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Original Research Article

An Observational Assessment of the Correlation of Laparoscopic Finding with USG and HSG Findings in Females Diagnosed with Infertility

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Abstract

Aim: Correlation of laparoscopic finding with ultrasonography and hysterosalpingography findings in females with infertility.

Material and methods: This observational prospective study was carried out in the Department of Obstetrics and Gynaecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India. Couples who had not lived together for at least 12 months and patients with absolute or relative contraindication for laparoscopy i.e. any pre-existing cardiovascular or respiratory condition, generalized peritonitis, intestinal ileus or obstruction and abdominal hernia, were excluded. Sample size taken was 100.

Results: Out of the 50 patients with abnormal findings on USG, 20 had polycystic ovaries (20%) which was the most common finding. The other findings were fibroid uterus in 5 (5%), ovarian cyst in 3 (3%), adnexal mass in 4 (4%), endometrioma in 5 (5%), uterine polyp in 4 (4%) patients. Out of the 50 patients with abnormal findings on hysterosalpingography, most common finding was tubal block. 10 patients (10%) had bilateral tubal block, left tubal block in 20 (20%), right tubal block in 20 (20%) patients. The other findings were intra uterine filling defects in 4 patients (4%), extravasation in 1(1%) patient, intra uterine septum in 5 (5%) patients and hydrosalpinx in 5 (5%) patients. On hysteroscopy, 7 patients (7%) had septum and in 3 (3%) ostia were not seen. One patient had bicornuate uterus confirmed on laparoscopy. On laparoscopy 60 patients (60%) had abnormal finding. Most common finding was endometriosis in 20 patients (20%). The other findings were B/L tubal block in 12 (12%) patients, left tubal block in 20(20%) and right tubal block in 18 (18%) patients, pelvic adhesions in 12 (12%), fibroid in 10 (10%), PCO in 10(10%), endometrioma in 7 (7%), ovarian cyst in 4 (4%), hydrosalpinx in 4 (4%) patients.

Conclusion: HSG and Laparoscopy are complimentary rather that competitive procedures. The accuracy of diagnosis is enhanced when two procedures are combined especially in those cases where the result of one of the tests is doubtful.

Keywords: Laparoscopy, HSG, Infertility

Introduction

Infertility is defined as the inability to conceive after one year of unprotected regular sexual intercourse.[1] Total infertility is divided into primary and secondary infertility. Primary infertility is defined as the inability to conceive after one year among women 15 to 49 years old with contact with sexually active partners and no contraceptive use. Secondary infertility refers to the inability to conceive following a previous pregnancy.[1,2] Fertility varies across various regions of the world and is estimated to affect 8 to 12 percent of couples worldwide.[2] For many couples, infertility and its treatment cause a serious strain on their interpersonal relationship, and cause disturbed relationships with other people.[3] The most common factors responsible for infertility in females are an ovulatory disorder, tubal factors, uterine and cervical factors along with endometriosis. One third of the infertility cases are due to anatomical abnormalities of the female reproductive tract such as tubal blockage.[4,5]

An accurate diagnosis is the best key to the treatment. The workup of the female partner begins with history and examination. It is more important to perform the relevant investigation in a logical order at the correct time as compared to the routine simple so least invasive and most predictive investigations should be performed first. A number of diagnostic tests are being used in clinical practice to assess tubal patency as part of the work-up for sub- fertility.[6]

Conventional way to assess the uterine cavity, tubal structure and tubal patency was Hysterosalpingography but now it has been largely superseded by laparoscopy and hysteroscopy. Laparoscopy is considered the clinical reference test for diagnosing tubal pathology.[7] Laparoscopy allows visualization of peri-adnexal adhesions and the presence of endometriosis, which cannot be done with HSG.[8] It provides information regarding tubal and ovarian status, uterine normality and standard means of diagnosing various pelvic pathology e.g. pelvic inflammatory disease, endometriosis, pelvic congestion and tuberculosis. Untreated pelvic inflammatory disease, post-abortal, postpartum infection and tuberculosis are common factors of infertility in developing countries.[8]

Material and methods

This observational prospective study was carried out in the Department of obstetrics and gynaecology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India for 10 months.

