DETERMINATION OF A POPULATION-SPECIFIC ANTI-MULLERIAN HORMONE CUTOFF VALUE FOR EVALUATION OF POLYCYSTIC OVARY SYNDROME

Authors: Knutson A, Lennon C, Dye T, Li D, Razak I, Irvine C, Hoeger K

Affiliations: Department of Obstetrics and Gynecology, University of Rochester, Rochester, NY, USA

Background

The updated 2023 International Evidence-Based Guideline for the Assessment and Management of PCOS identifies anti-mullerian hormone (AMH) as a new adjunct diagnostic tool in the evaluation of polycystic ovary syndrome (PCOS) in adults (1). These recommendations were largely informed by a recent meta-analysis examining the role of AMH in PCOS diagnosis (2). Multiple factors influence AMH levels and cause heterogeneity as well as limitations in this study. Consequently, no international cut-off value could be recommended, emphasizing the need for research on more individualized cut-off values. It is up to individual clinics to determine AMH cutoffs appropriate to their own populations.

Objective

We sought to identify an AMH cutoff within our patient population that can appropriately select for patients with PCOS through methodology which can be replicated by other clinics for their unique populations.

Materials and Methods

A single-site, retrospective cross-sectional study was performed among female subjects aged 20-40 who had a serum AMH obtained within our health system between 12/2018 and 12/2023. Subjects were categorized as PCOS (defined as the presence of at least 2 of the following: 1) physical or biochemical evidence of hyperandrogenism; 2) irregular menses; 3) polycystic ovarian morphology) or controls without PCOS. Diagnosis was confirmed through chart review. Exclusion criteria included hyperprolactinemia, congenital adrenal hyperplasia, and history of prior ovarian surgery. Contraceptive use prior to and at the time of AMH draw was recorded. Elecsys® AMH Assay (Roche Diagnostics) was utilized for all AMH samples. Receiver operating characteristic (ROC) curves were generated to identify an optimal AMH cut-point to distinguish between PCOS identified clinically and control populations who had no characteristics of PCOS. All analyses were performed using R Statistical Software (v4.4.1; R Core Team 2024).

Results

185 subjects with PCOS and 186 controls without PCOS met inclusion criteria. The mean AMH among PCOS subjects was 6.89 ng/mL ± 4.28 while the mean AMH among controls was 2.72 ng/mL ± 2.02. After adjusting for BMI, an ROC curve was generated with an AUC 0.9076. The optimal cutoff AMH value was 4.16 ng/mL with a sensitivity of 85.4%, 95% CI [80.2%, 90.6%], specificity of 86.1% [80.8%, 91.3%], positive predictive value of 86.9% [81.9%, 91.9%] and negative predictive value of 84.5% [79.1%, 90.0%]. Compared to subjects meeting two PCOS diagnostic criteria, the population meeting 3 criteria had a higher AUC (0.8892 vs 0.9223, respectively) and a lower optimal AMH cutoff point (4.50 ng/mL vs. 4.10 ng/mL, respectively).

Conclusions

With use of ROC curves, a serum AMH cutoff value was identified that accurately distinguished between subjects with and without PCOS among our local health system population. When fewer clinically distinguishing features were present (2 PCOS diagnostic criteria vs. 3) a higher optimal AMH cutoff value was needed to accurately predict PCOS status. This methodology can be used by other clinicians and health systems to determine AMH cutoffs to aid in PCOS diagnosis in their own local populations.

Financial Support

References

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