

Anti-Müllerian Hormone and Leutinising Hormone to Follicle Stimulating Hormone Ratio in the Diagnosis of Adolescent Girls with Polycystic Ovarian Syndrome



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Background

Diagnosis of polycystic ovarian syndrome (PCOS) during adolescence is challenging as the criteria overlap with pubertal physiological events. The international evidence-based guidelines defined the criteria for PCOS diagnosis during adolescence using irregular menstrual cycles according to years post-menarche and hyperandrogenism (Pena et al. 2020). The guidelines note emerging evidence for the use anti-Müllerian hormone (AMH) in PCOS diagnosis, highlighting the need for more evidence for a specific recommendation. There is no data on the use of AMH and the ratio of the proAMH to total AMH ratio in the diagnosis of PCOS during adolescence.

Objectives

To evaluate if the use of the ratio of proAMH to total AMH and LH/FSH ratio is useful in the diagnosis of PCOS during adolescence.

Methods

Cross sectional study of 41 adolescents with PCOS diagnosed according to international evidence-based guidelines (Pena et al. 2020). Adolescents were recruited consecutively from paediatric and gynaecology clinics at the Women's and Children's Hospital in Adelaide. The Women's and Children's Hospital's Human Research Ethics Committee approved the study (HREC/18/WCHN/101). Adolescents had AMH, pro-AMH, LH, FSH, total testosterone, sex hormone binding globulin and (SHBG) measured in addition to demographic and clinical data.

Serum total AMH concentrations were measured using a commercial enzyme-linked immunosorbent assay kit (A79765; Beckman Coulter) and ProAMH was assayed with a modified version of the total AMH assay kit. The intra-assay variation was 8.8 %CV for the total AMH assay and 11.2 %CV for the proAMH assay.

References

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Results

Forty-one adolescents with confirmed PCOS participated in the study (21 Caucasian, 14 Asian, 2 Indigenous and 4 others) (Table 1). Mean \pm SD LH/FSH ratio was of 2.21 \pm 1.65. Thirty one out of 41 girls (76%) had an LH/FSH ratio >1. Mean LH/FSH ratio was significantly greater than 1.23, considered to be the cut off for normal ($p=0.0004$), with 95% confidence intervals of 1.76 and infinity (Khashchenko et al. 2020). Total AMH and proAMH were significantly higher in our cohort of adolescents with PCOS than our previous data in healthy adolescents (Pankhurst, Dillingham & Pena 2021) (figure 1). AMH or proAMH were not related to LH/FSH ratio (p values 0.8008 and 0.2189).

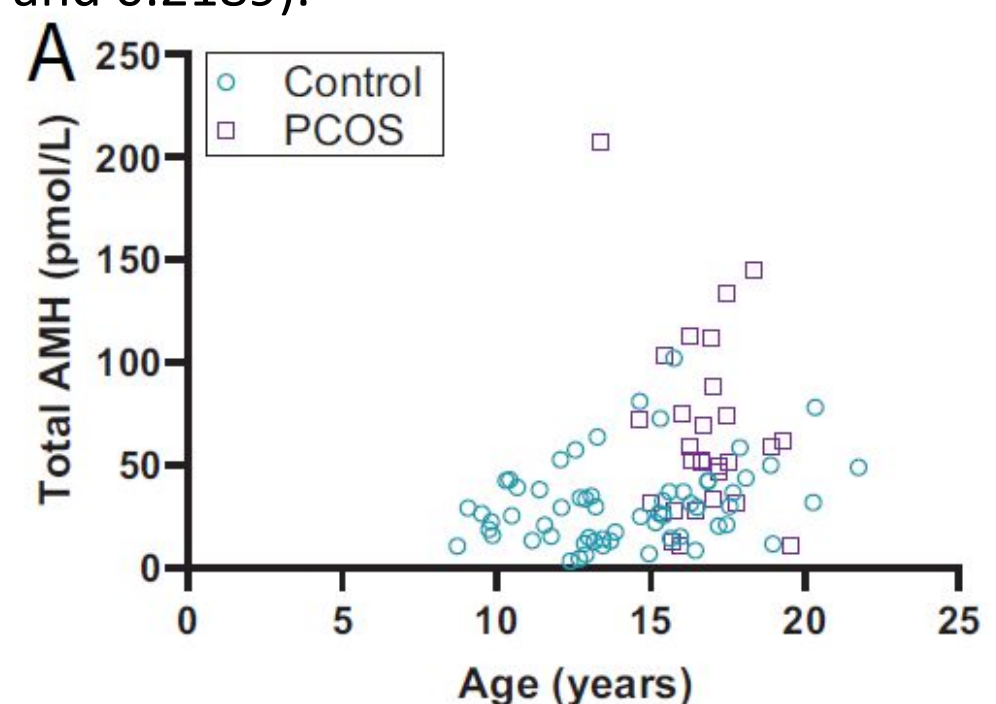


Figure 1: Control AMH vs PCOS AMH (Pankhurst, Dillingham & Pena 2021)

Discussion & conclusion

AMH, pro-AMH levels and LH/FSH ratio could be used to improve the diagnostic accuracy of PCOS in adolescent girls.

Characteristic	N = 41 ¹
Age (years)	16.64(15.71,17.21)
Free Androgen Index (%)	6(3,14)
Testosterone (nmol/L)	1.67(1.08)
Sex Hormone Binding Globulin (nmol/)	23(13,48)
Leutinising Hormone (IU/L)	11.0(5.8,15.5)
Follicular Stimulating Hormone (IU/L)	5.37(1.44)
Pro-AMH (pmol/L)	17(10,27)
Total AMH (pmol/L)	52(29,74)
BMI (Kg/m ²)	30(24,37)
Menarche (years)	11.77(2.51)

¹Median(25%,75%); Mean(SD); n (%)

Table 1: Demographics and results

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