Inclusion and exclusion criteria

Couples who had not lived together for at least 12 months and patients with absolute or relative contraindication for laparoscopy i.e. any pre-existing cardiovascular or respiratory condition, generalized peritonitis, intestinal ileus or obstruction and abdominal hernia, were excluded.

Infertile women who gave consent were first subjected to a detailed history followed by clinical examination. Routine investigations include hemoglobin percentage, blood group and Rh type, HIV, HBsAg, VDRL, Anti HCV, urine routine examination, electrocardiogram and chest X-ray.

- Transvaginal ultrasonography was done on day – 9 of the menstrual cycle with 2- D Siemens ultrasound machine.
- Hysterosalpingography was done between 8 -10 days of menstrual cycle. Under fluoroscopic guidance contrast media 3-5ml (Urograffin 60%) is injected to delineate uterine cavity. X ray films were taken as tubes begin to fill and when peritoneal spill has occurred.

- Hysterolaparoscopy was performed in the post menstrual phase under general anaesthesia. Hysteroscopy was performed with a Karl Storz 2.9 mm hysteroscope and the distending medium used is normal saline. Thereafter laparoscopy was done. The uterus, bilateral ovaries and tubes, pouch of douglas, ovarian fossa and upper abdomen was assessed. Chromopertubation was performed by inserting methylene blue dye under vision.

Statistical analysis

All the data was collected on a predesigned proforma and was entered in Microsoft Excel sheet. It was assessed by SPSS ver. 25.0 software for statistical analysis. P-value of

<0.05 was considered as significant.

Results

Patients were studied as regards their demographic characteristics, ultrasonography, hysterosalpingography and hysterolaparoscopy findings and also the results were compared.

Out of total 100 patients, 80(80%) were primary infertility and 20 (20%) were secondary infertility. On analyzing the age wise distribution of the patients, mean age of the patients were 27.6 yrs±4.0 with minimum age of 22 yrs and maximum age of 36 yrs. Also, maximum number of patients of primary (52%) and secondary (56%) infertility fall in the age group of 25-30 yrs. Duration of infertility in present study ranged from 1- 15 yrs. Mean duration of infertility was 4.38 yrs±2.8, of which mean in primary infertility was 3.68 yrs and 6.8 yrs in secondary infertility. Maximum number of patients of primary infertility had duration of infertility of <5 yrs and maximum number of patients of secondary infertility had duration of infertility in the range of 5-10 yrs.

Table 1: Comparison of the findings on ultrasonography and laparoscopy

USG		Laproscopy		Total	p-value
		No	Yes		
PCO	No	76	4	80	<0.001
	%	95%	5%	80%	
	Yes	13	7	20	
	%	65%	35%	20	
	Total	89	11	100	
Fibroid	%	89%	11%	100.00%	< 0.01
	No	87	8	95	
	%	91.58%	8.42%	95%	
	Yes	2	3	5	
	%	40%	60%	5%	
	Total	89	11	100	
Ovarian Cyst	%	89%	11%	100 %	<0.001
	No	95	2	97	
	%	97.94%	2.06%	97%	
	Yes	1	2	3	
	%	33.33%	66.67%	3%	
	Total	96	4	100	
Endometrioma	%	96%	4%	100%	<0.001
	No	92	3	95	

