

Comparing Hysterosalpingographic Findings with Laparoscopic and Hysteroscopic Results in Infertile Patients: A Southwestern Iranian Study

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ABSTRACT

Aim: This study aimed to compare the hysterosalpingographic findings with laparoscopy and hysteroscopy findings in infertile patients referring to Ahvaz Imam Khomeini Hospital.

Materials and methods: This retrospective study was conducted on patients referred to infertility clinics of Imam Khomeini Hospital in Ahvaz for hysterosalpingography (HSG) during 2 years from March 2014 to February 2016. Our subjects were married women with different years of infertility.

Results: Of 200 patients, six cases were excluded from the study due to the lack of information, and 194 patients were included in the study. In this study, 71 women (36.6%) had secondary infertility. On average, the women examined had 5.19-year infertility. Less than 10% of women have been suffering from infertility for more than 10 years. The most common uterine findings (50.5%) in uterine hysteroscopy were normal. The most cervical findings (97.9%) in cervical hysteroscopy were normal. The most laparoscopic finding (54.6%) was the normality and openness of both fallopian tubes. The highest hysteroscopy findings (76.3%) were the normality of the endometrial cavity and cervix and the openness of both fallopian tubes. The hysterosalpingographic findings (54.6%) were consistent with laparoscopic findings, and in 75.2% of the cases were consistent with the hysteroscopy findings.

Conclusion: Considering the results of the study and the ease of using ultrasound in all medical diagnostic fields, in particular, consideration of the issues surrounding the reproductive system of women, the adaptation of transvaginal sonography and other diagnostic methods, such as hysterosalpingography, laparoscopy and hysteroscopy in future studies is recommended.

Keywords: Hysterosalpingography, Hysteroscopy, Infertility.

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INTRODUCTION

Infertility is defined as a failure in achieving a successful pregnancy 12 months after regular unprotected intercourse.¹⁻⁷ Nearly 8% of couples suffer from infertility all over the world. Although this is not a physical disabling disease, infertility can greatly affect psychological coordination, sexual life and couples' social function.⁴ Tubal disorders account for approximately 30% of cases of infertility, while uterine pathologies account for between 15–20% of cases.^{1-3,5,7} Other factors include ovulatory disorders (30–40%) and male factor (30–40%).²

Tests that are used to determine open and non-damaging tubes are an important part of infertility testing. In evaluating uterine and tuboperitoneal causes of infertility, nearly all of the protocols focus on hysterosalpingography (HSG), hysteroscopy and laparoscopy as the first-line diagnostic tool.⁸ Hysteroscopy is considered as the gold standard in the diagnosis of intrauterine pathologies.^{9,10} Hysteroscopy causes a wide view of the uterine cavity and direct biopsy of the lesions, thus increasing the accuracy and delicacy in detecting the intrauterine conditions.¹⁻³ Hysteroscopy has two main uses in infertile patients, including the evaluation of the cervix and uterine cavity to reject any lesion that is mistakenly detected in HSG and for the management of intrauterine defects. In addition, hysteroscopy is useful in identifying endometrial abnormalities not detectable in HSG.¹¹ When HSG and hysteroscopy are compared, mismatches are observed in 30% of cases.¹ In a comparative study of HSG and hysteroscopy, performed on 336 patients, the most common mistake detected conditions were cervical stenosis, such as severe intrauterine adhesions, and endometrial polyps, such as submucosal myomas, as well as submucosal myomas, such as endometrial polyps.⁷ However, hysteroscopy is not a way to examine the openness or the anatomy of the fallopian tubes.¹

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HSG is the most common technique used in the evaluation of the uterine cavity, for example, anatomical abnormalities, intrauterine space-occupying lesions, uterine adhesions, and tubes, for example, tube obstruction.³ No anesthetic is needed to perform HSG, but disadvantages such as exposure to radiation, exposure to an iodinated contrast agent of patient discomfort.^{3,11,12} Although HSG is good enough for the rejection of intrauterine pituitary pathology, the unobtrusive changes in the form of small polyps, adhesions and the subendometrial fibroid buds, which can affect fertility, can be lost. These subtle changes are better eliminated in magnification with hysteroscopy.² HSG is unsuccessful in detecting outflow and peritoneal factors.¹³ While HSG is a screening method for uterine abnormalities, hysteroscopy is used to confirm and treat abnormalities found in HSG or cases with normal HSG findings that have not had any improvement in the fertility for at least six months.⁷

