



A COMPARATIVE STUDY OF HYSTEROSALPINGOGRAPHY AND SONOHYSTEROSALPINGOGRAPHY IN INFERTILITY PATIENTS WITH UTERINE OR TUBAL FACTOR DISORDER

Gynaecology

Dr Ramona Perhar	Lecturer , Ex Associate professor Department of Obs \$ Gynae MLN Medical college Allahabad
Dr shilpi Rawat*	Senior Resident Department of Obs \$ Gynae MLN medical college Allahabad *Corresponding Author
Dr rita shukla	Associate Professor Department of Obs \$ Gynae MLN medical college Allahabad

ABSTRACT

Objective : To evaluates sonohysterosalpingography as an alternative to hysterosalpingography in patients of infertility.

Method: This study was carried out in infertile women which included cases of both primary and secondary infertility attending the out patient department of obstetrics and gynaecology of Gayatri Hospital. This study includes 92 cases of infertility, in which 59 cases of primary infertility while 33 cases were of secondary infertility. All patients were examined by both techniques.

Result : In detecting tubal patency, when results of HSG and SHSG were compared, agreement was found in 63 cases (94.03%) while disagreement in 4 cases (5.97%). In detecting tubal block the agreement was found in 25 cases (86.21%) while disagreement in 4 cases (13.79%). In detecting uterine abnormalities agreement between HSG and SHSG was found in 7 cases (i.e concordance rate of 53.85%) while no agreement was found in 6 cases (discordance rate 46.15%). In detecting the hydrosalpinx agreement rate between two procedures was 94.44% and disagreement 5.56%.

Conclusion : The conclusion of this study is that SHSG and HSG both are complementary to each other. SHSG cannot totally replace the HSG.

KEYWORDS

Sonohysterosalpingography, Hysterosalpingography, Infertility.

INTRODUCTION:

Infertility is defined as failure to conceive desired pregnancy after 12 months of unprotected intercourse & affects 10 % of married couple¹. The No of cases of infertility in the world is increasing mainly due to tubal factors such as tubal dysfunction, tubal obstruction, primarily caused by Pelvic inflammatory disease (PID), septic abortion, use of intra-uterine contraceptive device (IUCD), ruptured appendix, tubal surgery or ectopic pregnancy². In the past 20 years, Fallopian tube patency has been studied by different modalities such as X-Ray-hysterosalpingography (X-Ray HSG), Ultrasonography hysteroscopy or Sonosalpingography (SSG), Laparoscopic Hysteroscopy, Hysteroscopic guided Falloscopy, Pelvic USG, among them X-Ray HSG named as HSG remain frequently used procedure.

Normal Fallopian tube is usually not seen by abdominal Sonography & endovaginal Sonography unless it becomes fluid filled in different normal or abnormal condition.

HSG with iodinated contrast to assess the tubal patency & uterine pathology have been standard for many years but it has many disadvantages such as Ionizing radiation, has risk to oocyte, may have congenital anomalies and mutation in subsequent sibling if conception occurs during investigating cycle, allergic reaction to contrast agent, PID &, infection³. Few advantages of HSG are opacification of tubal lumen and uterine anomalies can be seen. Other modalities include Hysteroscopy, Falloscopy, to see tubal patency & uterine pathology but such surgical procedure has many disadvantages including anesthetic complication⁴. The newer technique in the study of sub-fertility, Sonosalpingography named as SHSG, is the another procedure & now a days has become modalities of choice. The SSG has benefit of free of Ionizing radiation & Contrast reaction. It is easily repeatable, convenient & shows tubal motility, patency as well as used for therapeutic purpose to dislodge the intra-luminal debris, but needs patient full co-operation & experienced radiologist⁵. It has also benefits to see uterine anomalies, endometrial Polyp, Carcinoma, Sub-mucosal fibroid, hematoma &, measurement of endometrial thickness. The accuracy of SSG as compared to HSG has 80%.

History of ultrasonic assessment of the Fallopian tube;

In 1954 Rubin⁶ published the first attempt as inflating the Fallopian tube on trans-abdominal Sonography after intra -cervical injection of fluid.

Richmen and colleagues⁷ were first to report on the abdominal Sonographic evaluation of uterus & tubal patency after injecting isotonic solution through special intra-uterine catheter (Harris tube rin injector).

Randolph & co-workers⁸ used abdominal Sonography for observation of fluid in retro-uterine space after injecting the 200 ml of saline through Rubin canula. The presence of fluid was accepted as tubal patency one or both tube without differentiation of side.

A new transvaginal ultrasonography technique was developed by Deichert & colleagues⁹ in 1989. They observed patent tube & its motility by trans-cervical injection of an echogenic ultrasonic contrast fluid through 8F Bladder Catheter.

