PRECISION OF HYSTEROSALPINGOGRAPHY (HSG) IN THE DIAGNOSIS OF FALLOPIAN TUBE PATHOLOGY AMONG INFERTILE FEMALES

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ABSTRACT

Objective: To determine the diagnostic precision of hysterosalpingography in the diagnosis of fallopian tube pathology among infertile females using laparoscopy as yardstick.

Study Design: Cross sectional validation study.

Place and Duration of Study: Armed Forces Institute of Radiology and Imaging, Pak Emirates Military Hospital Rawalpindi, from Feb 2015 to Aug 2015.

Methodology: Two hundred thirty patients who presented with infertility in Armed Forces Institute of Radiology and Imaging and satisfying the inclusion and exclusion criteria, were included. Informed consent was obtained before undergoing investigations, hysterosalpingography was performed at Armed Forces Institute of Radiology and Imaging and Laparoscopy by Gynecologist at Pak Emirates Military Hospital Rawalpindi.

Results: Total 230 patients were enrolled, ages were 32.39 ± 6.30 years. Frequency of tubal pathology in infertile women (on yardstick test) was recorded in 61 (26.52%). Diagnostic precision of hysterosalpingography for diagnosis of tubal pathology in infertile females taking laparoscopic findings as yardstick was recorded, true positive cases were 50 (21.74%), 11 (4.78%) were false negative, 20 (8.70%) were false positive and 149 (64.78%) were true negative. Sensitivity, specificity, positive predictive value and negative predictive value were calculated as 81.97%, 88.17%, 71.43% and 88.17% respectively.

Conclusion: There was higher diagnostic precision of hysterosalpingography in the diagnosis of fallopian tube pathology.

Keywords: Diagnosis, Diagnostic precision, Hysterosalpingography, Infertile women, Tubal pathology.

INTRODUCTION

Infertility is a worldwide problem and carries a social stigma in many countries. It affects approximately 15-22%[1,2] of couples. Broadly common etiologies of infertility are divided into male causes, ovulation factors and tubal pathologies[3]. Tubal pathologies accounts for 40%[4,5] of all infertility cases. Combined factors are found in almost 20%[4,6] of all infertile couples. The tubal pathology can be intraluminal due to ascending salpingitis and salpingitis isthmica nodosa or extra tubal due to peritonitis, endometriosis and pelvic surgery. Uterine abnormalities can cause infertility in upto 10% of women and include endometrial polyps, intrauterine adhesions and congenital anomalies[6].

Tubal patency assessment is first step in investigation of infertility and HSG is used for the purpose. In addition to tubal patency, HSG also delineate outline of the uterine cavity and by doing so it may exclude myriad of causes of infertility. It was also proved through different studies that HSG has a therapeutic role in infertility and patients underwent HSG were observed to have increased rate of conception after under-going this procedure. It is relatively inexpensive procedure with few mild adverse effects, it satisfy many traits of a first-line test for tubal pathology[7].

As per fertility-guideline of the National Institute for Clinical Excellence (NICE, 2004), HSG can be proposed for screening of infertile women who having no co-morbidities. However patients suffering from co-morbidities like

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Pelvic inflammatory disease, previous ectopic pregnancy, endometriosis or other pathologies are offered Laparoscopy instead of HSG[8].

Importance of diagnostic laparoscopy in fertility practice is still pondered upon. Lately, laparoscopy (hysteroscopy) is considered as final diagnostic procedure in infertile female patients, as per American Fertility Society in 1992 and World Health Organization guidelines. It offers 100% sensitivity, specificity and predictive values in diagnosing tubal pathology. It visualizes morphology of fallopian tubes directly and generally accepted as the gold standard to determine the precision of other diagnostic tests for tubal pathology and that includes Hysterosalpingography[8]. Number of HSG procedures is increased dramatically in last few years. This is likely due to, refinement in reproductive medicine, leading more successful in vitro fertilization; and the social behavior of delaying pregnancy in urbanized literate women[8,9].

Pakistan being as developing country has constrained health facilities and these again are not up to mark or uniform. Only few centers are well equipped with laparoscopy facilities, expertise are still even very limited. Though other tests like hysterosonosalpingography etc are available for tubal pathology workup but not any of them are ideal[6,8].

HSG has specificity of 91% and sensitivity of 74.2% for tubal pathology in contrast with laparoscopy. Studies shown HSG have sensitivities and specificities in range from (60-98%) and (15-80%) respectively for uterine pathologies[10].

Variable results have been seen on different studies regarding sensitivities and specificities of HSG in the past. Rationale of this study was that we want to explore the accuracy of HSG in comparison with previous studies and results of my study may help in recommending HSG in place of Laparoscopic test in areas where Laparoscopic facilities are not available for investigating tubal pathology in infertile women.

