Effect of Heparin on Viscoelastic Parameters of COVID-19 Critically Ill Patients. A Viscoelastic Coagulation Monitor (VCM) Analysis

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Background

Viscoelastic Coagulation Monitor (VCM - Entegrión, Durham, NC) is a portable, recently validated device developed to quickly evaluate the viscoelastic properties of whole blood activated by direct contact with a glass surface. We employed VCM as daily assessment of COVID-19 critically ill patients. Aim of the study was to assess whether VCM parameters were modified by heparin administration.

Methods

Retrospective cohort study on COVID-19 critically ill patients who were tested with VCM during their ICU stay from March 25th to June 8th. Anticoagulation was provided either with unfractionated (UFH) or with low molecular weight (LMWH) heparin, per institutional protocol. VCM analysis was simultaneously run to standard coagulation tests.

Results

Thirty-six patients were included in the study for a total of 151 measurements. ECMO patients (N=4) received UFH, the remaining (except one heparin-free) received LMWH, for a total of 52 samples on UFH, 86 samples on LMWH and 13 samples without any type of heparin. The administration of UFH influenced all VCM parameters towards hypocoagulability, LMWH did not. No flat-line tracings were observed. The correlation between CT and UFH dose was moderate (Spearman’s rho = 0.48, p = <0.001), the correlation between aPPT and UFH was low (Spearman’s rho = 0.35, p = 0.010). As expected, no correlation was found between VCM parameters and LMWH dose.

Conclusions

VCM parameters were modified by anticoagulant doses of UFH in a cohort of COVID-19 critically ill patients. VCM could be further evaluated as a tool for UFH anticoagulation monitoring.