Tufekci and co-workers¹⁰ have developed an easier technique, where patient does not need anesthesia & can be performed by intra-uterine injection of isotonic saline solution & evaluation of tubal patency directly, named as Trans-vaginal Sono-salpingography. It is physiological, easy to perform, safe, cost effective, non-invasive, non-radiation & more convenient than other conventional method. Nowadays this technique is popularly used in sub-fertile women.

AIMS AND OBJECTIVES:

To evaluates sonohysterosalpingography as an alternative to hysterosalpingography in patients of infertility.

MATERIAL AND METHODS:

This study was carried out in infertile women which included cases of both primary and secondary infertility attending the out patient department of obstetrics and gynaecology of Gayatri Hospital.

For present study purposive sampling method was used and all patients seeking treatment for infertility and fulfilling inclusion criteria within a period of 12 months were explained about the study and the procedure and after obtaining consent they were included in study. Overall 92 patients were found willing to participate in study among which 59 cases were to be found of primary infertility while 33 cases were of secondary infertility. All patients were examined by both techniques i.e. HSG and SHSG. In all patients HSG was performed first and subsequently SHSG was performed in the same cycle.

Inclusion Criteria :

The criteria of selection of cases were as follows :

1. Age between 21-35 years.
2. Living with their husbands.
3. No evidence of acute pelvic inflammatory disease.
4. No evidence of uterine bleeding.
5. Women having no free fluid in pouch of Douglas on USG screening.
6. Patients who consented to participate in the study.
7. No history of existing and recent pelvic infection.

Both the procedures, HSG and SHSG were performed in late proliferative phase of the menstrual cycle between 8th-12th day after last menstrual period. An informed consent was taken and all procedure was explained in detail to the patient. Procedure was performed under i.v. sedation. In HSG contrast agent used was 20 ml of 60% meglumine and sodium salts of diatrizoate. In SHSG 20-80 cc of normal saline was used known as negative contrast and patency of tubes was evaluated transabdominally using B mode real time USG scanner, with a 3 MHz convex sector.

RESULT :

Table 1 Comparison of tubal patency between HSG and SHSG

	SHSG	HSG	Chi square test
Patent	67	63	Chi square value 0.51725
Blocked	25	29	

In 63 cases tubes were found to be patent on both S HSG and HSG, while in 25 cases tubes were found to be blocked on both procedures. In 4 cases tubes were found to be patent on S HSG, while they were found to be blocked on HSG. No cases was detected where patency was shown on HSG while blockage on S HSG.

Table 2 Comparison of uterine and extrauterine abnormalities by HSG and SHSG

	No.	%	No.	%
Uterine	9	9.79	11	11.96
Peritubal / periovarian adhesions	1	-	9	9.78
Ovarian pathology	4	4.35	1	-
Hydrosalpinx (U/L or B/L)	18	19.56	17	18.75

Uterine abnormalities were found in 9 (9.78%) cases by USG and in 11 (11.96%) cases by HSG. Two cases of arcuate uterus, and two cases of unicornuate uterus were diagnosed by HSG. Four cases of fibroid uterus were diagnosed on USG, while only two cases of fibroid uterus could be detected by HSG.

Peritubal and periovarian adhesions were detected in 9 cases (9.78%) by HSG, while they could not be commented in any case on SHSG.

Ovarian pathology was noted 4 (4.35%) cases only on USG. Hydrosalpinx were noted in 18 (19.57%) cases on SHSG while 17 cases (18.45%) were detected on HSG.

Table 3 Agreement and disagreement between HSG and SHSG for various diagnosis

Diagnosis	Agreement		Disagreement		Total	
	No	%	No	%	No	%
Tubal patency	63	94.03	4	5.97	67	100
Uterine abnormality	7	53.85	6	46.15	13	100
Hydrosalpinx	17	94.44	1	5.56	18	100
Tubal block	25	86.21	4	13.79	29	100

In detecting tubal patency, when results of HSG and SHSG were compared, agreement was found in 63 cases (94.03%) while disagreement in 4 cases (5.97%). In detecting tubal block the agreement was found in 25 cases (86.21%) while disagreement in 4 cases (13.79%).

In detecting uterine abnormalities agreement between HSG & SHSG was found in 7 cases, while no agreement was found in 6 cases.

In detecting the hydrosalpinx agreement rate between two procedures was 94.44% and disagreement was 5.56%

Table 4 Complications after the procedure

Complications	sonohysterosalpingography		Hysterosalpingography	
	No	%	No	%
Pain	37	40.22	42	45.65
Intravasation of contrast medim	-	-	5	5.44
Allergy to contrast medium	-	-	2	2.17
Total	37	40.22	49	53.26

The only complication of SHSG was pain seen in 37 (40.22%) cases. On HSG pain was felt by 42 (45.65%) cases. Intravasation of contrast media seen in 5 (5.44%) cases, while the hypersensitivity reaction was noticed in 2 (2.17%) cases.

