EVALUATION OF THE HEALTH ID PSD MICROSAMPLING DEVICE FOR THE DETERMINATION OF TESTOSTERONE IN DRIED PLASMA OBTAINED FROM CAPILLARY BLOOD USING LC-MS/MS

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INTRODUCTION: Steroid hormones play essential physiological roles in the body. Recently, monitoring the plasma levels of these hormones, especially testosterone (T), has gained relevance. In this context, the use of dried capillary blood microsampling has emerged as a promising alternative to conventional phlebotomy. Collection devices capable of producing plasma from whole blood have demonstrated significant utility in clinical medicine. OBJECTIVE: To develop and validate a method using the HealthID PSD microsampling device for the determination of testosterone in dried capillary plasma (DPS) using liquid chromatography coupled to mass spectrometry (LC-MS/MS). In addition, to evaluate the correlation between the results obtained in venous plasma, collected by phlebotomy, and DPS. MATERIALS AND METHODS: The validation followed guidelines for bioanalytical methods and was adapted to the IATDMCT recommendations for dried samples. DPS was extracted and analyzed by LC-MS/MS. Chloride-corrected T concentrations were obtained by a correction factor applied to measurements in dried plasma extracts. The corrected concentrations were compared to those in venous plasma by Passing-Bablok (PB) regression. A multiplication factor, based on the mean difference between the corrected concentrations in DPS and venous plasma, was used for the prediction of venous T levels from measurements in DPS. RESULTS AND CONCLUSION: The method showed linearity from 1.63 to 104.02 nmol/L. Interassay precision ranged from 1.90 to 4.13% and intraassay precision from 5.59 to 7.24%. Accuracy ranged from 96.8 to 105.2%. Matrix effect ranged from -14.76 to 0.38%, and extraction yield was high at 89.7-92.5%. The interassay imprecision normalized by chloride ranged from 7.87 to 8.10% and the intraassay imprecision from 6.01 to 7.77%. No significant impact of hematocrit was observed. The analyte remained stable for up to 10 days at 22 and 40 ºC, allowing transportation without the need for refrigeration. DPS and venous plasma concentration of T were compared in a group of 52 male volunteers. A strong correlation between corrected T levels from DPS and venous concentrations was observed (r = 0.95), without presenting proportional or systematic differences. Therefore, the developed method is a promising and effective alternative for the clinical monitoring of T.

Keywords: Testosterone; Microsampling; Plasma separation device; Clinical monitoring; HealthID PSD.