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Coagulation status of critically ill patients with liver disease assessed using a novel thrombin generation analyser

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Abstract Content: **Background:** The liver synthesises the majority of pro- and anti- coagulant and fibrinolytic proteins. Haemostatic tests, such as the prothrombin time (PT), represent only 5% of thrombin generation (TG) and do not assess the effects of natural anti-coagulants, therefore, have limited predictive value for bleeding.
Aim: To identify an algorithm, using TG, to predict bleeding risk in critically ill patients with liver disease admitted to the intensive care unit (ICU).
Methods: A novel analyser by Stago, STGenesia®, is a fully automated and standardised TG method. TG was triggered using STG®-Thromboscreen kit, containing an intermediate concentration of human recombinant tissue factor (TF) ±rabbit lung thrombomodulin (TM). We studied platelet poor plasma (PPP) samples from the Intensive Care Study of Coagulopathy-2 (ISOC-2), which recruited patients with abnormal clotting, defined by a PT prolonged by 3 seconds above the reference range, but not bleeding upon admission to ICU. Bleeding was defined using the HEmorrhage Measurement (HEME) assessment tool.
Results: Despite a prolonged PT, 50% of patients had normal endogenous thrombin potential (ETP) (912.4 - 1715.6 nM.min), and the remaining 50% were below the normal limit (< 912.4 nM.min). Addition of TM reduced thrombin generation and was recorded as the % ETP inhibition, which was lower in patients (33.46 ± 20.06%) than in healthy volunteers (59.70 ± 17.86%). After addition of TM, 42 and 38% of patients had elevated or normal TG ability, respectively. Peak height correlated strongly with ETP (r^2=0.68, p <0.0001) and could be rapidly obtained in 5.52 ±1.49 min from starting the test.
Conclusion: Measurement of TG and addition of TM provides a more accurate assessment of coagulation capacity, indicating that haemostasis is balanced in patients with liver disease during critical illness, despite conventional tests suggest that bleeding risk is increased. The STGenesia® may be used in clinic to identify hypercoagulable patients not requiring plasma transfusion.

Disclosure of Interest: None Declared

Keywords: bleeding risk, intensive care, liver disease, thrombin generation, thrombomodulin