Usefulness of 3D ultrasonography for assessment

of the morphology of the ovary in adolescents with hyperandrogenism

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Objectives:

Polycystic ovary morphology (PCOM) in USG should not be identified with polycystic ovary syndrome (PCOS) and it is not a criterion for diagnosis of this syndrome in adolescents.
Objective and hypotheses: Assessment of the usability of 3D ultrasonography in diagnostics of androgen excess disorders.

Methods:

Forty girls aged 14-18 with hyperandrogenism were subjected to endocrinological examinations and transrectal USG of the reproductive organ. The patients were divided into two groups: I - girls with PCOS and II - girls that did not meet the criteria for the diagnosis of PCOS (regularly menstruating girls).

Ultrasound examinations were performed with a Voluson Expert E8 (GE Healthcare Technologies, Milwaukee, WI, USA) ultrasound scanner using an endovaginal/endoanal volumetric transducer RIC5-9D. The scans were performed from the endoanal access. Each scan consisted of 2D (two dimensional) B-mode assessment of the uterus and ovaries and subsequently 3D (three-dimensional) scan of the organs, and was post-processed with the use of the SonoAVCTM follicle (Sonographic automated volume count follicle) software. SonoAVC™ is a dedicated gynaecological software which automatically identifies, counts, and measures follicles within a 3D volume. 3D ultrasound facilitates standardization of ultrasound examination through the automated multi-planar approach. Informed consent was obtained from all patients and parents.

The ovary in 3D ultrasound in girls without PCOS

The ovary in 3D ultrasound in girls with PCOS
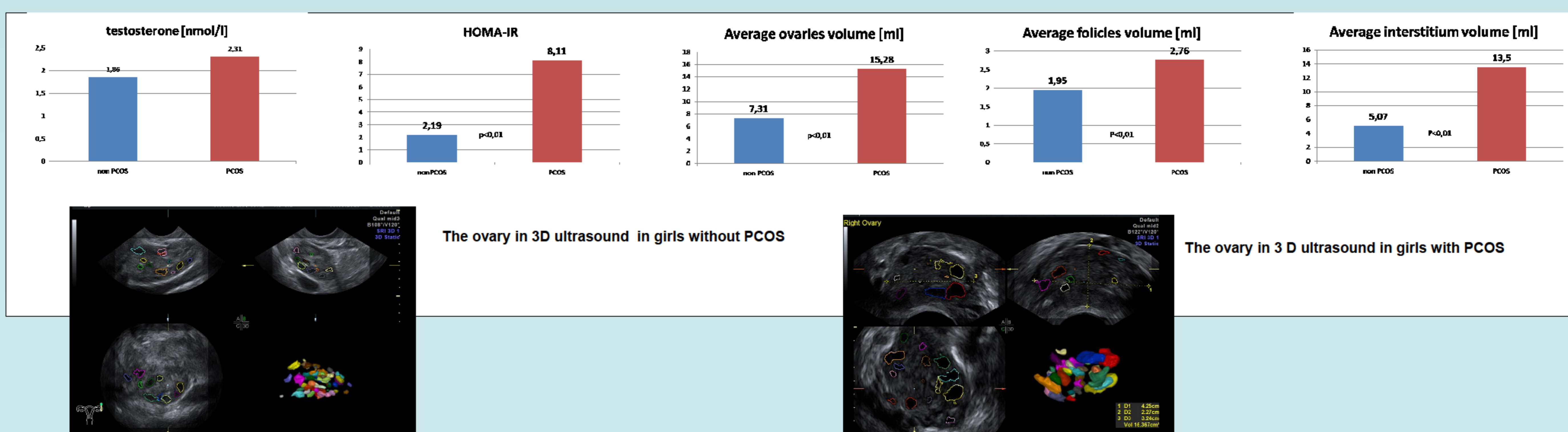
Results:

In both groups, there was a correlation between the size of both ovaries and hyperinsulinemia defined by the level of insulinemia > 100mU/l in 75g oral glucose load test. No correlation was found between the HOMA IR (p=0,045 vs. 0,968) and the ovary volume; comparison of the groups showed that the value was significantly higher only in group PCOS (p =0.005 vs p = 0,218). There was no significant correlation between the number of ovary follicles and insulinemia (for OGGT; p=0,740and HOMA IR; p = 0,699). The mean level of androgenemia in groups I and II (FAI = 12,44 vs 5,97, respectively) and the mean number of follicles in the right ovary (26,81 vs 17,89) were significantly higher in the group of adolescents with PCOS.
Displaying ovarian follicles in a 3D mode allows an easy visual depiction of the geometric shape of individual follicles and thus enhances the optimal evaluation of the ovary. SonoAVC standardizes the process of follicular assessment and decreases inter-observer and intra-observer variability. The ability to automate follicular assessment using ultrasound enhances the efficiency and reproducibility of follicular volume measurement. Additionally, SonoAVC increases the efficiency of ultrasound follicular monitoring by eliminating the need to measure each individual follicle. Follicular assessment utilizing two-dimensional (2D) ultrasound imaging has been met with many challenges, inconsistencies, and irregularity from user to user.

Conclusions:

Our observations indicate that, in adolescents with hyperandrogenism, the size of the ovary rather than the number of follicles correlates considerably better with endocrine disorders, since androgens are produced in the interstitial ovary cells. It seems that hyperinsulinemia is one of the most important factors determining the ovary size in adolescents. Evaluation of ovaries by the 3D ultrasound technique facilitates accurate measurement of the volume of the ovary and can be a useful tool for examination of girls with hyperandrogenism

References:

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