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Removal of DOACs from plasma: performance comparison and pre-analytical considerations of three different devices

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Introduction

Given the plethora of coagulation tests influenced by Direct Oral Anti-Coagulants (DOACs), it would be of particular interest to remove DOACs from a sample. This could enable a better investigation of an underlying plasma defect potentially hidden by a DOAC interference. In this context, several DOACs-removal devices have been developed for a potential use in clinical routine. The transfer of plasma through a filter or the addition of an adsorbing agent is currently under investigation.

The aim of this study was to evaluate the performances of three devices enabling the removal of DOACs from spiked plasma samples. Their efficiency to eliminate DOACs from plasma, the impact of the transfer through the filters on the coagulation and their ergonomics were investigated.

Methods

Fresh normal pooled plasma from 6 healthy volunteers were mixed with either dabigatran, rivaroxaban or apixaban at 0-125-250-500 ng/mL theoretical final concentration. Six hundred µL of plasma were tested before and after filtration on DOAC filter (Stago, France), DOAC Stop (Haematek Research, Australia) or on Hemofilter (Hemosafe, Belgium) on a STA-R Max2 analyzer using calibrated STA-Liquid anti-Xa or STA-ECAl for dosage of anti-Xa and anti-lla drugs, respectively (all products from Stago, France). Prothrombin time (PT) and activated partial thromboplastin time (aPTT) were also analyzed on the STA-R Max2. Several usage data regarding these devices were collected throughout the study.

- **1- Procedure for DOAC removal**

- **2- DOAC removal efficiency**

- **3- Impact on PT and aPTT**

In conclusion, the DOAC Filter and the Hemofilter are the easiest DOAC removal devices to use. In addition, no visible residues potentially interfering with measurement are observed with these devices as opposed to DOAC Stop. However, the DOAC Filter is not able to eliminate apixaban at concentration higher than 250 ng/mL.

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