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Title : Anti-factor Xa monitoring in severe Covid-19 patients

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Introduction
Severe Covid-19 disease has been associated with coagulopathy, leading to thromboembolic (TE) complications. High incidences of both venous (VTE) and arterial thromboembolism (ATE) have been described, despite pharmacological thromboprophylaxis. Anti-factor Xa (aXa) monitoring is an in vitro assessment of the efficacy of low-molecular-weight-heparins and has shown potential in trauma and burn patients, in obesity and in renal failure. A laboratory test evaluating the efficacy of a given dose of enoxaparin and guiding dose adjustments, might help to prevent TE complications and side effects such as hemorrhage.

Objectives
To evaluate the utility of routine aXa monitoring in severe covid-19 patients initiated on weight-based enoxaparin treatment.

Methods
In this single-center retrospective cohort study, all PCR-positive patients admitted to the ICU until the 12th of January 2021 were screened for eligibility. Routinely, patients are started on intermediate intensity enoxaparin (0.5 mg/kg bd). In case of suspected or confirmed VTE or in case of a non-covid related indication, therapeutic intensity enoxaparin (1 mg/kg bd) is started. In case of renal failure, doses are reduced by half. AXa peak levels are taken 3 to 4 hours after an enoxaparin dose. Patients were included if they were admitted for respiratory failure and if aXa peak levels were taken after at least three doses . The initial aXa peak level was examined, with inclusion of both intermediate and therapeutic regimens. The target aXa peak levels were resp. 0.2 to 0.5 U/mL and 0.6 to 1.0 U/mL. The primary outcome was the incidence of out-of-range aXa peak levels. Secondary outcomes included the incidence of VTE, ATE and hemorrhage and potential risk factors for an inadequate aXa peak level.

Results
A total of 93 patients met the inclusion criteria. AXa peak levels were out-of-range in 32/93 (34.4%) of patients: 21/93 (22.6%) were sub- and 11/93 (11.8%) were supratherapeutic. The total incidence of TE was 14/93 (15.1%) with VTE occurring in 6/93 (6.5%) and ATE in 8/93 (8.6%) of patients. The incidence of hemorrhage was 22/93 (23.7%). As shown in table 1, no statistically significant risk factor was found.

Conclusions
The use of aXa monitoring can be helpful to ensure appropriate dosing in severe covid-19 patients initiated on enoxaparin treatment. Further trials should evaluate whether aXa monitoring is superior to weight-based dosing in terms of clinical outcome. Furthermore, debate remains regarding the ideal target level.