METHODOLOGY

This was cross sectional validation study performed from February 2015 to August 2015 at Armed Forces Institute of Radiology and Imaging (AFIRI) Rawalpindi. Approval of hospital ethical committee was taken. Cases were identified and selected on bases of inclusion criteria already decided. Inclusion criteria was all married women between ages 22-45 years, diagnosed infertile cases according to operational definitions of primary & secondary infertility, confirmed ovulatory cycles or normal ovarian reserve and absence of severe sperm pathology. Women diminished ovarian reserve, severe sperm pathology, contraindications for HSG and Laparoscopy and with any ovarian pathology on pelvic ultrasound were excluded from the study.

Two hundred and thirty patients were selected after meeting inclusion and exclusion criteria. After taking informed consent patient were undergone hysterosalpingography and Laparoscopy. HSG was performed in early part of menstrual cycle from 9-12 days by flouroscopic machine under flouroscopic control and 10 ml of urografin were used and four image were taken i.e control, early filling phase, tubal outline phase and delayed free peritoneal spill phase. Foley's catheter is used for injection of contrast and Foley's bulb for securing lower uterine seal. Patients of tubal pathology were identified as unilateral, bilateral tubal blockage, adhesions (fig-1) hydrosalpinx (fig-2a & 2b), and salpingitis isthmica nodosa. Readings were documented and the patient was referred to Gynecological department for Laparoscopy. Data was analyzed in SPSS version 17.0. Mean / standard deviation for duration of infertility and age was calculated. 2x2 table was used to ascertain Sensitivity, Specificity, positive predictive and negative predictive value.

RESULTS

A total of 230 cases were enrolled. Age dispensation of the patients was carried out which shows that 167 (72.61%) were between 22-35 years and 63 (27.39%) were between 36-45 years

of age, mean/sd was calculated as 32.39 ± 6.30 years.

Infertility duration recorded in table-II, where 144 (62.61%) and 86 (37.39%) were between 6-10 years of duration of sub fertility, mean/sd was calculated as 5.47 ± 2.32 years (table-I).

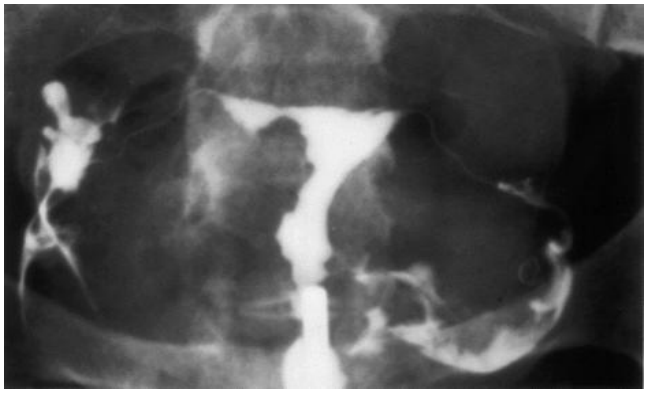

Figure-1: Hysterosalpingogram showing a filling defect due to synechiae.

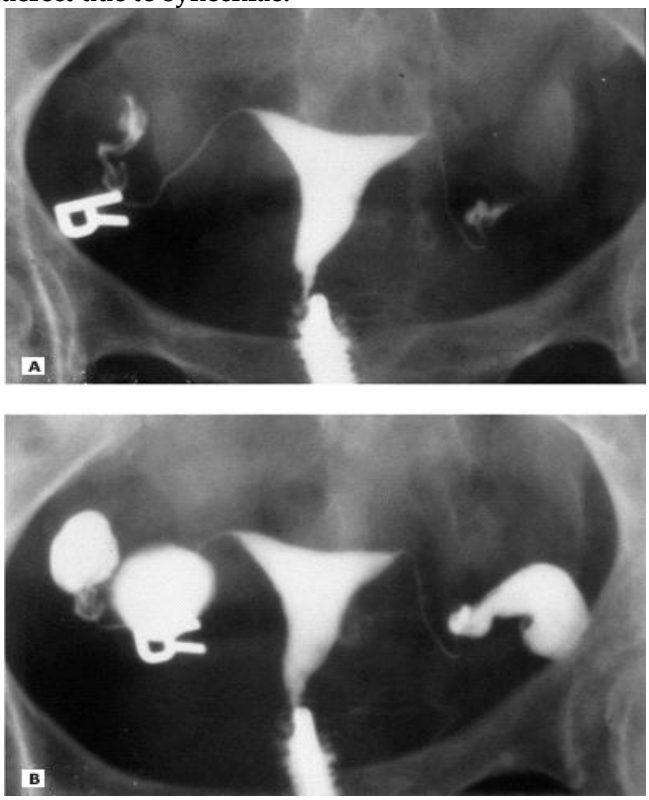

Figure-2: (A): Hysterosalpingogram (HSG) delineating normal uterine cavity with opacified tubes without free spill from the tubes. (B): Hysterosalpingogram of the patient A after more contrast injected and shows bilateral hydrosalpinx.

