

Effect Of Oral Contraceptive On Absolute Basophil Counts During Different Phases Of Menstrual Cycle

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Abstract: Background: Different Method are used to detect the time of ovulation. It is difficult to find out exact time of ovulation. Leucocytes have an active role in ovulation. In our previous studies we have found that there is significant change in Absolute basophil count in peripheral blood at the time of ovulation. Present study was done to find out effect of oral contraceptive on absolute basophil count in different phases of menstrual cycle and establish a correlation between basophil count and ovulation. Method: Absolute basophil count and ultra sonography was done in forty four female subjects aged 20-40 years. Result: Statistical significant fall in absolute basophil count was seen on 14th day (calculated date of ovulation) as compare to 7th and 21st day of menstrual cycle with signs of ovulation by ultra sonography in subjects with spontaneous ovulation. But no significant change was seen in absolute basophil count as compare to 7th and 21st day of menstrual cycle and no signs of ovulation were seen in ultra sonography on 14th day of menstrual cycle, In subjects having Anovulatory cycle and Anovulatory cycles induced by oral contraceptives. The significant fall in basophil count in peripheral blood in subjects with spontaneous ovulation was probably due to migration of these cells from peripheral blood toward the maturing follicle in ovary. While this change was not seen in subjects with anovulatory cycles and subjects in which anovulation induced by oral contraceptives. Conclusion: There is a significant fall in basophil count at the time of ovulation. The absolute basophil count can be used as an indicator of ovulation.

Key words: Absolute basophil count, C.D.O.(Calculated date of Ovulation), Ultra sonography, Anova

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Introduction: Different Method are used to detect the time of ovulation. Exact timing of ovulation still represents a major diagnostic problem. The direct proof of ovulation rest on establishment of pregnancy or recovery of ovum from fallopian tube. Many classical inflammatory mediator appear to participate in the process of ovulation, leucocytes have an active role in ovulation¹. Many studies showed a mid cyclic fall in the basophil count^{2, 6, 7}. The ovulation can be prevented by giving oral contraceptives. They act via, multiple mechanisms like suppressing level of LH and FSH, mid cyclic surge of LH does not occur and endogenous steroid levels are diminished preventing ovulation⁸. Keeping this view mind present study was conducted that if we try to induce anovulation by oral contraceptives, the mid cyclic fall in basophil count will not occur. And this can support our hypothesis that absolute basophil count can be a good indication of ovulation.

Material and Method: After taking institutional ethical committee approval, the present study was done in 44 female subjects ageing 20 to 40 years, having history of regular menstrual cycle and in other group subjects taking oral contraceptive were included in the study. While subjects who were taking any hormonal preparation, for any reason (Infertility cases) having irregular cycles and suffering from any bacterial or viral infection were not included in the study. After taking consent and detail menstrual history from them, the proper clinical examination was done, so that the calculated date of ovulation can be found out. The subjects were divided in different group

Group I : study group Induced anovulation by oral contraceptive.

Group II: spontaneous ovulation

Group III: Anovulatory

Subjects of group I (Study Group) were taking the oral contraceptive from day 1 of menstrual cycle asked to report on 7th, 12th, 13th, 14th

and 21st day of menstrual cycle. Date of ovulation was calculated on the basis of history of menstrual cycle. And were asked to report on 7th day and 3day prior to calculated date of ovulation (as the subjects of regular cycle were included) mostly they were called from day 12th day and their absolute basophil count was done by using Fuchs-Rosenthal haemocytometer according to Moores and James method³ Ultra sonography⁴ was done so that follicular and endometrial changes can be studied till subjects showed signs of ovulation (Include in Group II) subjects which did not showed the signs of ovulation on 14th day were studied. Further for 2-3 days so that even if there is delayed ovulation can be studied (Included in Group III) all the subjects were called again on 21st day for the absolute basophil count and ultra sonography.