There is a growing tendency to assign diagnostic hysteroscopy and laparoscopy after a normal HSG and replace it with the onset of direct infertility treatment.⁴ The aim of this study was to find the findings of HSG with laparoscopy and hysteroscopy in infertile patients referring to Ahvaz Imam Khomeini Hospital.

MATERIALS AND METHODS

Study Design and Population

This retrospective study was conducted on patients referred to infertility clinics of Imam Khomeini Hospital in Ahvaz, southwest of Iran, for HSG during two years from March 2014 to February 2016. The study was approved by Ahvaz Jundishapur University of Medical Sciences Ethics Committee, and patients signed the consent form before entering the study.

Inclusion Criteria

Married women with different infertility years.

Exclusion Criteria

Incompleteness of patient file information.

METHODS

Demographic data such as age, number of deliveries, and duration of infertility were extracted from data collection forms with special design. All HSGs were reported by the same counselor radiologist using David and Jamil's technique. After HSG, those who had abnormal findings were advised for laparoscopic and hysteroscopic assessments. Those who declared their informed consent underwent diagnostic laparoscopy and hysteroscopy. A gynecologist, who was unaware of patients' HSG, completed

laparoscopy and hysteroscopy using laparoscopy and dye testing, respectively. Finally, the results of the HSG and laparoscopic and hysteroscopic report of patients were investigated by the researcher.

Statistical Analysis

Data analysis and statistical methods: In addition to descriptive statistics, the Chi-square test was used. To determine the correlation between age and other quantitative variables, the Pearson correlation coefficient test was used. Data were analyzed using Statistical Package for Social Sciences (SPSS).

RESULTS

In this study, 200 patients, referred to the infertility clinics due to proven infertility, were investigated. Of these, six cases were excluded from the study due to the lack of information required for the study, and 194 patients were selected for entering the study. The mean age of patients was 30.58 years, with a range of 18–45 years. The majority of patients (59.3%) were aged 26–35 years (Table 1).

In this study, 71 women (36.6%) had secondary infertility. The mean of women studied was 19.5 years old. The minimum and maximum duration of infertility in patients was 1 and 21 years, respectively (Graph 1). Less than 10% of women had an above 10 year- infertility and more than 50% of women studied have suffered from infertility for less than 4 years (Graph 1).

The highest finding in the uterine cavity in HSG was the normalization of the uterine cavity, which was reported in 5.50% of cases. The most cervical findings reported (97.9% of cases) were in normal cervical HSG. The most common tubular findings (54.1% of cases) were in normal tubular HSG. The most laparoscopic finding was the normality and openness of both fallopian tubes, which was reported in 54.6% of cases. The most hysteroscopy findings were related to the normality of the endometrial cavity and cervix and the openness of both fallopian tubes, which was reported in 76.3% of cases.

In this study, 93.8% of cases that were normal as reported by HSG in the examination of the uterine cavity, were also confirmed by laparoscopy. Overall, in 5.58% of cases, the HSG report was consistent with the uterine cavity with a laparoscopic report (Table 2).

In this study, 70.4% of cases that were normal, as reported by the tubular examination, were also confirmed by HSG. In general, in 51.2% of cases, tubular findings in HSG were matched with laparoscopic reports.

