

# Sonosalpingography for Assessment of Tubal Patency: Our Experience

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**Summary:** Forty patients of infertility were subjected to sonosalpingography on Day-8 of menstrual cycle in the Gynaecology OPD of L.T.M.G. Hospital, Sion, Mumbai – 400 022 for the assessment of tubal patency from June 1995 to June 1996. This was followed by hysterosalpingography on Day-10 and laparoscopy with chromopertubation preferably in the same cycle. The results of the three tests were then compared to determine the accuracy of the three patency tests.

## Introduction:

The age old problem of infertility still continue to baffle gynaecologists. Amongst all the causes of infertility, the tubal factor is responsible for almost 25-30% of female related factors. The incidence of tubal factor is rapidly increasing with increasing prevalence of salpingitis, sexually transmitted diseases etc. The assessment of tubal patency is commonest and most practical method of evaluating tubal function. Ever since Rubin introduced his patency test using CO<sub>2</sub> insufflation, numerous methods have been described for assessment of tubal patency. The commonest and most practical ones are hysterosalpingography and laparoscopy with chromopertubation. We used vaginal sonography-hydrotubation, popularly called as sonosalpingography for assessment of tubal patency as basic screening method for infertile women.

Aim of the Study was to evaluate accuracy and efficacy of sonosalpingography in assessment of tubal patency, particularly in comparison to established methods like laparoscopy and hysterosalpingography and to determine its value as a basic non-invasive screening procedure in infertile women.

## Materials and Methods:

The study involved a series of 40 patients of infertility in gynaecological outpatient department at L.T.M.G. Hospital, Sion, Mumbai – 400 022, over a period of one year from June 1995 to June 1996.

In all these patients, detailed history with respect to nature and duration of infertility and history suggestive of aetiological factors like PIH, TB, previous operations etc

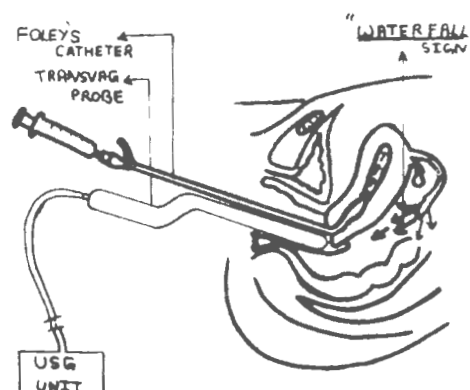
were taken. Menstrual history, past obstetric history in case of secondary infertility and significant personal and past history were recorded. History regarding male factors of infertility was also taken.

The patients were subjected to a general, abdominal and bimanual pelvic examination to detect any obvious pathology.

Routine investigations, husband's semen analysis and other relevant investigations were done in all these cases. In post-menstrual preovulatory phase (Day-8), these patients were subjected to sonosalpingography in Gynaecology OPD. Hysterosalpingography was carried out on Day-10 using Conray-280 in department of Radiology. Diagnostic premenstrual D & C laparoscopy was done under general anaesthesia in all these patients preferably in the same cycle.

The data was analysed to study the accuracy of sonosalpingography in the evaluation of tubal patency as compared to the other two methods.

Procedure of Sonosalpingography:



(Figure 1)

Transvaginal sonography was done on USG Machine Philips SDR 1550 XP using 7.5 MHz Vaginal Transducer. Informed consent was taken, bladder was emptied and patients were atropinised. After a pelvic examination, the patient was brought to the edge of the table and a 8F Foley's catheter was inserted transcervically just beyond the internal os and 3 ml saline was then injected into the Foley's bulb thus stabilising the catheter within the uterine cavity. At this point, the patients usually complained of a dull lower abdominal pain. A new condom was slipped over the probe before each examination for reasons of hygiene and readiness for the next patient. A small amount of coupling gel was applied to the inner surface of the top of the condom to assure contact. Once the preparation was completed, the transducer was gently inserted into the vagina with the marker pointing anteriorly towards the pubic symphysis.

sonosalpingography, hysterosalpingography and diagnostic laparoscopy was done.

Most of these patients were between 25-30 years of age. Thirty-four patients had primary infertility, while 6 had secondary infertility.

Three patients had undergone tuboplasty operation prior to these investigations.

Mean duration of infertility was 3.5 years and 5.2 years in primary and secondary infertility groups respectively. Table-1 shows accuracy of the 3 patency tests. On sonosalpingography, in 32 patients bilateral tubal patency was diagnosed while in 5 patients, bilateral tubal block was found.

The 3 scanning manoeuvres used were: -

1. Side to side movement within upper vagina for sagittal imaging.
2. Transverse orientation for imaging in semiaxial/axial planes.
3. Cervical imaging by gradual withdrawal of probe.

