

0172 - STEROID PROFILING BY ULTRA-HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY (UHPLC-MS/MS) FOR THE ASSESSMENT OF HYPERANDROGENEMIA IN ADOLESCENTS WITH POLYENDOCRINE METABOLIC OVARIAN SYNDROME (PMOS).

Mode: Research paper

Thematic Unit: Puberty

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Background/Objectives: PMOS is a common endocrine disorder that often emerges during adolescence. It is characterized by oligoanovulation, clinical and/or biochemical hyperandrogenism, and frequent glucose and lipid impairments. This study assessed UHPLC-MS/MS steroid profiling of $\Delta 5$ and $\Delta 4$ pathways to explore hyperandrogenemia in adolescents with PMOS, and its association with metabolic parameters.

Methods: We conducted a prospective case-control study including 30 adolescents (Ethics approval CEI 23.30). PMOS group ($n = 22$) met the following inclusion criteria: amenorrhea/oligomenorrhea at least 2.5y of gynecological age (GA),

clinical signs of hyperandrogenism (hirsutism/severe acne), and biochemical hyperandrogenism. The control group consisted of 8 eumenorrheic girls, with normal BMI-SDS, without clinical or biochemical hyperandrogenism, matched by chronological and GA. UHPLC-MS/MS method was used to quantify $\Delta 4$ steroids: progesterone (P4), 17-hydroxyprogesterone (17-OHP4), androstenedione (A4) and testosterone (T), and $\Delta 5$ steroids: pregnenolone (P5), 17-hydroxypregnenolone (17-OHP5), and dehydroepiandrosterone (DHEA). Free T and HOMA-IR were calculated. Product-to-precursor ratios were calculated to estimate steroidogenic enzyme activities. Lipid profile and SHBG were also measured. Data are presented as mean $\pm$ SD.

Results: PMOS group had higher T (43 ± 22 vs. 23 ± 6 ng/dL) and A4 (191 ± 101 vs. 107 ± 40 ng/dL), and lower P5 (0.7 ± 0.3 vs. 1.6 ± 1.4 ng/mL) and 17-OHP5 (3.3 ± 2.3 vs. 7.0 ± 5.3 ng/mL) compared with controls, $p < 0.01$. Regarding the cardiometabolic profile, the PMOS group presented 81% HOMA-IR > 2.5 , 65% insulin > 17 μ IU/mL, 62% low HDL-C (90 mg/mL). When androgen levels were analyzed according to these cut-offs, patients with hypertriglyceridemia exhibited significantly higher A4 (231 ± 93 vs 137 ± 47 ng/dL), T (51 ± 18 vs 32 ± 13 ng/dL), and free T (1.28 ± 0.69 vs 0.59 ± 0.31 ng/dL) compared with those with normal triglyceride levels (p

Conclusion: UHPLC-MS/MS-based steroid profiling enabled the characterization of hyperandrogenemia in adolescents with PMOS. Beyond confirming androgen excess, the panel suggested increased 3β -HSD and CYP17-20 lyase activities favoring androgen synthesis, which were associated with a worsened lipid profile.