In this study, 84.1% of cases that were normal in the examination of the uterine cavity as reported by the HSG,

Table 1: Grouping of patients based on age, infertility, cervical findings, tubal findings, laparoscopic findings and hysteroscopy

Variable	Number	Percentage (%)
Age range		
15–20	5	2.6
21–25	31	16.0
26–30	68	35.1
31–35	47	24.2
36–40	37	19.1
41–45	6	3.1
Infertility		
Primitive	123	63.4
Secondary	71	36.6
Uterine finding in HSG		
Normal	98	49
Bicornuate or Septated uterus	29	9.8
Unicornuate uterus	5	2.6
Arcuate uterus	42	21.6
Filling defect	31	15.9
Cervical finding in HSG		
Normal	190	97.9
Adhesion	4	2
Tubular finding in HSG		
Normal	105	54.1
Right tubular obstruction	12	6.2
Left tubular obstruction	7	3.6
Bilateral obstruction	7	3.6
Right hydrosalpinx	4	2.1
Left hydrosalpinx	7	3.6
Bilateral hydrosalpinx	14	7.2
Right tube torsion	10	5.2
Left tube torsion	6	3.1
Bilateral tube torsion	22	11.3
Laparoscopic finding		
Bilateral fallopian tube obstruction	11	5.7
Unilateral fallopian tube obstruction	16	8.2
Normality and openness of both fallopian tubes	106	54.6
Hydrosalpinx	25	12.9
Peritubular adhesion	21	10.8
Fibroid	11	5.7
Fundus concavity	4	2.1
Hysteroscopy finding		
Normal*	148	76.3
Septated uterus	4	2.0
To see bilateral osteoma	9	4.6
To see unilateral osteoma	12	6.1
Intrauterine adhesion	10	5.1
Endometrial polyp	10	5.1
Bicornuate uterus	1	0.5

*Normality of the endometrial cavity and cervix and to see both osteomas of fallopian tubes

were confirmed by hysteroscopy. Overall, 49.3% of the cases of the uterine cavity in HSG were consistent with hysteroscopy findings. In this study, 98.6% of cases that were normal in the cervical examination reported by HSG, were also confirmed by hysteroscopy. In general, 73% of cases of cervical findings in HSG were consistent with hysteroscopy findings.

DISCUSSION

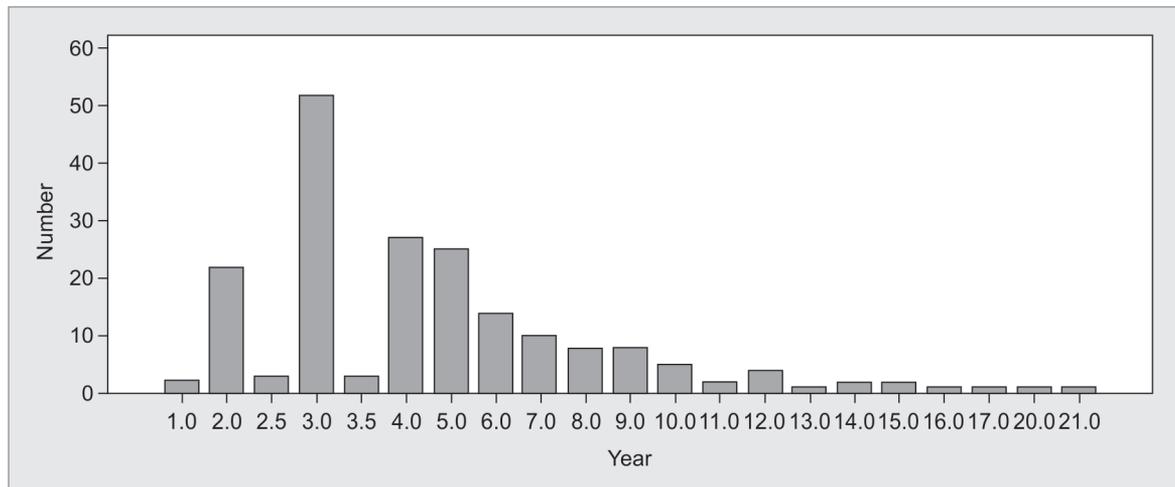
In the present study, the mean age of women studied was 5.19 years with infertility with a minimum of 1 and a maximum of 21 years. Less than 10% of women have suffered from infertility over 10 years and more than 50% of women studied have suffered from infertility for less than 4 years. This result was more than the reported duration in India,¹⁴ Egypt, and Kuwait,¹⁵ and Nigeria.¹⁶ This difference in the duration of infertility may be due to the difference in ethnicity and beliefs of these individuals and the traditional therapies that these people are doing before they come to a gynecologist to solve their problem.

