

THE CARAMEL TEST (FOR OVULATION)

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Anovulation is considered as an important cause for infertility. In the developing countries where sophisticated investigations are beyond reach, a simple test like 'Caramel Test' may establish its place for the detection and timing of ovulation. It is technically simple, economical, needs no special aids and can be performed without complication.

Cervical mucus study reveals that it undergoes a cyclic change in its quantity, viscosity, spinnbarkeit and arborization pattern which can indicate the occurrence of ovulation, ovulation time and physiological function of the cervix in sterility. These cyclic changes facilitate migration, capacitation and storage of the spermatozoa in the endocervical crypts. Although useful, it is difficult to monitor routinely the fertile period and establish probable ovulation dates.

The relation of the timing of ovulation to the colour of heated cervical mucus was studied by Ferrary *et al*, 1972 and Compos da Paz and Jaramillo, 1974. The ovulatory mucus is colourless or white and turning of this colour to brown or

light caramel is the earliest sign of ovulation.

Material and Methods

This paper presents the evaluation of the Caramel test in 100 infertile patients who attended gynaecological out-patient department of Govt. Medical College and Hospital, Nagpur during 1975. The cases with menstrual disorders, overt pelvic infections, tumours and palpable genital lesions were excluded.

The ectocervix was cleaned and the cervical mucus withdrawn with a special syringe which was then expelled on to a glass slide and the syringe withdrawn to test the spinnbarkeit, dried rapidly and examined microscopically for ferning. The mucus filament thus obtained was heated for 30 seconds over a spirit lamp and the colour of the mucus examined against a light source.

Using the above procedure the test was carried out in post-menstrual, ovulatory and pre-menstrual phases of the menstrual cycle. The findings have been compared with the fern pattern, endometrial biopsy and the vaginal cytology.

Observations

A total of 100 primary or secondary sterility cases were studied, majority between the age group of 21-30 years.

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Cervical Mucus Study

TABLE I
Quantity of Cervical Mucus in Different Phases of Menstrual Cycle

Menstrual Phase	Scanty	Fair	Copious
1. Postmenstrual	75	20	5
2. Midmenstrual	13	35	52
3. Premenstrual	92	6	2

TABLE II
Viscosity of Cervical Mucus

Menstrual Phase	Thin	Thick	Moderate
1. Postmenstrual	28	61	11
2. Midmenstrual	71	20	9
3. Premenstrual	11	81	8

TABLE III
Spinnbarkeit of Cervical Mucus

Menstrual Phase	0-5 cms.	6-10 cms.	11-15 cms.	16-20 cms.
1. Postmenstrual	79	18	2	1
2. Midmenstrual	26	32	23	19
3. Premenstrual	91	7	1	1

TABLE IV
P. L. Reaction of Cervical Mucus

Menstrual Phase	+	++	+++	Atypical	Negative
1. Postmenstrual	53	10	2	22	13
2. Midmenstrual	19	12	60	5	4
3. Premenstrual	6	7	1	30	56

TABLE V
Relation of Caramel Test and Fern Test

Menstrual Phase	Caramel Test	Fern Pattern
1. Postmenstrual	Brown or Caramel	Atypical or Negative
2. Midmenstrual	White	Typical
3. Premenstrual	Brown or Caramel	Negative

TABLE VI
Vaginal Cytology: Mean Maturation Index

Menstrual Phase	Para-basale	Inter-mediate	Super-ficial
Postmenstrual	0	55	45
Midmenstrual	0	38	6
Premenstrual	0	67	33

TABLE VII
Histopathological Findings or Endometrium

Menstrual Phase	No. of cases
1. Proliferative	16
2. Secretory	73
3. Mixed	11

TABLE VIII
Corelation of Cervical Mucus Fern, Pattern, Caramel Test, Endometrial Biopsy and Vaginal Cytology

Endometrial Biopsy	Fern Pattern %	Caramel Test %	Vaginal Cytology %
Ovulatory cycle	95.0	95.0	97.0

Discussion

The colourless or white appearance was always associated with a typical fern pattern and was seen in 95.00% of the ovulatory cycles. The brown or caramel appearance coincided with a negative or atypical fern. Thus in all the cases the results agree with the fern test suggesting

either estrogenic stimulation or progesterogenic inhibition.

The colour of the heated mucus was dark brown during the first few days after menstruation but the intensity decreased as the day of ovulation approached. The mucus was whitish or whitish brown on the day of ovulation changing to brown or dark brown on the following day. Though this phenomenon is dependent on estrogen and progesterone there are other determinants of the cervical mucus which include variations in the aqueous volume, cellular content and the concentrations of the sodium chloride, proteins and glucose. Coincident with the ovulatory period, the mucoid fraction increases while serum derived albumin (Moghissi, 1966) and glucose content as determined in the dry mucus diminish. In addition, the cellular content of the cervical mucus falls and the aqueous volume of the cervical mucus increases.

These facts suggest that among the elements which undergo cyclical alterations, those of greatest importance in the production of the phenomena are decreased

water volume, increased cellular content and elevation of serum albumin and glucose.

From the present study it can be concluded that, the following white colour a positive caramel test suggests ovulation. In the management of infertility, it is highly desirable to know the reliability of such simple tests which does not require well equipped pathological laboratory and hence can be performed in the rural areas at the Primary Health Centres. Also such simple methods in the detection and timing of ovulation may perhaps be of greater importance in solving the problems of fertility control.

References

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