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Full Length Research Paper

Hysterosalpingography versus Office Hysteroscopy in the Detection of Intrauterine Pathology in Infertile Women

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Abstract

Aim: *To investigate the accuracy of hysterosalpingography (HSG) in comparison to hysteroscopy in the detection of intrauterine pathology in patients with infertility, where hysteroscopy is the gold standard.* ***Methods:*** *A prospective, comparative study included 300 patients undergoing both HSG and diagnostic hysteroscopy. Main outcome measures were sensitivity, specificity, positive and negative predictive value, and accuracy rate of HSG.* ***Results:*** *In current study, total abnormal office hysteroscopy (155), only (110) of them were abnormal by HSG (71.0%). Also, total normal office hysteroscopy (145), only (116) of them were normal by HSG (80.0%), with highly statistically significant difference where P value=0.000. The most common finding on hysteroscopy was endometrial polyp 32 (10.7%) followed by submucous fibroid in 31 (10.3%), Arcuate uterus 20 (6.7%), Subseptate uterus17 (5.7%) and Asherman's syndrome 9 (3%). The most common finding on HSG was endometrial polyp 31 (10.3%) followed by submucous fibroid in 25 (8.3%), Arcuate uterus 22 (7.3%), Subseptate uterus 17 (5.7%) and Asherman's syndrome 10 (3.3%) women. HSG, with hysteroscopy as the gold standard had a sensitivity of 70.97%, specificity of 80%, PPV of 79.1%, and NPV of 72% for evaluating Müllerian anomalies.* ***Conclusion:*** *Hysterosalpingography is still a useful screening test for the evaluation of the uterine cavity. If a hysterogram demonstrates intrauterine abnormalities, hysteroscopy should be considered to make a definite diagnosis and treatment. Both procedures should be complementary to each other.*

Keywords: *Female infertility- hysterosalpingography-hysteroscopy*

Introduction

Intrauterine pathologies are present in 25-50% of infertile patients. Structural abnormalities of the uterine endometrial cavity affect reproduction outcomes because they interfere with implantation or cause spontaneous abortions. Therefore, accurate diagnosis of any endometrial pathology in the patient is an important step prior to beginning the assisted reproductive technology cycles (1). HSG still has an essential role in screening for uterus-related primary or secondary infertility. Because of the high prevalence of uterine abnormalities, evaluation of the uterine cavity is routinely performed in the evaluation of infertile patients. In addition, HSG provides information about tubal patency. HSG and hysteroscopy are two different approaches to the uterine cavity (2). The advantages of HSG include the ease of the study, its safety, and cost-effectiveness in comparison with hysteroscopy. In addition, HSG provides information about tubal patency or blockage. Several disadvantages are inherent in the technique, including exposure to ionizing radiation, use of iodinated contrast material, and often discomfort for the patient (3).When HSG shows no abnormality, the indication of hysteroscopy has been questioned. We believe that when HSG shows no abnormality, the indication of hysteroscopy must not be discarded because it adds additional and exclusive information about hormonal, trophic, inflammatory, and infectious disorders that may be responsible for poor reproductive outcome in nearly 25% of cases(4).

Hysteroscopy has traditionally been performed as an adjunct tool to evaluate abnormalities suspected as a result of HSG evaluation. Recent studies have shown increased benefit from combining diagnostic hysteroscopy and HSG in the evaluation of female infertility (5). The accuracy of HSG and hysteroscopy for detecting uterine abnormalities in infertile patients has been discussed by various authors. Hysteroscopy has an increased accuracy over HSG, although the magnitude of this discrepancy is controversial. Although some authors have suggested that HSG should be completely replaced by hysteroscopy, others have found that hysteroscopy added little information when HSG results were negative (6).

Aim of the work

This study was designed to compare between hysterosalpingography and office hysteroscopy in evaluation of uterine cavity in infertile patients where hysteroscopy is considered the gold standard.

Patients and Methods

This cross-sectional observational study was conducted over a period of three years from January 2016 to Feb 2018. A total number of 300 patients attending infertility Clinic at Al-Azhar University Hospital (Assiut) were recruited in the study after taking written informed consent. The age of the patients ranged from 18 to 38 years and the mean age was 27.12 years., Our investigations of infertility included basal body temperature charts, serum progesterone assays and/or endometrial biopsies to assess ovulation, analysis of semen, postcoital test to assess male factor and sperm–mucus interaction, HSG to evaluate uterine and tubal factor and hysteroscopy. HSG was performed first followed by office Hysteroscopy for all participants. The hysteroscopic study was considered asa gold standard method. Uterine biopsy was taken from any uterine pathology and sent to histopathological examination.

