

## **Sims-Huhner Test in the Evaluation of Infertility**

Mehrun Nisa,\* M.B.B.S.,  
M.C.P.S.,  
Government Maternity Hospital,  
and  
Shamim S. Majeed,\*\* M.B.B.S.,  
D.R.C.O.G., M.R.C.O.G.,  
F.R.C.O.G.,  
Postgraduate Medical Institute,  
Lady Reading Hospital,  
Peshawar, Pakistan

### **Abstract**

*This is a prospective study of 140 cases of infertility. They were all followed up in semenalysis, D & C, HSG and PCT. Abnormal PCT accounted for 48.5% of the cases. Of these 53% were suffering from infections, either male or female. Three percent of the couples with abnormal PCT had male factors alone. The vast majority had a defective cervical mucus. Another 7% couples had a poor coital technique. This study concludes that:*

- 1. PCT is a reliable, cheap, non-invasive and easily performed test for cervical mucus-sperm interaction defects.*
- 2. Male and female infections and faulty coital technique are easily correctable causes of infertility.*
- 3. Anatomical defects account much less in the aetiology of infertility.*
- 4. Poor cervical mucus responds well to Oestrogens.*

### **Introduction**

Examination of midcycle post-coital cervical mucus has been in practice for a long time. Its importance lies in the fact that it is the only in-vivo test for the evaluation of a couple as a single unit.

---

\* Woman Medical Officer, Government Maternity Hospital.

\*\* Professor & Head, Deptt. of Gynaecology & Obstetrics, Postgraduate Medical Institute & Visiting Gynaecologist, Lady Reading Hospital.

Sims examined post-coital cervical mucus microscopically for the first time in 1870s. Later Huhner modified it, hence called |Sims-Huhner Test. Since then there has been difference among workers in respect of:

1. Method of mucus collection
2. Post-coital interval of examination
3. Period of abstinence.
4. Criteria for positive results.

These issues were largely settled when WHO standardised the test. The standard has been set at finding of 7 or more motile sperms/HPF two hours after intercourse.

#### **Material and Methods**

All patients came through the out-patient department of Gynaecology, 'B' Unit, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar. Couples came from all around the North West Frontier Province. Many Afghan refugees also fell into the study. Most of the patients were referred to us by consultant gynaecologist. All the couples had their semen analysis done and azoospermic couples were excluded from the study. All the female partners had their dilatation and curettage (D&C) and hystosalpingography performed before the test. Couples of both primary and secondary infertility constituted population of the study. All the cases were dealt with as day cases without admission to the ward.

#### **Pre-Procedure Instructions**

The couples were instructed to reside, at least, temporarily, within two hours reach of our unit.

Male abstinence of at least three days was requested. The best preovulatory time for coitus was suggested to them i.e. 14th day of the cycle.

As some husbands do not perform well on demand, only the wives were taken into confidence but this is very difficult in our society.

After successful relationship, the female partners were asked to report to our unit within two hours. They were particularly told not to wash their parts or douche before coming to us.

### Preparation

The patients were taken to the labour room and put in lithotomy position under good light. All the aseptic precaution were taken. The patients were then draped without cleaning them with antiseptics.

### Procedure

A Sim's speculum was passed in the vagina. The anterior lip of the cervix was held with Volsellum forceps. Fluid from the posterior fornix was drawn with a pipette and put on a slide (No. 1). A second specimen was taken from internal os, at the same time performing Spinbarkeit test. This specimen was put on two slides, one of which was covered under a cover slip for ferning (No. 2) and the other left uncovered for sperm count (No.3). Slides No. 1 and 2 were seen under the microscope for the number of sperms and their mobility. Pus cells and RBCs if seen were also recorded. After this, vaginal examination was performed and the state of vagina, cervix, uterus and fornices recorded.

### Instruments

1. Sim's vaginal speculum
2. Good light source
3. Pipette
4. Disposable syringe
5. Volsellum
6. Kidney tray
7. Gloves
8. Microscope
9. Slides & cover slips
10. Culture swabs

### Results

The predominant age group of female partners who really worried about their infertility was the 21-30 years age group i.e. 87.1% of all patients (Table I). Majority of the couples complained of primary infertility (Table II). The couples came pretty soon after an issue-less marital relationship. More than 2/3 of them turned up within 5 years of marriage (Table III).