In this study, most women have suffered from primary infertility, and only 36.6% of women had secondary infertility. These results were similar to Foroozanfar's study,¹⁷ but significantly different from Ibinaiye's study.¹⁶ This difference may be due to the inclusion criteria and study population.

In the present study, the most uterine findings in HSG were uterine normality, reported in 50.5% of cases, and then, arcuate uterus (21.6%), filling defect (15.4%), bicornuate or septated uterus (24.2%), and unicornuate uterus (5%), respectively. The most cervical findings in HSG were normal cervix (7.9%) and then, adhesion (2%). The most tubular findings in HSG were normality of tubes, reported in 54.1% of cases. These results differed from the findings of the study conducted by Nigam¹⁴ on infertile Indian women and the study conducted by Ibinaiye¹⁶ on infertile women in Nigeria but were consistent with the results of the Roma's study¹⁸ on infertile women in Spain.

In the present study, the most laparoscopic findings were the normality and openness of both fallopian tubes, which was reported in 54.6% of cases, and the next, the prevalence of hydrosalpinx (12.9%), peritubular adhesions (10.8%), unilateral obstruction of the fallopian tube (8.2%), Subserous fibroids (5.7%), bilateral obstruction of the fallopian tubes (5.7%) and fundus concavity (2.1%). These results are different from the results of the study conducted by Nigam et al.¹⁴ of infertile women in India, in which the most common finding by laparoscopy was uterine adhesion, which was reported in 49.9% of cases, and also the incidence of bilateral tubular obstruction (25.7%), unilateral tubular obstruction (21.09%), hydrosalpinx (18.75%), endometriosis (12.50%), twisted tubes (4.68%), uterine fibroids (3.12%), uterinetubal mass (3.12%), and uterine malformations (3.12%) were also reported.

In the study, in 54.6% of the cases, in the HSG findings of uterine cavity were consistent with laparoscopic findings. In 51.2% of cases, tubular findings in HSG were consistent with laparoscopic reports, which this consistency



Graph 1: Age distribution of patients with infertility

Table 2: Laparoscopic and HSG findings in patients under study

<i>HSG finding</i>	<i>Laparoscopic finding</i>	<i>Number (percentage) (%)</i>
<i>Normality of the uterus cavity (98)</i>	Non-normality of the uterus appearance	92 (93.8)
	Sub-serous fibroids	5 (5.1)
	Fundus concavity	1 (1.0)
<i>Bicornuate or septated uterus (29)</i>	Normality of the uterus appearance	4 (13.7)
	Fundus concavity	25 (84.2)
<i>Unicornuate uterus (5)</i>	Unicornuate uterus	1 (20)
	Normality of the uterus appearance	4 (80)
<i>Arcuate (42)</i>	Normality of the uterus appearance	40 (95.2)
	Fundus concavity	2 (4.7)
<i>Tubular findings in HCG</i>	<i>Laparoscopic finding</i>	<i>Number (percentage) (%)</i>
<i>Normal (105)</i>	Bilateral fallopian tube obstruction	8 (7.6)
	Unilateral fallopian tube obstruction	5 (4.7)
	Normality and openness of both fallopian tubes	74 (75.4)
	Hydrosalpinx	6 (5.7)
	Peritubular adhesion	12 (11.4)
<i>Right tubular obstruction (12)</i>	Bilateral fallopian tube obstruction	2 (16.6)
	Unilateral right fallopian tube obstruction	7 (58.3)
	Normality and openness of both fallopian tubes	3 (25)
<i>Left tubular obstruction (7)</i>	Bilateral fallopian tube obstruction	2 (28.5)
	Unilateral left fallopian tube obstruction	2 (28.5)
	Normality and openness of both fallopian tubes	2 (28.5)
	Peritubular adhesion	1 (14.2)
<i>Bilateral obstruction (7)</i>	Bilateral fallopian tube obstruction	2 (28.5)
	Normality and openness of both fallopian tubes	3 (42.8)
	Hydrosalpinx	1 (14.2)
	Peritubular adhesion	1 (14.2)
<i>Right hydrosalpinx (4)</i>	Unilateral fallopian tube obstruction	1 (25)
	Normality and openness of both fallopian tubes	1 (25)
	Hydrosalpinx	5 (71.4)
	Peritubular adhesion	1 (25)
<i>Left hydrosalpinx (7)</i>	Hydrosalpinx	4 (71.4)
	Peritubular adhesion	2 (28.5)

(Contd...)

