

ORIGINAL ARTICLE

study the correlation of hormonal and sonographic markers of ovarian reserve in Indian woman with primary infertility.

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ABSTRACT

BACKGROUND: To study the correlation of hormonal and sonographic markers of ovarian reserve in Indian woman with primary infertility. **METHOD:** Fifty women with primary infertility of age >35 years having regular monthly cycles and no history of ovarian surgery were included in this descriptive study conducted from December 2010 until July 2011 in the Mahila Chikitsalaya, Sawai Man Singh Medical College & Hospital, India. A transvaginal ultrasound examination and blood tests were carried out between the third and fifth day of their menstrual cycle (follicular phase). The ovarian volume was measured and total antral follicles (AFC) were counted. Hormonal markers such as Follicle stimulating hormone (FSH) and Anti mullerian hormone (AMH) were measured. **RESULTS:** There is highly significant negative correlation between s.FSH and ovarian volume & s.FSH and AFC. There is highly significant positive correlation between s.AMH and ovarian volume & s.AMH and AFC. **CONCLUSION:** With increasing age (>35yrs) hormonal markers of ovarian reserve i.e., s.FSH increases and AMH decreases while sonographic markers of ovarian reserve i.e., AFC and ovarian volume decreases thus decreasing the chances of conception. Ultrasonography and hormonal tests are important tools for the prediction of ovarian reserve in cases of infertility. Knowing the ovarian reserve in case of primary infertility we can predict the ovarian response to stimulation with ovulation induction drugs in normal and IVF cycles.

Keywords: descriptive study, hormonal, sonographic markers, s.FSH, s.AMH, AFC and ovarian volume

INTRODUCTION

Ovarian reserve is an indication of reproductive age as opposed to chronological age and is a parameter of calculating remaining reproductive lifespan of woman. It mainly depends on the number and quality of eggs in the ovaries and response of ovarian follicles to hormonal signals from the brain. Diminished ovarian reserve is characterized by decreased number of remaining oocytes in the ovaries and impaired preantral oocytes development and recruitment. Over the past two decades, a number of tests of ovarian reserve have been used to determine follicle number and quality and to predict the outcome of assisted reproduction procedures. The

woman's age and assays of serum FSH in the early follicular phase were among the earliest and most useful parameters used for evaluation of ovarian reserve. Several ultrasound parameters have been used for evaluation of ovarian reserve, including ovarian volume, ovarian blood flow and the antral follicle count, with varying degrees of reliability. Recently, serum antimüllerian hormone levels have been introduced as a novel measure of ovarian reserve. AMH is a product of the granulosa cells in preantral and antral follicles. Serum AMH levels decline with age and are correlated with the number of antral follicles and the ovarian response to hyperstimulation.

MATERIAL AND METHOD

Indian women >35 years attending the department of Obstetrics and Gynaecology, Sawai Man Singh Medical College, Jaipur between December 2010 to July 2011 for management of primary infertility were offered participation in descriptive observational study. Inclusion

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criteria for study were:

- Women of primary infertility of age >35 years.
- Regular cycles of 25-35 day with maximum 4 day difference between 2 cycles.
- Presence of both the ovaries.

Exclusion criteria for study were:

- Male factor infertility.
- Tubal factor infertility.
- Presence of gynaecological disorders such as menorrhagia or DUB.
- History of ovarian surgery.
- Other causes of infertility

A detailed history and informed written consent was taken from every case prior to participation in the study. Cases were called on early follicular phase of menstrual cycle (day 1-3) and underwent transvaginal USG and Blood Tests. All Transvaginal USG were carried out by same radiologist and carried out by using Toshiba Echo C using 7.5 MHz vaginal probe. The length, height and width of each ovary was measured in sagittal and coronal plane during TVS scanning and ovarian volume was obtained using formula of ellipsoid i.e., $\pi/6 \times (\text{length} \times \text{height} \times \text{width})$. The number of antral follicles <10 mm in each ovary were counted. Blood samples were taken for measurement of S.FSH and S.AMH. S.FSH was measured by standard MICT R FSH test kit-Magnetic Immunochromatic test-sensitivity 0.2mIU/ml and s.AMH was measured by ELISA (B.Lal laboratories diagnostic analytical sensitivity 0.2ng/ml).

Statistical method: All the data obtained were entered in excel spread sheet. Correlation between s.AMH, s.FSH and; ovarian volume & AFC calculated by Pearson coefficient of correlation. Measure of agreement between markers find out with kappa and p value.

RESULTS

There is highly significant negative correlation between s.FSH and ovarian volume & s.FSH and AFC. There is highly significant positive correlation between s.AMH and ovarian volume & s.AMH and AFC as shown in Table-1. There is highly significant measure of agreement between AFC and; s.FSH & s.AMH as shown in Table-2. P value .002 and .000 respectively.

There is highly significant measure of agreement between ovarian volume and s.FSH, s.AMH as shown in Table-3. P value .002 and .000 respectively.

Table 1: Correlations Between Measures Of Ovarian Reserve And S.Fsh& S.Amh

		Ovarian Volume	Afc
S.Fsh	Pearson Correlation	-.489	-.364
	SIG. (2-TAILED)	.000	.009
S.Amh	Pearson Correlation	.665	.644
	SIG. (2-TAILED)	.000	.000

Table2: Measure Of Agreement Between Afc And Other Measures Of Ovarian Reserve

		Afc		Total	Measure Agreement Of		
		Normal	Poor		Kappa	Std. Error	'P' Value
S.Fsh	Normal	24	3	27	.421	.123	.002
	Poor	11	12	23			
S.Amh	Normal	32	2	34	.766	.099	.000
	Poor	3	13	16			
	Total	35	15	50			

Table 3: Measure Of Agreement Between Ovarian Volume And S.Fsh& S.Amh

		Ovarian Volume		Total	Measure Agreement Of		
		Normal	Poor		Kappa	Std. Error	'P' Value
S.Fsh	Normal	23	4	27	.425	.126	.002
	Poor	10	13	23			
S.Amh	Normal	32	2	34	.864	.076	.000
	Poor	1	15	16			
Total		33	17	50			

DISCUSSION

This study shows highly significant negative correlation between s.FSH and ovarian volume, this is in accordance to the study of Shahrara et.al¹ which showed ovarian volume & s.FSH are inversely correlated. Study shows highly significant negative correlation between s.FSH and AFC, this is similar to the findings of Pedro N. Barri Soldevila et.al² which found that AFC is correlated negatively and significantly with age, FSH & LH This study shows highly significant positive correlation between s.AMH and ovarian volume, this is in accordance to the study of Yang, Yun Seok et.al³ which showed correlation of AMH and ovarian volume. This study shows highly significant positive correlation between s.AMH and AFC, this is similar to the findings of Joop S E. Laven et.al⁴ which showed AMH

concentrations correlate with AFC as well as age and constitute an endocrine marker of ovarian aging.

CONCLUSION

With increasing age (>35yrs) hormonal markers of ovarian reserve i.e., s.FSH increases and AMH decreases while sonographic markers of ovarian reserve i.e., AFC and ovarian volume decreases thus decreasing the chances of conception. Thus, Knowing the ovarian reserve in case of primary infertility we can predict the ovarian response to stimulation with ovulation induction drugs in normal and IVF cycles.

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