Monitoring of Direct Oral Anticoagulants with STG-Drugscreen on automated analyzer ST Genesia

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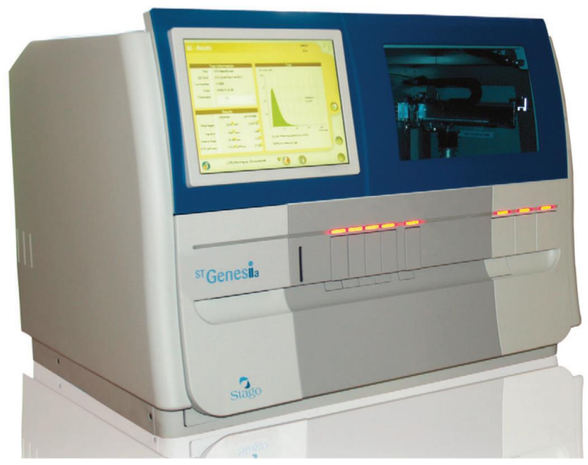
Background

Thrombin generation (TG) assays have been shown to be useful to assess the hemostatic potential of an individual. However, the lack of standardization and cumbersome handling hampered their widespread clinical application. With the recent introduction of the ST Genesia (Diagnostica Stago) fully automated thrombin generation (TG) will be available for clinical use. Using standard calibration and control procedures, ST Genesia (STG) may improve standardization and comparability of results. Here we present the feasibility of STG-Drugscreen for monitoring the direct oral anticoagulants (DOACs) apixaban, edoxaban, rivaroxaban, and dabigatran.



Source: Stago Haemostasis Catalogue

Subjects and methods

Samples from patients receiving DOACs (20 patients per anticoagulant) were investigated. For every patient, four samples were collected at different time points. STG-Drugscreen assay was performed for every sample; the data analysis includes lag time, time to peak, peak height (thrombin peak), endogenous thrombin potential (ETP), and velocity index.

Results

Factor Xa inhibitors resulted in a significant dose-dependent reduction in thrombin generation, with high sensitivity for thrombin peak and velocity index, while lag time and time to peak are affected at a drug level above 50-100 ng/mL, depending on the drug. In contrast, dabigatran showed a much less impact on thrombin peak and velocity index, but resulted in prolongation of lag time and time to peak. The variability of TG parameters before administration of the drug reflects the inter-individual variability.

