A single-centre evaluation of Elecsys Roche Automated anti-Mullerian hormone assay and comparison with the current clinical standard assay

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INTRODUCTION

What’s already known: Prediction of response and outcome in assisted reproduction is a central aspect of current practice, allowing greater individualization of treatment protocols, reducing the risk of potentially serious adverse effects such as ovarian hyperstimulation syndrome (OHSS) and at the other end of the spectrum of response, identifying ‘poor responders’ and thus overall providing more accurate information to patients.

Measurement of circulating AMH reflects the number of small antral follicles and is predictive of ovarian response. The Gen II assay is the most commonly used AMH assay in routine biochemistry at present, but persistent calibration/interference problems have been reported. Fully automated platform-based AMH assays are being developed, with the characteristics of one developed by Roche Diagnostics recently described.

Study question: What are the concordance and the repeatability in serum AMH determinations between the well established Beckman Coulter Gen II ELISA method and the novel Roche Elecsys Automated assay?

MATERIAL AND METHOD

Study design, size, duration: Transversal single centre study performed between September and December 2014. Samples from 277 patients submitted for AMH evaluation were determined with both assays. We selected randomly 66 samples for analysis of repeatability.

Participants/materials, setting, methods: All serum samples from patients referred for AMH at the Instituto Valenciano de Infertilidad from Valencia-Spain during the study period. Comparisons between two methods were assessed using Lin’s concordance correlation coefficient (using log transformed data to satisfy assumptions of normal distribution) and Bland–Altman plots using Pitman’s test to assess likelihood of bias.

RESULTS

Samples from 35 patients returned AMH results which were below the Limit of Detection (LoD)(5 of which were below the LoD on both assays). After excluding these samples for analysis of continuous data, median [interquartile range (IQR)] AMH was 13.0 pmol/l in the Gen II assay (6.8 –29.0 pmol/l) and 10.8 pmol/l (5.4 –22.4 pmol/l) in the Roche assay (P<0.0001).

The concordance between log-transformed values was \( \rho = 0.96 \) (95% CI 0.96 –0.97). The Passing–Bablok regression equation (Figure 1) was: \( y(\text{Roche assay in pmol/l}) = 0.51 + 0.75 \times \text{Gen II} \)

where Intercept (95% CI 0.36, 0.67) and slope (95% CI 0.74, 0.77)

Bland–Altman analysis showed evidence of bias in absolute measurements, such that samples with higher AMH concentration had higher estimates on the Gen II assay (Figure 2). The correlation between the difference and the mean was \( r=0.51, P<0.001 \).

CONCLUSIONS

Limitations, reasons for caution: The present study is a pragmatic assessment of the new assay under ideal conditions. Lot to lot variation could not be assessed. Demographics and outcomes of patients referred for AMH measurement were not known.

Wider implications of the findings: The new Elecsys Roche Automated assay performance characteristics are similar to the Gen II assay and may be suitable for clinical and epidemiological use. Enhanced sensitivity of the Elecsys assay enables measurement of low AMH concentrations, as well as a higher precision for high AMH levels. The Elecsys assay showed also a better repeatability.

Study funding/competing interest(s): Roche Diagnostics provided kits for this study free of charge. The manufacturer played no part in conducting assays or data analysis.