No bleeding during a dialysis catheter insertion in a patient with INR 3.2 due to acute liver dysfunction

Piotr F. Czempik[1,2], Tomasz Jaworski[1]

[1]*Department of Anesthesiology and Intensive Care, Faculty of Medical Sciences in Katowice, Medical University of Silesia, Katowice, Poland;*
[2]*Transfusion Committee, University Clinical Center of Medical University of Silesia in Katowice, Katowice, Poland*

Dear Editor,

We report the case of a 61-year-old woman admitted to the intensive care unit due to circulatory failure, acute liver failure (ALF), and stage 3 acute kidney injury (AKI) in the course of severe acute pancreatitis. Directly before a dialysis catheter insertion international normalized ratio (INR) was 3.18. In order to assess the patient's global hemostasis, VHA was performed (ROTEM Delta, Tem Innovations, Munich, Germany) and revealed preserved clot dynamics. In EXTEM assay clot propagation was within normal limits, as indicated by normal clot formation time and alpha angle. Clot firmness was also maintained, with normal amplitude values at 10 and 20 minutes and normal maximal clot firmness. Clot initiation parameters were significantly impaired with prolonged clotting time in EXTEM and FIBTEM (**Figure 1**). There were no signs of bleeding diathesis. The

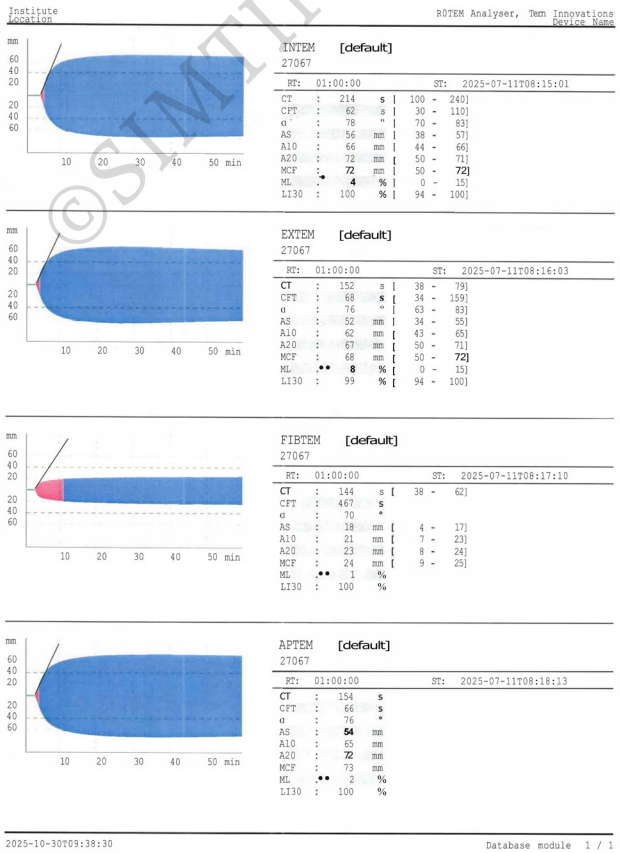


Figure 1 - Rotational thromboelastometry tracings illustrating clot formation, propagation, and clot firmness parameters

Arrived: 13 September 2025
Accepted: 2 October 2025
Correspondence: Piotr F. Czempik
e-mail: pczempik@sum.edu.pl

©SIMTIPRO Srl

© SIMTIPRO Srl
Published under a CC BY-NC-ND license

decision was made to insert a dialysis catheter. In the event of procedure-related bleeding, in light of delayed clot initiation, a plan for prolonged mechanical compression at the insertion site was made. No bleeding was observed during or after procedure.

Coagulopathy is a main feature of ALF and prothrombin time (PT), and its derivative INR were considered to correlate with bleeding risk. There is growing evidence that in both chronic and acute liver disease PT/INR can be misleading as a marker of bleeding risk. Hemostasis in liver disease depends on the balance between pro- and anti-hemostatic factors, modulated by factors like AKI or sepsis. In ALF patients there is imbalance between von Willebrand factor (vWF) and vWF-cleaving protease and reduced fibrinolysis[1]. Correction of elevated INR with transfusion of fresh frozen plasma (FFP) before invasive procedures in ALF patients may not be required and even lead to complications, like portal hypertension or venous thromboembolism. We previously described a patient with subacute liver failure who underwent a major surgical procedure with an INR of 2.75 and acceptable VHA with no bleeding[2]. Other observational data show that VHAs are useful in confirming rebalanced hemostasis in cirrhotic patients with elevated INR[3].

The recent guideline regarding transfusion of FFP in critically ill adults generally advise against routine transfusion of FFP before invasive vascular procedures, however no INR thresholds for prophylactic FFP transfusion are given. The authors suggest considering bleeding risk; however, no reliable bleeding risk scores are currently available. Patients with INR >3 have not been studied and constitute research priorities, as well as use of VHAs for assessing bleeding risk[4]. The European Society of Anesthesiology and Intensive Care guidelines recommend that moderately elevated INR (i.e., 1.5-2.0) should not be corrected before invasive procedures in patients with ALF[5]. By using VHA for assessment of bleeding risk we avoided an inappropriate FFP transfusion.

In conclusion, conventional coagulation tests should not be used to predict bleeding before invasive vascular procedure in acute liver dysfunction patients. Viscoelastic hemostatic assays are able to assess global hemostatic profile and potentially prevent patients from inappropriate transfusion of fresh frozen plasma and its associated risks in this clinical scenario.

The Authors declare no conflicts of interest.

REFERENCES

1. Driever EG, Stravitz RT, Zhang J, Adelmeijer J, Durkalski V, Lee WM, et al. VWF/ADAMTS13 imbalance, but not global coagulation or fibrinolysis, is associated with outcome and bleeding in acute liver failure. Hepatology. 2021; 73(5): 1882-1891. doi: 10.1002/hep.31507.
2. Czempik PF, Płonka J. No bleeding complications during major surgery in a subacute liver dysfunction patient with international normalized ratio in the therapeutic range. Acta Haematol Pol. 2024; 55(1): 48-50. doi: 10.5603/ahp.97821.
3. Seeßle J, Löhr J, Kirchner M, Michaelis J, Merle U. Rotational thrombelastometry (ROTEM) improves hemostasis assessment compared to conventional coagulation test in ACLF and Non-ACLF patients. BMC Gastroenterol. 2020; 20(1): 271. doi: 10.1186/s12876-020-01413-w.
4. Yataco AC, Soghier I, Hébert PC, Belley-Cote E, Disselkamp M, Flynn D, et al. Transfusion of fresh frozen plasma and platelets in critically ill adults: an American College of Chest Physicians Clinical Practice Guideline. Chest. 2025; 168(3): 661-676. doi: 10.1016/j.chest.2025.02.029.
5. Kietaibl S, Ahmed A, Afshari A, Albaladejo P, Aldecoa C, Barauskas G, et al. Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care: Second update 2022. Eur J Anaesthesiol. 2023; 40(4): 226-304. doi: 10.1097/EJA.0000000000001803.

© SIMTIPRO Srl