

## Clomiphene Citrate Challenge Test and L.H. Level

S.M. Bhattacharya

*Dept. of Obstetrics & Gynaecology, R.K.M. Seva Pratisthan, Calcutta-700026.*

### Summary

Serum FSH level after Clomiphene Citrate Challenge test (CCCT) indicates the status of the ovarian reserve. Different patients have different LH levels at the same time. A review of 60 cases of different categories are reported where the serum FSH level though in the same range, it is the "LH" level which is different. Attempt has been made to analyse the significance of these varying levels of LH.

### Introduction

Clomiphene Citrate Challenge test (CCCT) is an important test to assess ovarian reserve. It unmasks abnormalities that may not be detected by basal F.S.H. screening alone. Normally on Day 10 (D10), the overall metabolic activity of the developing follicles should be able to overcome the impact of Clomiphene Citrate on the hypothalamo-pituitary axis and suppress FSH levels back to the normal range.

In this study different levels of LH were found on D10 in response to Clomiphene though the serum FSH levels were in the normal range.

### Material & Methods

This is a retrospective analysis of 60 cases reporting to the author for evaluation of primary infertility.

A standard protocol of investigations was used.

Out of these 60 cases, 11 were clinically very obvious leases of "Polycystic Ovaries" (PCO). All of them belonged to WHO group II (Progestogen Challenge test positive).

Rest of the cases were advised to keep a record of basal body temperature chart for 3 cycles only.

Basal body temperature chart (BBT) showed consistent biphasic pattern in only 13 cases. Rest of the cases showed varieties of patterns suggestive of "Dysovolatory Problems". BBT chart was interpreted as per criteria laid down by Chattopadhyay et al (1993).

All these 60 cases had FSH and LH estimations on D2/D3 and again on D10 after Clomiphene Citrate Challenge test, as suggested by Sharara and Scott (1997).

### Results

Table I shows the age group of the patients. Forty seven percent belonged to the age group of 26-30 years

and 37% belonged to the age group of 31-35 years.

**Table I**  
Age group of patients

Age	No.	%
21-25 years	8	13.3%
26-30 years	28	46.7%
31-35 years	22	36.7%
36-40 years	2	3.3%
60 cases		

For analysis of results, the patients were divided into the following groups-

- A) Consistent biphasic pattern with regular cycles - 13 cases.  
 B) "Discordant" BBT with regular cycles - 36 cases.  
 C) Clinically diagnosed as PCO - 11 cases.

Table II shows the FSH and LH levels on D2/D3 and D10 among the 3 groups of patients. In group "B", the mean LH level on D2/D3 shows rise on D10 and the rise is more in Group "C" patients. In group A, the rise in LH is small relatively. All these patients had FSH levels more or less in the same ranges (on D2/D3 and D10).

Table III shows the relationship between ages of the 3 groups of patients. Patients belonging to Group B had the maximum range in ages.

**Table II**  
FSH and LH levels on D2/D3 and again on D10

Group	Basal Levels (Mean $\pm$ SD)		D10 (Mean $\pm$ SD)	
	FSH	LH	FSH	LH
A) 13 cases	7.75 $\pm$ 1.91	4.74 $\pm$ 2.15	7.00 $\pm$ 1.8	6.6 $\pm$ 2.5
B) 36 cases	7.70 $\pm$ 1.8	6.34 $\pm$ 2.2	7.2 $\pm$ 2.1	11.10 $\pm$ 5.40
C) 11 cases	7.33 $\pm$ 1.40	10.6 $\pm$ 3.6	7.68 $\pm$ 1.30	18.90 $\pm$ 7.40

**Table III**  
Relationship between age and the 3 Groups

Age ranges:	
Group A - 13 cases.	21 years - 35 years
Group B - 36 Cases.	21 years - 40 years
Group C - 11 Cases.	23 years - 32 years

**Table IV**  
Body Weight and the 3 Groups of patients

	Range of Body Weight (in kgs.)	Mean $\pm$ S.D.
Group A	48 kgs - 68 kgs	54.1 $\pm$ 5.9
Group B	39 kgs. - 66 kgs	55.0 $\pm$ 6.4
Group C	45 kgs - 78 kgs	65.0 $\pm$ 13.0

Table IV shows the range of body weights among the 3 groups. The mean body weight among Group A and Group B were not very different. But mean body weight of Group 'C' is a little more.

## Discussion

Clomiphene citrate is a widely used drug for management of infertility.

Circulating levels of LH are essential for the production of steroid hormones that regulate the timing of ovulation and target tissue responses.

Clinical and basic science observations show that elevated levels of serum LH during follicular phase are not only unnecessary for follicular maturation but are also deleterious to normal reproductive processes.

Elevations in serum LH above the resting levels may result in increased androgen production and diminished follicular function and reduced early embryo viability (Chappel and Colin, 1991).

The present series shows similarities in the "basal" (D2 or D3) and "stimulated" (D10) FSH levels among the 3 groups of patients. It was not possible to repeat the tests in every cycle because of costs. In fact, two values of FSH taken at two different moments have "less" putative bias because it has a pulsatile secretion

pattern (Loumaye and Billion, 1995).

This study though limited shows that even if the FSH levels are normal it is indicative of well preserved ovarian reserve. The LH level varies when stimulated with clomiphene citrate.

Thus in Group A, the LH:FSH ratio on D10 is either 1.2 or less than 1. The BBF Chart showed typical biphasic pattern.

But in group B and C, the LH:FSH ratio shows variations from 1.5 to more than 2.1.

Typical PCO patients in this series have the very characteristic LH:FSH ratio of more than 2:1 on D10.

But the patients of Group B probably represent "theca cell hyperactivity". This can cause "functional" ovarian hyperandrogenism. In fact, some authors have described "ovulating PCO" patients as another category not necessarily hyperandrogenic. (Franks, 1995). The present series fails to show any significant relationship between LH level on D10 and body weight. Probably a relationship between "body mass index" and the stimulated LH level might be of clinical significance.

### Conclusion

Response to clomiphene citrate is variable particularly for LH. The C/C/T, can not only indicate ovarian follicular reserve status but also the intrinsic intraovarian status reflected peripherally in LH level.

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### References

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