

Hysterosalpingography vs Hysteroscopy: Role in Assessment of Uterine Factor during Infertility Workup

Meenakshi Barsaul Chauhan, Pinkey Lakra, Roopa Sangwan, Smiti Nanda, Vani Malhotra

ABSTRACT

Objective: Uterine pathologies are the cause of infertility in 15% of infertile couples and their correction is associated with improved pregnancy rates. This prospective study was carried out to compare hysterosalpingography (HSG) with hysteroscopy (HSC) in evaluation of uterine pathology.

Study design: The research was approved by the institutional review board. A total of 100 infertile women were included in the study. HSC and HSG were performed in the follicular phase and the findings were compared. Student's t test and chi-square test were applied wherever applicable. Degree of agreement between the two procedures was calculated using kappa estimates.

Results: Thirteen percent of the women had abnormal HSG regarding the uterine cavity while 20% had abnormal HSC findings (chi-square value 1.77, $p > 0.05$). Out of 10% women who had normal HSG, some abnormality was found on HSC. Similarly 3% women with abnormal HSG had normal findings on HSC. Sensitivity of HSG in detecting uterine cavity abnormality was 50% and specificity 98.1%. Positive predictive value was 76.9% and negative predictive value was 88.5%. Result of HSG was false-negative in 10% of women and false-positive in 3%.

Conclusion: Hysteroscopy should be considered essential while investigating infertile women. Since HSG provides valuable information about tubes, it may supplement the hysteroscopic assessment.

Keywords: Hysterosalpingography, Hysteroscopy, Uterine cavity.

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INTRODUCTION

Uterine pathologies are the cause of infertility in 15% of couples seeking treatment and are diagnosed in as many as 50% infertile patients.^{1,2} For patients undergoing *in vitro* fertilization, lower pregnancy rates are observed in the presence of uterine cavity anomalies.^{3,4} The correction of these anomalies has been associated with improved pregnancy rates.² Therefore, evaluation of the couple with infertility should include an assessment of the endometrial

cavity. Traditionally hysterosalpingography (HSG) have been used as a tool to evaluate tubouterine factors. Although hysterosalpingography has 85 to 100% sensitivity in detecting tubal pathology, it is only 44 to 77% sensitive in documenting uterine.⁵

Office hysteroscopy has demonstrated to have superior sensitivity (100%) and specificity (95%) in evaluation of endometrial cavity.⁶ Hysteroscopy allows exact location of intrauterine lesions, and provides a better way than blunt curettage to ensure excision of such lesions.⁷

Though there are still no perspective randomized studies to prove that hysteroscopy is superior to HSG in terms of pregnancy rates, hysteroscopy has become gold standard for the diagnosis of intrauterine abnormalities.⁸ Thus we evaluated hysteroscopy as a primary tool in a basic infertility work up and compared it with HSG.

MATERIALS AND METHODS

This study was carried out on 100 consecutive patients of infertility. These patients had complete infertility workup including husband semen analysis and ovulatory study. Hysteroscopy was performed first as an outpatient procedure followed by hysterosalpingography on the same day. Patients with active pelvic inflammatory disease, active tuberculosis, heart disease, liver disease, kidney disease, hypo or hyperthyroidism and diabetes were excluded from the study.

Pre-menstrual endometrial sampling for histopathologic examination and acid fast bacilli was done. Premedication with injection Fortwin 30 mg intravenous slow and injection Phenargan 25 mg intravenous slow 5 minutes before the procedure was given. Sterilized saline was used as a distension medium. Images were seen on a monitor.

Hysterosalpingography was done half an hour after hysteroscopy under fluoroscopic guidance.

RESULTS

The demographic profile of the women participating in the study is depicted in Table 1. On HSG only 13 women had abnormal uterine findings while hysteroscopy revealed abnormal findings in 20 women (Table 2) Hysteroscopy was found to be more useful in diagnosing uterine pathology, e.g. fibroid in 6%, polyps 4%, adhesions 4%, but on comparison the difference was not statistically significant

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(chi-square 1.77, p-value > 0.05) (Table 3). The sensitivity of HSG in detecting uterine cavity abnormalities was 50% and specificity 98.1%. The positive predictive value was 76.9% and negative predictive value was 88.5%. Further more results of HSG were false-negative in 10% of patients and false positive in 3% of patients.