Hysterosalpingography

Patient preparation:

Hysterosalpingography was performed in the proliferative phase of menstrual cycle. Premedication with anti-inflammatory drugs was not routinely administered. Half an hour before HSG, injection of Buscopan®(Hyoscine Butyl Bromide) 0.5 ml was given intramuscularly to avoid tubal spasm.

Technique of HSG:

Cervix was visualized with the help of Sim's speculum and the anterior lip of cervix was held with tenaculum. Water-soluble contrast media (urographin) was injected slowly by using Leech Wilkinson canula and the films were taken under fluoroscopic monitoring.

Images:

first film of pelvis was taken before the administration of the contrast medium into the uterine cavity. By this way, possible intrapelvic masses or calcifications would not lead to diagnostic problems during the study of the films. Soluble contrast material was slowly instilled under intermittent fluoroscopic control to evaluated uterus and fallopian tubes. Care was taken to expel air from syringe and Leech-Wilkinsion cannula, to avoided confusion during interpretation. Second film was taken during the filling of the uterine cavity; Small filling defects were best seen at this stage. Third image was obtained when uterus was fully distended with contrast material and the Fallopian tubes were fully distended. Shape of uterus was best evaluated during this stage, although small fillings were obscured when uterus was well opacified. Fourth film was obtained after the removal of the salpingographer, to check the presence of contrast medium into the peritoneal cavity. Fourth image shows the free intraperitoneal spillage of contrast material. If one or both tubes show no contrast spillage into peritoneal cavity then possibility of tubal spasm excluded by intravenous administration of 20mg of Buscopan® (scopolamine). HSG abnormalities were interpreted as filling defects in the uterine cavity, uterine wall irregularities, uterine contour abnormalities and tubal contour and spillage pattern. Filling defects and uterine wall irregularities werethe two main outcome measures on HSG:

1-Singlefilling defects were diagnosed as polyps or submucosalmyomas according to their morphologyand uterine cavity configuration.

2-Multiple diffusenodular filling defects of the entire endometrialcavity were interpreted as endometrial hyperplasia.

3-Uterine adhesions were seen as uterine wall irregularities, sometimes with sharply delineated filling defects of angulated contours.

Office hysteroscopy

Diagnostic hysteroscopy was performed by a gynecologist as an office procedure and scheduled after cessation of menstrual flow that is in early proliferative phase (between 7th to 11th days of menstrual cycle), using a 3.8-mm-diameter lens-based rigid continuous-flow endoscope with an optical angle of 30º equipped with a 4-mm hysteroscopic diagnostic sheath and a xenon light source (Storz, GmbH). Hysteroscopy was performed without premedication or local or general anesthetic.

Technique of Hysteroscopy:

Thehysteroscope was introduced through the vagina and cervix into the uterine cavity without aspeculum and without placing a tenaculum on the cervix. Approximately 200 ml of saline solution was used as a distention medium and was instilled by way of a conventional blood pressure cuff. Maximum distension media (saline, glycine) pressure used was 100 mmhg. Normal saline was used as distension media for diagnostic hysteroscopy and glycine was used only when operative procedure has to be undertaken.
Images were recorded with a video camera and seen on a monitor. Photographs were systematicallyobtained for both the patient's report and medical history. Hysteroscopy evaluated status of cervical canal, isthmus, uterine cavity, and tubal ostia. Findings on HSG and hysteroscopy were compared. Data were expressed as percentages. Statistical comparisons were expressed in terms of sensitivity, specificity, positive predictive value, negative predictive value, accuracy rate, false-positive and false-negative rate.

Ethical considerations:

The study was ethically approved by ethical committee of Al-Azhar Faculty of Medicine and Informed consent was obtained from every patient for participation in this study.

Results

A total number of 300 patients attending infertility Clinic at Al-Azhar University Hospital (Assiut) were recruited for the study. Abnormal office hysteroscopy (155), only (110) of them were abnormal by HSG (71.0%). Also, total normal office hysteroscopy

(145),only (116) of them were normal by HSG (80.0%), with highly statistically significant difference where P value=0.000., the most common finding on hysteroscopy was endometrial polyp 32 (10.7%) followed by submucous fibroid in 31 (10.3%), Arcuate uterus 20 (6.7%),Subseptate uterus17 (5.7%) and Asherman's syndrome 9 (3%)women. The most common finding on HSG was endometrial polyp 31 (10.3%) followed by submucous fibroid in 25 (8.3%), Arcuate uterus 22 (7.3%), Subseptate uterus17 (5.7%) and Asherman's syndrome 10 (3.3%) women. HSG with hysteroscopy as the gold standard had a sensitivity of 70.97%, specificity of 80%, PPV of 79.1%, and NPV of 72% for evaluating Müllerian anomalies.

