

AN EVALUATION OF THE PREDICTIVE VALUE OF THE
POSTCOITAL TEST AND IN VITRO
TESTS OF CERVICAL MUCUS

by

SUJA VERGHESE

V. HINGORANI

and

S. KUMAR

SUMMARY

Thirty infertile couple were studied. The sperm count ranged from 80 to 312 million per ml. There was a significant improvement in the quality of PCT with higher sperm count. Ten patients conceived. There was no significant difference in the incidence of conception with sperm count less than 80 million and those with higher sperm count.

Introduction

The value of the PCT as a diagnostic and therapeutic tool in the management of the infertile couple has been both questioned and established by several authors since it was first advocated by Sims in 1866.

The postcoital test evaluated sexual function, sperm action, the cervical factor and cervical mucus sperm interaction. It is thus a simple and adequate screening method in the diagnostic survey of infertile couples (Tredway *et al* 1975).

Danezis *et al* (1962) and Jettee and Glass (1972) did correlate the occurrence of conception with a favourable PCT. Giber *et al* (1970) and Giner *et al* (1974) however found that the results of the PCT were not a reliable index of fertility in an

individual couple. The recovery of sperm from the peritoneal cavity of cases with a negative PCT by Asch (1978) further reinforced this conclusion. The present study was aimed at evaluating the predictive value of the PCT and in vitro studies of cervical mucus in the normal infertile couple.

Methodology

Selection of Couples: Thirty infertile couples with normal reproductive function according to the following criteria were selected for this study.

(a) History and general medical examination of the male and female partner indicated that no significant finding could be found which implicated an infertility factor.

(b) The male partner provided 2 fresh masturbated semen sample obtained at 2 weekly intervals which satisfied the following criteria.

From: Department of Obstetrics and Gynaecology All-India Institute of Medical Sciences, New Delhi-110 029, India.

Accepted for publication on 23-2-83.

- Volume 1.5-6.7 ml.
- 10% agglutination
- 40% motility (Majority progressive movement)
- 40% viability with supravital staining
- 20 x 10⁶/ml density
- 30 x 10⁶/sperm/ejaculate
- 40% normal morphology
- Leucocytes—less than 4-5/100 sperm

(c) Female partner had regular, spontaneous menstrual cycles (occurring every 21-35 days).

(d) Endometrial biopsy during luteal phase was secretory and tuberculosis was thus ruled out.

(e) Female partner had normal patent fallopian tubes as assessed by—

- (i) Laparoscopy and dye hydrotubation (methylene blue) or
- (ii) Hysterosalpinography.

(f) No significant psychosexual problems which would preclude regular vaginal intercourse atleast twice a week during presumed fertile period.

Design of Cervical Mucus Study:

Cervical mucus was assessed each morning from 17 days before expected date of period, according to the following parameters:

Amount	0 = 0
	1 = 0.1 ml
	2 = 0.2 ml
	3 = 0.3 ml or more
Viscosity	0 = Thick, highly viscous, premenstrual mucus
	1 = Intermediate type viscous
	2 = Mildly viscous
	3 = Normal midcycle mucus
Ferning	0 = No crystallization
	1 = Atypical fern formation

2 = Primary and secondary stem	
3 = Tertiary and quaternary stem	
Spinnbarkeit	0 = 1 cm
	1 = 1-4 cm
	2 = 5-8 cm
	3 = 9 cm
Cellularity	0 = 11 cells/HPF
	1 = 6-10 cells/HPF
	2 = 1-5 cells/HPF
	3 = 0 cells/HPF

The cervix was exposed by means of a speculum. Endocervical mucus was collected by means of a tuberculin syringe. The volume was noted and its viscosity evaluated in arbitrary terms. It was deposited on the slide. A coverslip placed over it and lifted away to note the length of cervical mucus thread stretched in between i.e. the spinnbarkeit. It was examined for leucocytes under the microscope. The coverslip was then removed and the dried slide observed for degree of ferning.

Procedure of PCT: The couple was asked to abstain from intercourse from the day cervical mucus screening was begun. When the score reached 12 the couple was instructed to have intercourse, 6-10 hours before the scheduled PCT. On the day of the PCT the cervix was exposed by means of a nonlubricated speculum and the nasal polyp forceps was used to take samples from the — (1) Vaginal pool; (2) exocervix; (3) endocervix which was then assessed for presence of sperm and grade of motility. The same procedure was carried out for 4 consecutive cycles unless the patient achieved conception. Where the score was poor because of cervicitis, and never reached 12 local and systemic antibiotics were given. If there was no cervicitis she was given 0.01 mg

ethinyl estadiol, from the 4th to 14th day of cycle and this definitely improved the score.