	%	96.84%	3.16%	95%	
	Yes	1	4	5	
	%	20%	80%	5%	
	Total	93	7	100	
	%	93%	7%	100%	

Table 2: Comparison in the findings on HSG and laparoscopy

HSG		**Laproscopy**		**Total**	**p-value**
		No	**Yes**		
Left Tubal Block	No	70	10	80	<0.001
	%	87.5%	12.5%	80%	
	Yes	10	10	20	
	%	50%	50%	20%	
	Total	80	20	100	
Right Tubal Block	%	80%	20%	100%	<0.01
	No	76	6	82	
	%	92.5%	7.5%	82%	
	Yes	6	12	18	
	%	33.33%	66.67%	18%	
	Total	82	18	100	
Hydrosalpinx	%	82%	18%	100%	<0.001
	No	92	3	95	
	%	96.84%	3.16%	95%	
	Yes	3	2	5	
	%	60%	40%	5%	
	Total	95	5	100	
	%	95%	5%	100%	

Out of the 50 patients with abnormal findings on USG, 20 had polycystic ovaries (20%) which were the most common finding. The other findings were fibroid uterus in 5 (5%), ovarian cyst in 3 (3%), adnexal mass in 4 (4%), endometrioma in 5 (5%), uterine polyp in 4 (4%) patients.

Out of the 50 patients with abnormal findings on hysterosalpingography, most common finding was tubal block. 10 patients (10%) had bilateral tubal block, left tubal block in 20 (20%), right tubal block in 20 (20%) patients. The other findings were intra uterine filling defects in 4 patients (4%), extravasation in 1(1%) patient, intra uterine septum in 5 (5%) patients and hydrosalpinx in 5 (5%) patients.

Table 3: Comparison of the findings on HSG and hysteroscopy

HSG		**Hysteroscopy**		**Total**	**p-value**
		No	**Yes**		
Septate uterus	No	94	1	95	<0.001
	%	98.95	20	95	
	Yes	1	4	5	
	%	1.05	80	5	
	Total	95	5	100	
	%	100	100	100	

On hysteroscopy, 7 patients (7%) had septum and in 3 (3%) ostia was not seen. One patient had bicornuate uterus confirmed on laparoscopy.

On laparoscopy 60 patients (60%) had abnormal finding. Most common finding was endometriosis in 20patients (20%). The other findings were B/L tubal block in 12 (12%) patients, left tubal block in 20(20%) and right tubal block in 18 (18%) patients, pelvic adhesions in 12 (12%), fibroid in 10 (10%), PCO in 10(10%), endometrioma in 7 (7%), ovarian cyst in 4 (4%), hydrosalpinx in 4 (4%) patients.

Discussion

In everyday clinical practice, it is not always clear if and when exactly in the fertility work-up a diagnostic laparoscopy should be offered. There is a need for more randomized controlled trials to answer remaining questions regarding its value in the diagnosis and treatment of patients with infertility.

In present study 100 patients were assessed, out of which 80 cases (80%) were of primary infertility and 20 cases (20%) of secondary infertility, which correlates with the studies conducted by Jani RS et al 74% and 26%, Kumar A et al 82% and 18% and 48% and 52%, Shetty et al 68% and 32% for primary and secondary infertility respectively.[9,10,11] In the present study, maximum number of patients of primary (52%) and secondary (56%) infertility fall in the age group of 25-30 yrs . Various studies like that of Shetty et al and Krishna C et al have shown that there is rise in age at which women present with infertility.[12,11] In present study, Maximum number of patients of primary infertility had duration of infertility of <5 yrs and maximum number of patients of secondary infertility had duration of infertility in the range of 5-10 yrs. Because of the decline in fertility and the increased time to conception that occurs after the age of 30, women >30 years of age should be referred for infertility work-up after 6 months of trying to conceive. Importance of the age factor lies in the fact that as the age advances fertility decreases.

In the present study, Mean duration of infertility was 4.38 yrs±2.8, of which mean in primary infertility was 3.68 yrs and 6.8 yrs in secondary infertility. Duration of infertility ranged from 1- 15 yrs. Study conducted by Shetty et al and Gour et al correlates with the present study.[13]

Thus, majority of the infertile couple start worrying about their inability to conceive within 5 years of marriage and decide to get investigated.

