New Rapid and Cost-Effective Tool for Monitoring DOACs

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Thromb Haemost 2021;121:7.

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Over the past decade, direct oral anticoagulants (DOACs) have been steadily complementing and replacing vitamin K antagonists for prevention and treatment of venous thrombosis as well as for the management of non-valvular atrial fibrillation, particularly in suitable subgroups.[1,2] Despite the considerable advantages of DOACs, their metabolism is complex and assessment of DOAC anticoagulant effects may be useful in several situations. Conventional clotting time assays performed in diagnostic laboratories including the prothrombin time and activated partial thromboplastin time capture the anticoagulant effect of DOACs with variable sensitivity and cannot reliably predict clinically meaningful DOAC levels. In contrast, drug-specific anti-Xa assays and liquid chromatography mass spectroscopy are extremely precise and sensitive, but their use is limited to central laboratories and results are not rapidly available.

In this issue of *Thrombosis and Haemostasis*, Maji et al[3] describe a novel point-of-care diagnostic device termed ClotChip, which utilizes the electrical technique of dielectric spectroscopy to assess whole blood coagulation ex vivo. This novel assay allows predicting DOAC response within 30 minutes using only 10 µL of whole blood. In this pilot study, the authors demonstrated that ClotChip could reliably detect the anticoagulant effects of rivaroxaban, apixaban, and dabigatran with improved sensitivity over routine coagulation tests. This novel point-of-care device is cheap to manufacture and does not require special equipment or reagents, making ClotChip a cost-effective means to monitor the efficacy of DOACs under various clinical scenarios in a single, disposable cartridge. Anticoagulation therapy often entails time-critical decisions. Such an onsite analyzer of patients' hemostatic ability, addresses a currently unmet need and could potentially shift the current care of patients with DOAC-related emergencies and beyond.

Conflict of Interest
None declared.

References

1 Bavalia R, Middeldorp S, Weisser G, Espinola-Klein C. Treatment of venous thromboembolism in special populations with direct oral anticoagulants. Thromb Haemost 2020;120(06):899–911
2 Giustozzi M, Agnelli G, Del Toro-Cervera J, et al. Direct oral anticoagulants for the treatment of acute venous thromboembolism associated with cancer: a systematic review and meta-analysis. Thromb Haemost 2020;120(07):1128–1136
3 Maji D, Opneja A, Suster MA, et al. Monitoring DOACs with a novel dielectric microsensor: a clinical study. Thromb Haemost 2021; 121(01):58–69

received
September 29, 2020
accepted
October 30, 2020

Georg Thieme Verlag KG,
Rüdigerstraße 14,
70469 Stuttgart, Germany

DOI https://doi.org/10.1055/s-0040-1721485.
ISSN 0340-6245.