Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editors-in-Chief

COVID-19 and thrombotic complications: Pulmonary thrombosis rather than embolism?

Dear Editor,

We read with great interest the recent article by Demelo-Rodríguez et al., reporting that the incidence of (asymptomatic) deep vein thrombosis (DVT) in patients admitted with COVID-19 pneumonia (14.7%) was not greater than that described in other series of non-COVID affected patients admitted to general medicine or orthopedic wards [1]. Recent studies have reported a high number of venous thrombotic complications in patients with pneumonia related to SARS-CoV2 infection admitted to ICU or general wards, despite standard prophylactic anticoagulation [2–4]. Most were pulmonary events (presumed pulmonary embolism [PE]) [2,3], which were much more common in COVID-19 patients than in other groups of patients with respiratory failure from other etiologies [2].

Interestingly, the majority of patients with PE did not have associated DVT [2,4]. Of note, recent autopsy studies [5] were consistent with thrombosis occurring within the pulmonary arterial circulation, in the absence of apparent embolism.

These data suggest that COVID-19 may be associated with a high incidence of pulmonary thrombosis (PT) rather than of venous thromboembolism. PT is not a new entity or a distinctive feature of COVID-19; it has been found also in patients with respiratory failure from other causes, both infectious and non-infectious [6]. However, it seems more common in COVID-19 [2–4].

Local thrombi may form in the lung vessels as a consequence of strong activation of inflammatory processes within the lung, with associated cytokine storm and resultant pulmonary endothelial dysfunction or damage. In addition, SARS-CoV-2 could activate the coagulation pathway by binding the ACE-2 receptor of type II pneumocytes and then dysregulating the kallikrein/kinin system [7]. The high incidence of PT could also be the result of a prothrombotic state associated with the presence of lupus anticoagulant (LA), detected in about 90% of the tested patients in a recent study [2].

If confirmed, these speculations could have two practical consequences. First, if COVID-19 is associated with PT rather than PE, the commonly used Wells pretest probability score may not be valid since it depends on the presence/absence of clinical signs of DVT, which would not be relevant for in situ PT. Second, the different pathogenic mechanism of PT from PE may alter treatment recommendations. The available literature suggests that standard prophylactic therapy with LMWH is not able to prevent pulmonary thrombotic complications in COVID-19 patients. This finding could be the consequence of different pathogenic mechanisms behind PT and PE. If confirmed, it could take to change the use of anticoagulants in these patients: to start with higher prophylactic or directly therapeutic doses of LMWH since admission, and to consider a prolonged administration of anticoagulants after hospital discharge.

Declaration of competing interest

There are no conflicts of interest.

All authors reviewed and approved the final version of the manuscript.

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