Anti-Müllerian Hormone as a Quantitative and Qualitative Marker of Euploid Blastocysts.

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Anti-Müllerian hormone (AMH) is widely used in clinical practice to predict the ovarian response after ovarian stimulation and is considered as valid as antral follicle count.[1] AMH has also been proposed as a qualitative marker of the reproductive competence of the oocyte or embryo, although some discrepancies have been described.

It has been postulated that, independent from age, ovarian reserve is associated with an increased rate of euploid blastocysts among patients with a normal response to ovarian stimulation.[2] On the other hand, when stratifying patients <38 years old, no significant differences in blastulation and aneuploidy rate has previously been observed in patients with diminished and reduced ovarian reserve.[3]

The purpose of this study was to evaluate, irrespective of age, the association between AMH values and the proportion of euploid embryos and blastocyst formation among patients who underwent intracytoplasmic sperm injection preimplantation genetic testing for aneuploidies (PGT-A).

A retrospective analysis was performed between March 2017 and August 2018 including couples who were planned for PGT-A. Patients were split into two groups and were analysed individually: the fresh group which comprised couples who underwent PGT-A with only fresh oocytes (n=516), and the vitrified group (n=184) in which vitrified oocytes were accumulated from 1.97 (±1.26) previous ovarian stimulation cycles, as a strategy to increase the number of potential euploid embryos. Vitrification and warming were performed with the Cryotop method (Kitazato, Biopharma). Trophectoderm biopsy samples were subjected to next generation sequencing to screen the cells. AMH serum levels (ng/mL) were determined using a commercial, fully automated Elecsys® assay (Roche) and values >5 ng/mL were excluded. Blastulation rate was defined as the number of fertilised embryos capable of cavitating on Day 5.

Linear regression analysis was conducted to verify the predictability of AMH values and the percentage of euploid embryos and blastulation rate on Day 5. A Poisson regression model was used to correlate AMH levels with the number of euploid embryos according to the number of embryos biopsied.

In the fresh group, the average maternal age was 35.8 years (± 5.95), AMH 1.95 ng/mL (±1.27), 54% (± 33%) blastulation rate on Day 5, 46% (± 35%) euploid rate. Higher AMH values were found to have a statistically significant effect on the percentage of euploid embryos (p=0.001) and blastocyst formation on Day 5 (p<0.001), as well as for the number of euploid embryos (p<0.001).

In the vitrified group, average maternal age was 38.6 (± 5.35), AMH 1.2 ng/ml (± 1.06), 8.43 (± 5.57) metaphase II oocytes warmed, 86% (± 21%) survival rate, 34% (± 33%) blastulation rate on Day 5, 31% (± 39%) euploid rate. As in the fresh group, higher AMH values were found to have a statistically significant effect on the percentage of euploid embryos (p=0.009) as well as for the number of euploid embryos (p=0.003). However, no significant difference was found between higher AMH levels and blastocyst formation (p=0.249).

The independent relationship between AMH and the percentage of euploid embryos suggeststhat AMH is not only a quantitative but

also qualitative biomarker of oocyte-embryo competence. As the effect of AMH on blastocyst formation is lost after oocyte vitrification, the use of oocyte accumulation should be further evaluated.

References

1. Himabindu Y et al. Anti-mullerian hormone and antral follicle count as predictors of ovarian response in assisted reproduction. J Hum Reprod Sci. 2013;6(1)27-31.
2. La Marca A et al. Female age, serum antimüllerian hormone level, and number of oocytes affect the rate and number of euploid blastocyst in vitro fertilization/ intracytoplasmic sperm injection cycles. Fertil Steril. 2017;108(5)777-83.e2.
3. Morin SJ et al. Diminished ovarian reserve and poor response to stimulation in patients <38 years old: A quantitative but not qualitative reduction in performance. Hum Reprod. 2018;33(8)1489-98.