

A Study of size of follicle at the time of ovulation: A Comparative Sonographic Study

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Abstract: Dominant follicle size were studied at the time of ovulation by tow diffeternt method of ultrasound i.e. Transabdominal and transabdominal route on 81 female patients. These patients were referred by infertility clinic and were normal and having stimulated cycles. Patients respond excellently to TVS, there were initial hesitancy which removed by adequate counseling. Detection rate of follicle less than 10 mm were good on TVS while no difference were observed on more than 20 mm. Ultrasonographically the Ovary is defined as mix echogenic structure having well defined cortex peripherally and central medulla. Follicle arranged at periphery as oval shape anechoic area of varying size representing the various stages of follicles.

Keywords: Domint Follicle, Ovulation, Ultrasound, TAS, TVS

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I. Introduction

Human ovary contain about 2 million oocytes at birth but when puberty attained it is near about 380000. Further they are depleted as about 1000 follicles per month until 35-40 years of age, which increases later. Thus there are only 400 to 450 follicles remains for reproductive life. More than 98% follicles undergoes atresia. Primordial follicles begin to grow and undergo various developmental stages, like primary follicle, antral stage, tertiary follicle.¹¹ Now the follicle increases in size upto 2 cm. Cumulus oophorus appears at this stage. This is graffian follicle. Releasing of secondary oocyte from graffian follicle is ovulation, followed by formation of corpus luteum.^{8,10}

Ultrasound is a modalities used in radiology department for examining the normal anatomy of pelvic organ. It is unique tool to study the ovarian anatomy, follicular anatomy as well as ovulation.⁴

II. Material And Methods

The present study was conducted in department of anatomy in association with department of Radiology and department of Obstetrics and Gynaecology at Uttar Pradesh University of Medical Sciences, Saifai, Etawah. Before the ultrasound examination, consent was obtained. Transabdominal ultrasound done on full bladder while transvaginal performed on empty bladder. A full bladder is essential for transabdominal ultrasound as it displaces the bowel loops and provide good acoustic window. The ovary were identified and measured in three planes and the volume was calculated.

The ultrasound was started on 9th or 10th day of menstrual cycle. Than monitoring done on 11th, 12th, 13th, 14th, 15th, 16th and 17th day in natural as well as stimulated cycles. The follicle are defined as rounded or oval shape anechoic structure about 4-7 mm in size at periphery of ovarian stroma. The ovarian stroma is of mix echogenicity.¹⁹ Both the procedure was performed by same observer in different sittings.

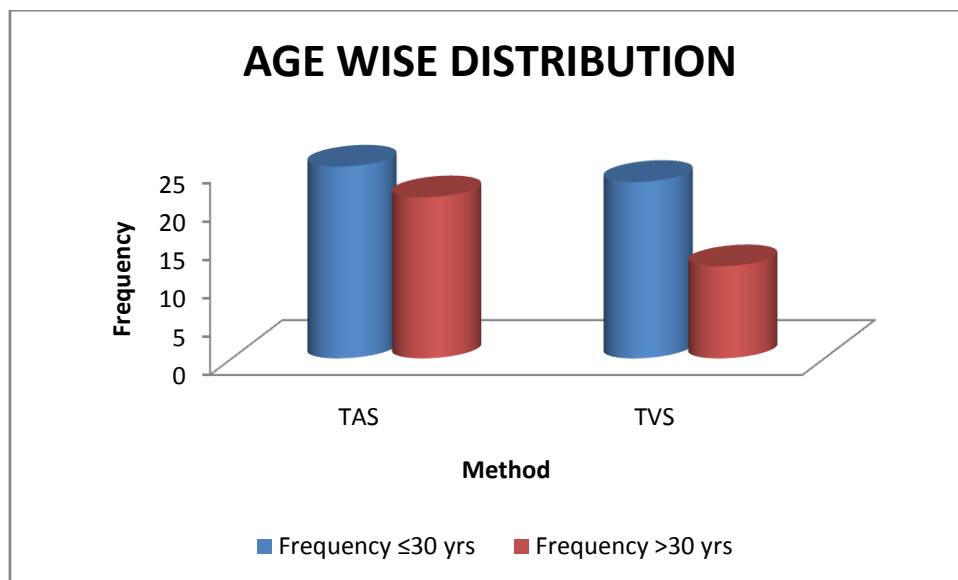
III. Result And Observations

The present study was conducted in the department of Anatomy, department of Obstetrics and Gynecology and department of radiodiagnosis. A total 81 married female patient were studied.

