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Assessment of the Effects of Delay in Separation of Plasma and Analysis, on Pre-Analytical Stability of Plasma Adrenocorticotropic Hormone

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Background: Adrenocorticotropic hormone (ACTH) is an unstable pituitary hormone circulated in very low concentrations in blood. Therefore, strict procedures are followed in plasma ACTH assay in current laboratory settings such as immediate refrigerated centrifugation and analysis after collection. But delay of sample analysis can occur due to unavoidable reasons at any time in practice. This study enables to expand the knowledge related to maximum acceptable time delay and effect of plasma separation for plasma ACTH assay to achieve a clinically acceptable test result.

Objectives: To investigate the in-vitro stability of human plasma ACTH until separation of plasma and acceptable time delay until sample analysis in chemiluminescence immunoassay (CLIA) platform at 2-8 ⁰C

Methods: Retained samples which were received for ACTH assay were obtained for the study (n = 8). Each sample was divided into two portions; A and B. Each protocol was done for time delays of 2 hours, 4 hours, 8 hours, 24 hours and 48 hours. In protocol A, whole blood was immediately centrifuged and plasma aliquots were stored at 2-8 ⁰C and analyzed at each time point. In protocol B, whole blood was divided into 5 aliquots and stored at 2-8 ⁰C, plasma was separated at each time point and analyzed. Sample aliquot analyzed at standard conditions was taken as baseline value for each sample. Percentage difference in ACTH value >10% was considered as clinically significant.

Results: It was noted that ACTH levels decreased with time in both protocols. However, the mean percentage differences of both protocols were <10% up to 8 hours after sample collection, and mean percentage differences of protocol A were less than that of protocol B. p values were >0.05.

Conclusions: This study shows that maximum acceptable time delay for plasma ACTH assay is 8 hours for both plasma and for whole blood at 2-8 ^{0}C. However, immediately centrifuged and separated plasma is better than whole blood samples.

Keywords: ACTH, Analysis, Plasma separation, Preanalytical stability, Time delay