Table 5 Conception after both procedures

Conception rate	Cases	%
Total No. of cases	92	100
No. of conception	12	13.04

Out of 92 cases, in which both HSG and SHSG were done consecutively, 12 cases (13.04%) conceived. Out of 12 conceptions, 7 pregnancy progressed up to term and they delivered full term babies. In 2 cases spontaneous abortion occurred, while remaining 3 cases are still under follow-up.

DISCUSSION :

In our study uterine abnormalities were detected in 11 (11.96%) cases, peritubal adhesions in 9 (9.78%) cases, hydrosalpinx in 17 (18.48%) cases, bilateral patent tubes in 48 (52.18%) cases, unilateral tubal block in 15 (16.30%) cases and bilateral tubal block was seen in 29 (31.52%) cases.

¹¹Onwuchekwa CR, Orij Vket et al (2017) noted following findings : A total of 299 patients were evaluated. Of these, 250 were for infertility with primary and secondary infertility constituting 18.4 and 81.6%, respectively. Seventy percent of the cases for infertility had abnormalities on the HSG. Normal uterine cavity was found in 123 (49.2%) cases. Uterine filling defects were the most common uterine abnormality. Fallopian tube occlusion, loculated contrast material spillage and hydrosalpinx were more common on the right, and bilateral tubal occlusion was seen only in 11.2%. All cases of intravasation were associated with either unilateral or bilateral fallopian tube blockage or irregularity of the uterus.

¹²Wadhwa L, Rani P, Bhatia et al (2017) : P.HSG showed normal uterine cavity in 77.8% (81/105) women and abnormality was found in 22.85% (24/105) women. Most common abnormality found on HSG was filling defects in 15 (14.28%) women. HSG showed congenital uterine anomaly in five (4.6%) women, bicornuate uterus in four, and arcuate uterus in one woman

SONOHYSTEROSALPINGOGRAPHIC FINDINGS :

In present study uterine pathology was detected in 9 (9.79%) cases, ovarian mass in 3 (3.26%) cases, polycystic ovarian disease in 1 (1.09%) case, normal follicle in the ovary in 60 (65.22%) cases, patent tubes in 67 (72.83%) cases, while in 25 (27.17%) cases bilateral tubal block was seen.

¹³In a study by Preeti Deshpande1, Suhas Deshpande2 et al (2015) 20 cases of sonohysterosalpingography confirmed by HSG, Regarding the tubal patency, there was complete agreement with HSG in 80% (16) cases, partial agreement in 15% (3) cases and total disagreement in 15% (3) cases.

Tubal diagnosis by sonohysterosalpingography and hysterosalpingography :

In detecting tubal patency, when results of HSG and SHSG were compared, agreement was found in 63 cases (94.03%), while in detecting tubal block, concordance was in 25 (86.21%) cases. Eighteen cases (19.56%) of hydrosalpinges were detected by SHSG, while 17 cases (18.45%) were detected by SHSG, while 17 (18.45%) were detected by HSG. The preliminary ultrasound scan could diagnose one additional case of noncommunicating hydrosalpinx or bipolar tubal disease, which was not diagnosed by HSG. The concordance rate between the two procedures was 94.44% for detecting hydrosalpinges.

¹⁴Raj N et al found that in HSG 66% women had bilateral patent tubes, 20% women had a bilateral tubal block while 14% had a unilateral tubal block, whereas in SSG 70.83% women had bilateral tubal patency, 20.83% women had a bilateral tubal block while 8.34% women had a unilateral tubal block.

Uterine and Extrauterine abnormalities :

In our study for detecting uterine abnormalities by HSG and SHSG agreement was found only in 53.85% (7 cases). Two cases of arcuate uterus and 2 cases of unicornuate uterus could be diagnosed only by HSG and 2 cases of uterine fibroid were diagnosed by HSG only. While 4 cases of uterine fibroid were diagnosed by USG. Four cases of

bicornuate uterus and one case of uterus didelphys were detected by both HSG and SHSG.

Peritubal and periovarian adhesions were detected in 9 (9.78%) cases only by HSG. Ovarian pathology was noted in 4 cases (4.35%) by USG only.

All the above data show that for detection of uterine abnormalities, HSG is more sensitive. It could detect 84.62% of all uterine abnormalities while could detect only 69.23% of uterine abnormalities. For detection of uterine fibroid, however, USG was more sensitive than HSG, especially for intramural and subserous fibroid.