AGE WISE DISTRIBUTION

Method	Frequency		Mean	SD	t-value	p-value
	≤30 yrs	>30 yrs				
TAS	25	21	29.9	3.72	-1.1233	0.2653
TVS	23	12	30.6	1.75		

The two methods are not significantly different. at 0.05 level of significance.



Graphical presentation of age wise distribution. 46 women undergoes TAS while TVS performed on 35 women. Two method are not significantly different at 0.05 level of significance.

TABLE-1A: COMPARISON OF SIZE OF FOLLICLE AT THE TIME OF OVULATION (RO) N=81

Method	Average size of follicle	SD	t-value	p-value
TAS	23.79	2.35	-3.0516	0.0032
TVS	25.01	1.18		

The two methods are significantly different at 0.05 level of significance

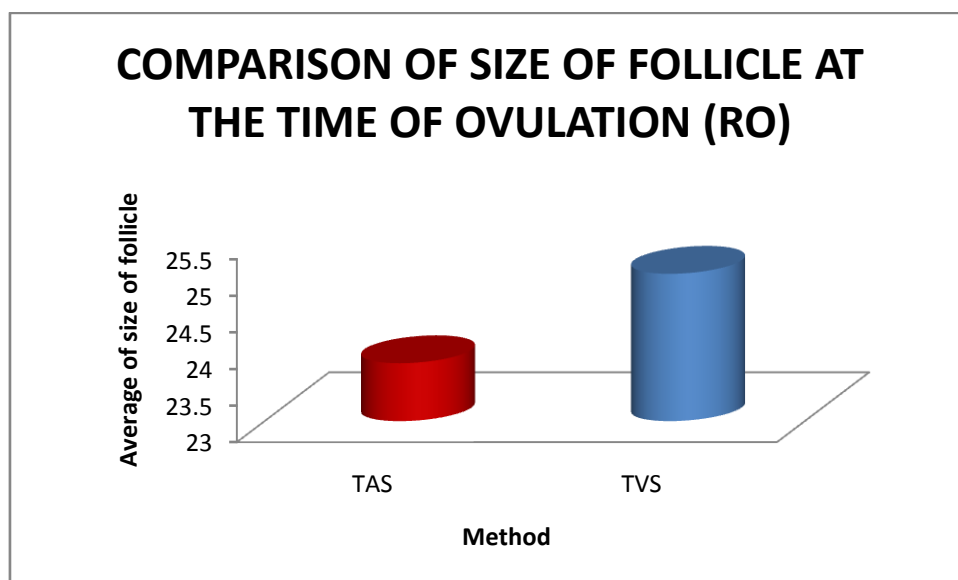


TABLE-1B: COMPARISON OF SIZE OF FOLLICLE AT THE TIME OF OVULATION (LO) N=81

Method	Average size of follicle	SD	t-value	p-value
TAS	23.03	3.07	-6.0116	<0.0001
TVS	25.84	0.69		

The two methods are significantly different at 0.05 level of significance.

