Abstract

Congenital adrenal hyperplasia (CAH) is an autosomal recessive disease that causes a disorder of steroidogenesis in the adrenal cortex. This disease is a part of a panel of diseases searched in preclinical nationwide neonatal screening. The methodology is based on measuring the concentration of 17-hydroxyprogesterone (17-OHP) in a dried blood spot using fluorescence immunoassay (FIA). However, this determination is not entirely specific and generates a high rate of false positive results (up to 4.3 %). In this diploma thesis the LC-MS / MS method was developed. This method measures selected steroid hormones involved in cortisol metabolism with respect to the diagnosis of CAH disease. The method was validated and applied to clinical samples, it identified CAH patients from negative controls and significantly reduced the false positivity of neonatal screening results. Compared to the FIA results, the LC-MS / MS method reduced false positivity up to 50 % by evaluating the concentration of 17-OHP. Moreover, by extending the diagnostic algorithm with other measured markers, the reduction was enhanced up to 98%. The developed method is also applicable for the measurement of serum and plasma samples, respectively, and has become a part of the confirmation tests for suspected CAH screening findings.

Key words: Steroid hormones, congenital adrenal hyperplasia, dried blood spot, tandem mass spectrometry, newborn screening