Statistical analysis: all the data were analyzed by SPSS (Statistical Package for Social Sciences) Individual intra group comparison was done using paired test. Inter group comparison were derived by ANOVA followed by Bonferroni post hoc test safer multiple comparison⁹

Result: This study was consisting of three groups namely study group (subjects using oral contraceptives) Ovulatory and Anovulatory group. The observations were taken on 7th, 12th, 13th, 14th and 21st day. The results shows that in study group the mean basophil counts in cells/cumm with S.D. were 50.08 (± 27.28) on 7th day, 47.74 (± 24.87) on 14th day and 52.42 (± 20.42) on 21st day. In ovulatory group the mean basophil counts with S.D. were 40.78 (± 13.39), 13.70 (± 11.81) and 41.73 (± 14.24) respectively on 7th, 14th and 21st day. Similarly in Anovulatory group the observations were noted as 44.67 (± 17.99), 31.12 (± 18.87) and 47.23 (± 19.82) respectively on 7th, 14th 21st day.

The individual intra group comparisons between the 7th, 14th and 21st day observations showed that there is fall in basophil count from 7th day of cycle to 14day in all the groups. The

changes on 14th day observation form 7th day observation was non-significant but 14th day observation was significantly lowered from its 21st day observation in study group and similar findings were observed for Anovulatory group while results of **ovulatory group** were entirely different form these two groups where 14th day observations were significantly lower than its corresponding 7th day and 21st day observations. (Using paired t test – Table II, III and Graph)

Table 1 :Means basophil count with SD

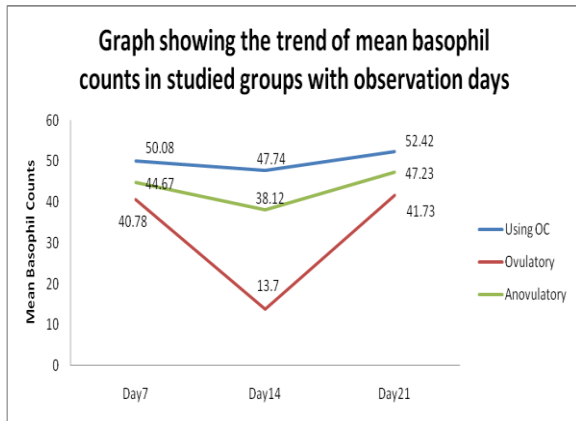
No	Group		Day 7	Day 14	Day 21
1.	Case	Mean	50.08	47.74	52.42
		SD	27.28	24.87	20.42
		N	12	12	12
2	Ovulatory	Mean	40.78	13.70	41.73
		SD	13.39	11.81	14.24
		N	21	21	21
3	Anovulatory	Mean	44.67	38.12	47.23
		SD	17.93	18.87	19.82
		N	11	11	11
4	Total	Mean	44.29	29.09	46.02
		SD	19.08	23.23	17.69
		N	44	44	44

Table 2 : Paired Sample statistics

Group			Mean	N	SD
Study	Pair 1	Day 7	50.08	12	27.28
		Day 14	47.74	12	24.87
	Pair 2	Day 14	47.74	12	24.87
		Day 21	52.42	12	20.42
	Pair 3	Day 7	50.08	12	27.28
		Day 21	52.42	12	20.42
Ovulatory	Pair 1	Day 7	40.78	21	13.39
		Day 14	13.70	21	11.81
	Pair 2	Day 14	13.70	21	11.81
		Day 21	41.73	21	14.24
	Pair 3	Day 7	40.78	21	13.39
		Day 21	41.73	21	14.24
Anovulatory	Pair 1	Day 7	44.67	11	17.9309
		Day 14	38.12	11	18.87461
	Pair 2	Day 14	38.12	11	18.87461
		Day 21	47.23	11	19.82021
	Pair 3	Day 7	44.67	11	17.9309
		Day 21	47.23	11	19.82021

Table 3: Paired Samples Test

Group	Pairs		Paired Differences		Sig.
			Mean	SD	
Study	Pair 1	Day7-Day14	2.33	11.28	0.48
	Pair 2	Day14-Day21	-4.67	7.36	0.05
	Pair 3	Day7- Day21	-2.34	14.19	0.57
Ovulatory	Pair 1	Day7-Day14	27.07	10.90	0.00
	Pair 2	Day14-Day21	-28.02	11.43	0.00
	Pair 3	Day7-Day21	-0.94	8.81	0.62
Anovulatory	Pair 1	Day7-Day14	6.54	10.32	0.06
	Pair 2	Day14-Day21	-9.10	12.93	0.04
	Pair 3	Day7-Day21	-2.56	6.07	0.19