Table (1): HSG finding

HSG	No. (300)	%
Normal	161	53.7
Subseptate uterus	17	5.7
Submucous fibroid	25	8.3
Endometrial polyp	31	10.3
Arcuate uterus	22	7.3
Cervical polyp	10	3.3
Bicornuate uterus	8	2.6
Unicornuate uterus	4	1.3
Ostium obliteration	3	1.0
Cervical stenosis	4	1.3
Adhesions (synechia)	10	3.3
Endometrial hyperplasia	5	1.7

Table (2): Office hysteroscopy

Office hysteroscopy	No. (300)	%
Normal	145	48.3
Subseptate uterus	17	5.7
Submucous fibroid	31	10.3
Endometrial polyp	32	10.7
Arcuate uterus	20	6.7
Cervical polyp	11	3.7
Bicornuate uterus	7	2.3
Unicornuate uterus	4	1.3
Ostium obliteration	3	1.0
Cervical stenosis	7	2.3
Adhesions (synechia)	9	3
Endometrial hyperplasia	9	3
Chronic endometritis	5	1.7

Table (3): Relationship between office hysteroscopy and HSG

HSG	Office hysteroscopy				P-value
	Normal (n= 145)		Abnormal (n= 155)		
	No.	%	No.	%	
Normal	116	80.0	45	29.0	0.000*
Abnormal	29	20.0	110	71.0	

Table (3) illustrates relationship between office hysteroscopy and HSG. It is clear from this table that 110 of 155 total abnormal office hysteroscopy (71.0%) were abnormal by HSG. Also, 116 of 145 total normal office hysteroscopy (80.0%) were normal by HSG, with highly statistically significant difference.

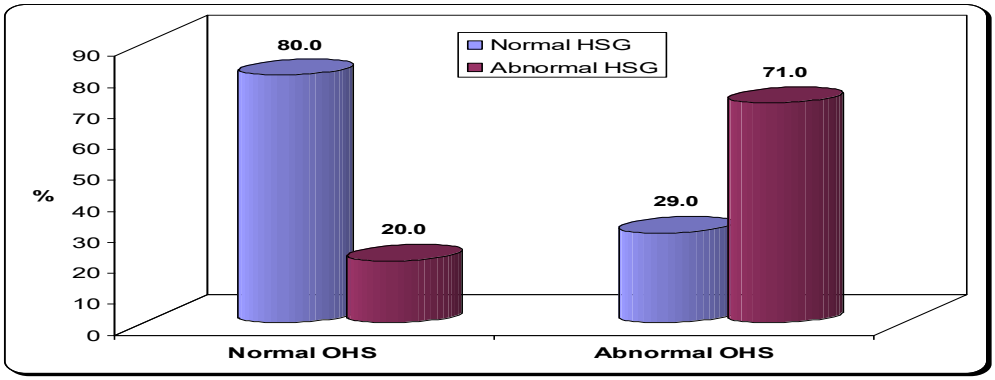

Fig (1) Relationship between office hysteroscopy and HSG

Table (4): Comparison between HSG findings according to the age groups.

Age (years)	HSG				P-value
	Normal (n= 161)		Abnormal (n= 139)		
	No.	%	No.	%	
< 25	59	54.1	50	45.9	0.162
25 – 30	53	60.9	34	39.1	
> 30	49	47.1	55	52.9	

There was no statistically significant difference between the groups of age as regards the distribution of HSG findings P>0.162 .

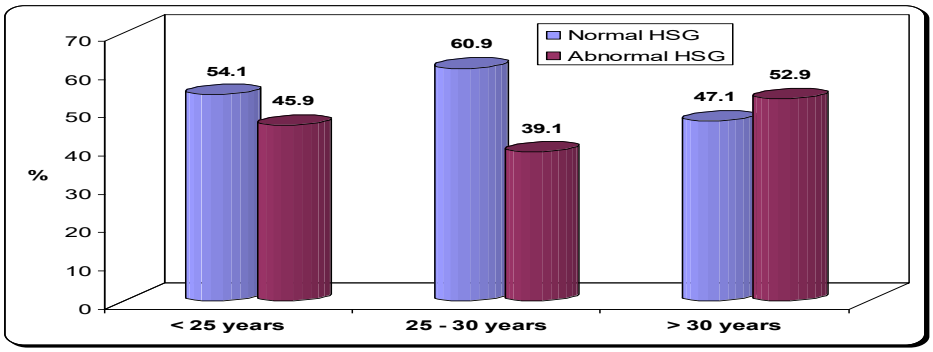

Fig (2) Comparison between HSG findings according to the age groups.

