

Assessment of Ovarian Reserve Tests for Prediction of Oocyte yield and Change of Pregnancy after Ovulation Induction

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Ovarian reserve plays a crucial role in achieving pregnancy following any treatment in sub fertile women. Assessment of ovarian reserve is essential for prediction the ovarian response and outcome of In Vitro Fertilization. However, there are controversial opinions about advantages of the various ovarian reserve tests for prediction of IVF outcome.

Objective: The aim of this study was assessment of most widely used ovarian reserve tests: age, follicle stimulating hormone (FSH), antral follicle count (AFC), anti-Mullerian hormone (AMH) and determination of the most reliable markers of ovarian reserve for prediction the outcome of ovulation induction in terms of oocyte yield and chance of pregnancy.

Methods: The prospective study included 111 infertile women, who underwent IVF with or without ICSI. Patients with an oocyte count ≤ 3 were considered as poor responders (n=48); those with >3 were considered as good responders (n=68). AFC, levels of FSH and AMH were determined on day 3 of menstrual cycle.

Results: The results of the whole study shows that, the correlation between AMH and number of oocytes was the strongest ($r_s = 0.6$), as well as between AFC and number of oocytes ($r_s = 0.6$). There were statistically significant differences between two groups in all parameters. Poor responders were older, having higher FSH concentrations, lower AMH and AFC values and significantly lower number of retrieved oocytes and embryos compared with good responders ($p < 0.05$). Comparison between those with ongoing pregnancy (n=32) and those without (n=68) revealed that there were significant differences in age ($p = 0.000$), AMH ($p = 0.004$) and AFC ($p = 0.006$), as well as in number of retrieved oocytes ($p = 0.004$) and number of embryos ($p = 0.002$). Women with ongoing pregnancy were younger, had higher values of AMH, AFC, oocytes and embryos number. No significant differences were observed in concentrations of FSH ($p = 0.115$).

The binary logistic regression analysis for clinical ongoing pregnancy shows, that age is the only factor, which significantly predicted the likelihood of clinical ongoing pregnancy ($B = 0.14$; $p = 0.005$). The cut-off value of the age for prediction of the clinical pregnancy was 33.5 y ($ROC_{AUC} = 0.733$; sensitivity 79%, specificity 50%). Binary Regression Analysis for Poor Ovarian Response shows, that AFC is the only factor which significantly predicts poor response after ovulation induction. The cut-off value of AFC for prediction of poor response was 5 (ROC curves/area under the curve [AUC], $ROC_{AUC} = 0.816$; sensitivity 90%, specificity 65%).

Conclusions: AMH and AFC have the same values for prediction of oocyte and embryo number after ovulation induction. The levels of FSH have no predictive value for embryo number and chance of pregnancy during IVF. AFC is the most reliable predictor of poor ovarian response after ovulation induction during IVF. Among ovarian reserve tests Age is the only factor which significantly predicts the likelihood of cumulative ongoing pregnancy during IVF.