

The Comparison of Hysterosalpingography and Laparoscopy in Predicting Fertility

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Objective of the study was to compare the prognostic significance of Hysterosalpingography (HSG) and laparoscopy for fertility outcome.

Materials and Method: Study was conducted in Radiology Departments of Sir Ganga Ram Hospital, Lahore and Lahore General Hospital, Lahore from June to November 2005. Hysterosalpingography was performed on 100 patients being investigated for infertility. Later all study patients were investigated with Laparoscopy. Findings of both these investigations were compared for their ability to demonstrate anatomy and pathology of fallopian tubes, uterine cavity, intrapelvic peritoneal adhesions, and intraperitoneal contrast/ dye spill.

Results: On HSG 68% patients showed bilateral intraperitoneal contrast spill demonstrating patency of both fallopian tubes, 22% showed unilateral spill and 10% showed no spill. On laparoscopy, 28% patients showed bilateral intrapelvic spill of dye, 18% showed unilateral spill, while 55% patients showed no intrapelvic spill of dye. Difference in determination of tubal patency was significant ($p < 0.001$) between both these methods. There was no significant difference between two techniques in demonstrating hydrosalpinx and uterine cavity. On HSG 24% patients showed bilateral peritoneal adhesions, 28% showed unilateral while 50% patients were without such adhesions. Using laparoscopy, the number of patients with bilateral adhesions was 39%, while 16% patients had unilateral and 4% were without peritoneal adhesions. Results with two techniques differed significantly ($p < 0.05$).

Conclusion Hystero-salpingography was found to be significantly more accurate in showing patency of fallopian tubes and thus predicting future prognosis in patients being managed for infertility. It is less invasive as compared to laparoscopy and is reliable and almost equally useful method for evaluating internal architecture of female reproductive tract. Utilizing HSG it may be possible to minimize the use of invasive procedures like laparoscopy and hysteroscopy. Laparoscopy was found to be more useful than HSG in demonstrating pelvic adhesions.

Key Words Hysterosalpingography (HSG), Laparoscopy, Hysteroscopy, Infertility, Peritoneal adhesions, Tubal patency, Hydrosalpinx.

Hysterosalpingography and laparoscopy are important diagnostic tools in gynecological practice. These are the investigations of choice when uterine pathology, tubal factor or peritoneal adhesions are suspected to be the cause of infertility. In such patients the diagnostic workup should start with HSG,¹ which is a very useful initial screening test.² Hysterosalpingography is relatively simple radiological technique to demonstrate uterine cavity and fallopian tubes by injecting contrast medium in them. On HSG, intrauterine lesions like submucosal fibroids, endometrial polyps, intra-uterine adhesions and endometriosis can also be diagnosed.³ HSG is performed as an out-patient procedure, so it is very cost effective.⁴

Hysterosalpingography is performed with water soluble contrast medium at the end of first week of menstrual cycle when tubal filling is easy and there is no risk of pregnancy. Contrast is administered in the uterine cavity through small catheter or a purpose designed cannula.⁵

Laparoscopy is inspection of the pelvic cavity through a cold light endoscope, passed through the abdominal wall

under anesthesia. During this procedure a dye can be injected through a cannula in uterine cervix to test the patency of fallopian tubes. This investigation is now frequently performed, but it does carry potentially serious risks. (e.g. perforation of viscus, hemorrhage due to blood vessel damage, or a trocar punctures). Hysteroscopy involves inspection of uterine cavity.

Material and Method

Study was conducted in Radiology Departments of Sir Ganga Ram Hospital, Lahore and Lahore General Hospital, Lahore. Total one hundred patients with primary and secondary infertility, presenting from June to November 2005 were included in the study using convenience sampling. Patients with history of pelvic surgery, ectopic pregnancy, malignancy, marked obesity, and acute genital tract infection were excluded from the study. Hysterosalpingography of all these patients was performed using eight French gauge Foley's catheter and Urograffin contrast medium. Balloon catheter method has been shown to be superior to the

traditional metal cannula for performing HSG⁶. Intravenous Buscopan injection was given before the procedure to reduce false positive results for tubal blockage. Later all study patients were investigated with Laparoscopy.

Results

Out of 100 patients of the study, 63 had primary infertility and 37 patients were with secondary infertility. Patients age ranged between 18 and 42 years (mean age 27.84 ± 4.72). On HSG 68 patients showed bilateral intraperitoneal contrast spill (Table1), 22 patients had unilateral spill and 10 patients showed no spill at all. On laparoscopy only 28 patients showed bilateral spill, 18 patients showed unilateral spill and 54 patients showed no spill. Difference in determination of tubal patency was significant (p<0.001) between both these methods. On HSG 68 patients had regular shape of uterine cavity and 32 showed irregular shapes. While on laparoscopy 74 patients had regular uterine cavities and 26 showed irregular uterine cavities. Difference in the results was statistically non-significant (P>0.05) (Table2). On HSG 24 patients had bilateral peritoneal adhesions, 28 showed unilateral while 50 patients were without such adhesions. Using laparoscopy, the number of patients with bilateral adhesions was 39, while 16 patients had unilateral and 4 were without peritoneal adhesions. Laparoscopy was significantly (p<0.05) more accurate in showing adhesions (Table 3).