Results

The age group of the patients was between 19 and 38 years. The period of infertility ranged from 1½ to 14 years and 43% reported within 3 years of infertility. Twenty-five of them presented with primary and 5 with secondary infertility. The sperm count ranged from 20 to 412 million per cc.

The quality of PCT was graded as follows:

Negative—No spermatozoa seen.

Poor—Variable number of nonmotile spermatozoa seen.

Fair—1-5 motile spermatozoa per high power field (HPF) i.e. x 400.

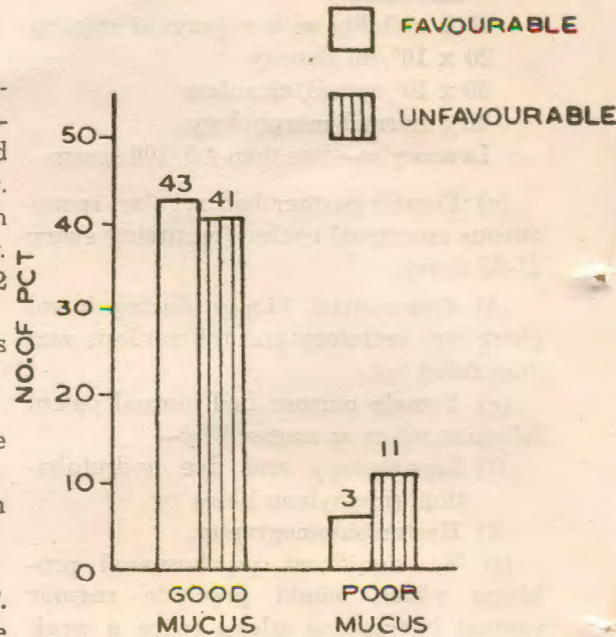
Good—6-25 motile spermatozoa/HPF.

Excellent—25 motile spermatozoa/HPF.

The quality of mucus affected the quality of the PCT (Table I) there being a significant ($p < 0.025$) association of favourable PCT with good cervical mucus (that is these whose cervical mucus reached a score of 12). (Fig. I).

The semen analysis of the male partner showed the sperm count to range from 20 to 412 mill/cc. There was a distinct im-

FIGURE I - QUALITY OF PCT IN RELATION TO QUALITY OF MUCUS



provement in the quality of PCT with higher sperm count which was found to be significant ($0 < 0.01$) Table II.

In all, 10 patients conceived. The incidence of conception and probability of pregnancy in relation to the number of PCTs done is shown in Table III.

TABLE I
Quality of PCT in Relation to Quality of Mucus

Quality of PCT	Good mucus	Poor mucus	Total
<i>Unfavourable</i>	41	11	52
Negative	31	9	40
Poor	10	2	12
<i>Favourable</i>	43	3	46
Fair	26	2	28
Good	15	1	16
Excellent	2	0	2
Total	84	14	98

TABLE II
Relationship of Sperm Count to Quality of PCT

Sperm count (mill/cc)	Negative	Poor	Fair	Good	Excellent	Total
20-39	11	0	1	0	0	12
40-59	9	1	7	4	0	21
60-79	7	10	8	3	0	28
80-99	1	0	7	2	1	11
100	12	1	5	7	1	26
	40	12	28	16	2	98

TABLE III
Probability of Pregnancy as Related to Number of PCTs

No. of PCT	No. of pregnancy	Probability of pregnancy	Cumulative probability of pregnancy
1	3	0.10	0.10
2	6	0.22	0.32
3	1	0.05	0.37
4	0	0.00	0.37

There was no significant difference in the incidence of conception among those with sperm count less than 80 mill/cc (5 out of 18) and those with sperm count equal to or more than 80 mill/cc (5 out of 12). Though 60% of those with secondary infertility and 28% of those with primary infertility conceived, this was not statistically significant. All the conceptions occurred among those who were infertile for less than 8 years.

If the general quality of the PCT done in each of the 30 patients be compared to the incidence of occurrence of conception among those with favourable PCT is 40% as against 20% among those with unfavourable PCT (Table IV). However, this difference is not statistically significant (Fig. II).