Images of the uterus with the Foley's catheter in situ were obtained in the sagittal and coronal planes. After scanning the uterus, left ovary and right ovary, we concentrate on an area between the left cornu of the uterus and the left ovary. About 30-40 cc of sterile saline with air with an ampoule of a suitable antibiotic and hydrocortisone was pushed through the Foley's catheter. The left tube if patent distends and the mixture of saline and air-bubbles gush past the ovary to give rise to what is known as "the Waterfall Sign", the sign of sonosalpingography. The procedure was repeated on the right side. The catheter was then deflated and pulled out. Patients with bilateral tubal block complained of a sharp acute lower abdominal pain the moment the mixture of air and saline was injected and the reflux was seen very clearly in the stem of Foley's catheter with slight withdrawal of the probe. The patients were allowed to rest for a short period of time and then sent home on a 5-day course of doxycycline and metronidazole.

**Results:**

We had a series of 40 patients on whom

**Table-1**  
**Tubal Patency**  
**(Correlation in 3 Tests)**

	SSG	HSG	Laparoscopy
Total	40	40	40
Bilateral Tubal Patency	32	30	33
Bilateral Tubal Block	5	6	4
Right Tubal Block	2	2	1
Left Tubal Block	1	2	2

When results of sonosalpingography were compared to those of laparoscopy, 97% correlation was noted whereas there was around 93% correlation between the results of sonosalpingography and hysterosalpingography.

In a series of 50 women investigated by Donnez, et al (1982), these 3 techniques gave comparable information regarding tubal patency in 90% of cases.

In 2 patients we got false positive results, i.e. patent tubes on sonosalpingography but blockage on laparoscopy and/or hysterosalpingography. Both these patients had a huge hydrosalpinx. This hydrosalpinx itself could be the reason for the false positive result since turbulence of flow of saline through dilated tubes may simulate spillage on USG screen.

In few patients, false negative results were elicited i.e. blocked tubes on sonosalpingography but patent tubes on hysterosalpingography and/or laparoscopy. This con-

be due to tubocornual spasm, endometrial bits blocking the tube, inappropriate technique, inexperience or human error.

Table-2 shows associated pathology diagnosed on sonosalpingography, most of them established by the other two techniques.

Table-2

Pathology	SSG	HSG	Laparoscopy
Hydrosalpinx	5	6	4
Tubo-ovarian Mass	2	0	5
Ovarian Cyst	6	1	4
Uterine Fibroid	2	1	1
Evidence of Tuberculosis	0	3	5

Average time requirement for sonosalpingography was 10 minutes.

Tubal factor accounts for 25-30% of female factors of infertility. The beginning of this century was marked by the development of diagnostic procedures for tubal patency and pathology with introduction of hysterosalpingography and laparoscopy with chromopertubation. Radiological studies complement endoscopic investigation.

Hysterosalpingography is more useful in determining endosalpingeal pathology with exact site of tubal block. It is also useful in diagnosing uterine anomalies. But it has certain disadvantages like the radiation exposure involved and that it can be done only on certain days of the cycle.

Laparoscopy has the advantage of direct visualisation of tubes, detection of peritubal adhesions and fimbrial pathology. But exact site of tubal block may not be diagnosed and there are anaesthetic and operative hazards involved.

With discovery of ultrasound, its use in the management of infertility was an expected development. Sharma (1989) used abdominal sonography for detection of tubal pathology with limited success. Abdominal sonography requires full bladder which is not well tolerated by patients and involves waste of time. Transducers of high

frequency have less resolution at deeper pelvic structure making visualisation difficult. This can be overcome by use of high frequency transvaginal probe which almost comes in contact with genital organs making good visualisation possible. The waterfall sign can be elicited on each side independently allowing assessment of tubal patency bilaterally.

Apart from this, sonosalpingography has the following advantages:

1. It is an office procedure, less time consuming and cost effective.
2. It is a non-invasive procedure.
3. No anaesthesia is required.
4. It helps in diagnosing both uterine anomalies and pelvic pathology.
5. It can be used to detect tubal patency during post-operative hydrotubation following tubal reconstructive operation.
6. No radiation hazards are involved.

But sonosalpingography can be criticised on the following grounds: -

1. Site of tubal block cannot be determined.
2. Intratubal pathology cannot be visualised.
3. Peritubal adhesions and mobility of the tube cannot be properly assessed.
4. There are false positive results in cases of massive hydrosalpinx
5. Findings are subjective.

But here we like to stress that sonosalpingography is not a substitute for established tests like hysterosalpingography or laparoscopy, but it can be done as a screening test in the initial work-up of infertile women. Laparoscopy and hysterosalpingography can be deferred for about 6 months in patients in whom sonosalpingography showed patent tubes thus allowing us to concentrate on other factors of infertility.

In patients with negative or suspicious findings on sonosalpingography, established methods like hysterosalpingography or laparoscopy can be done to confirm the diagnosis. In patients with normal findings

in these tests, further tests to detect defects in tubal function like electron microscopic examination of microbiopsy specimen collected by salpingoscopy (Brosens & Vasquez, 1976) or radionucleotide hysterosalpingography (Brundin et al, 1989) can be done.

**Conclusion:**

Transvaginal sonosalpingography is a simple, cost effective, non-invasive test which can be used as a screening procedure for assessment of tubal patency in the initial work-up of infertile women.

**Acknowledgement:**

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