Point-of-care haemostatic management in orthotopic liver transplantation of an *ex situ* hepatectomized liver graft

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BACKGROUND

Anatomical considerations in split-liver transplantation

- Variant hepatic anatomy must be recognized and managed during split-liver transplantation (SLT).
- In SLT, portal flow is redirected through relatively small-for-size (SFS) grafts, leading to SFS syndrome (SFSS)
- Good graft function depends on graft's intact arterial and portal supply as well as biliary and venous drainage from all retained liver segments.
- Liver splitting in the heart-beating donor, abolishes *ex situ* benching and prolonged ischemia time and provides two anatomically perfect grafts with hemostasis accomplished.

Challenges in haemostatic management in OLT

- Reduced levels of both procoagulant factors and inhibitors.
- Thrombocytopenia/dysfunction is counterbalanced by the increased levels of fVIII and vWf.
- Hyperfibrinolysis is a major issue after reperfusion.
- ESA 2013: "We recommend the use of perioperative ROTEM/TEG monitoring for targeted management of coagulopathy".
- Goal-directed P-O-C parameters algorithmic approach.

CASE REPORT

- ❖ Male, 45 y, BMI 30 kg/cm²
- ❖ Alcoholic Cirrhosis MELD score 16
- ❖ Four HE episodes, type II diabetes
- ❖ Coagulation profile : INR 1,8 PT 19,9s APTT 50,7s
FIB 1,94g/dl PLTs 105000 μ /l
- ❖ No signs of HE, varices or pulmonary hypertension
- ❖ Spironolactone, furosemide, lactulose, Mg, folic acid, vitB

Graft peculiarity (figures)

- ❖ Exceptional left liver lobe perfusion.
- ❖ Ectopic hepatic artery rising directly from the aorta (rare anatomic variation, 1.6%).
- ❖ Vessel endothelium "fractured".
- ❖ Extended graft hepatectomy of the depended liver segments (II and III) on the bench.
- ❖ Extended surface with no *ex vivo* surgical haemostasis.

Fig. Graft IVC with middle and right hepatic veins, the left being sutured.
In circle, the extended surface where no surgical haemostasis was feasible *ex vivo*.

Orthotopic liver transplantation (piggy pack technique)

- ❖ Hbg 10.5 (start) – 9.3 (end) g/dl, 2 PRBCs after reperfusion
- ❖ Fluids balance +6000 ml
- ❖ 10 hrs cold ischemia time, anhepatic phase 2.5 hrs
uneventful reperfusion, Lactate_{max} 7mmol/L
- ❖ Total OLTx duration 6 hrs
- ❖ Acceptable haemodynamics CI 3.2-5.0, PVRI 139-92,
Ca-vO₂ 2.7-2.9, SvO₂ 81-72%
- ❖ Prolonged ICU stay, mild cholestasis but no signs of SFSS.
- ❖ Discharged tracheostomized but in good general state.

DISCUSSION

Haemostatic management and transfusions were directed by ROTEM® following a published algorithm.
(Goerlinger K, 2006, rev. 2014).

PREANHEPATIC PHASE No bleeding

CT _{EXTM}	A5 _{EXTM}
66	49
A5 _{FIBTEM}	MCF _{EXTM}
13	54

ANHEPATIC PHASE Mild diffuse bleeding

CT _{EXTM}	A5 _{EXTM}
176	7
A5 _{FIBTEM}	MCF _{EXTM}
11	14

- ✓ 1500 U Prothrombin Complex Concentrate, (Beriplex®)
- ✓ No Platelet transfusion (although considered)

NEOHEPATIC PHASE Minimal bleeding

CT _{EXTM}	A5 _{EXTM}
97	23
A5 _{FIBTEM}	MCF _{EXTM}
13	41

- ✓ No Platelet transfusion (although considered)
- ✓ 1g Fibrinogen conc. (Riastap®) to enhance clot strength
- ✓ Bleeding ceased completely

LEARNING POINTS

- ❑ Point-of-care haemostatic management combined with close clinical evaluation of surgical bleeding contributed successfully to safe decision making in this complex case.

REFERENCES

- Goss JA et al. In situ splitting of the cadaveric liver for transplantation. Transplantation. 1997 Sep 27;64(6):871-7.
- Chaib E. et al. The main hepatic anatomic variations for the purpose of split-liver transplantation. Transplant Proc. 2005 Mar;37(2):1063-6.
- Goerlinger K. Coagulation management during liver transplantation. Hämostaseologie 2006; 26 (Suppl 1): S 64 –S 75