Perioperative Heparinase Rotational Thromboelastometry Monitoring During and after Adult Living Related Liver Transplantation

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Background and Goal of Study: Heparin like effect (HLE) can affect coagulation variably during transplantation. Primary aim is to monitor incidence and severity of HLE with rotational thromboelastometry (ROTEM) and standard laboratory tests (SLT) in our center.

Materials and Methods: A diagnostic clinical trial among recipients (2015-2017) (PACTR201712002839259). No heparin was given prior to surgery and liver donor vessels were flushed. Unfractionated heparin was infused (60-180 U/kg/day) postoperatively for 2 days and then was replaced by low molecular weight heparin (LMWH) (20 mg/12 h). ROTEM (INTEM and HEPTEM) and SLT (aPTT) were performed pre-operative, anhepatic, post-reperfusion, and on post-operative day (POD) 1, 3 and 7. HLE is identified when CT INTEM is >240 sec and CT INTEM/CT HEPTEM ratio >1.25. Blood transfusion was ROTEM-guided.

Results: 39 recipients included (1 excluded), with age 49.53 ± 6.11 y, graft body weight ratio 1.01 ± 0.08 g/kg, operation duration 11.00 ± 2.0 h, MELD 15.00 ± 3.0 . Prolonged CT INTEM was observed in 7/38 during anhepatic phase (range: 257-1523 sec), in 19/38 at reperfusion (range: 270-3312 sec) and in 10/38 at POD 1 with heparin infusion (range: 257-344 sec). A mild to moderate HLE in 4/38 on POD 3 and no HLE on POD 7 was detected on ROTEM with the shift to LMWH. Grades and percentages of HLE are presented in the figure.

Total 3-month survival was 78.9% (30/38) and mortality, 21.1% (8/38) (2/6 with severe HLE, died 3 weeks postoperative). No blood was transfused in 26.32% (10/38) during surgery, in contrast to recipients with severe HLE (median [IQR]: red blood cells 8 [6-10], plasma 6.5 [6-7.5] units). Weak correlation existed between aPTT and CT INTEM ($r=0.12$, $p=0.04$). aPTT was only prolonged after reperfusion and on POD1.

Conclusion

HLE mainly accompanies reperfusion, but when identified in a severe form, it carries a high risk of mortality. CT INTEM and CT INTEM/CT HEPTEM-ratio are more sensitive to identify HLE than aPTT. This is important since HLE during the anhepatic phase is associated with worse outcome.