Inter group comparisons for the specific day observation were derived by ANOVA followed by Bonferroni post Hoc tests for multiple comparisons and results reveals that 7th and 21st day observations did not differ significantly for either of the groups however 14th day observations of ovulatory group were

considerably lowered from those of study and Anovulatory groups, a significant F ratio ($F=15.643$; $P<0.0001$, $p=0.000$ for study/Ovulatory and $p=0.002$ for Ovulatory/Anovulatory and $p=0.617$ for study/Anovulatory)

When the absolute basophil count on 7th, 14th and 21st day were compared between group I and III. It is seen that the difference is there but it is insignificant. This difference might be due to ovustatic effect of oral contraceptive, while 14th day observation of group II when compared with group I and III. There was highly significant

change. These findings support our previous study that basophil count fall at the time of ovulation. This fall in count is prevented by oral contraceptives. (Present Study)

Table 4: One way ANOVA Day 7

	Sum of Squares	Df	Mean Square	Sig.
Between Group	661.858	2	330.92	0.41
Within Group	14994.848	41	365.72	
Total	15656.706	43		

Discussion: The changes in the absolute basophil count during the different phases of menstrual cycle obtained in present study are consonance with Rajan, Mettler^{6, 7}. At the time of ovulation due to presence of inflammatory mediator in vicinity of maturing ovum there in five fold increase of leucocytes.

Basophils degranulate and release of histamine occur might be responsible for ovulation. Brannstrom et al¹ reported that at ovulation there was a marked increase in density of Macrophages and Neutrophilic granulocyte in the follicular wall, especially in the thecal layer. There was no significant change in density of these cell type when early and late leuteal phase were compared, When he tried to study the frozen sections labeled with panel of monoclonal antibodies against leucocyte subtype marker and detected by immunohistochemical method. No such study has been reported for basophil. Kannan N et al¹⁰ have reported that they have found no significant changes in Eosinophil, Monocyte, Basophil counts in different phases of menstrual cycle. We could not compare our study with them as they have not focused mainly on the day of ovulation. The statistical significant fall in the absolute basophil count at the time of ovulation has been reported at the time of ovulation in our previous studies and the studies by Rajan and Mettler. If oral contraceptives are given due to their ovustatic effect, the ovulation is prevented and this might

prevent migration of basophil resulting in no change or slight change in peripheral blood in count at time of ovulation.

Conclusion: This significant fall in basophil count at the time of ovulation and insignificant change in natural and induced (by oral contraceptive) Anovulatory cycle support that basophil count changes at the time of ovulation and it can be used as an indicator of ovulation.

References:

1. Brannstrom M, Pascoe V, Harmann RJ, McClure N, Localization of leucocytes subsets in the follicle wall and in the corpus luteum through out the human menstrual cycle fertility and sterility 1994, 61:488-495
2. R. Soni, S. Bose, D. Gada, V Potnis. Basopenia as an indicator of ovulation. Indian journal physio-Pharmacology 1996, 40(4):385:388
3. Moore J.E. and James, G.W. proc. Soc. Exper. Biol and Med: 1953, 82:601
4. Hackel B.J. , Fleming R, Robinson HP, Adam AH, Coutts JRT. Correlation of ultrasonic and endocrinologic assessment of human follicular development American journal of obstetrics and Gynaecology 1979, 135:122-128
5. Thonnard-Newmann E. The influence of hormones on the basophilic Leucocytes. Actahaematol(Basel) 1961,25:261
6. Mettler LL Shirwani D. Direct basophil count for timing ovulation. fertilesteril. 1974:25:718-723
7. Rajan P, Sunder Rao G, Walter S. Blood basopenia as an indicator of ovulation Indian j Physiology-Pharmacology 1992;36(2)115-117
8. David s. Loose Mitchell and George M Stancel. E strogen and progestin. test book of pharmacological basis of therapeutic Goodman and Gilman 10th edition, 2001;1624-25
9. Kothari CR. Analysis of variance and covariance in research methodology method and technique II nd edition 1990; 300-310.
10. N Kannan, R Aravind Kumar, Ramaprabha p, P. Naveen, IvvalaAnand shaker. Evaluation of hematological and pulmonary function test parameters in different phases of menstrual cycle in rural south Indian population. International journal of Bioassays 2013; 02(03), 506-509

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