

## FOLLICULAR DYNAMICS IN SPONTANEOUS VERSUS CLOMIPHENE INDUCED CYCLES -A TRANSVAGINAL SONOGRAPHY STUDY -

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### SUMMARY

Healthy volunteers regularly ovulating and infertile patients treated with clomiphene were studied from 7th day onward to know and compare the follicular dynamics in spontaneous and clomiphene induced cycles. Ovaries were scanned by Transvaginal probe 7.5 MHZ using Phillips DR 1550 XR machine. Clomiphene citrate resulted in higher rate of follicular growth and higher average follicular diameter on corresponding days compared to spontaneous cycle. Clomiphene resulted in early ovulation and higher multifollicular response. Signs of impending ovulation appeared in same frequency in both groups. Separation of granulosa and presence of cumulus oophorus were most common signs of impending ovulation in both groups.

### INTRODUCTION

Disorder of ovulation is an important contributor to the problems of infertility. For years together ovulation was monitored entirely by clinical parameters. But after 1970 with the advent of ultrasound it was possible to observe ovulatory events by ultrasonographic imaging. Advent of

endovaginal sonography in later part of the last decade provided panoramic view of the dynamics of ovulation. The development and fate of follicle has been documented by sequential scanning through the menstrual cycle in both spontaneous and induced cycles. Transvaginal sonography provides better resolution by use of higher ultrasound frequencies in order of 5.0 to 7.5 MHZ (Timor and Rottem 1987).

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**MATERIAL AND METHODS**

A prospective study was carried out in dept. of obstetrics and gynecology, SSG Hospital, Baroda from Nov. 1993 to December 1994 to compare the follicular dynamics in spontaneous versus clomiphene induced cycles. All patients selected for study were classified in two groups.

**Group A :**

Healthy women regularly ovulating who were motivated for study were selected as spontaneous group. Spontaneous group had 50 patients in which 133 cycles were studied.

**Group B :**

Patients attending OPD for infertility with normal clinical findings who required clomiphene for induction of ovulation were selected for induced group. Those patients who failed to ovulate or who required H.C.G. for ovulation induction were excluded. Clomiphene citrate was given in dose of 50mg daily starting from 2nd day of menstrual cycle. Induced group had 70 patients in which 168 cycles were studied.

T.V.S. was carried out by 7.5 MHZ vaginal probe using Phillip DR 1550 XR machine using standard technique. At each

scanning mean follicles diameter (average of longitudinal, transverse and sagittal diameter measured in longitudinal and transverse scan plane) no. of follicles developing in each cycle and signs of impending ovulation were noted. Scanning was started from 7th day on alternate day till follicular size was 16 mm. After that it was carried out daily.

Statistical indices in form of Chi-square test were applied and P value less than .05 was considered significant.

**ANALYSIS & DISCUSSION**

Table I shows that average follicular diameter in spontaneous cycles was always smaller than induced cycle on corresponding days. This was also observed by Bryce et al (1983) and Hackleolar (1979). The above table also shows that average preovulatory follicular diameter was 22.98 mm in induced cycle as compared to 19.50 mm in spontaneous cycle. This was found to be statistically significant. This was also observed by Rajan (1989) in his series where he found preovulatory follicular diameter to be of 18.86 mm in spontaneous cycle and 23.25 mm in induced cycles.

**Table I**  
**Average Follicular Diameter**

Day relative to ovulation	Spontaneous (mm)	Induced (mm)
-5	14.0	16
-4	15.10	18.47
-3	17.26	19.86
-2	18.10	20.40
-1	19.50	22.98
0	20.20	23.00

Qeenam (1980) also revealed same finding in her study. But Carlo (1980) depicted that induced cycles had lower preovulatory follicular diameter than spontaneous cycle.

Table II shows average rate of follicular growth during the cycle is higher in induced group i.e. 1.95 mm/day as compared to spontaneous group 1.46 mm/day. This was also observed by Bultery et al 1983. Ivan (1985) & Vargyas (1982). The mean daily growth rate of the follicle during the late follicular growth is around 2.3 mm per day (Leerentveid 1985).