Frequency of tubal pathology in sub fertile women (on yardstick) recorded as 61 (26.52%) while 169 (73.48%) were normal (table-II).

Diagnostic precision of HSG for tubal pathology in sub fertile women taking laparoscopic findings as yardstick was recorded in table-IV, true positive cases were recorded as 50 (21.74%), 11 (4.78%) were false negative, 20 (8.70%) were false positive and 149 (64.78%) were true negative. Sensitivity, specificity, positive predictive value and negative predictive value were calculated as 81.97%, 88.17%, 71.43% and 88.17% respectively (table-III).

Table-I: Age dispensation (n=230).

Age	Cases Number	Percentage
22-35	167	72.61
36-45	63	27.39
Mean ± SD	32.39 ± 6.30	

Table-II: Sub fertility duration (n=230).

Duration (yrs)	Cases number	Percentage
1-5	144	62.61
6-10	86	37.39
Mean ± SD	5.47 ± 2.32	

Table-III: Frequency of tubal pathology in sub fertile female (on gold standard) (n=230).

Tubal Pathology	Cases number	Percentage
Yes	61	26.52
No	169	73.48

Table-IV: Diagnostic precision of hsg for tubal pathology in subfertile female taking laparoscopic findings as yardstick (n=230).

HSG Findings	Laparoscopic Findings	
	Tubal Pathology Present	Tubal Pathology Absent
Positive	True positive (a) 50 (21.74%)	False positive (b) 20 (8.70%)
Negative	False negative(c) 11 (4.78%)	True negative (d) 149 (64.78%)

DISCUSSION

Infertility is defined as not being able to get pregnant despite having frequent, unprotected intercourse for at least a year for most couples[11-13]. Infertility cause devastating personal sufferings and perturb the tranquility of family life[14,15]. Fortunately, there are many safe and effective therapies that significantly improve

chances of getting pregnant. Tubal pathology is a most common cause of infertility, and laparoscopy or HSG are two established methods[16-18] for workup of this condition. Variable results in wide range regarding sensitivities and specificities of HSG in diagnosing tubal pathology was mentioned previously[19-22]. So, we want to further explore the accuracy of HSG and results of our study may help in recommending HSG in place of laparoscopic test in areas where laparoscopic facilities are not available for investigating tubal pathology in infertile women.

In this study of 230 cases, 167 (72.61%) were between 22-35 years and 63 (27.39%) were between 36-42 years of age, Mean ± SD was deliberated as 32.39 ± 6.30 years, frequency of tubal pathology in infertile women HSG was recorded as 61 (26.52%) while 169 (73.48%) had no findings of the morbidity, diagnostic precision of HSG for tubal pathology in sub fertile women taking laparoscopic findings as gold standard was recorded, true positive cases were recorded as 50 (21.74%), 11 (4.78%) were false negative, 20 (8.70%) were false positive and 149 (64.78%) were true negative. Sensitivity, specificity, positive predictive value and negative predictive value were deliberated as 81.97%, 88.17%, 71.43% and 88.17% respectively.

Our findings regarding frequency of tubal pathology are in agreement with a local study[23] recorded 21.9% women having tubal blockage among infertile women.

Our findings regarding diagnostic accuracy of HSG for diagnosing infertile women are in agreement with a study showing specificity of 91%[18] and sensitivity of 74.2%[18] for any tubal pathology compared with laparoscopy. Our findings are within the range of previous studies shown HSG have sensitivities and specificities in range from (60-98%)[19] and (15-80%)[19] respectively for uterine pathologies.

Hysterosalpingo-contrast sonography is other newer technique of tubal patency workup. This technique utilizes a special Ultrasound contrast agent (Echovist). It is injected into uterine cavity through Foley's catheter which is placed at the internal Os. Contrast produces anechoic interface that allows visibility of fallopian tubes lumen and uterine cavity. Results of this technique are as comparable as of HSG, and diagnostic precision of 86% and 90% have been reported[24,25]. To summarize, results of this study showed the precision of HSG in diagnosing tubal pathology as stable and have near comparable results to gold standard laparoscopy. Therefore, HSG can be considered as useful in detecting tubal pathology for sub fertile female patients specifically in underdeveloped areas.

CONCLUSION

This is higher diagnostic precision of Hysterosalpingography in diagnosing tubal pathology among sub fertile female. So recommending that these patients must be investigated for sub fertility by using HSG as first line investigation in areas were laproscopic facilities are not available.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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