Table (5): Comparison between hysteroscopic findings according to the age groups.

Age (years)	Office				P-value
	Normal		Abnormal		
	No.	%	No.	%	
< 25	48	44.0	61	56.0	0.530
25 – 30	44	50.6	43	49.4	
> 30	53	51.0	51	49.0	

There was no statistically significant difference between the groups of age as regards the distribution of hysteroscopic findings P>0.530

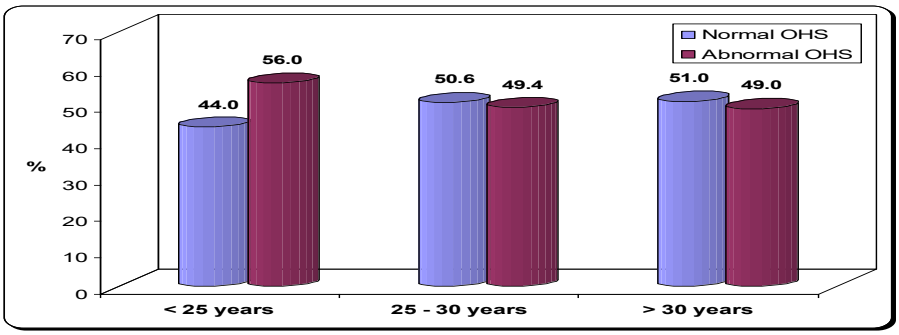

Fig (3) Comparison between hysteroscopic findings according to the age groups.

Table (6): Comparison between HSG findings according to type of infertility.

Type of infertility	HSG				P-value
	Normal		Abnormal		
	No.	%	No.	%	
Primary	113	52.3	103	47.7	0.451
Secondary	48	57.1	36	42.9	

There was no statistically significant difference between the groups of residence as regards the distribution ofHSGfindings P>0.451.

Table (7): Comparison between hysteroscopic findings according to Type of infertility.

Type of infertility	Office				P-value
	Normal		Abnormal		
	No.	%	No.	%	
Primary	100	46.3	116	53.7	0.258
Secondary	45	53.6	39	46.4	

There was no statistically significant difference between the groups of Type of infertility as regards the distribution of office hysteroscopicfindings P>0.258.

Table (8): Comparison between HSG findings according to the body mass index groups.

BMI	HSG				P-value
	Normal		Abnormal		
	No.	%	No.	%	
Underweight	17	48.6	18	51.4	0.028*
Normal	137	56.8	104	43.2	
Overweight	7	29.2	17	70.8	

There was statistically significant difference between the groups of body mass index as regards the distribution of HSG findings>0.028.

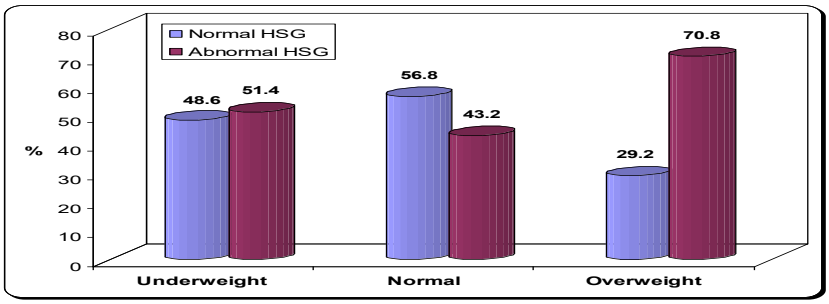

Fig (4) Demonstrated comparison between HSG findings according to the body mass index groups.

Table (9): Comparison between Officehysteroscopic findings according to the body mass index groups.

BMI	Office				P-value
	Normal		Abnormal		
	No.	%	No.	%	
Underweight	13	37.1	22	62.9	0.166
Normal	123	51.0	118	49.0	
Overweight	9	37.5	15	62.5	

There was no statistically significant difference between the groups of body mass index as regards the distribution ofhysteroscopicfindings P>0.166.

Table (10): Comparison between OH and result of histopathological examination of uterine pathology.

	Hysteroscopy		Histopathology		P-value
	NO	%	NO:	%	
Endometrial polyp	32	10.7	23	7.7	
Endometrial hyperplasia	9	3.0	7	2.3	0.213
Chronic endometritis	5	1.7	4	1.3	
Cervical polyp	11	3.7	10	3.3	

There was no statistically significant difference between result of office hysteroscopy and histopathological examination of uterine pathology where P =0.213.

