

## 9<sup>th</sup> Yazd International Congress and Student Award on Reproductive Medicine with 4<sup>th</sup> Congress of Reproductive Genetics

### Key Lectures

#### K-12

#### AMH and ovarian surgery

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Ovarian reserve is defined as the number and quality of follicles in the ovary at a set time. The hypothesis that endometrioma can impact ovarian reserve was established when histology-related research hypothesized that growing cysts, stretching the cortical tissue, might cause structural variations and circulation impairment, possibly leading to a decrease in the primordial follicle cohort in affected ovaries. The effects of ovarian endometrioma (OMA) (without previous surgery for OMA) on the ovarian reserve remain to be elucidated. The most reliable and extensively used ovarian reserve marker has been the level of anti-Mullerian hormone (AMH) due to its consistency throughout the menstrual cycle and following hormonal variations or treatments. AMH levels were noticeably lower in females with endometrioma in contrast to control groups (healthy ovaries and/or benign ovarian cysts). As has been detailed in previous publications, the presence of OMA is correlated with a decrease in AMH levels and adversely affects the ovarian reserve. However, numerous studies call into question the adverse influence of endometrioma on the ovarian reserve. AMH levels were downregulated only in subjects having undergone surgery independently of the presence of current endometriomas. Nieweglowska and co-workers reported that significantly decreased AMH levels were observed only in females with bilateral endometrioma, rather than in those with unilateral endometrioma. Similarly, Esinler reported that endometriomas with  $\leq 3$  cm in diameter did not impact the ovarian reserve. Of note, data from females with unilateral endometrioma are poorly informative, since the contralateral intact ovary compensates for ovarian function and fertility potential. Since larger cysts may be associated with lower levels of AMH, a relatively small cyst may not cause AMH levels to be

significantly altered. women with endometrioma exhibited a progressive decline in serum AMH levels, faster than that in age-matched healthy females. It is emphasized that even experienced surgeons and accurate techniques cannot avoid operative ovarian reserve damage. AMH concentrations decreased noticeably after one year in patients with bilateral endometriomas, in individuals with cyst size  $>7$  cm and in stage IV groups.

AMH hormone is a glycoprotein, a substance produced by granulosa cells in ovarian follicles. It is first made in primary follicles that advance from the primordial follicle stage. At this stage, follicles are microscopic and cannot be seen by ultrasound. An AMH test is often used to check a woman's ability to produce eggs that can be fertilized for pregnancy. A woman's ovaries can make thousands of eggs during her childbearing years. The number declines as a woman gets older. AMH levels help show how many potential egg cells a woman has left.

Unlike FSH, which may vary day to day and month to month, AMH is more consistent and, when combined, AMH and FSH provide the best insights compared to FSH alone. AMH is produced by the granulosa cells that line the tiny follicles within the ovaries. AMH serum levels differ widely according to genotype. Very low serum AMH concentration is characteristic of AMH mutations. However low AMH concentration in newborns or in boys undergoing puberty is physiological (Grinspon *et al.*, 2011), and should not be interpreted as a sign of AMH mutation. Measurement of serum AMH is even more sensitive and specific than the AFC as it also reflects pre-antral and small antral follicles ( $< 2$  mm), which are hardly seen in the ultrasound. Serum AMH is therefore a deeper "probe" for the growing follicular pool than the AFC (Dewailly *et al.*, 2014a).

The level of AMH in the blood can help doctors estimate the number of follicles inside the ovaries, and therefore, the woman's egg count. A typical AMH level for a fertile woman is 1.0-4.0 ng/ml; under 1.0 ng/ml is considered low and indicative of a diminished ovarian reserve. To encourage your body to naturally raise levels of AMH is to choose a diet that is rich in

necessary nutrients, such as vitamin D. Many women with a low AMH get pregnant naturally, though it's less likely as the score falls below "low." AMH levels vary from month to month, and a lower level doesn't say with absolute certainty that you can't get pregnant.

AMH levels below 1.6 ng/mL predict a smaller number of eggs retrieved with IVF. Levels below 0.4 ng/mL are severely low and are not compatible with successful IVF. Women with very low (< 0.5 ng/ml) AMH levels undergoing IVF still have reasonable chances of achieving a pregnancy, but their prognosis is significantly affected by chronological age. Women with PCOS often have elevated AMH levels, likely to be due to the high levels of follicles they have in the early stage of development. Studies showed that stress exposure was related to reproductive failure. In this study, we found that there was a significant correlation

between psychological stress and decreased AMH levels for infertile women.

Endometrioma is the cystic lesion of ovaries originating from endometrial glands and stroma; it is identified in 17-44% of patients with endometriosis. Numerous existing studies have reported the association between endometrioma and infertility. Surgical excision has commonly been considered to avoid further ovarian damage. However, the potential adverse effect of this surgery on the ovarian reserve has recently become a focal point. Whether or not surgical excision can facilitate subsequent conception in young women planning to be pregnant is controversial. Whether non endometriotic ovarian cystectomy or unilateral oophorectomy can decrease ovarian reserve will be discussed during the presentation, and few techniques of laparoscopic cystectomy will be demonstrated.