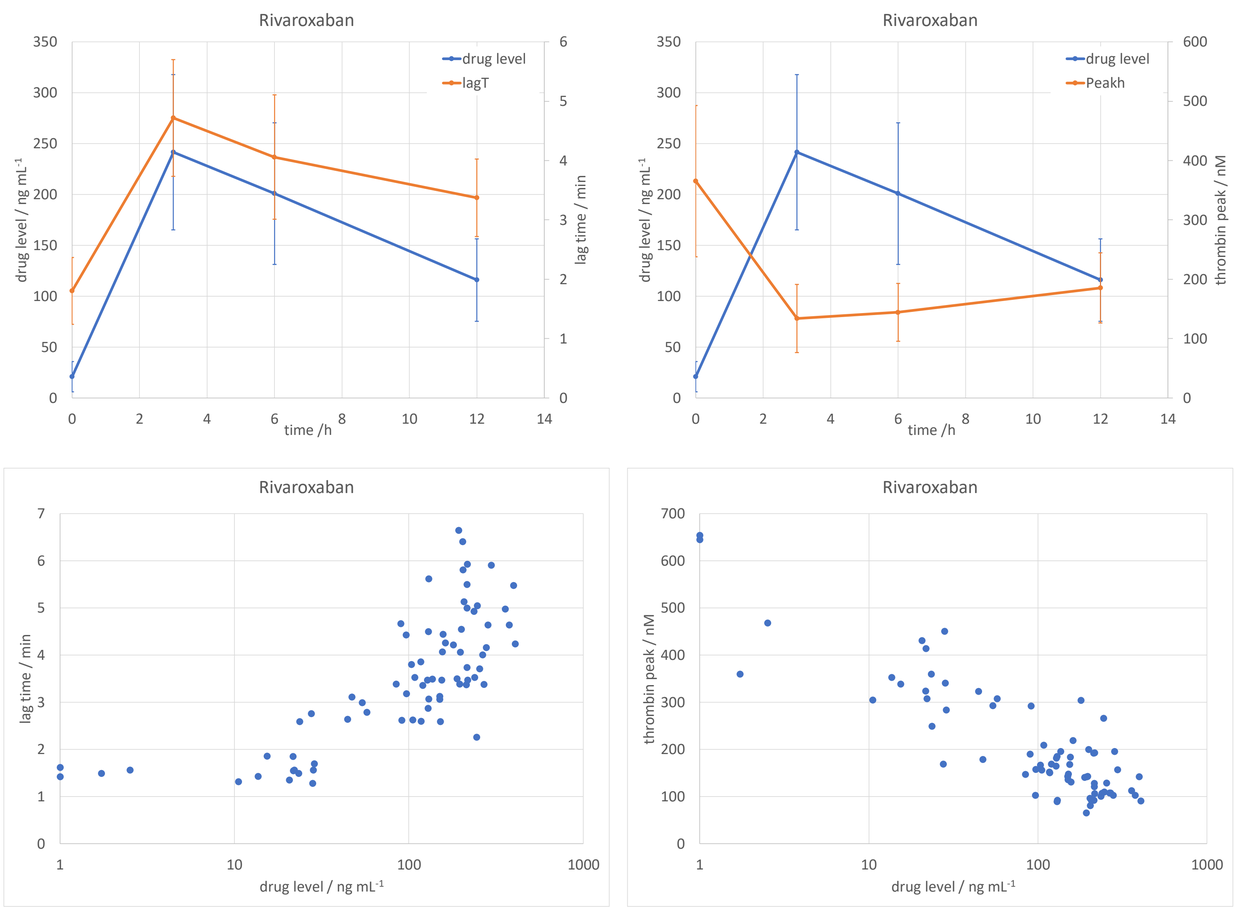


Figure 1: The dose and time-dependent inhibition of thrombin generation by rivaroxaban, measured as *lag time*, *thrombin peak*, *velocity index* and *Endogenous Thrombin Potential* on the ST Genesia system (average and SD, N = 19)

Conclusions

Quantifying the impact of an anticoagulant on the patient´s coagulation system is more preferable than merely assessing drug levels. ST Genesia allows assessing thrombin generation with a high grade of standardization while requiring little technical effort. The effect of DOACs on TG is variable, depending on their target. STG is a promising tool for multicenter studies as well as for routine clinical application.