Discussion

This diagnostic and therapeutic potential of the PCT has been long disputed. Danezis (1962) found that the cervical

FIG II. QUALITY OF PCT IN RELATION TO OCCURRENCE OF CONCEPTION

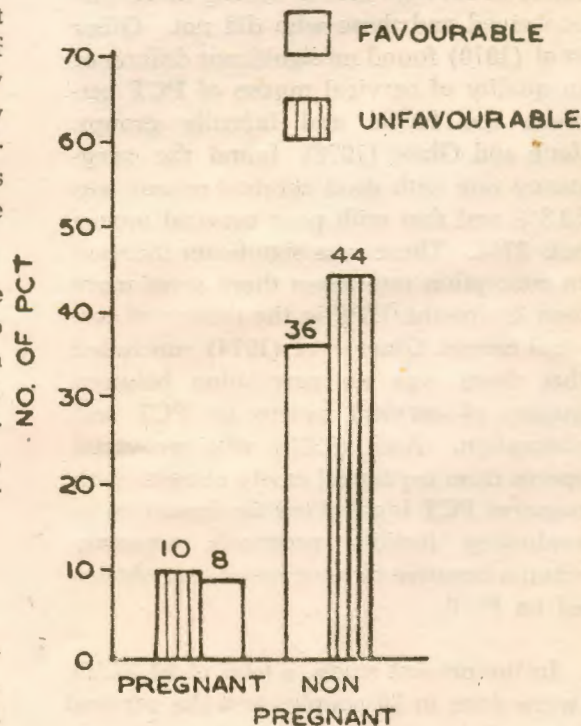


TABLE IV

Quality of PCT in Relation to Pregnancy

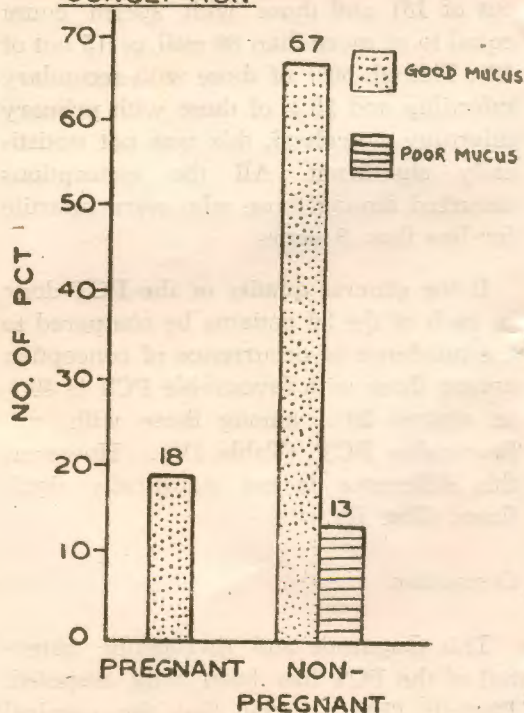
Quality of PCT	No. of patients	No. of pregnancies
Unfavourable	10	2
Negative	6	2
Poor	4	0
Favourable	20	8
Fair	11	4
Good	7	3
Excellent	2	1
Total	30	10

mucus was good in 82% and PCT favourable in 88% of the conception cycles and that good cervical mucus resulted in better PCT but found no significant difference in cervical mucus among those who conceived and those who did not. Gibor *et al* (1970) found no significant difference in quality of cervical mucus of PCT between the fertile and infertile groups. Jette and Glass (1972) found the pregnancy rate with good cervical mucus was 53.8% and that with poor cervical mucus was 37%. There was significant increase in conception rate when there were more than 20 sperms/HPF in the postcoital cervical mucus. Giner *et al* (1974) concluded that there was no correlation between quality of cervical mucus or PCT and conception. Asch (1978) who recovered sperm from peritoneal cavity of cases with negative PCT highlighted the limitation in evaluating fertility prognosis especially when a negative or poor result was obtained on PCT.

In the present study, a total of 98 PCTs were done in 30 couples and the cervical

mucus scored from 17 days before the next expected menstrual period. All the pregnancies occurred in patients with good cervical mucus, there being no pregnancies in the group with poor cervical mucus (Fig. III). Of the 18 PCTs in the pregnant group, 10 were favourable and of the 80 PCTs done in the non-pregnant group, 36 were favourable. Forty per cent of those with favourable PCT conceived and 80% of the conceptions occurred in the group with favourable PCT. A negative PCT may be due to quick migration and invasion of the crypts or technical errors which are the reasons put forward to explain conception in these cases. It may also be due to hostile cervical mucus, poor timing, immunological factors, inadequacy of insemination or abnormal

FIG. III. QUALITY OF CERVICAL MUCUS IN RELATION TO OCCURRENCE OF CONCEPTION



semen which have to be further investigated (fractional *in vivo* and *in vitro* examination of postcoital cervical mucus, cross-testing of cervical mucus with donor sperm) and treated (artificial insemination of husband/donor).

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