

LABQUALITY DAYS

Assessment of Stability of Activated Partial Thromboplastin Time, D-Dimer, Fibrinogen, and Thrombin Time Under Different Storage Conditions in Human Plasma

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Introduction

Various pre-analytical factors can affect the accuracy of coagulation test results. These factors include the sampling technique, order of draw, anticoagulant type and concentration, hematocrit levels, tube filling, transportation, centrifugation, temperature, the time between collection and testing, as well as storage and assay methods. We took a closer look at the effects of storage time and temperature on commonly performed coagulation tests.

Aims

In this study, we aimed to determine the effects of storage time and temperature on commonly performed coagulation tests such as activated partial thromboplastin time (APTT), D-dimer (DD), fibrinogen (FBG), and thrombin time (TT) in human plasma.

Methods

Whole blood samples from 80 patients were collected in a 3.2% sodium citrate vacutainer. The blood was centrifuged within two hours of collection at an RCF of 2,000 g for 15 minutes, and the platelet-poor plasma obtained was analyzed for APTT, DD, FBG, and TT tests. For APTT, DD, and FBG tests, the remaining sample was split into two parts. The first part was kept at room temperature, testing was repeated at 4 hours, 6 hours, and 8 hours from sample collection time. The second part was frozen at -18°C, testing was repeated the following day, 24 hours from sample collection time. For TT tests, the sample was only frozen and tested the following day, 24 hours from sample collection time. Tests were performed on a fully automated coagulation analyzer. The percentage change of the results from baseline (first test) for APTT, DD, FBG, and TT tests was also studied. A percentage change of more than $\pm 5\%$ from baseline was considered as a clinically significant change.

Results

A total of 79 samples were evaluated. In the freezer, the samples were stable for DD, FBG, and TT tests at 24 hours, showing a change of $<5\%$ from baseline. In comparison, the samples for the APTT test were not stable at 24 hours, showing a change of 10.6% on average. At room temperature, the samples were stable for DD and FBG tests for up to 8 hours, and for APTT tests for up to 4 hours, showing a change of $<5\%$ from baseline. However, the samples for the APTT tests were not stable at 6 hours and 8 hours, showing a change of 9.0% and 9.3% on average, respectively, from the baseline.

Conclusions

In conclusion, the patient plasma samples for DD, FBG, and TT tests could be safely stored for up to 24 hours in the freezer, whereas the samples for APTT could not. At room temperature, samples for DD and FBG tests could be safely stored for up to 8 hours, while the samples for APTT could be stored for up to 4 hours.