Infection accounted for a large number of infertility cases but male genital infections are an uncommon cause of infertility as compared to female genital infections (Table IV). Pyospermia was seen in only 2 cases

and they were put on broad spectrum antibiotics by the andrologist. The infection cleared up and both had a normal subsequent PCT.

Any cervical mucus with pus cells was sent for culture and sensitivity test. The predominant organism recovered was *E. coli*, (Table V) with *Strep. fecalis* next on the list. *Proteus* was isolated in only one case. Four cultures were without any growth. Sensitivity tests showed reasonable response to Minocyclin and Tobramycin (Table V).

Hystosalpingography showed tubal blockade in two cases. Empirical diagnosis of tuberculosis was made and patients were put on antituberculosis drugs.

#### Anatomical Defects

On P/V examination, we came across 47 cases of anatomical variations and abnormalities (Table VI). Only one had a fixed retroverted uterus. Twenty nine had mobile retroverted uteri. Two patients had small and 15 had large bulky uteri. Only two of these 47 patients had an abnormal PCT and they too had infection as well.

#### An-Ovulation

Those patients who had anovulatory cycles through D & C had already had courses of treatment. Twenty seven of such patients were recorded. Fifteen anovulatory females had taken Clomid and Premarin, of which twelve responded positively. Rest of the anovulatory patients had Clomid alone and one fourth of them responded (Table VII).

#### Poor Cervical Mucus

We recorded 33 cases of poor cervical mucus. 21 had low quantity of mucus. They were put on Premarin 0.625 mg/day (day 5 to 15). Only 13 of them returned for follow up, of which 8 responded well (61% response rate). Twelve patients had thick cervical mucus. Only six of them could be traced for the effect of Premarin with a response rate of 83% (Table VIII). Thus scanty cervical mucus responded better to Premarin than thick mucus did.

### **Coital Techniques**

Ten cases had no or very small number of sperms in the vagina and cervical canal, inspite of good sperm count. They were advised on coital technique and strictly advised to report within two hours of coitus. One couple who had not observed the abstinence instruction had a poor PCT. Subsequent PCT was normal in 9 of them. One couple with normal semen analysis, and no impotence could not produce any sign of semen deposition in the vagina or cervical canal even after repeating PCT three times.

### **Discussion**

There has been no agreement on the exact prevalence of infertility due to faulty cervical mucus-sperm interaction. It has been differently reported as 10 to 15% of all infertile cases<sup>2,3</sup>. Cervical mucus defects alone account for about half of them<sup>2</sup>. Poor semen which can be very easily ruled out on simple semen analysis, is the causative factor in 10-15% of infertility. Rest of the cases have either blocked tubes, ovulatory problems or faulty coital technique.

Evaluation of ovulatory status of the female can be very easily carried out by diagnostic dilatation and curettage. It is more specifically done by daily plasma oestadiol and LH levels which correspond well to the ovulatory status but these tests are expensive and not freely available. Patency of the tubes is usually determined by hystosalpingography, laparoscopic dye test and tubal insufflation. But there still remains a large percentage of infertile couples that have completely normal semen analysis, D & C and hystosalpingography. Majority of this undetermined group have either a faulty cervical mucus or poor sperm penetration. Post coital test remains the only reliable test to exclude or diagnose these causative factors. Many other tests have been devised in an effort to improve upon PCT e.g. Sperm Cervical Mucus Penetration Test (SCMPT) and the Cross Test (X-Test) using bovine cervical mucus and donor semen but as Tredway et al showed there is no significant difference between PCT, SCMPT and X-test<sup>2</sup>.

Poor semen quality is the domain of andrologist and we excluded them from our study. Patients revealing anovulatory cycles were tried with Premarin and Clomid in combination or Clomid alone.

Tuberculosis is quite common in this part of the world and female genital system is no exception. It is by far the commonest cause of tubal blockage. When we find tubal blockage, we screen the patient for tuberculosis. Bilateral blockage, of course, needs plastic surgery; the results of

which even in the best hands are still very poor. Some hope can be made in cases of unilateral blockage. In our study the only two patients of such presentation did not conceive during a follow up of 2 years.