In 77% of patients both HSG and HSC were normal and in 10% of patients both were abnormal (Table 4). The degree of agreement between HSG and HSC as calculated by kappa estimates was 0.545 suggestive of fair degree of agreement, though there was lack of agreement in 60% of patients with abnormal findings.

There were no major complications in both the procedures. A few minor problems like pain and slight bleeding were observed with both HSG and hysteroscopy which were relieved with antispasmodics.

DISCUSSION

Procedures evaluating uterine factor include endometrial sampling, endometrial culture, hysterosalpingography, saline infusion sonography, hysteroscopy and laparoscopy. For centuries, hysterosalpingography was the sole procedure that could provide adequate information about the normality or abnormality of the uterine cavity as well as fallopian tubes. Hysterosalpingography is an indirect method of uterine cavity evaluation whereas hysteroscopy allows direct visualization as well as simultaneous operative intervention if required. Moreover hysteroscopy is useful in identifying endometrial abnormalities not detectable on hysterosalpingography.⁹

In our study, 13% of the patients had abnormal HSG regarding the uterine cavity and 20% of the patients had abnormal hysteroscopic findings, though the difference was not statistically significant (chi square value 1.77, p-value >0.05). A similar trend was found in the study by Shakya et al¹⁰ where he detected only 2% abnormal cases on HSG and 12% abnormal cases on HSC. In contrast to this, Ganglione et al¹¹ in their study had 47.1% patients with pathological findings on HSG and 41.4% patients had pathological findings on hysteroscopy. The reason of higher number of cases detected by hysterosalpingography in this study is that they have included 8 cases of endometrial hyperplasia on HSG, which were not confirmed by hysteroscopy and also endometrial hyperplasia has negligible importance as far as infertility is concerned.

In the present study, 10% patients had normal HSG but some abnormality was found on HSC. Almost similar observations were made by other workers.^{9,11,12} In our study, 3% patients with abnormal HSG had normal findings on hysteroscopy. Similarly in the study by Roma et al,⁹

Table 1: Demographic profile of patients (N = 100)

	Primary infertility	Secondary infertility
Number	66	34
Mean age (years)	24.63 ± 2.50	30 ± 4.40
Rural (%)	60	40
Urban (%)	52.5	47.5
Mean duration of cohabitation (years)	4.10 ± 2.07	9.29 ± 4.86
History of menstrual disorder	17	11

Table 2: Comparison of findings by HSG and hysteroscopy (HSC) (N = 100)

	HSG	HSC
Uterine pathology	13	20
Submucous fibroid	1	6
Polyps	3	4
Adhesions	3	4
Subseptate uterus	3	3
Double uterine cavity suggestive of septate/bicornuate uterus	2	2
Uterus didelphus	1	1

Table 3: Discrepancies between findings of HSG and HSC

HSG	HSC
Normal	Submucous fibroid
Normal	Polyp
Normal	Polyp
Normal	Adhesions
Normal	Submucous fibroid
Normal	Submucous fibroid
Normal	Adhesions
Polyp	Normal
Multiple filling defects suggestive of adhesions	Normal
Normal	Polyp
Polyp	Normal
Normal	Submucous fibroid

Table 4: HSG and HSC findings in 100 women with infertility (N = 100)

HSG	HSC (standard)		
	Abnormal	Normal	Total
Abnormal	10	3	13
Normal	10	77	87
Total	20	80	100

19% patients with abnormal HSG had normal hysteroscopy whereas such patients were 18.5% in the study by Ganglione et al¹¹ and 5% in study by Kumar et al.¹²

The most common uterine abnormalities detected in our study were submucous fibroids and congenital malformations each of which was found in 6% of the patients. HSG could diagnose only one fibroid while hysteroscopy detected fibroids in six cases. HSG detected 3 endometrial polyps;

only one was confirmed on hysteroscopy while in 3 normal cases of HSG, hysteroscopy showed polyps. Air bubbles may be introduced while pushing the dye through the uterus which may be interpreted as polyp thereby giving false-positive results. Hence it can be concluded that hysteroscopy is superior for the diagnosis of intrauterine polyps. The importance of detecting endometrial polyps lies in the fact that polypectomy can be performed at the same sitting hysteroscopically and this has been shown to improve fertility and increase pregnancy rates in previous infertile women with no other reason to explain their infertility.¹³

