

Hemoadsorption for Dabigatran Removal in an ECMO Patient: A Case Report on Anticoagulation Management



Andrea Balata¹, Leonardo Bianciardi², Maria Caterina Spanu¹, Antonella Vaccarella²

¹ University Hospital Trust Simple Departmental Structure of Cardioanesthesia; Sassari; Italy

² University Hospital Trust Complex Departmental Structure of Intensive Care Unit for Emergency and Urgency; Sassari; Italy

Introduction

The management of coagulation in extracorporeal membrane oxygenation (ECMO) patients is particularly challenging due to the need for anticoagulation to prevent circuit thrombosis while minimizing haemorrhagic complications. Direct oral anticoagulants (DOACs), such as Dabigatran, further complicate this balance, particularly in patients with impaired renal function, where drug accumulation can lead to excessive anticoagulation. Unlike vitamin K antagonists, DOACs lack standardized reversal strategies outside of specific antidotes, making urgent anticoagulation modulation difficult. CytoSorb hemoadsorption therapy has been introduced as an effective method for removing DOACs.

Methods

After catheter ablation, a 58-year-old male developed refractory biventricular shock, requiring veno-arterial ECMO support. Laboratory tests revealed excessive anticoagulation due to Dabigatran accumulation (452 ng/mL), exacerbated by acute renal failure. Given the necessity of transitioning to unfractionated heparin for ECMO, an urgent reversion of Dabigatran was required. CytoSorb hemoadsorption was integrated into the ECMO circuit for rapid Dabigatran elimination. Idarucizumab was not administered due to concerns that its effect could induce a hypercoagulable state, requiring ECMO unplanned discontinuation. Coagulation parameters, including thrombin time, aPTT, and Dabigatran plasma levels, were rigorously monitored throughout the treatment course.

Results

Six hours after hemadsorption initiation, pre-cartridge Dabigatran levels had dropped to 43 ng/mL, while post- cartridge levels were 36 ng/mL, indicating effective drug removal.

After 24 hours, a pre-cartridge measurement showed an increase in Dabigatran concentration to 93 ng/mL, while the post-cartridge level was 90 ng/mL. This rise was attributed to redistribution of Dabigatran from peripheral compartments back into the bloodstream. To have an effective drug removal, a second cartridge was started. By the final assessment, Dabigatran plasma concentration had decreased further to 38 ng/mL, a level considered below therapeutic activity.

Conclusion

The use of CytoSorb hemoadsorption therapy successfully facilitated Dabigatran removal in a critically ill ECMO patient with renal impairment. Ultimately, the intervention enabled safe anticoagulation transition to heparin, reducing hemorrhagic risk while maintaining ECMO circuit function. This case highlights the need for dynamic anticoagulation management strategies in ECMO patients with DOAC accumulation and underscores the utility of CytoSorb as an adjunctive therapy in such complex scenarios.