and received therapy) sedation, mechanical ventilation, administration of vasopressors and insertion of central venous catheters are more specific risk factors for VTE in ICU patients. Moreover, high platelet levels ($>1000 \times 10^9/l$) and blood transfusions (both red blood cells and platelets) are associated with VTE in ICU patients.^[1] Without thromboprophylaxis, the incidence of VTE in the ICU is very high.^[2] Nowadays, according to evidence-based guidelines, hospitalised patients receive thromboprophylaxis, which has reduced the incidence of VTE. Despite this, approximately 3-4% of ICU patients develop VTE, while the incidence of VTE is even ten times higher in patients with sepsis. The mortality rate with adequate treatment is 2-8%; this is higher in patients with right ventricular failure or septic shock.^[3] Therefore, the use of thromboprophylaxis to prevent VTE has become common practice.

For the prediction of VTE in hospitalised patients, several risk assessment models have been employed. Among these models, the Padua Prediction Score was the best for predicting VTE and bleeding risk in hospitalised medical patients. The Padua Score stratifies patients as low-risk (<4 points) or high-risk (≥ 4 points) based on eleven common risk factors for VTE.^[4] In this issue of the Netherlands Journal of Critical Care, Hosseini et al. investigate the appropriateness of thromboprophylaxis according to the Padua Score model in ICU patients.^[5] They found that almost 90% of patients had an indication for thromboprophylaxis, although 12.8% did not receive thromboprophylaxis. More than half of patients received low-molecular-weight heparin and more than one third received unfractionated heparin. Furthermore, 24% of the patients who received thromboprophylaxis did not receive an adequate dose. In several studies the dosing of

thromboprophylaxis was inappropriate in almost half of the patients.^[5] In 2020, the world was facing a new disease with an unexpected clinical course. We have all experienced that the clinical course of patients with COVID-19 admitted to the ICU is primarily characterised by the development of severe respiratory insufficiency. Yet, in these patients significant coagulation abnormalities and their consequences are also commonly observed. The most typical findings in patients with COVID-19 coagulopathy are increased D-dimers and a prolonged prothrombin time. This hypercoagulability in COVID-19 mimics in part thrombotic microangiopathy and is associated with the development of venous as well as arterial thromboembolic complications, subsequently related to higher mortality.^[6] It has been postulated to monitor coagulation parameters in all clinical COVID-19 patients for proper evaluation of hypercoagulability and if so to increase the dose of thromboprophylaxis.^[7] In two Dutch observational studies the incidence of VTE was 20% and 31% in ICU patients with COVID-19.^[8,9] In these studies all patients received routine prophylactic thromboprophylaxis, whereby in several hospitals different dosages were used. Furthermore, only patients with proven VTE received the therapeutic dosage.

At this time with the uncertain challenges in the diagnosis and therapy of this widely unknown illness, the need for evidence-based guidance is increasing. The observations resulted in a worldwide discussion about which thromboprophylaxis should be used for these patients, which dosing and monitoring regimen is appropriate and when it can be stopped. From this point of view, the role of a prediction score for the assessment of the risk of VTE in the critically ill emphasises the essence of scoring systems in the management of VTE risk stratification and additional treatment. Probably, a dedicated prediction score model in combination with the individualised coagulation status would be the best way to ensure the correct use of thromboprophylaxis. To understand the pathogenesis

and to optimise VTE management in COVID-19, a nationwide research consortium (the Dutch COVID and Thrombosis Coalition) has been set up in the Netherlands.

Disclosures

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