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HSG finding	Laparoscopic finding	Number (percentage) (%)
Bilateral hydrosalpinx (14)	Bilateral fallopian tube obstruction	1 (8.3)
	Unilateral fallopian tube obstruction	1 (8.3)
	Normality and openness of both fallopian tubes	2 (16.6)
	Bilateral hydrosalpinx	8 (66.6)
	Peritubular adhesion	2 (16.6)
Right tube torsion (10)	Bilateral fallopian tube obstruction	1 (10)
	Normality and openness of both fallopian tubes	5 (50)
	Hydrosalpinx	3 (20)
	Peritubular adhesion	1 (10)
Left tube torsion (10)	Bilateral fallopian tube obstruction	1 (10)
	Unilateral fallopian tube obstruction	1 (16.6)
	Normality and openness of both fallopian tubes	1 (16.6)
	Hydrosalpinx	1 (16.6)
	Peritubular adhesion	2 (33.9)
Bilateral tube torsion (22)	Unilateral fallopian tube obstruction	1 (4.5)
	Normality and openness of both fallopian tubes	15 (68.1)
	Hydrosalpinx	4 (18.1)
	Peritubular adhesion	2 (9.0)
Uterus finding in HSG	Hysteroscopy results	Number (percentage) (%)
Normal (98)	Normality of the endometrial cavity and cervix and to see both osteomas	84 (85.7)
	Septated uterus	4 (4)
	Endometrial cavity polyp	10 (10.2)
Bicornuate or septated uterus (39)	Normality of the endometrial cavity and cervix and to see both osteomas	22 (75.8)
	Septated uterus	4 (4)
	Bicornuate uterus	10 (10.2)
	Peritubular adhesion	5 (10.2)
Unicornuate uterus (5)	Normality of the endometrial cavity and cervix and to see both osteomas	5 (100)
Arcuate uterus (42)	Normality of the endometrial cavity and cervix and to see both osteomas	34 (89.4)
	Septated uterus	1 (2.3)
	Intrauterine adhesion	6 (14.2)
	Bicornuate uterus	1 (2.2)
Filling defect (30)	Normality of the endometrial cavity and cervix and to see both osteomas	24 (80)
	Intrauterine adhesion	1 (3.3)
	Cervical canal polyps	5 (16.6)
Cervical finding in HSG	Hysteroscopy results	Number (percentage) (%)
Normal (94)	Normality of the endometrial cavity and cervix and to see both osteomas	188 (98.9)
	Cervical canal polyps	2 (1)
Adhesion	Intrauterine adhesion	4 (100)

was lower than the results of studies conducted by El-Tabbakh,¹⁵ Ibinaiye,¹⁶ and was more than the results of the Foroozanfar's study.¹⁷

In a study of 49.3%, the findings of the uterine cavity in HSG were consistent with the hysteroscopy findings.

In 73% of cases, cervical findings in HSG were consistent with hysteroscopy findings. These results were consistent with the findings of the study conducted by Roma, in which 73% of HSG findings were consistent with hysteroscopy findings.

CONCLUSION

As a major radiological study in infertile women, HSG has an appropriate diagnostic power, and its results were appropriately matched with the results of measures such as laparoscopy and hysteroscopy.

Recommendations

Considering the results of the study and the ease of using ultrasound in all medical diagnostic fields, in particular, consideration of the issues surrounding the reproductive system of women, the adaptation of transvaginal sonography and other diagnostic methods, such as HSG, laparoscopy, and hysteroscopy in future studies is recommended.

