Features of Hormonal Status in Adolescent Girls for the Prediction of Ovarian Reserve

Suraya Yuldasheva *
Associate Professor, Department of Obstetrics, Gynecology and Pediatric Gynecology, Tashkent State Medical University, Tashkent, Uzbekistan

Hakimakhon Ibragimova
Department of Obstetrics and Gynecology, Fergana Medical Institute of Public Health, Fergana, Uzbekistan

Najmiddin Quzibaev
PhD student, Department of Pediatric and Adolescent Gynecology, Tashkent State Medical University, Tashkent, Uzbekistan

Benko Vladimir
PhD Student, Department of Pediatric and Adolescent Gynecology, Tashkent State Medical University, Tashkent, Uzbekistan

Laylo Madaminova
PhD Student, Department of Pediatric and Adolescent Gynecology, Tashkent State Medical University, Tashkent, Uzbekistan

Abstract

Background: Adolescence is a critical period for the formation of the reproductive system, characterized by significant neuroendocrine, somatic, and metabolic transformations. Hormonal regulation during this phase is highly variable and unstable. Early detection of hormonal imbalances is strategically important for predicting future gynecological and endocrine disorders, including diminished ovarian reserve (DOR).

Purpose: The aim of this study was to assess the hormonal profile of adolescent girls aged 14-18 and to determine clinical and diagnostic predictors of early ovarian dysfunction associated with the risk of decreased ovarian reserve.

Materials and Methods: A cross-sectional study involved 57 adolescent girls with menstrual disorders (secondary amenorrhea, oligomenorrhea, irregular menstruation) and 50 healthy controls. Participants were divided into three groups: Main Group (n=29, with DOR), Comparison Group (n=28, with menstrual disorders but normal reserve), and Control Group (n=50, healthy). Comprehensive assessment included clinical history, pelvic ultrasound (ovarian volume, antral follicle count - AFC), and hormonal profiling (FSH, LH, AMH, progesterone, prolactin, free testosterone, TSH, fT4, fT3, anti-TPO). Statistical analysis was performed using SPSS/MedCalc.

Results: Significant differences were found between groups. The Main Group (DOR) had later menarche (13.4±0.2 vs. 12.2±0.24 years in controls, $p<0.01$) and longer amenorrhea duration (7.9±0.5 months). Hormonal analysis revealed significantly higher FSH (7.1±0.32 mIU/ml), LH (8.2±0.41 mIU/ml), prolactin (22.4±1.1 ng/ml), free testosterone (4.9±0.24 pg/ml), TSH (3.42±0.15 μIU/ml), and anti-TPO (38.6±2.4 IU/ml) in the Main Group compared to controls ($p<0.05$ for all). AMH (1.12±0.08 ng/ml) and progesterone (0.71±0.06 ng/ml) were significantly lower ($p<0.0001$). Strong positive correlations were found between AMH and AFC ($r=+0.76$, $p<0.001$), and negative correlations between AMH and FSH ($r=-0.62$, $p<0.001$) and amenorrhea duration ($r=-0.48$, $p<0.001$). ROC analysis identified AMH <1.4 ng/ml and AFC <6 as the most sensitive predictors of DOR.

Conclusion: A complex of interrelated hormonal disorders (hyperprolactinemia, hyperandrogenism, subclinical thyroid dysfunction) is prevalent among adolescents with menstrual disorders and is closely associated with early signs of diminished ovarian reserve. Levels of AMH, FSH, and free testosterone are the most significant biomarkers. Comprehensive hormonal assessment in adolescence should form the basis for personalized predictive strategies to preserve long-term reproductive health.

Keywords

Ovarian Reserve, Adolescent Girls, Hormonal Markers, Anti-Müllerian Hormone (AMH), Reproductive Health, Predictive Diagnostics.