Quantitative Estimation of Preanalytical Variables Which May Influence the Determinations of Prothrombin Time (PT) and Activated Partial Thromboplastin Time (APTT)  
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Abstract: Prothrombin time (PT) and activated partial thromboplastin time (APTT) tests principally measure the time for a fibrin clot developed in citrated plasma after activation. For the complexity of chemical reactions, a number of preanalytical variables potentially influence the outcome of results. In the present study, we evaluated some preanalytical variables frequently encountered in clinical settings. The volumes of citrated whole-blood specimens collected from inpatients widely varied from 0.99 ml to 2.90 ml indicating 1.6% of unacceptable rate, whereas none of the specimens from outpatients was out of acceptable range. The citrated whole-blood volume significantly affected the determinations of both PT and APTT; the results indicating the more volume the longer clotting time. Also, whole-blood specimens collected in EDTA-2K revealed significantly prolonged PT and APTT values in healthy subjects and the patients with anticoagulant therapy of heparin and of warfarin. Storage conditions, time and temperature might influence the PT and APTT values. In particular, citrated whole-blood specimens stood at room temperature revealed the prolonged clotting time in APTT assay by hours. The effects of other variables evaluated such as a half-volume adjustment, needle gauge or syringe type were negligible.

With these results, it was concluded that; first, an accurate venipuncture is critical, particularly venipuncture from patients in wards where many different physicians and nurses are in charge and in changing by days. Secondly, the citrated whole-blood specimens should be assayed quickly without any unnecessary storage at room temperature beyond four hours.

Key words: preanalytical variables (測定前変動要因), prothrombin time (プロトロンビン時間), activated partial thromboplastin time (活性化部分トロンボプラスチン時間), venipuncture volume (採血量), anticoagulant (抗凝固剤)