The main stay of our study was the evaluation of PCT in the management of infertility. The following is a detailed discussion on findings of abnormal PCT.

### Differential Diagnosis of Abnormal PCT

#### A. ANATOMICAL DEFECTS

i. Cervical Stenosis accounts for about 5-7% of the cases of abnormal cervical mucus samples. They can be classified etiologically into congenital and post traumatic.

The latter is by far the more common cause and conization stands as the first cause of it. The diagnosis is usually easy as the external os is visibly stenosed. But at times only the endocervix or a variable length of the cervical canal is narrowed. This is then revealed by passing a sound or catheter.

The entity is very difficult to treat. Various regimes tried are:

- 1- Large doses of conjugated oestrogens (2.5 mg/day) 5th to 15th day of cycle, but the BBT record should be maintained to avoid suppression of ovulation.
- 2- Cervical canal has been tried to recanalise with cryosurgery. It has a low success rate.
3. Laminaria tents are back again. Its one night stay in cervical canal has proved to be successful on many occasions.
4. Laser therapy is still very premature to bet upon and is largely a research tool in dilatation of cervical canal.
5. As an alternative to cervical dilatation, intra-uterine insemination of husband semen was not very promising until recently. But the Australians have been now achieving good results. Cervical stenosis is a rare cause of abnormal PCT here. Not even a single case was found.

#### ii. Endo-cervical Varices

In some patients there are small varicose veins running over the cer

vix. They bleed on touch on colposcopy. There is a low lying columnar epithelium. Some patients improve with cryo surgery or laser therapy but conception in them is uncommon. In contrast to other studies, our inference is that cervical varices are an uncommon cause of infertility and PCT.

## B. ABNORMAL CERVICAL MUCUS

### i. Cervicitis

We found 34 specimens (24.3%) of cervical mucus with pus cells. They were subsequently cultured. Five of them turned out to be negative. Eighteen cases showed *E. coli* sensitive to Minocyclin and Tobramycin and 11 grew *Strep. fecalis* sensitive to Minocyclin (Table V)

Inflammation impairs the normal function of cervical mucosa and if lasting longer can lead to irreversible changes. Also surgery on cervix can result in destructive reduction of cervical glands.

### ii. Poor Quality Cervical Mucus

Thick and cellular cervical mucus is encountered in 25% cases of abnormal PCT. Sperm penetration is poor in such a mucus. The main stay of treatment is oestrogen. DES is given in doses of 0.1 mg/day from day 5 to 15 of the cycle. About 40% of patients respond well to this regime. In the rest of the cases the dose can be increased to 0.2 mg/day. High doses of conjugated oestrogen can be tried in those still not responding. If ovulation is suppressed as evident by BBT records, Clomid should be given from day 5 to 15 with oestrogens from day 10 to 20 of the cycle. Combination of HMG and high dose oestrogen has proved effective in 56% of previously failed cases.

Sometimes thick mucus can be gently aspirated so that the thin normal mucus starts coming. The couple should be instructed on intercourse or artificial insemination performed on that day. Those who conceive would do so in the first four cycles after the procedure. In case of failure, therapy should be continued for at least a year. Kolfer has studied the effect of local application of oestrogen tablets. According to his study, intra-vaginal application of oestriol tablets 1-3 mg daily for one or more subsequent cycles, improved the cervical mucus quality (51.9% of the cases with a pregnancy rate of 27.2%).

Segal introduced another method in the treatment of poor quality cervi

cal mucus. He applied donor mucus into the cervical canal. The donor mucus was incubated with the husband's split ejaculate at 37 degrees Celsius for 20 minutes and then introduced into the cervical canal. Cervical cap was then applied upon. Six hours later PCT was performed which was normal. The patient conceived after second such trial.

D & C has a curative effect on infertility due only to cervical factor. In a study, 47% female patients dilated and curetted, conceived after six months and 64% after five years. D & C and Premarin combined has even a better prognosis i.e. 78% conception rate.