For extrauterine pathology, HSG was better in detection of periadnexal adhesions, where as the same could not be diagnosed on SHSG. For detection of hydrosalpinges USG was better than HSG. USG could detect one additional case of non -communicating hydrosalpinx or bipolar tubal disease. HSG was unable to detect ovarian pathology.

¹⁵Seal SL et al did a study in which Hydrosalpinx was detected in 6 women by SSG, in 5 women by HSG and in 8 women by laparoscopy, tuboovarian mass was detected in 4 women by SSG and in 2 women by laparoscopy, endometriosis was seen in 4 women in SSG and in 5 women by laparoscopy, peritubal adhesions were seen only by laparoscopy in 4 women, fibroid uterus was seen in 2 women by SSG and in 4 women by laparoscopy, whereas ovarian cysts and polycystic ovaries were seen in 6 women by SSG, in 2 women by HSG and in 8 women by laparoscopy and concluded that pelvic pathologies were better detected by laparoscopy than by SSG and HSG and SSG detected more pelvic pathology than HSG.

COMPLICATIONS:

37 cases experienced moderate to intense pain during SHSG. No other complication was noted during the procedure.

During HSG 42 cases (45.65%) experienced moderate to intense pain in lower abdomen. In 5 cases (5.44%) intravasation of contrast medium seen, while in 2 cases allergic reaction to contrast medium was seen.

Pain in lower abdomen, in nearly all cases of HSG and SHSG. Correlated with the presence of bilateral tubal or in some cases of unilateral tubal block. Intravasation of contrast medium occurred due to excessive injection pressure in cases of bilateral tubal block. Study

CONCEPTION:

In our one year study, after doing HSG and SHSG on all 92 cases consecutively, 12 conceptions (13.04%) were registered in which 7 pregnancies reached term and delivered full term babies, 2 pregnancies aborted spontaneously, while remaining 3 pregnancies are still under follow-up. Study

CONCLUSION:

The conclusion of this study is that sonohysterosalpingography and hysterosalpingography both are complementary to each other. SHSG can not totally replace the HSG, but SHSG can be performed in the early stages of infertility investigation as a preliminary office procedure on an outpatient basis prior to the initiation of more invasive and expensive investigations and therapeutic measures.

REFERENCES

1. Asim Kurjak, et al, Ultrasound in obstetrics & gynecology 2nd edition Jaypee - Sonographic imaging in sub-fertility 2008;58,865-66
2. Asim Kurjak, et al, Ultrasound in Obstetrics & gynecology 2nd edition Jaypee - Hysterosalpingography, Normal & abnormal finding . 2008,60,899-902.
3. David Sutton, text book of radiology & imaging 6th Ed. Churchill Livingstone Vol III 1998;45,1247-48
4. RG Grainger & Allison Diagnostic Radiology 3rd edition Churchill Livingstone, Imaging in Gynecology Vol III 1999,90,1955-57.
5. M Rumack et al, -Diagnostic Ultrasound 3rd edition Churchill Livingstone Vol I Transvaginal sonohysterography 1998,15,530-531.
6. Rubin et al Difference between the uterus & tube as cause of oscillation recorded during utero-tubal insufflation. 1954;5;147-53.
7. Richman TS & et al Fallopian tubal patency assessed by ultrasound fluid injection Radiology 1984;152;507-10
8. Randolph & et al Comparison of real -time Sonography, hysterosalpingography and laparoscopy/hysteroscopy 1986,46,828-32.
9. Deichert U & et al Transvaginal Sono-salpingography compared with conventional tubal diagnostics 1989;4;418-22
10. Tufekci S & colleague Evaluation of tubal patency by trans-vaginal Sonosalpingography. Fertile Sterile 1992;57;336-40.
11. N, Sonowal R. Comparative study of Hysterosalpingography and Sonohysterosalpingography in the evaluation of fallopian tube patency in routine infertility assessment. International Journal of Recent Trends in Science and Technology. 2015;16(3):494-8.

12. Seal SL, Ghosh D, Saha D. Comparative evaluation of sonosalpingography, hysterosalpingography and laparoscopy for determination of tubal patency. J Obstet Gynecol India. 2007;57:158-61.
13. Preeti Deshpande, Suhas Deshpande SHSG aA useful adjuvant in infertility evaluation. Journal of evolution of medical and dental sciences. 2015, 1628-1633.
14. Raj N, Sonowal R. Comparative study of Hysterosalpingography and Sonohysterosalpingography in the evaluation of fallopian tube patency in routine infertility assessment. International Journal of Recent Trends in Science and Technology. 2015;16(3):494-8.
15. Seal SL, Ghosh D, Saha D. Comparative evaluation of sonosalpingography, hysterosalpingography and laparoscopy for determination of tubal patency. J Obstet Gynecol India. 2007;57:158-61.