

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

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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, $p > 0.05$). 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%. In 77% of patients, both HSG and HSC were normal and in 10% of patients, both were abnormal. The degree of agreement between HSG and HSC as calculated by kappa estimates was 0.545.

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

Office hysteroscopy (HSC) 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 HSC is superior to HSG in terms of pregnancy rates, HSC has become gold standard for the diagnosis of intrauterine abnormalities.⁸ Thus, we evaluated HSC as a primary tool in a basic infertility workup 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 HSG 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.

Premenstrual endometrial sampling for histopathologic examination and acid fast bacilli was done. Premedication with injection pentazocine lactate 30 mg intravenous slow and injection promethazine 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. Hysteroscopy was done half an hour after HSC under fluoroscopic guidance.

The findings of HSC were compared with those of HSG. For statistical analysis, student's t-test and chi-square test were applied wherever applicable. Sensitivity, specificity, positive predictive value and negative predictive value of HSG were calculated. The degree of agreement between the two procedures was calculated using kappa estimates.

RESULTS

The demographic profile of the women participating in the study is depicted in Table 1. On HSG, only 13 women had

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 |

abnormal uterine findings, while HSC 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 (chi-square: 1.77, p-value > 0.05). 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%. Furthermore, results of HSG were false negative in 10% of patients and false positive in 3% of patients.

In 13 patients, there was a discrepancy in the findings of HSC and HSG (Table 3).

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 HSC which were relieved with antispasmodics.

DISCUSSION

Procedures evaluating uterine factor include endometrial sampling, endometrial culture, HSG, saline infusion sonography, HSC and laparoscopy. For centuries, HSG 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 HSC allows direct visualization as well as simultaneous operative intervention, if

required. Moreover, HSC is useful in identifying endometrial abnormalities not detectable on HSG.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 HSC. The reason of higher number of cases detected by HSG in this study is that they have included eight cases of endometrial hyperplasia on HSG, which were not confirmed by HSC 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 HSC. Similarly in the study by Roma et al,⁹ 19% patients with abnormal HSG had normal HSC, 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 HSC detected fibroids in six cases. HSG detected three endometrial polyps; only one was confirmed on HSC, while in three normal cases of HSG, HSC 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 HSC 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 HSC. 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 HSC only. Intrauterine synechiae were the most frequent abnormal findings (19.4%) in patients of infertility evaluated by HSC in a study by Lasmar et al.¹⁴

Table 2: Comparison of findings by HSG and 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 didelphys | 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) | | Total |
|----------|----------------|--------|-------|
| | Abnormal | Normal | |
| Abnormal | 10 | 3 | 13 |
| Normal | 10 | 77 | 87 |
| Total | 20 | 80 | 100 |

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 HSC and laparoscopy. In our study, two patients on HSG showed bicornuate uterus, the same was confirmed by HSC and later on by laparoscopy. Similarly, three cases of subseptate uterus and one case of didelphys 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 hysterolaparoscopy 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 HSC and their rhythmic contraction expresses a normal functioning tube, it primarily evaluates the uterine cavity.

The advantages of HSC 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 and 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 HSC 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 HSC.¹⁵ The findings of this study suggest that traditional protocol of doing HSC only when an intrauterine abnormality is detected on HSG may be re-evaluated. We believe that when HSG shows no abnormality the indication of HSC 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 HSC should be added as one of the routine test during infertility workup and tests to evaluate tubal morphology and function like HSG may supplement the hysteroscopic assessment.

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