In the present study, HSG detected three cases of intrauterine adhesions which were confirmed only in two cases on hysteroscopy. This suggests that artifacts may be falsely interpreted as adhesions. However HSC demonstrated adhesions in a total of four cases, in three of these cases HSG was normal. Though HSG picked up abnormality it did not come to conclusion, exact diagnosis was given by hysteroscopy only. Intrauterine synechiae were the most frequent abnormal findings (19.4%) in patients of infertility evaluated by hysteroscopy in a study by Lasmar et al.¹⁴

The diagnosis of double uterus is generally made from HSG but it cannot differentiate between septate and bicornuate uterus. The most frequently used diagnostic approach consists of combined hysteroscopy and laparoscopy. In our study, two patients on HSG showed bicornuate uterus, the same was confirmed by hysteroscopy and later on by laparoscopy. Similarly, three cases of subseptate uterus and one case of didelphus uterus diagnosed on HSG were confirmed by HSC. It is apparent that HSG can be used for initial diagnosis of congenital uterine malformations but confirmation by hysterolaproscopy is mandatory.

Sensitivity of HSG in this study is only 50% in detection of uterine anomalies, though it was more in other studies (80.2, 79.1 and 60% respectively).^{9,11,12} It shows that HSG is not as good a screening procedure as was previously advocated in detection of uterine cavity pathologies although it is well known that it is good screening procedure for tubal patency. Though tubal ostia can be visualized by hysteroscopy and their rhythmic contraction expresses a normal functioning tube, it primarily evaluates the uterine cavity.

The advantages of hysteroscopy over HSG include no risk of exposure to ionizing radiation and iodinated contrast material, as with HSG. Hysteroscopy, permits direct visualization of the interior of the uterine cavity, revealing the nature and localization of endocavitary lesions, allows diagnosis of infectious, functional and organic abnormalities; allows guidance of endometrial biopsies and cultures for histological evaluation. Moreover, if therapeutic approach

is indicated, hysteroscopic surgery is widely accepted as the most effective.¹⁵

Though tubal ostia can be visualized by hysteroscopy and their rhythmic contraction expresses a normal functioning tube, it primarily evaluates the uterine cavity. Since HSG provides valuable information about tubal patency and blockage, it remains mandatory in the evaluation of infertility. Yet we feel that the drawbacks of HSG as a screening test are so substantial that the additional information regarding tubes it produces does not justify compromising evaluation of the endometrial cavity. Moreover it is well known that small intrauterine lesions, which may be of great significance in causing reproductive failure, are diagnosed more precisely by hysteroscopy.¹⁵ The findings of this study suggest that traditional protocol of doing hysteroscopy only when an intrauterine abnormality is detected on HSG may be reevaluated. We believe that when HSG shows no abnormality the indication of hysteroscopy must not be disregarded because it adds additional information that may be responsible for poor reproductive outcome in 25% of cases.¹⁶

CONCLUSION

Thus there is now enough evidence to suggest that hysteroscopy should be added as one of the routine test during infertility workup and tests to evaluate tubal morphology and function may supplement the hysteroscopic assessment.

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ABOUT THE AUTHORS

Meenakshi Barsaul Chauhan (Corresponding Author)

Professor, Department of Obstetrics and Gynecology, PG Institute of Medical Sciences, Rohtak, Haryana, India, Phone: 01262212590
e-mail: mbc51490@yahoo.co.in

Pinkey Lakra

Senior Resident, Department of Obstetrics and Gynecology
PG Institute of Medical Sciences, Rohtak, Haryana, India

Roopa Sangwan

Assistant Professor, Department of Obstetrics and Gynecology
PG Institute of Medical Sciences, Rohtak, Haryana, India

Smiti Nanda

Senior Professor, Department of Obstetrics and Gynecology
PG Institute of Medical Sciences, Rohtak, Haryana, India

Vani Malhotra

Associate Professor, Department of Obstetrics and Gynecology
PG Institute of Medical Sciences, Rohtak, Haryana, India