Hysterosalpingography has been used for many years for the assessment of tubal patency. Laparoscopy enables direct visualisation of adnexa and to perform chromopertubation test (CPT) to assess tubal patency. Hysterosalpingography can also assess any intrauterine adhesions if there are any filling defects on radiographs, also extravasation with filling defects can be correlated with endometriosis. Any change in the shape of the uterine cavity on hysterosalpingography can be helpful towards diagnosis of any congenital malformation.

In a study conducted by Zhu H et al, the sensitivity, specificity, positive predictive value and negative predictive value of TVS in the detection of endometrial polyps (EP) were 67, 96, 88.23 and 86.49%, respectively.[14] Compared with hysteroscopy as the gold standard, the sensitivity of TVS in detecting EP was relatively low; however, the two methods are similar in specificity, positive and negative prediction value. Though TVS may not replace hysteroscopy, it may be helpful to use TVS for initial screening of EP. A study by Yantapant examined 60 EP patients with a mean age of 31-40 years.[15]. In that study, sensitivity,

specificity and accuracy of the diagnosis of EPs by TVS were 60, 33.3 and 57.6%, respectively. Vitner et al identified that, although hysteroscopy presented improved predictive values for diagnosing uterine polyps when compared with TVS, the difference was not statistically significant.[16] A study by Babacan A et al concluded that for diagnosing any pathology, hysteroscopy had better specificity ($p<0.001$) although the two methods did not differ with regard to sensitivity ($p=0.188$).[17]

In a study conducted by Jain P et al the sensitivity of HSG is 93.3%, specificity is 91.1%, positive predictive value is 77.7% and negative predictive value is 97.6%.[18] Lavy et al concluded that it is unnecessary to apply laparoscopy if HSG is normal or reveals suspicious unilateral tubal obstruction and therapy scheme does not alter in 95% of patients.[19] However, laparoscopy is more beneficial for the patients with suspicious bilateral tubal pathology and alters therapy scheme. For tubal patency HSG was found to be satisfactory. However, some factors such as cornual spasm were held responsible for false positive tubal obstruction detected by HSG, while laparoscopy confirmed tubal patency for the same cases.

Table 4: Laparoscopy findings in comparison with other studies

Laparoscopy findings	Nayak et al[20]	Gao M[21]	Un Nisa Z[22]	Parveen S[23]	Present study
Endometriosis	37%	18.75 %	-	19.35%	20%
Tubal occlusion	31%	-	25%	16.12%	10%
Ovarian cyst	-	8.05%	2.5%	4.8%	3%
Polycystic ovaries	-	1.55%	-	19.35%	10%
Myoma	15%	3.8%	2.5%	6.45%	10%
Pelvic adhesions	26%	59.3%	7.5%	11.2%	10%
Uterine anomaly	3%	-	7.5%	12.9%	2%

10 patients (10%) had bilateral tubal block, left tubal block in 20 (20%), right tubal block in 20 (20%) patients. The other findings were intra uterine filling defects in 4 patients (4%), extravasation in 1(1%) patient, intra uterine septum in 5 (5%) patients and hydrosalpinx in 5 (5%) patients.

On hysteroscopy, 7 patients (7%) had septum and in 3 (3%) ostia was not seen. One patient had bicornuate uterus confirmed on laparoscopy. In a study by Nayak et al 10% had septum on hysteroscopy.[17]

As seen in the table above, most common finding seen on laparoscopy was endometriosis (20%) seen in 21 patients in our study which correlated with the study by Nayak et al and Parveen S.[13,16] Tubal occlusion was the most common cause in study conducted by Shetty et al and UnNisa Z.[6,15]

Conclusion

HSG and Laparoscopy are complimentary rather that competitive procedures. The accuracy of diagnosis is enhanced when two procedures are combined especially in those cases where the result of one of the tests is doubtful.

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