Anti-Müllerian hormone, antral follicle count and follicle-stimulating hormone for predicting the number of oocytes retrieved in IVF/ICSI cycles

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Objective *To evaluate the efficacy of anti-Müllerian hormone (AMH), antral follicle count (AFC) and follicle-stimulating hormone (FSH) for predicting the number of oocytes retrieved in in-vitro fertilization/intracytoplasmic sperm injection (IVF/ICSI) cycles.*

Methods *In this retrospective study, a total of 122 infertile women were divided into two groups: group A, <35 years (n=71); group B, ≥35 years (n=51). AMH and FSH were determined on 2−5 d of the early menstrual cycle. AFC was tested on the second day of the menstrual cycle before the start of stimulation.*

Results *Group B had higher FSH levels compared with group A (8.2 ± 3.5 IU/L vs 6.8 ± 2.4 IU/L, P<0.05). However, levels of AMH and AFC in group B were lower than those of group A (AMH: 4.2 ± 3.5 μg/L vs 2.7 ± 2.7 μg/L; AFC: 9.0 ± 3.9 vs 5.4 ± 3.3, P<0.05). The number of oocyte retrieved in the two groups was not significantly different (11.5 ± 6.8 vs 9.6 ± 6.9, P>0.05). The level of AMH was more strongly correlated with the number of oocytes retrieved than that of AFC or FSH level. The strengths of the correlation degrees were AMH level, AFC, and FSH level in turn (r=0.600, 0.511, −0.369).*

Conclusion *AMH would be a useful predictor for ovarian response.*

Key words: anti-Müllerian hormone (AMH); antral follicle count (AFC); follicle-stimulating hormone (FSH); ovarian response

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Ovarian reserve and ovarian response are declining with age. Follicular depletion doubles at the age of 37−38 years[1]. The evaluation of reproduction capacity of infertile women to accurately determine the protocols and the doses of gonadotropins (Gn) is essential during *in vitro* fertilization/intracytoplasmic sperm injection (IVF/ICSI) cycles. Several indicators such as age, follicle-stimulating hormone (FSH), estradiol (E_2), inhibin B (INHB), antral follicle count (AFC) and anti-Müllerian hormone (AMH) have been used for the prediction of ovarian function[2,3]. FSH is a sensitive factor to assess ovarian reserve in advanced women. However, its level enhances only in case when the ovarian function is extremely decreased in young women[4]. In recent years, AMH and AFC have emerged as preferred methods for assessing ovarian reserve and IVF/ICSI outcomes[5,6].

AMH is a dimeric glycoprotein belonging to the transforming growth factor-β (TGF-β) family, which is expressed by small antral follicles[7]. It is manifested by granulosa cells of the ovary and the level of which is not affected by the menstrual cycle[8]. AFC is the sum of the number of antral follicle in both ovaries measured by transvaginal ultrasound. Currently, there is a debate that AMH or AFC is the most accurate predictor for IVF/ICSI outcomes, which could relate with the specific outcome and patient subpopulation evaluated. Several studies have demonstrated that both AMH and AFC have consistently provided the best performance in terms of predicting the number of oocytes retrieved[9-11]. On the other hand, some data suggested that either AMH[6,12,13] or AFC[7,14] as being a better predictor.

Hence, the present study was carried out to compare the AMH level, AFC, FSH level, and the number of oocytes retrieved in both young and advanced women, and to evaluate the efficacy of AMH, AFC and FSH for predicting the number of oocytes retrieved in IVF/ICSI cycles.

Materials & Methods

Subjects

This was a retrospective analysis conducted from September 2015 to April 2016 at Center for Reproductive Medicine, the Third Affiliated Hospital of Sun Yat-sen University. The women included in this trial had been infertile for at least 1 year and underwent IVF/ICSI protocol. Patients who have used any medication that could interfere with the original sex hormone level during the last 3 months, with any internal medicine diseases, and above 45 years or with premature ovarian failure (POF) were excluded. Totally 122 patients were divided into two groups according to age: group A, <35 years (*n*=71); group B, ⩾ 35 years (*n*=51). Informed consent was obtained from all women.

Circulating concentrations of FSH and AMH were analyzed in serum samples on 2−5 d of the early menstrual cycle. Transvaginal ultrasound scans of the ovaries were performed by the same experienced investigator on the second day of their menstrual cycles