A COMPARATIVE STUDY OF SOME METHODS OF DETECTING OVULATION

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Summary: Detection of days of ovulation is of practical importance and an attempt has been made to detect this during menstrual cycles in healthy adult females by simultaneous interpretation of Basal Body Temperature (BBT) and the colorimetric readings of urine by Sevag and Colton's method (6). High correlation was found between the results obtained by these two methods. Phenomenon of intermenstrual pain and appearance of characteristic vaginal mucous discharge were also noted during these menstrual cycles, as criteria for ovulation; although they showed a pettern of distribution of ovulatory days similar to that shown by examination of urine and BBT records, these were not present in a high percentage of ovulatory cycles detected by BBT and urine examination. The results show that the detection of ovulation by chemical examination of urine has the same degree of reliability as BBT records, but intermenstrual pain or characteristic vaginal mucous discharge, as criteria for detection of ovulation have limited value.

Key words: days of ovulation basal body temperature colorimetric readings of urine

Detection of ovulation is of obvious importance in control or promotion of fertility. At present it is doubtful if there is any method better than 'Basal Body Temperature' (BBT) method for detecting ovulation which may be used conveniently by the women at home. Sevag & Colton (6) described a simple chemcial method for detecting ovulation in women by examining their urine. Hartman (3) observed that intermenstural pain has proved to be a fairly good indicator of impending or already consumed ovulation. Recently Billings *et al.* (1) have reported that a characteristic slippery lubricative vaginal mucous discharge could be identified by women themselves around the time of ovulation and concluded that the time of ovulation can be identified clinically without recourse to temperature measurements or more specilised tests.

In this study ovulation was detected in medical girl students by examining their BBT records and urine for three successive cycles and an attempt was made to see if the results obtained from these coincide with each other. A record of dates of occurence of intermenstrual abdominal pain and appearance of vaginal discharge of clear slippery mucous was also kept during these

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cycles to assess if the days of occurence of these phenomenon had any significant correlation with the days of ovulation as detected by above two methods.

MATERIALS AND METHODS

The observations had been made on 70 healthy unmarried girl students residing in the hostel of G.S.V.M. Medical College, Kanpur. The ages of these students varied from 17 to 25 years. The reason for selecting them for this study was that they were expected to extend more co-operation in this field of research because it is easier to make them understand the nature and significance of this kind of study. Moreover, they were expected to be more methodical in keeping records of the basal body temperature and menstrual cycles. All the girls were provided with a thermometer for measuring their basal body temperature and a chart for maintaining a record of it. The thermometer provided had a range from 96°F to 100°F and could record temperature differences to the extent of 0.1°F. Thorough instructions were given for maintaining BBT records and these were also printed on the back of charts for ready reference. The girls were also told to record on the chart itself the dates of menstrual onsets, occurence of intermenstrual abodminal pain and appearance of vaginal discharge of clear slippery mucous (like raw white of egg), if any. BBT charts were interpreted thoroughly and the day of beginning of thermal shift before an established hyperthermic phase was taken as ovulation day. Sevag & Colton's method (6) was used for detecting the day of ovulation in these girls by chemical examination of the urine collected between 11.00 P.M. and 7.00 A.M. for successive nights. The method is based on the measurements of the intensities of blue colour developed in reaction between specific reagents and chemical entities produced in varying amounts by follicles and other organs believed to be stimulated or depressed by gonadotrophic hormones during ovulatory cycles. Ovulation day was evaluated according to a pattern which could be easily recognized while looking over the colorimeteric readings of the urine samples from successive cycle days. One of the authors (S.B. - a lady medical graduate) had to reside in girls hostel concerned to supervise BBT recordings and collection of urine for exmination.

OBSERVATIONS AND RESULTS

Table I gives the distribution of ovulation days and incidence of ovulatory and anovulatory cycles as detected by different methods. The ovulation day in all the cycles was within the range of 6th to 18th day. Comparision of chemcial and BBT methods show that both have given almost identical results as far as range and distribution of ovulatory days and incidence of ovulatory and anovulatory cycles are concerned as the value of chi-square (X^2) obtained for testing the significance of difference between the results obtained by two methods in three different cylces as well as in total of the three cycles taken together has not been found to be significant at all. The X^2 test could not be applied for testing the significance of difference in relation to other two methods i.e. the occurence of intermenstrual pain and the appearance of characteristic vaginal mucous discharge due to the fact that the frequencies in most of the cells were either zero or very few.

TABLE I: Showing distribution of ovulation days as detected by different methods in three cycles studied.

