Editorial

Venous thromboembolism and COVID-19

The outbreak of 2019 novel Coronavirus disease (COVID-19) is deeply weakening the whole world, and particularly, the healthcare systems. Respiratory physicians are part of the first-line healthcare providers involved in the fight against the severe acute respiratory syndrome Coronavirus 2 [SARS-CoV-2] whose effects on the human body are still poorly understood. In addition to severe lung parenchymal damage, which is the main cause of the disease severity, a particular interest has been raised regarding venous thromboembolic (VTE) diseases.

In this context of a profusion of scientific information (sometimes contradictory), what do we really know? We know that the SARS-CoV-2 activates the coagulation pathway, and that D-dimers levels greater than 1000 ng/mL are associated with a poor prognosis [1]. Further retrospective analysis reported a larger involvement of coagulation pathway and endothelial dysfunction than only clotting [2], leading to the elaboration of an international guidance on recognition and management of coagulopathy in COVID-19 [3]. In addition, preliminary analysis of pathological data reports a diffuse alveolar damage with marked inflammation around thrombotic microangiopathy limited to pulmonary small vessels [4]. Finally, in parallel with these biological data, a high frequency of VTE events has been reported in patients admitted for COVID-19 (from 20 to 30% in ICU patients) [5–7].

Some hypotheses have been extrapolated from these data. Firstly, COVID-19 has been proposed as a specific risk factor for VTE. However, admission for an acute infection (whatever the pathogen) or an inflammatory disease is already known to be a VTE trigger. The role of anticoagulant therapy [mainly by low-molecular weight heparin (LMWH)] as a potential therapy in patients with COVID-19 has been suggested [8,9]. But, one has to remember that less than a quarter of these patients received thromboprophylaxis, despite such prescription being widely recommended for adult patients admitted for an acute infection [10]. So, the positive effect of heparin proposed by the authors [8] may rather represent the negative effect of lacking thromboprophylaxis in frail patients.

Secondly, for patients with the most severe COVID-19 presentation (for example, those in intensive care unit (ICU) [11]), a high risk of VTE has been reported, despite thromboprophylaxis [12]. Hence, despite the absence of evidence, some scientific societies suggest to increase the dosages of LMWH for thromboprophylaxis, particularly in those with high level of D-Dimers [13]. Finally, although many communications alert about the risk of VTE in patients with COVID-19, the frequency of VTE in these patients is still unknown. The answer to this question requires to first decipher the timeline of the patients, with the differentiation of patients admitted with concomitant COVID-19 and VTE from those who developed VTE during the hospital stay. The use of computerised tomography scan (CT-scan) has drastically increased at admission in the hospital, to assess for COVID-19 probability and severity [14]. However, most of the data published were based on CT-scan without injection, precluding any information on pulmonary embolism (PE) prevalence at admission. Similarly, following the recommendations of the French Society of Radiology, spiral CT pulmonary angiography is used in case of respiratory degradation, but the frequency of PE has not been reported today. Moreover, in ICU patients, performing spiral CT pulmonary angiography is not always feasible due to the severity of the disease, and the use of 4-point compression ultrasound (CUS) for systematic screening has been proposed in some centres.

Based on these hypotheses, what are the next steps to provide evidence-based medicine to COVID-19 patients? Firstly, we need epidemiological data. A prospective cohort of patients admitted with COVID-19 as performed in the "PEP trial" for COPD patients [15], with a systematic assessment for VTE at admission and a reporting of VTE events during the follow-up, may help us to determine the frequency of VTE in COVID-19 patients and predictive factors. Secondly, we need to understand better the pathophysiology COVID-19 coagulopathy in order to better discriminate patients at higher risk of VTE in this population. Thirdly, we need to assess the efficacy and safety of increased doses of LMWH for thromboprophylaxis during hospital stay, and the efficacy and safety of extended thromboprophylaxis after hospital discharge, using, for example, direct oral anticoagulants. Lastly, we need to determine the best treatment options for patients with VTE and COVID-19. The international RIETE registry [16] has recently communicated some information on baseline characteristics and evolution of the 500 patients first included. Collecting data in this academic registry will help us to increase our knowledge on the evolution of patients with VTE and COVID-19.

Disclosure of interest

The authors declare that they have no competing interest.

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L. Bertoletti [a,*]
F. Couturaud [b]
D. Montani [c]
F. Parent [c]
O. Sanchez [d,e], for the "Circulation Pulmonaire et Interactions Coeur-Poumons" group of the SPLF

[a] *Service de Médecine Vasculaire et Thérapeutique, Centre Hospitalo-Universitaire de Saint-Etienne, INSERM CIC 1408 and UMR 1059, FCRIN-INNOVTE, Université Jean Monnet, Saint-Étienne, France*

[b] *Département de Médecine Interne et Pneumologie, Centre Hospitalo-Universitaire de Brest, Université de Bretagne-Occidentale, EA 3878, CIC INSERM 1412, FCRIN-INNOVTE, Brest, France*

[c] *Department of Respiratory and Intensive Care Medicine, Université Paris-Saclay, Assistance publique–Hôpitaux de Paris, Hôpital de Bicêtre, Le Kremlin-Bicêtre, France*

[d] *INSERM UMR_S 999, Hôpital Marie-Lannelongue, Le Plessis-Robinson, France*

[e] *Service de Pneumologie et de Soins Intensifs, Hôpital Européen Georges-Pompidou, AP-HP, Université de Paris, INSERM UMR S 1140, FCRIN-INNOVTE, Paris, France*

*Corresponding author at: Service de Médecine Vasculaire et Thérapeutique, Centre Hospitalo-Universitaire de Saint-Étienne, Hôpital Nord, 42055 St-Étienne cedex, France.
E-mail address: laurent.bertoletti@gmail.com
(L. Bertoletti)