Table 1: Comparison of Intraperitoneal Spill.

TECHNIQUE	Bilateral Spill		Unilateral Spill		No Spill	
	N	%	N	%	N	%
HSG n = 100	68	68%	22	22%	10	10%
Laparoscopy n = 100	28	28%	18	18%	54	54%
p < 0.001						

Table 2: Comparison for Appearance of Uterine Cavity.

UTERINE CAVITY	Hysterosalpingography		Laparoscopy	
	Number	%	Number	%
Regular n = 100	68	68%	74	74%
Irregular n = 100	32	32%	26	26%
p = 0.350				

Table 3: Peritoneal Adhesions on HSG and Laparoscopy.

Technique	Bilateral adhesions		Unilateral adhesions		None	
	N	%	N	%	N	%
HSG n=100	24	24%	26	26%	50	50%
Laparoscopy n=100	39	39%	16	16%	45	45%
p < 0.05						

On HSG 48 patients showed hydrosalpinx and remaining 52 patients showed normal tubes. While on laparoscopy, 45 patients showed hydrosalpinx and 55 patients showed normal tubes. The observations did not differ significantly on comparison (P = 0.671) (Table4).

Table 4: Tubal appearance on HSG and Laparoscopy.

Technique	Hydrosalpinx		Normal Appearance	
	N	%	N	%
HSG	48	48%	52	52%
Laparoscopy	45	45%	55	55%
p = 0.671				

Discussion

During the past decade there has been a dramatic increase in the number of women seeking infertility evaluation. It is desirable that management of these cases should be as less invasive as possible. HSG and diagnostic laparoscopy/hysteroscopy target the correct treatable diagnosis. However HSG is significantly simple, least invasive, and cost effective of these procedures and in certain cases laparoscopy can be omitted⁷. This review emphasizes the wide range of available information and advantages of HSG which can be extremely useful in diagnosis and management of infertile patients⁸. Cost and risks of laparoscopy exclude the use of laparoscopy solely to check tubal patency, which can be documented more easily by HSG. Laparoscopy has greater sensitivity for diagnosis of endometriosis and adhesions in pelvis.⁹

This study shows that HSG is significantly superior in interpreting tubal patency, as on HSG, 68% patients had bilateral spill as compared to 28% showing bilateral spill on laparoscopy.

Tuberculosis is an important common cause for tubal blockage in our community and characteristic radiographic appearances on HSG are reliable indicators of genital tuberculosis.¹⁰

HSG is as accurate as laparoscopy in the diagnosis of tubal disease and it should remain an integral part of the female infertility investigation.¹¹ In our study the HSG was found to be much more sensitive in diagnosing tubal blockade as compared to laparoscopy.

The incorrect contrast passage through the fallopian tubes and increased pressure required during HSG in women with the characteristic history suggest endometriosis. In these cases laparoscopy is important examination for further evaluation.¹²

When comparing these two techniques, we found that while laparoscopy provides information on the condition of fallopian tubes, HSG also provides information on the status of uterine cavity without any additional maneuvering. Laparoscopy can check in addition the endometriosis, pelvic inflammatory diseases, tubal patency, ovaries and pouch of Douglas.¹³ It was recently shown that laparoscopic treatment of endometriosis improves fertility prospects by 13%.¹⁴

The combined diagnostic approach of laparoscopy and hysteroscopy is recommended in the evaluation of female infertility when risk of chronic pelvic infection is great. HSG can be performed on all infertile patients before undergoing diagnostic laparoscopy.^{15,16}

The current study shows that laparoscopy is better as compared to HSG in showing peritoneal adhesions ($p < 0.05$). It was shown by Coimbra et al,¹⁷ that in population with chronic pelvic pain, HSG is not a first choice diagnostic tool. This examination only permitted the identification of 1/3 of the patients with endometriosis and is unable to exclude this disease. Improvement in HSG in the diagnosis of peritubal adhesions can be achieved by looking for more than one of the radiographic signs like convoluted tubes, loculation of contrast medium in peritoneum, halo effect and fixed retro-flexion of uterus.

Conclusion

HSG is an invaluable procedure for evaluating internal architecture of female reproductive tract. It is significantly more accurate in showing patency of fallopian tubes and predicting future prognosis in patients being managed for infertility. It is less invasive as compared to laparoscopy and is almost equally useful method for evaluating female pelvic pathologies. Demonstration of hydrosalpinx and conditions of uterine cavity on HSG is comparable to laparoscopy. Utilizing HSG, it may be possible to minimize the use of invasive procedures like laparoscopy and hysteroscopy. The probability of laparoscopy to show tubal occlusion after a normal HSG is very low. Patients showing patent fallopian tubes on HSG may be managed conservatively. Patients showing tubal blockage on HSG need further evaluation which may be done with laparoscopy. Laparoscopy is more useful than HSG in demonstrating pelvic adhesions. HSG and Laparoscopy have complementary role in the complete evaluation of female infertility.

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