Unfortunately we lost about half of the patients with poor quality cervical mucus. But those who turned up had an 83% success rate with Premarin 2.5 mg/day from day 5-15.

### iii. Scanty Cervical Mucus

This is defined as volume of mucus aspirated less than 0.1 ml in amount. The course of management is the same as for poor quality mucus. About half of the patients respond well to oestrogen therapy. One should not give up in case of failure for at least one year. Our study confirms that oestrogen 2.5 mg/day on day 5-15 gives good results (success rate 61%).

## C. ABNORMAL PCT WITH NORMAL CERVICAL MUCUS

### i. Faulty Coital Technique

Some patients do not achieve intra-vaginal ejaculation. Obesity accounts for some of the cases or the wife jumps out of the bed immediately after the intercourse. As evident from our study, 7% of infertile couples have this problem which can be very easily solved by properly educating them.

### ii. Vaginal Factor

This is a diagnosis by exclusion. If sperms are found in the posterior fornix and PCT is abnormal and cervical mucus is normal, a cup PCT may be performed. In this technique a specially designed cup is applied to the cervix and insemination is done in it. The sperms remain in contact with the cervix for 4-6 hours and then the cup is removed. A repeat PCT is performed. If this is normal, a diagnosis of defective vaginal factor is made which is usually the case in 3-5% of the cases. This cup insemination is then followed for at least four cycles. A pregnancy rate of 43% has been



reported.

iii. Oligospermia

If abnormally low number of sperms are seen on PCT, semen analysis should be repeated. A count less than 20 million/ml in repeated three analyses, is diagnosed as oligospermia. Apart from cup insemination no other method has been grossly successful. Recently in-utero insemination of husband's washed sperms has been successful but needs extensive laboratory work. Expert ultrasonography and rapid LH ratios are essential for the procedure.

iv. Low Semen Volume

Semen volume of less than two ml is usually insufficient for fertilisation. Management is as for oligo-spermia.

v. Immobilisation of Sperms in the Endocervix

Sperm immobilisation is yet another cause of abnormal PCT. So far three different factors have been recognised.

1- Vaginal hostility: The PCT is abnormal but it improves with cup insemination so that vagina is by-passed. The number of mobile sperms is increased. If this is so, the cup PCT should be repeated for a few cycles until pregnancy occurs.

2- Sperm immobilising antibodies in the cervical mucus: If the cup PCT also remains abnormal, search should be made for these antibodies in the cervical mucus. Kremer test using capillary tube system or Franklin-Duke test using slide can be helpful. A six-month use of condom usually brings the antibody titre low and pregnancy may be expected later on.

Antibodies can be detected by Sperm Immobilization Test (SIT) and Sperm Toxicity Test (STT) which are repeatedly positive in 38.5% of unexplained abnormal PCT.

Dor. has proved that sometimes cell mediated immunity in the endocervical canal is present. Leucocyte Migration Inhibition Test (LMIT) has been used to detect cell mediated immunity sperm antigens. LMIT was positive in 5.3% of the cases with abnormal PCT and normal mucus and semen. While testing for complement dependent sperm immobilising anti-bodies, care

should be taken not to use buffer salt solution for dilution of cervical mucus. A false positive result may appear due to a factor in the animal serum used as a complement preparation. This error may be obviated by use of human serum for dilution.

Sperm agglutinating antibodies are also sometimes detected but they are of no significance.

3- Infection: In some observations, infection (either male or female) with *T. mycoplasma* and *Chlamydia* results in unexplained sperm immobilisation. Therefore extensive bacteriological cultures should be pursued in cases of abnormal PCT with good semen and mucus. In our study we could easily diagnose male infections. Only two cases were detected as pus cells in the semen. More sophisticated culture and sensitivity tests are not available here (Table V).

### Conclusion

PCT is a reliable diagnostic procedure in cases of fertility with normal semen analysis, D&C and HSG. It is easy, cheap and non-invasive.

Male and female infections are easily treatable causes.

Cervical infections respond well to Minocyclin 100 mg b.i.d.

Anovulatory cycles respond better to Clomid and oestrogen combination rather than to oestrogen alone.