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REFERENCES

1. Overstreet JW. Evaluation of sperm-cervical mucus interaction. *Fertility and Sterility*. 1986;45(3):324-326.
2. Hull M, Savage P, Bromham D. Prognostic value of the post-coital test: prospective study based on time-specific conception rates. *BJOG: An International Journal of Obstetrics & Gynaecology*. 1982;89(4):299-305.
3. Portuondo J, Echanojauregui A, Herran C, Agustin A. Prognostic value of postcoital test in unexplained infertility. *International Journal of Fertility*. 1982;27(3):184-186.
4. Giner J, Merino G, Luna J, Aznar R. Evaluation of the Sims-Huhner postcoital test in fertile couples. *Fertility and Sterility*. 1974;25(2):145-148.
5. Margalioth EJ, Navot D, Laufer N, Lewin A, Rabinowitz R, Schenker JG. Correlation between the zona-free hamster egg sperm penetration assay and human *in vitro* fertilization. *Fertility and Sterility*. 1986;45(5):665-670.
6. Franken DR, Burkman LJ, Oehninger SC, Coddington CC, Veeck LL, Kruger TF, et al. Hemizona assay using salt-stored human oocytes: Evaluation of zona pellucida capacity for binding human spermatozoa. *Molecular Reproduction and Development*. 1989;22(1):15-26.
7. Franken DR, Oehninger S, Burkman LJ, Coddington CC, Kruger TF, Rosenwaks Z, et al. The hemizona assay (HZA): a predictor of human sperm fertilizing potential in *in vitro* fertilization (IVF) treatment. *Journal of In Vitro Fertilization and Embryo Transfer*. 1989;6(1):44-50.
8. Oehninger S, Coddington CC, Franken DA, Scott R, Burkman LJ, Acosta AA, et al. Hemizona assay: assessment of sperm dysfunction and prediction of *in vitro* fertilization outcome. *Fertility and Sterility*. 1989;51(4):665-670.
9. Maruani P, Schwartz D. Sterility and fecundability estimation. *Journal of Theoretical Biology*. 1983;105(2):211-219.
10. Trussell J, Wilson C. Sterility in a population with natural fertility. *Population Studies*. 1985;39(2):269-286.
11. Matthiesen S, Frederiksen Y, Ingerslev HJ, Zachariae R. Stress, distress and outcome of assisted reproductive technology (ART): a meta-analysis. *Human Reproduction*. 2011;26(10):2763-2776.
12. Decherney AH, Cholst I, Naftolin F. Structure and function of the fallopian tubes following exposure to diethylstilbestrol (DES) during gestation. *Fertility and Sterility*. 1981;36(6):741-745.
13. Hoover RN, Hyer M, Pfeiffer RM, Adam E, Bond B, Cheville AL, et al. Adverse health outcomes in women exposed *in utero* to diethylstilbestrol. *New England Journal of Medicine*. 2011;365(14):1304-1314.
14. Nigam A, Saxena P, Mishra A. Comparison of hysterosalpingography and combined laparohysteroscopy for the evaluation of primary infertility. *Kathmandu University Medical Journal*. 2017;13(4):281-285.
15. El-Tabbakh MN, Slamka P. Transvaginal Sonohysterography (Tv-Sh), Versus Hysterosalpingography (Hsg) and Laparoscopy. 2011.
16. Ibinaiye PO, Lawan RO, Avidime S. Comparative evaluation of pattern of abnormalities in hysterosalpingography, diagnostic laparoscopy and hysteroscopy among women with infertility in Zaria, Nigeria. *International Journal of Medicine and Medical Sciences*. 2015;7(2):26-35.
17. Foroozanfard F, Sadat Z. Diagnostic value of hysterosalpingography and laparoscopy for tubal patency in infertile women. *Nursing and Midwifery Studies*. 2013;2(2):188.
18. Roma Dalfó A, Úbeda B, Úbeda A, Monzón M, Rotger R, Ramos R, et al. Diagnostic value of hysterosalpingography in the detection of intrauterine abnormalities: a comparison with hysteroscopy. *American Journal of Roentgenology*. 2004;183(5):1405-1409.