Steroid Hormones in Predicting the Effectiveness of Reductive Treatment
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Introduction: The enzyme 11beta-hydroxysteroid dehydrogenase type 1 (11β-HSD 1) is responsible for the majority of the extra-adrenal production of glucocorticoids by the regeneration of inactive cortisone to biologically active cortisol. Its elevated activity and expression is associated with the development of obesity and metabolic syndrome. The enzyme also catalyzes the inter-conversion of 7α-hydroxy- and 7β-hydroxy-dehydroepiandrosterone (DHEA) into 7-oxo-DHEA. Based on the levels of selected circulating steroids, we developed a predictive mathematical model of effectiveness of reductive therapy. Methods/design: The cohort of 282 obese adolescents, 154 girls (median age 15.31, range 14.17-16.68 years) and 128 boys (median age 14.95, range 13.87-16.16 years), BMI (Body Mass Index) 90th was examined. Circulating levels of cortisol, cortisone, DHEA, 7-oxo-, 7α-hydroxy-7β-hydroxy- and 16α-hydroxy-DHEA were analyzed by a novel liquid chromatography-tandem mass spectrometry method. The Orthogonal Projections to Latent Structures (OPLS) model was calculated to quantify the prediction ratio. Results: A significant reduction in circulating levels of cortisone, E2 and increased levels of 7β-hydroxy-DHEA after the reductive treatment was observed. Levels of cortisol, DHEA, DHT sustained without any significant change. The predictive OPLS model reveal the basal levels of 7α-hydroxy-DHEA, DHEA, cortisol and E2 as the strongest predictors of reduction treatment efficacy. Conclusion: DHEA and its 7-hydroxylated metabolites showed significance to the prediction of reductive treatment efficiency. Our findings support a role of 11β-HSD 1 as well as derivatives of DHEA in the control of human metabolism. Acknowledgement: Funded by IGA MZCR NT/12211.