COVID-19 AND THROMBOTIC OR THROMBOEMBOLIC DISEASE IN ICU

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Coronavirus disease-2019 (COVID-19) is a viral respiratory illness caused by the severe acute respiratory syndrome- coronavirus-2 (SARS-CoV-2). some report have found these patients to be more susceptible to develop thrombotic disease, both in the venous and arterial circulations, because of excessive inflammation, platelet activation, endothelial dysfunction, hypoxia, and stasis.
Additionally, procoagulant state has long been recognized also as part of ARDS pathophysiology, demonstrated by the identification of diffuse pulmonary endothelial injury associated with platelets' activation, macro- and micro-thrombi thought to be either embolic, formed in situ or both.
High prevalence of acute pulmonary embolism (APE) has been recently reported in patients admitted with COVID-19-related pneumonia.

We report the prevalence of venous thrombotic events in patients consecutively admitted to the ICU of a Hub Hospital for SARS-CoV-2 since the beginning of the Italian outbreak infection on February 21, 2020. Informed consent was collected following the *ad hoc* procedures defined by the Ethics Committee for the COVID-19 pandemic.
There is a well-established link between inflammation and increased risk of deep vein thrombosis (DVT). A potential explanation is that vessel wall inflammation initiates thrombus formation, through the activation of endothelial cells, platelets, and leukocytes that trigger the coagulation pathway.
Moreover, the interaction pathway among platelets, neutrophils, and endothelial cells' dysfunction in ARDS has been associated with deep vein thrombosis development. All patients were sedated, mechanically ventilated and treated with prophylactic low-molecular-weight heparin (LMWH) adjusted on body weight since the admission.

Twelve out of 81 patients (14,8%) were diagnosed with deep vein thrombosis, of which ten were central catheter related. Additionally, one patient had a thrombotic formation attached to the tricuspid valve in the absence of predisposing factors. Sub-segmental pulmonary embolism was found in eight patients examined with computed tomography pulmonary angiography (CTPA) and one patient died of cardiac arrest with pulseless electrical activity (PEA) as presentation rhythm and sudden right ventricular dilatation.
In our experience 20,9% of patients (76,5% male, 61,5 ± 9,8 years old; C-reactive protein 20.7 ± 11,7 mg/dl, fibrinogen 684 ± 264.6 mg/dl,) admitted to ICU due to SARS-CoV-2 interstitial pneumonia had venous thrombotic events.
ICU admission and ARDS are considered both predisposing factors for a number of reasons, including the need for prolonged immobilization and hyperinflammatory state. The prevalence of vein thrombosis in patients admitted with ARDS is currently unknown.

Because of the pathophysiological link between inflammation and thrombosis development, especially in critically ill patients, the hyperinflammatory status of patients with COVID-19 and the high prevalence of APE and of vein thrombotic events found in our population, we strongly suggest that a close vein ultrasound screening and monitoring should be performed in all patients

hospitalized due to SARS-CoV-2-related infection. Additionally, right ventricular dilatation/dysfunction should trigger the suspicion of APE.