Discussion

In current study, total abnormal office hysteroscopy (155), only (110) of them were abnormal by HSG (71.0%). Also, total normal office hysteroscopy (145), only (116) of them were normal by HSG (80.0%), with highly statistically significant difference where P value=0.000, wheretrue positive result =110 patient (71%)-true negative result=116 (80%)- false positive=29 (20%)- false negative=45 (29%)-sensitivity of HSG =71%- specificity of HSG =80%. In current study, 46.3% of the patients had abnormal HSG regarding the uterine cavity and 51.7% of the patients had abnormal hysteroscopic findings, A similar trend was found in the study by Ganglione et al, 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 OH, which were not confirmed by OH and also endometrial hyperplasia has negligible importance as far as infertility is concerned (7).

Our result was in contrast with the study by Ibinaiye et al, who showed that normal HSG findings were seen in 77.8% and abnormal findings in 22.85%. Also, our result was in contrast with the study by Chauhan et al, who showed that normal HSG findings were seen in 87% and abnormal findings in 13% (8).

In current study, hysteroscopic abnormalities in the uterine cavity were seen in about 51.66% of cases, our results were in contrast with the study by Larusso et al, who showed that abnormal hysteroscopic pathologies were present in (40.6%) only of patients with infertility and RIF after IVF. But our studies agree with him in finding where the most common findings were endometrial,

cervical polyps and submucous myomas. They concluded that diagnostic and therapeutic hysteroscopy have a significant role in the evaluation and treatment of these patients, and they suggested introducing hysteroscopy as a routine part of investigation work-up (9).

In current study, 20% (29/145) patients with abnormal HSG had normal findings on OH.; this result agreement with the study was found by Roma et al, who found that19% patients with abnormal HSG had normal OH, also; this result agreement with the study was found by Ganglione et al, who found that 18.5%with abnormal HSG had normal OH, but our results were in contrast with the study by Kumar et al, who showed that only 5% patients with abnormal HSG had normal OH (10). In current study, abnormal hysteroscopic findings were detected in 53.7% (116/216) women with primary infertility and in 46.4% (39/84) women with secondary infertility. Our results were in contrast with the study by Raju et al, who showed that abnormal hysteroscopic findings were detected in 35.44% (28/79) women with primary infertility and in 35.71% (10/28) women with secondary infertility (11).

In current study, 46.3% of the patients had abnormal HSG regarding the uterine cavity and 51.7% of the patients had abnormal hysteroscopic findings, A similar trend was found in the study by Ganglione et al, in their study had 47.1% patients with pathological findings on HSG and 41.4% patients had pathological findings on HSG. The reason of higher number of cases detected by HSG in this study is that they have included eight cases of endometrial hyperplasia on OH, which were not confirmed by OH and also endometrial hyperplasia has negligible importance as far as infertility is concerned (12). In current study, HSG detected false-negative in 29% (45/155) and false-positive in 20% (29/145)with highly statistical significant difference where P value=0.000, Our results were in contrast with the study by Chauhan et al. who reported that HSG detected false-negative in 10% of women and false-positive in 3%.This difference in findings could be because they performed HSG and hysteroscopy on same day; though they didn't find the difference to be statistically significant (, P value >0.05) (13).

Also, our results were in contrast with the study by Taskin et al, who reported false- positive and false-negative rates of HSG as 16.23% and 78.43%, respectively. The reason for high false-negative rate in the study could be because standardization of the procedure was not possible in their center due to large patient population whereas in our study HSG were performed by one of the investigators so there is less discrepancy in results (14).

Conclusion

Hysterosalpingography is a useful screening test and should be the first step for the evaluation of the uterine cavity. In addition, HSG does provide information about tubal patency. Hysteroscopy can localize intrauterine lesions and determine their extent with more accuracy. It can clearly distinguish a condition of cervical stenosis from severe IUA, as diagnosed by HSG and endometrial polyps from submucous myoma. Therefore, hysteroscopy should be reserved for the confirmation and treatment of intrauterine abnormalities. Both procedures should be complementary to each other.

Recommendations

1- All gynecology units should provide a dedicated ambulatory hysteroscopy service to aid management of women with abnormal uterine bleeding, infertility and suspicious of intracavitary abnormalities. The procedure performed in such setting is defined *"office hysteroscopy"*. There are clinical and economic benefits associated with this type of service.
2- Eye directed biopsy is more accurate than blind biopsy, and therefore hysteroscopy with multiple target biopsies should be used in place of blind techniques in the diagnostic work for atypical lesions. The possible risk of the spreading into the abdominal cavity of neoplastic cells should not limit the use of hysteroscopy in favor of blind techniques.

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