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SHORT COMMUNICATION

BASOPENIA AS AN INDICATOR OF OVULATION (A SHORT TERM CLINICAL STUDY)

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Abstract : In the present study 60 cases age ranging from 18-40 years were studied for variation in the absolute basophil count on the different days of menstrual cycle. At the time of ovulation a statistically significant decrease in the number of basophil count was noted. The decrease in the number of basophil at mid cycle coincided with the irregular follicle seen by sonography, which indicated ovulation. The basophil count then increased during the luteal phase. Basopenia at the time of ovulation was probably due to migration of these cells from the peripheral blood towards the rupturing follicle for the release of histamine required for ovulation.

Key words : absolute basophil count C.D.O. (calculated date of ovulation) ANOVA (analysis of variance) ultra sonography

INTRODUCTION

Exact timing of ovulation still represent a major diagnostic problem. In 1930's it was showed that irrespective of the length of menstrual cycle, ovulation preceeded the next cycle by the time interval of 14 days (1, 2). In the last few years this understanding has grown a great detail but the direct proof of ovulation still rest on establishment of pregnancy or recovery of ovum from the fallopian tube. Many workers (3, 4) observed a relationship between the female sex cycle and the basophils showing a mid cycle fall in the basophil count. The reliable indicator of ovulation are hormonal estimation and ultra sonography, but these tests demand considerable expense for the patients. Absolute basophil count is a simple method. The simplicity of the counting basophil allows its application as a routine method, especially in sterlity clinics that do not have ultra sonography or hormonal assay available.

METHODS

Sixty subjects, 18 to 40 years of age and having regular menstrual cycle, were included in this study. Detailed menstrual history was taken to find out regularity and duration of the cycles. The probable time for ovulation was calculated from the history. In the subsequent cycle the subjects were called on the following days :

(a) 5-10 days after L.M.P.,
(b) Two days prior to C.D.O.,
(c) One day prior to C.D.O.,
(d) On the day of ovulations and
(e) 5 days after ovulation.

Absolute basophil count was done by using Fuchs-Rosenthal haemocytometer according to method of Cooper and Cruick Shank (6). Assessment of follicle growth and maturation of follicle was done by Ultrasonography daily till the follicle ruptured or disappeared. This was marked as the day of ovulation.

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Statistical analysis : The two dimensional analysis of variance (9) was applied to determine whether the results were significant (F>F–<0.05). Using the students 't' test the smallest total difference necessary for significance comparing the ovulatory basophil counts in cycle were calculated.

RESULTS

Table I shows the mean basophil counts with S.E. on the different days of menstrual cycle. Absolute basophil count shows a statistically significant fall in the count on the days of ovulation. The number then increased during the luteal phase. The smallest total difference necessary for statistical significance is present in all the five points of the cycle when compared to the time of ovulation.

Table II shows the F ration (F>F–<0.05) for the basophil count by ANOVA method. This shows that the difference between the samples and within the samples for the basophil counts done on the five selected days are statistically significant.

TABLE I : Mean basophil counts with S.E. on the different days of menstrual cycle.

	Follicular phase	*Two days prior to C.D.O.*	*One day prior to C.D.O.*	*On the day of ovulation*	*Luteal phase*
1. Mean cell counts/cu mm	41.26	25.3	22.48	11.69	44.92
2. S.E.	1.7	1.98	2.07	1.51	1.79
3. 'P' value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Follicular phase - 5–10 days after L.M.P.
C.D.O. - Calculated date of ovulation.
Day of ovulation - Confirmed by sonography.
Luteal phase - 5 days after ovulation.

TABLE II : ANOVA table for statistical calculation of basophil counts.

	S.S.	*d.f.*	*M.S.*	*F-ratio*	*F-limit (from F table)*
Between sample	45560.48	4	11390.12	58.58	2.37
Within sample	57352.98	295	194.416		
Total	102913.4	299			

S.S. - Sum of square of variation.
d.f. - Degree of freedom.
M.S. - Mean square of variation.
F. ratio - M.S. between/M.S. within

Ultrasonography findings : The follicular diameter observed in the initial phase was 8mmwith the range from 6 to 13 mm. Before the ovulation the follicle size reached to the maximum diameter of 21 mm with the range of 14 to 29 mm. The mid cyclic fall in the basophil count coincided with the following changes in the follicle :

1. The follicle disappeared and no distinguistable corpus leuteum could be seen.
2. An irregular cyst could be seen.
3. The follicle appeared filled with ultrasonographic echo.
4. The follicle collapsed and 2–3 days later filled with corpus leuteum cyst.

DISCUSSION

The cyclic pattern in the basophil count during the menstrual cycle obtained in the present study is similar to pattern seen by Mettler and Rajan (4, 5).

The mid cyclic decrease in the cell count in the blood might be due to migration of the cells to the area of need. The ovulatory process has been compared with inflammation because several classical inflammatory mediators appear to participate in this process (10). Macrophages and granulocytes are present in high number in the follicle wall and are further increased in the theca at ovulation, suggesting an active role for these leucocytes during the ovulation process (11). The chemical factor which is released at the site of mature ovum causing chemotaxis and release of histamine are prostaglandins (12). Peters et at (13) had seen that P.G.E_2 is responsible for basophil degranulation, which results into the release of histamine in the vicinity of maturing follicle. The released histamine then influences follicular contractility either directly on its own or through an interaction with transmitter released from the nerve terminals (14).

Histamine also influences the ovulatory process by stimulating the production of sex steroids (progesterone) as suggested by Hedine et al (15). Further progesterone has been shown in some studies to increase the frequency of ovulation *in vivo* and *in vitro* (16). Histamine receptor blockade lowered the incidence of L.H. induced ovulation, supports the view that histamine may be one of the mediators involved in the complex mechanism leading to follicular rupture under normal physiological conditions (17).

The present findings are in consonance with Rajan and Mettler (4, 5) who had also shown the mid cycle fall in the basophil count. These authors have correlated fall in basophil count during ovulation with basal body temperature and hormonal estimation respectively. In the present study the ovulation has been correlated with ultrasonography. By these studies, it appears that basophil count can be used as one of the reliable indicators of ovulation.

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