Pulmonary embolism is a frequent complication in covid-19 patients on the intensive care unit

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Introduction:
COVID-19, the disease caused by SARS-CoV-2 became a major health issue in 2020. One of the most recognized laboratory changes associated with COVID-19 is an increase in d-dimer levels, which correlates with poor prognosis. The origin of the elevated d-dimer levels however is poorly understood. One of the distinct characteristics of COVID-19 however is a prothrombotic state. Here, we investigate if pulmonary embolism (PE) might be more frequent in this patient collective.

Methods:
All COVID-19 patients admitted to our medical intensive care unit are screened as part of the daily routine for clinical signs for PE including bed-side ultrasound, laboratory parameters and the Wells-score. In case of high clinical probability of PE, a computed tomography pulmonary angiogram (CTPA) was performed. Data was retrospectively collected and analyzed.

Results:
Twenty-two patients (age 60.4±10.2 years, 27.3% female, 91% BMI >25kg/m\textsuperscript{2}) were investigated. All patients were either on systematic prophylactic anticoagulation (16/22) or on systematic therapeutic anticoagulation (6/22) which was initiated for a preexisting indication for oral anticoagulation. Within the investigated time period, 16 out of the 22 patients (73%) were considered to have a high likelihood of PE and underwent at least one CTPA. PE was detected in 8 out of 16 patients (50%). According this cohort, the PE rate in COVID-19 patients on the ICU might be between 36.4% (8/22, in the entire cohort) and 50.0% (8/16, in patients undergoing CTPA). At time of CTPA, there was a significant difference in the level of d-dimers in the group in which pulmonary embolism compared to those without (26.5±11.2 and 7.8±10.3 mg/l, respectively, p<0.01). There was no difference in respect to first recorded or highest d-dimer levels comparing patients with and without PE.

Conclusion:
Despite systematic prophylactic anticoagulation, PE occurred in more than 36% of COVID-19 patients in our ICU. PE might be a disease-specific complication of COVID-19.