A Practical Guide to Ordering and Interpreting Coagulation Tests for Patients on Direct Oral Anticoagulants in Singapore

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Abstract

Introduction: Direct oral anticoagulants (DOACs) are establishing themselves as principle choices for the treatment of a variety of thrombotic disorders. DOACs are also known to affect common coagulation tests which are routinely performed for patients in clinical practice. An understanding of their varied effects is crucial for the appropriate ordering of coagulation tests and their interpretation. Materials and Methods: Laboratories in public and private healthcare institutions and commercial sectors were surveyed on coagulation tests offered and their methods. A Medline and bibliography search, including a search on search engines, was performed for publications reporting the effects of dabigatran, apixaban and rivaroxaban on these coagulation tests. These papers were reviewed and summarised for consensus recommendations. Results: Prothrombin time (PT) and activated partial thromboplastin time (aPTT) are variably affected by the DOACs and dependent of the coagulation assays used. Clinicians must know which laboratory has performed these tests to logically interpret test results. A normal PT or aPTT does not exclude the presence of residual DOACs effect. The thrombin time is sensitive to dabigatran but not apixaban or rivaroxaban. Specialised coagulation tests such as thrombophilia tests are also variably affected by the DOACs. All laboratories in Singapore however, employ similar test methods permitting a common set of recommendations for specialised coagulation testing. Conclusion: Knowledge of the effects of DOACs on coagulation testing is essential to determine the appropriateness of performing such tests and interpreting them coherently. Practical recommendations which are tests and location-specific are set out in this paper.

Key words: Apixaban, Dabigatran, Laboratory testing, Rivaroxaban

Introduction

Direct oral anticoagulants (DOACs) describe 2 classes of oral anticoagulants that target thrombin (oral direct thrombin inhibitors) (DTI) and factor Xa (anti-FXa), both of which have been rapidly changing the anticoagulation landscape. Their adoption as viable alternatives to conventional vitamin K antagonist such as warfarin have been fomented by clinical trial data indicating at least equivalence in efficacy and safety when compared to standard anticoagulants for a variety of indications. The added benefits of fixed dosing as well as the limited drug and food interactions without the need for routine monitoring has contributed to an increasing number of patients taking these anticoagulants. There are currently 3 DOACs registered in Singapore for a variety of indications as listed in Table 1. Dabigatran, a DTI, binds competitively and reversibly to the active site on free- and clot-bound thrombin. Rivaroxaban and apixaban are competitive anti-FXa that bind to both free- and clot-bound factor Xa. As DOACs primarily interrupt thrombus formation via the inhibition of downstream coagulation proteins, they can potentially interfere with many commonly available