Tubal blockage is a cause of infertility very difficult to treat.

Anatomical defects account much less in the aetiology of infertility.

Qualitatively and quantitatively poor cervical mucus responds well to Premarin.

Technical faults in coitus are easily manageable cause of infertility.

TABLE I  
FEMALE AGE

Age	Cases	%age
15-20 years	15	10.7
21-30 years	122	87.1
31-40 years	3	2.1
Total	140	100

TABLE II  
PRIM./SEC. INFERTILITY

Class	Cases	%age
Prim. Infer.	108	77.1
Sec. Infer.	32	22.9
Total	140	100

TABLE III  
YEARS OF MARRIAGE

Years of marriage	Cases	%age
01-05	93	66.4
06-10	44	31.4
11-15	3	2.1
Total	140	100

TABLE IV  
INFECTIONS

Type of Infection	Cases	%age
Pyospermia	2	1.43
Cervical Infection	34	24.3
Total Infection	36	25.7

TABLE V  
ORGANISMS AND SENSITIVITY

Org. grown	No. of cases	%age	Sensitivity
E. coli	18	53	Minocyclin, Gentamycin, Tobramycin.
Strep. fecalis	11	32.3	Minocyclin, Velosef, Fosfomycin.
Proteus	1	3.0	Tobramycin.
Negative	4	11.7	-----
Total	34	100	

TABLE VI  
ANATOMICAL DEFECTS

Defect	No. of cases	%age
R/V Uterus Fixed	1	0.7
R/V Mobile Ut.	29	20.7
Small Ut.	2	1.4
Bulky Ut.	15	10.7
Total	47	33.5

**TABLE VII**  
**ANOVLATION & TREATMENT**

No. of anovul. Cases	Treatment	Responded
15	Clomid + Premarin	12(80%)
12	Clomid alone	3(25%)
<b>Total</b> 27	(19.3%) of the whole study)	

**TABLE VIII**  
**POOR PCT AND TREATMENT**

Cx, Factor	No. of cases	Treatment	Response
Poor Quantity	(21-8) 13	Premarin 2.5 mgm Day 5-15	8 (61%)
Poor Quality	(12-6) 6	-do-	5 (83%)
<b>Total</b>	<b>(33-14) 19</b>		

---

**References**

- Tredway, D.R. et al, Correlation of postcoital evaluation with in vitro sperm cervical mucus determinations and urea plasma cultures. *Fertility Sterility*. (1985), 286-9.
- Davajan, Cervical factor, the practice of.
- Beauchamp, P.J. et al, Human sperm velocity and post insemination cervical mucus test in the evaluation of infertile couple. *Archeives of Andrology*. (1984), 107-42.
- Novak, Text Book of gynaecology.
- Scott, J.Z. et al, The cervical factor in infertility, diagnosis and treatment. *Fertility Sterility*. (1977), 1289-94.
- Dor, J. et al, Cell mediated and local immunity to spermatozoa in infertility. *Int. J. Fertility*. (1979), 94-100.
- Segal, S. et al, The use of donor mucus and insemination for cervical factor. *Int. J. Fertility*. (1979), 291-2.
- Zegars, F. et al, The cervical factor in patients with ovulatory infertility. *Br. J. Obs. Gynae*. (1981), 537-42.
- Smiljanic, N. et al, Cervical factor in sterile couples with a ovulatory cycle, normospermia and patent tubes. *Jugosl-Genikol-Opstet*. (1980), 191-6.
- Bernaes, E.R. et al, Infertility due to cervical factor; management and long term prognosis. *Int. J. Fertility*. (1982), 85-9.
- Check, J.H. et al, Improvement of cervical factor by high dose oestrogen and human menopausal gonadotrophin therapy with ultrasound monitoring. *Obs. Gynae*. (1984), 179-81.
- Jager, S. et al, Are sperm immobilising antibodies in cervical mucus an explanation for poor PCT? *Am. J. Reprod. Immunol*. (1984), 56-60.
- Kofler, E., Therapeutic effect of intravaginal oestiol tablets in the treatment of pathological cervical factor as a cause of sterility. *Geburtshilfe-Fraunheilkd*. (1984), 236-42.