



IS AMH A PREDICTOR OF PREGNANCY OUTCOME IN INFERTILE FEMALES?

Dr. Kaberi Banerjee

Clinical Director, Advanced Fertility and Gynaecology Centre, 6, Ring Road, Lajpat Nagar 4, New Delhi 110024

Dr. Bhavana Singla*

Senior Consultant, Advanced Fertility and Gynaecology Centre, 6, Ring Road, Lajpat Nagar 4, New Delhi 110024 *Corresponding Author

Dr. Shaili

Resident, Advanced Fertility and Gynaecology Centre, 6, Ring Road, Lajpat Nagar 4, New Delhi 110024

ABSTRACT **BACKGROUND:** To assess the pregnancy outcomes in infertile females according to the AMH levels in in vitro fertilization (IVF) cycles in a Private practice set up in India.

MATERIALS AND METHODS: From April 2016 to June 2016, 200 infertile females with age till 40 years who underwent IVF with self-eggs were evaluated. Serum AMH levels were measured at initial clinic visit in all the subjects. Serum AMH levels were divided into two categories – < 1 ng/ml and ≥ 1 ng/ml. The outcome measures were AMH levels and pregnancy rates.

RESULT(S): There wasn't any pregnancy in females with AMH levels less than 1 ng/ml. The pregnancy rate was 46.8% in females with AMH levels ≥ 1 ng/ml.

CONCLUSION(S): Patients with low AMH levels have very less chances of pregnancy with IVF with self eggs. But in the patients with average to high AMH levels, there is positive correlation between AMH levels and pregnancy outcomes. Therefore, AMH is a very good predictor of pregnancy outcomes.

KEYWORDS : AMH, pregnancy rates, IVF

Introduction

A number of ovarian reserve markers have been proposed to predict ovarian response to gonadotropin, as well as pregnancy outcome during assisted reproduction treatment (ART) (1). Anti Mullerian hormone (AMH) is one such marker which is regarded as precise biomarker of ovarian ageing and reserves(2,3). AMH is a member of the transforming growth factor -beta super family, a glycoprotein mainly secreted by the granulosa cells of early developing follicles of ovary. It is involved in folliculogenesis and reflects number of primordial follicles. There is an evidence regarding the positive correlation of AMH with egg reserve and oocyte yield following ovarian stimulation, both in cases of poor response and hyper-response (4,5). Despite being a good marker of ovarian response, AMH fails to predict the outcome of pregnancy (6). Therefore, the goal of the present study was to identify a possible association between serum levels of AMH and pregnancy outcome.

Materials and methods

From April 2016 to June 2016, a total of 200 women with age till 40 years were enrolled into this study and were stratified by serum AMH concentrations in two groups – group 1 (< 1 ng/ml) and group 2 (≥ 1 ng/ml). AMH levels were measured by enzyme-linked immunosorbent assay kit (ELISA). The association between serum AMH concentrations and pregnancy outcome was analyzed by Fisher's exact test.

Result

A total of 200 patients were analyzed in our study. The outcomes of our study are shown in Table (1).

Table 1. Association of AMH and pregnancy outcome

AMH (ng/ml)	Positive	Negative
Group 1 (< 1)	0	14
Group 2 (≥ 1)	87	99

It was found that in group 1 with AMH levels <1ng/ml, there was no pregnancy. The pregnancy rate was 46.8% in the group 2 with AMH level ≥ 1 ng/ml. It shows the positive correlation of AMH levels and pregnancy outcome with significant p value of 0.0003.

Discussion

Our study suggests that there is a significant association between serum AMH levels and pregnancy outcomes.

