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URINARY STEROID PROFILES BY GAS CHROMATOGRAPHY-MASS-SPECTROMETRY IN PATIENTS WITH VARIOUS ADRENAL DISEASES

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Determination of steroids and their metabolites in urine by gas chromatography with mass-spectrometric detection (GC-MS) is a powerful diagnostic tool in the study of adrenal diseases. Sample preparation conditions (hydrolysis, extraction, derivatization) and chromatographic separation of 66 steroids (androgens, glucocorticoids, mineralocorticoids and their precursors) were optimized. We analyzed urinary steroid profiles (USP) in 29 obese patients (OB), 45 patients with Cushing's syndrome (CS), 28 patients with Cushing's disease (CD), 16 patients with malignant corticosteroma (MC) and 27 healthy people. USP were performed on a gas chromatograph-mass spectrometer SHIMADZU GCMS-QP2010 ULTRA. OB patients had increased urinary excretion of androgens [androsterone (An), 11-OH-An, androstenedione-17 β (17 β dA2)], glucocorticoids [allo-tetrahydrocortisol (allo-THF), allo-tetrahydrocorticosterone (allo-THB), tetrahydro-11-dehydrocorticosterone (THA) and cortolones]. Increased allo-THF/5 β -THF, allo-THB/THB and 11-OH-An/11-OH-Et ratios may indicate an increase of 5 α -reductase activity, a depression of THF/THE and THB/THA ratios indicated a decrease of 11 β -hydroxysteroid dehydrogenase (11 β -HSDH) type I activity in OB patients. Patients with CS and CD had increased excretion of the following glucocorticoids: tetrahydro-11-deoxycortisol (THS), THE, 5 β -THF, 5 β -THB, cortolones, cortols, dihydrocortisone and dihydrocortisol. Decrease of urinary excretion of An, etiocholanolone (Et), dehydroepiandrosterone (DHEA) and androstentriole (dA3) had patients with CS, increased urinary excretion of androgens had patients with CD. Patients

with MC received 2 USP types by GC-MS. Common features of MC were increasing urinary excretion of THS (>1500 μ g/24 h), pregnantriol (P3), 11-oxo-P3, pregnendiol (DP2) pregnetriol (DP3), 16-OHDP2, 16-OHDP2-3 β , DP3-3 β , 16-OH-pregnenolone (16dP), 21dP, 11DP3. Additional features of ACC in 6 MC patients (type 2) increased urinary excretion of DHEA (>2500 μ g/24 h) and its metabolites (17 β dA2, 16-OHDEA, 16-oxo-dA2, dA3). A decrease of An/Et and allo-THF/5 β -THF ratios may indicate an increase of 5 β -reductase activity, increased THF/THE, (THF+allo-THF)/THE, (THF+allo-THF+cortols)/(THE+allo-THE+cortolones) and THB/THA ratios may indicate the decreasing of 11 β -HSDH type II activity in patients with CS and MC.

Biography

Ekaterina V. Malevanaia has completed her PhD at the age of 26 years from Saint-Petersburg State University, Saint-Petersburg, Russian Federation. She is a senior researcher of Research laboratory of chromatography in North-Western State Medical University named after I.I. Mechnikov, Saint-Petersburg, Russian Federation. The area of her interests is steroidogenesis, steroid hormones, adrenal diseases, chromatography (HPLC, GC-MS). She has more than 10 articles in Russian journals and more than 30 abstracts. The results of the research group, which includes Ekaterina Malevanaia, under the leadership of Dr. L.Velikanova were published in the form of two patents: «Diagnostic technique for pathologies related to endocrinopathies», «Differential diagnosis technique of adrenal neoplasms».

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