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Abstract

Comparison of Immunoassay and Liquid Chromatography-Tandem Mass Spectrometry Methods in the Measurement of Serum Androstenedione Levels

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Background: Recent reports have described inherent problems with androgen immunoassays compared with mass spectrometry analyses. In this study, a new liquid chromatography-tandem mass spectrometry (LC-MS/MS) method was developed according to CLSI rules. The developed method was compared with two immunoassay methods, the enzyme-linked immunosorbent assay (ELISA) and radioimmunoassay (RIA).

Methods: After liquid-liquid extraction, a Shimadzu Prominence LC unit coupled to an ABSCIEX API 3200 mass spectrometer with atmospheric pressure chemical ionization was used to quantify serum androstenedione levels. Serum androstenedione results taken from tandem mass spectrometry were compared with the immunoassays.

Results: The androstenedione assay was linear up to 50 ng/mL. Lower limit of quantitation and lower limit of detection were 0.195 ng/mL and 0.097 ng/mL, respectively. This method was not affected by matrix effect and other steroid hormone interferences. In this study, the obtained recovery was 69 - 99%, carryover value was determined as 0.026 ng/mL. According to the results of an interference study, androstenedione bias % did not exceed the limit of allowable bias % and 88.7% recovery was acquired for androstenedione. In the LC-MS/MS and ELISA comparison study, the slope value was found as 18.412, intercept -22.87, and r2 value as 0.1033. In the LC-MS/MS and RIA comparison study, slope value was found as 1.085, intercept 0.4541, and r2 value as 0.3712. In the RIA and ELISA comparison study, slope value was found as 9.57, intercept -15.5, and r2 value as 0.19.

Conclusions: The LC-MS/MS provides agreement with the results of radioimmunoassay but not with ELISA. This method offers better selectivity compared to immunoassay systems.

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