Table III shows that commonest sign of ovulation detected in both spontaneous and induced cycle was separation of granulosa. It was 51.88% and 51.19% in spontaneous and induced cycle respectively. However appearance of cumulus oophorus was detected in 21.05% of spontaneous

cycle and 19.05% of induced cycle. In his study Kerrin (1985) found cumulus oophorus for prediction of ovulation in 15-20% of cycles. Fluid in pouch of douglas as preovulatory sign was detected in 25% of induced cycles as compared to 18.80% of spontaneous cycle. However it was not found to be statistically significant. An abrupt increase in the amount of peritoneal fluid may be sonographically documented in 25% to 40% of cases after ovulation has taken place. Davis and Gasink (1986).

In 8.2% of spontaneous cycle and 4.76% of induced cycle no sign of ovulation was detected. Table III also showed that signs of ovulation appeared in equal frequency in both spontaneous and induced cycles.

Table IV shows in spontaneous cycle 76.59% of ovulation occurred between 13th and 15th day of the cycle, while 72.27%

**Table II**  
Average Rate of Follicular Growth

Cycle	Average Follicular growth (mm/day)
Spontaneous	1.46
Induced	1.95

**Table III**  
Ultrasonographic signs of Ovulation

U.S.G. Signs	Spontaneous		Induced	
Seperation of Granulosa	69	(51.88%)	86	(51.19%)
Fluid in pouch of Douglas	25	(18.80%)	42	(25%)
Cumulus oophorus	28	(21.05%)	32	(19.05%)
No Signs	11	(8.27%)	08	(4.76%)

**Table IV**  
**Predicting day of Ovulation**

Day of cycle	Spontaneous	Induced
10	00 (0%)	03 (1.79%)
11	04 (2.76%)	19 (11.48%)
12	12 (9.02%)	42 (25.08%)
13	39 (29.32%)	77 (45.81%)
14	44 (33.08%)	17 (10.24%)
15	19 (14.29%)	08 (4.93%)
16	13 (9.43%)	02 (1.17%)
17	01 (1.1%)	00
18	01 (1.0%)	00

**Table V**  
**Cycle Response**

Cycle Response	Induced	Spontaneous
Unifollicular	148 (88.1%)	130 (97.8%)
Multifollicular	20 (11.9%)	3 (2.2%)

of ovulation occurred between 11th and 13th day in induced cycle. It was found to be statistically significant. It suggests that ovulation occurs early in induced cycles.

Table V shows that in 11.9% of cycles in induced group had multifollicular response as compared to only 2.1% in spontaneous group.

### CONCLUSIONS

Induced cycle with clomiphene citrate results in :

1. higher average follicular diameter on corresponding days.

2. higher rate of follicular growth than

spontaneous cycle.

3. earlier ovulation as compared to spontaneous cycle.

4. Increase incidence of multifollicular response as compared to spontaneous cycle.

However it does not effect the frequency of signs of impending ovulation when compared to spontaneous cycle.

All the above observations are probably due to the fact that clomiphene citrate increases the pulse frequency of FSH and LH (Sakumoto 1983). According to Kerrin (1981) above observation may be also due to direct estrogenic effects on pituitary and direct ovarian effect.

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**REFERENCES**

1. Bryce R.L., Steil J.N., Picker R.H., Saunders D.M.: *Fertil. Steril.* 39, 458; 1983.
2. Bultery B., Travson A., M.C. Master R., Wood C.: *Fertil. Steril.* 39, 458; 1983.
3. Carlo H.: *Fertil. Steril.* 34, 24; 1980.
4. Davis F.A., Gasink B.B.: *J. Ultrasound Med.* 5, 75; 1986.
5. Hackleolar B.J.: *Am. J. Obst. Gynec.* 135, 122; 1979.
6. Ivan I.C.: *Fertil. Steril.* 44, 195; 1985.
7. Kerrin J.F.: *J. Clinical endocrinology* 61, 265; 1985.
8. Kerrin J.F.: *Brit. J. Obstet. Gynec.* 88, 81; 1981.
9. Leerentveid R.A.: *Fertil. Steril.* 43, 565; 1985.
10. Queenam J.T.: *Fertil. Steril.* 34, 99; 1980.
11. Rajan R.R.: *J. of Obstet. Gynec. of Ind.* 27, 11; 1989.
12. Sakonmoto C.: *Acta Endocrinology* 103, 289; 1983.
13. Timor I., Rottem S.: *Transvaginal Sonography*, New York Elsevier P. 36, 1987.
14. Vargyas J.M.: *Am. J. Obstet. Gynec.* 144, 549; 1982.