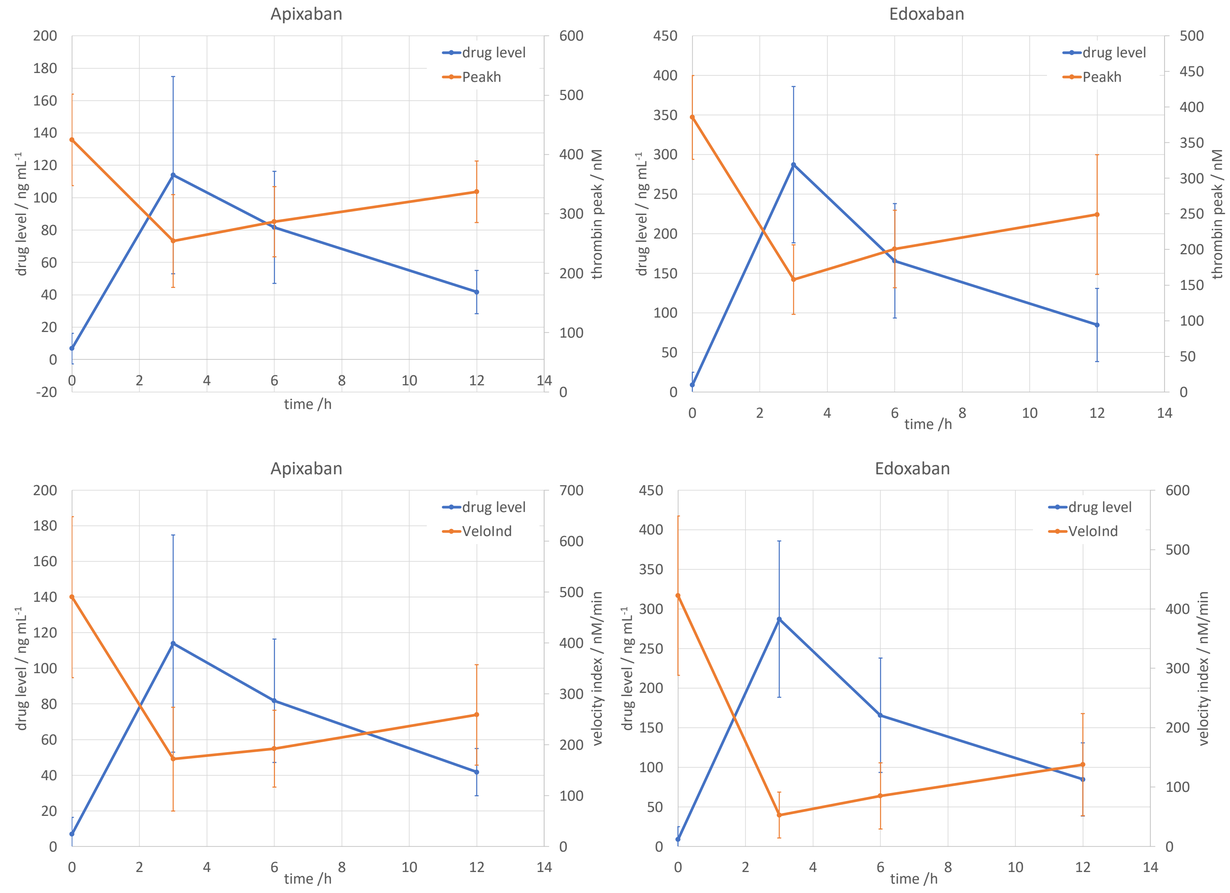


Figure 2: The dose and time-dependent inhibition of thrombin generation by apixaban and edoxaban, measured as *thrombin peak and velocity index* on the ST Genesia system (average and SD, N = 20)

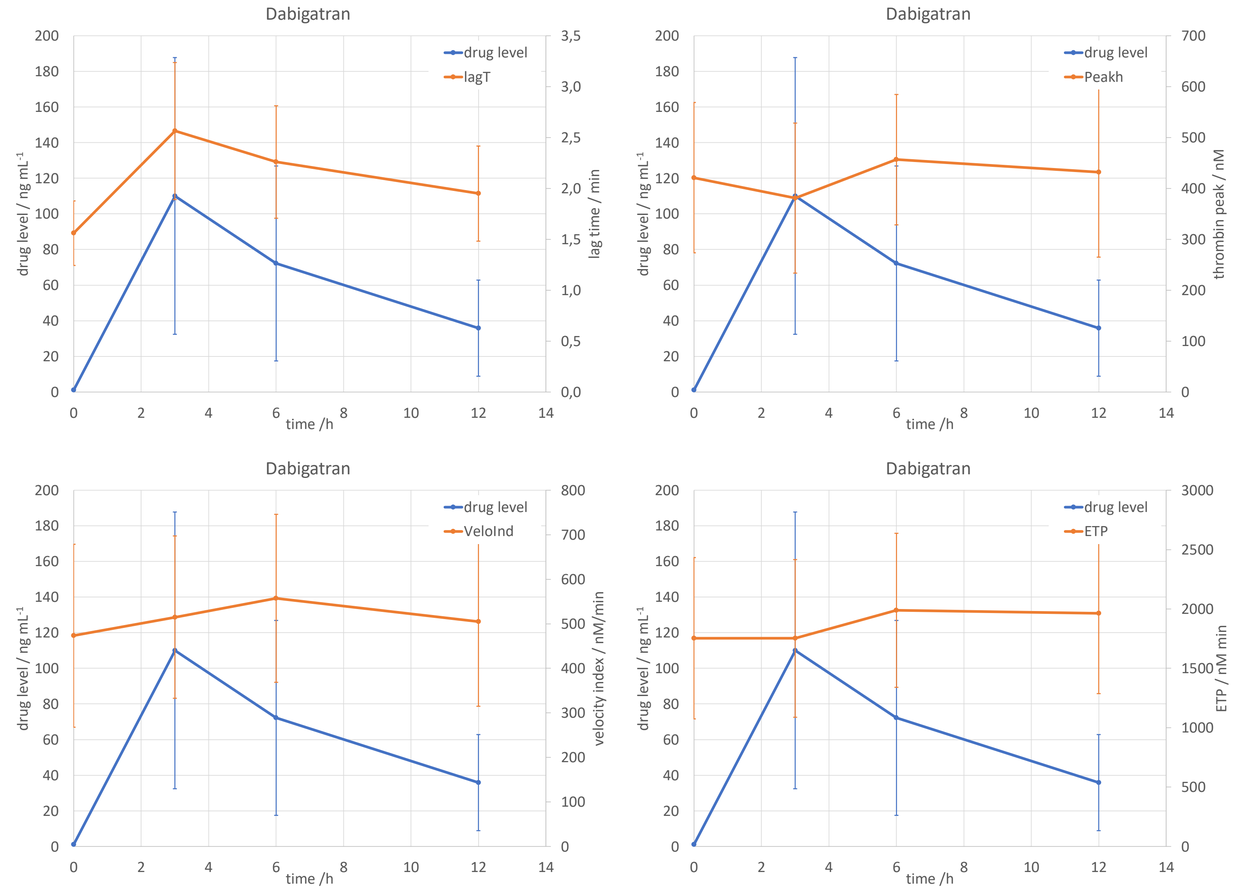


Figure 3: The dose and time-dependent inhibition of thrombin generation by dabigatran, measured as *lag time*, *thrombin peak*, *velocity index* and *Endogenous Thrombin Potential* on the ST Genesia system (average and SD, N = 19)