Wang et al. found a significant positive correlation between serum AMH levels and the rate of clinical pregnancy in women aged between 34 and 41 years. In women aged ≥ 36 years, a gradual age-related increase was observed in the degree of correlation between the clinical pregnancy rate and serum AMH levels (7). High AMH has been established as a quantitative marker of ovarian reserve and is widely used as a predictive marker of quantitative ovarian reserve. A significant positive relationship exists between pregnancy rate and the quantitative ovarian reserve as measured by the serum AMH; however, the strength of the association is modulated by patient age. The serum level of AMH is a useful predictor of ovarian response to controlled ovarian stimulation (COS), oocyte quality, fertilization, and implantation. However, AMH levels may also compromise clinical outcomes. Elgindy et al. reported that an AMH cut-off value of 2.7 ng/mL showed a specificity of 82.4% in predicting clinical pregnancy, and therefore suggested that it could be useful as a clinical predictor; but their study had the limitation of only including 33 patients (8). Regarding the clinical pregnancy rate, Gnath et al (n=132) reported no significant difference between patients with high levels of AMH and patients with low levels of AMH based on a cut-off value of 1.26 ng/mL (9). According to a recent meta-analysis published in 2015 (including 19 studies, n=5,373), serum AMH levels were poor for the prediction of clinical pregnancy (4).

Our study shows that AMH levels are good predictor of pregnancy rate. One limitation of our study was the fact that the sample size of the study was relatively limited (n=200).

Conclusion

AMH is an effective measure of quantitative ovarian reserve and it can predict ovarian response to controlled stimulation and it is positively correlated to the pregnancy outcomes.

References

1. Broekmans FJ, Kwee J, Hendriks DJ, Mol BW, Lambalk CB. A systematic review of tests predicting ovarian reserve and IVF outcome. *Hum Reprod Update.* 2006;12(6): 685–718.
2. LaMarca A, Sighinolfi G, Radi D, Argento C, Baraldi E, Arsenio AC, et al. Anti-Mullerian hormone (AMH) as a predictive marker in assisted reproductive technology (ART). *Hum Reprod Update.* 2010;16:113–30.
3. Sahmay S, Cetin M, Ocal P, Kaleli S, Senol H, Birol F, et al. Serum anti-Müllerian hormone level as a predictor of poor ovarian response in vitro fertilization patients. *Reprod Med Biol.* 2011;10:9–14.
4. Tal R, Tal O, Seifer BJ, Seifer DB. Antimullerian hormone as predictor of implantation and clinical pregnancy after assisted conception: A systematic review and meta-analysis. *Fertil Steril.* 2015;103:119–30. [PubMed]
5. Broer SL, van Disseldorp J, Broeze KA, Dolleman M, Opmeer BC, Bossuyt P, et al. IMPORT Study Group. Added value of ovarian reserve testing on patient characteristics

- in the prediction of ovarian response and ongoing pregnancy: An individual patient data approach. *Hum Reprod Update*. 2013;19:26–36. [PubMed]
6. Riggs R, Kimble T, Oehninger S, Bocca S, Zhao Y, Leader B, Stadtmauer L. Anti-Müllerian hormone serum levels predict response to controlled ovarian hyperstimulation but not embryo quality or pregnancy outcome in oocyte donation. *Fertil Steril*. 2011;95:410–412. doi: 10.1016/j.fertnstert.2010.07.1042. [PubMed] [Cross Ref]
 7. Wang JG, Douglas NC, Nakhuda GS, Choi JM, Park SJ, Thornton MH, et al. The association between anti-Müllerian hormone and IVF pregnancy outcomes is influenced by age. *Reprod BioMed Onlin*. 2010;21:757–61.
 8. Elgindy EA, El-Haieg DO, El-Sebaey A. Anti-Müllerian hormone: correlation of early follicular, ovulatory and midluteal levels with ovarian Response And Cycle outcome in intracytoplasmic sperm injection patients. *Fertil Steril*. 2008;89:1670–6.
 9. Gnoth C, Schuring AN, Friol K, Tigges J, Mallmann P, Godehardt E. Relevance of anti-Müllerian hormone measurement in a routine IVF program. *Hum Reprod* 2008;23:1359–1365.