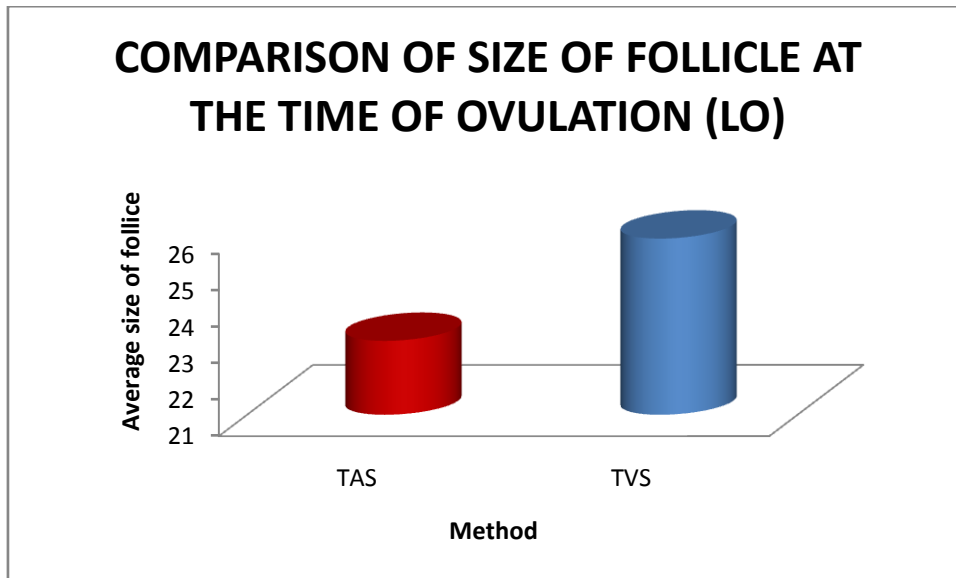


Figure 1 , Mature Follicle As Seen On Tvs,

Note A Tvs Scan Showing Ovary, Very Well Defined Peripherally Arranged Follicles, A Large Mature Dominant Follicle And Centrally Placed Stroma. The Follicles Are Anechoic Due To Presence Of Fluid Inside It While Centrall Placed Stroma Is Of Mix Echopattern Due Fibrous And Gladular Component.



Figure 2 , Mature Follicle As Seen On Tas

This Is Tas Scan Showing Uterus And Ovary. In This Case The Ovary Is Not As Efficiently Defined As On Tvs. Note That Follicles Are Noted But Poorly Defined But Dominant Follicle Is Very Well Defined.

IV. Discussion

In our study we observed that the size of follicle at the time of ovulation in right ovary was 23.79 mm with SD 2.35 on TAS and in TVS, it was 25.01 mm with SD 1.18. (Table 1A) and in TAS the size of follicle at the time of ovulation in left ovary was measured 23.03 mm with SD 3.07 and in TVS it measured 25.84 mm with SD 0.69 (Table 1B). When we compare our observations by applying t-test, in right ovary value of t-test was -3.0516 and p-value was 0.0032 and the two data was found significantly different at 0.05 level of significance and similarly in left ovary we observe that value of t-test was -6.0116 and p-value was 0.0001 and the two data were found significantly different at 0.05 level of significance.

In one study done by Ziban Nahar et al (2008), Transabdominal sonography (TAS) and Transvaginal sonography (TVS) were compared for follicular monitoring in 62 patients of infertility. Patients' compliance was excellent for TVS technique as compared to TAS technique. TVS show better resolution as compared to TAS. TAS shows 25.5% good visualization of follicles as compared to 84.8% ($p < 0.05$) in TVS. The follicles > 18 mm in size, no significant difference was noted in detection rate (55 vs 60) between TAS and TVS.⁶

Seibel MM et al (1981) in their study on 25 Twenty-five cycles induced by human menopausal gonadotropin (hMG) by ultrasound found follicular size ranged between 24 and 13 millimeters. No pregnancies occurred where the follicular size was below 15 mm.¹¹

O'Shea RT et al (1988) detected no significant differences in dominant follicular diameters with either technique in their comparative study on 45 patients.⁷

Our findings were consistent with the findings of Nahar et al, Seibel MM et al and O'Shea RT et al.

V. Conclusion

Total 81 patients were included in study and both modalities that is TVS and TAS performed. Patients were normal and having stimulated cycles referred from infertility clinic. Patients shows least hesitancy for TVS, which removed by adequate counseling.

No significant difference was noted in detection rate between TAS and TVS For follicles > 20 mm in size. However, TVS has better detection rate for follicle lesser than 10 mm. TVS even enabled us to detect and count follicles as small as 3-4 mm accurately. TAS fail to detect such small follicle and also the ovaries appears as blurred hypoechoic structure. thus again the TVS detection rate of follicles much better than TAS detection rate. The frequency of 5 or more growing follicles were detected in 88.7% in transvaginal scanning as compared to 12.9% in transabdominal scanning.

Ultrasound can play an important role in study of ovary, ovarian follicle and in the monitoring of ovulation induction . Ultrasound has an unique to study the morphology of ovary and follicle size particularly the TVS. The response to gonadotropin stimulation of follicle can be studied effectively and highly useful in infertility treatment guideline.

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