Ovulatory cycles	*I cycle*				*II cycle*				*III cycle*				*Total*			
Method / *Day of ovulation*	*Chem.*	*BBT.*	*I.P.*	*V.D.*	*Chem.*	*BBT.*	*I.P.*	*V.D.*	*Chem.*	*BBT*	*I.P.*	*V.D.*	*Chem.*	*BBT.*	*I.P.*	*V.D.*
6—7	1	2	0	0	3	3	0	0	1	1	0	0	5	6	0	0
8—9	14	14	1	1	14	15	1	0	8	8	1	0	36	37	3	1
10—11	28	25	3	7	21	19	0	5	25	25	4	4	74	69	7	16
12—13	6	6	1	5	12	12	0	4	20	20	0	3	38	38	1	12
14—15	6	7	0	2	7	7	1	5	9	9	0	5	22	23	1	12
													(91.4)**	(89.8)**	(100)**	(93.2)**
16—17	3	3	0	2	3	4	0	1	0	0	0	0	6	7	0	3
18 & above	2	3	0	0	2	2	0	0	1	1	0	0	5	6	0	0
Total ovulatory cycles	60	60	5	17	62	62	2	15	64	64	5	12	186 (88.6)*	186 (88.6)*	12 (5.7)*	44 (20.9)*
Total anovulatory cycles	10	10	65	53	8	8	68	55	6	6	65	58	24	24	198	166
Total cycles tudied	70	70	70	70	70	70	70	70	70	70	70	70	210	210	210	210
	$X^2 = 0.36$ d.f. = 5 P>.95				$X^2 = 0.19$ d.f. = 5 P>.95				$X^2 = 0$ d.f. = 5				$X^2 = 0.44$ d.f. = 7 P>.95			

Chem. = Chemical Method, BBT. = Basal Body Temperature Method. X^2 = Chi squire, d.f. = degrees of freedom.
I.P. = Occurence of Intermenstrual pain, V.D. = Appearance of vaginal mucous discharge
**percent of ovulatory cycles, *percent of total cycles
As the frequencies in class intervals 6-7 and 18 and above were zero or few these have been merged with the class intervals 8-9 and 16-17 respectively for the purpose of calculating X^2

88.6 % of the total cycles were found to be ovulatory by chemical and BBT methods while occurence of intermenstrual pain and appearance of characteristic vaginal mucous discharge have shown only 5.7% and 20.9% of the cycles respectively to be ovulatory if these phenomenon are taken to be a criteria for ovulation.

Ovulation day was within a range of 8th to 15th day in 91.4% of ovulatory cycles in case of chemical method and in 89.8% of ovulatory cycles in case of BBT method. All the ovulatory cycles indicated to be ovulatory by insermenstrual pain and 93.2% cycles indicated to be ovulatory by vaginal mucous discharge were within the range of 8th to 15th day. Thus the pattern of distribution of ovulatory days detected by all the methods was almost similar.

DISCUSSION

Our findings show high correlation between the results obtained by chemical test of urine by Sevag & Colton's method and by interpreting BBT records for detecting ovulation. In a similar type of study Lemon *et al.* (4) and Parson *et al.* (5) have reported high correlation between chemical test used by us and electrovaginal potential (EVP) tests for prediction of occurence of ovulation.

Only 5.7% of cycles have been found to be ovulatory if occurence of intermenstrual pain is taken to be a criteria for detecting ovulation as against 88.6% of cycles found to be ovulatory by chemical and BBT methods. This is in marked contradiction to the observations made by Hartman (3) that intermenstrual pain has proved to be a fairly good indicator of ovulation.

If appearance of characteristic slippery discharge of mucous from vagina in between the two menstrual onsets is taken to be a criteria for detection of ovulation only 20.9%of cycles have been found to be ovulatory as against 88.6% found by chemical and BBT methods. This finding also is in contradiction to Billings *et al.* (1) who reported that all his 22 cases studied could identify a characteristic lubricative vaginal mucous discharge during periovulatory period. However, one of the factors responsible for this difference in results might be the high motivation in the women studied by above authors to identify this kind of vaginal discharge as all of them were married catholic women desirous of learning a method by which they could predict or detect ovulation themselves without recourse to temperature measurements or other specialised tests. This kind of motivation was obviously lacking in our cases.

Our results show that the pattern of distribution of ovulation days in ovulatory cycles as indicated by the criteria of intermenstrual pain and characteristic vaginal discharge is similar to the pattern of distribution of ovulation days detected by examination of urine and BBT records (Table. I). However, the value of these criteria as the indicators of ovulation is much less as compared to the value of examination of urine and BBT records as most of the ovulatory cycles which could be detected by latter two methods remained undetected by the above two criteria.

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