

Original Article

Role of Hysterosalpingography for Evaluation of Infertility

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Abstract

The patients investigated under this study have complaints of inability to conception and they were not responding to treatment. Patients with infertility were studied, the peak incidence of infertility was found in between 26-29 years of age group. Hysterosalpingography examination detected tubal and uterine pathology correctly in 26 cases (81.25%) out of 29 cases of complaining of infertility. Of 18 negative cases, 12 cases (80%) are diagnosed correctly as normal by Hysterosalpingography. After laparoscopic examination it was established that three (20%) were false positive and 6 cases were false negative. If a longer series are analyzed, these findings may vary slightly but still it is very useful

diagnostic tool for detection of infertility. Hysterosalpingography will give utmost benefit to the patients of our country. In our study we found that Hysterosalpingography is still the best technique for intrauterine and tubal pathology.

This study has established the fact that Hysterosalpingography should be the first approach in the diagnosis of infertility which gives valuable information about both uterine cavity and fallopian tubes at low risk and minimal hazards. As a result of our findings, it is our investigation of female infertility due to its potential accuracy and easy performance.

Keywords: Hysterosalpingography, Infertility.

Introduction

Infertility is failure to conceive after one year during which no contraception is used. Human infertility is responsible for a great deal of personal unhappiness leading to marital disharmony often ending in divorce.¹ Infertility is estimated to occur in 10-15% of couple. The prevalence has increased in the last decade or so in large part because of an increase in sexually transmitted diseases resulting in pelvic inflammatory disease and increasing tendency to delay child bearing.

Considerable progress has been made in the understanding of reproductive physiology and in the development of newer and increasingly sophisticated imaging techniques to evaluate infertility. This has resulted in an increasing numbers of couples seeking evaluation of their infertility.

Hysterosalpingography has significant role in assessment of infertility. Hysterosalpingography has been extensively employed in infertility investigations since 1914.

For many years it was thought that infertility was a female problem only but during the last decades it has become increasingly apparent that the male partner is responsible for infertility in a considerable number of cases.

Understanding the reasons for infertility and the development of new techniques for its treatment is one of the fields within medicine which has undergone a dramatic development in the last two decades. It should however be emphasized that successful development of in vitro fertilization, and assisted reproduction technologies could not have taken place without the development of Hysterosalpingography, Ultrasound & Endoscopic techniques.²

Hysterosalpingography has for many years been an invaluable procedure for the assessment of tubal patency and tubal and intra-uterine pathology.³ However it is claimed that hysterosalpingography may be more reliable than laparoscopy.⁴

Hysterosalpingography has been employed for the evaluation of tubal patency and abnormalities, Uterine cavity, configuration, neoplasms, dysmenorrhoea, dysfunctional uterine bleeding, fistulas, pelvic pain, ectopic pregnancy, adenomyosis.

Any infertility evaluation should begin with a complete history, physical examination of both partners.

The basic underlying causes of infertility are: Male factor, cervical factor, endometrial-uterine factor, tubal factor, peritoneal factor, ovulatory factor.⁵

Tubal factors are believed to be responsible for 25-40% of infertile couples. Evaluation of tubal dysfunction is

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of obvious importance in the investigation of female infertility.⁶

Study of infertility is getting importance day by day. Various new methods are being applied to evaluate various causes of infertility.⁷ Methodes including BBT (basal body temperature), endometrial biopsy, cervical mucous study, vaginal cytology, serum progesterone. Serial ultrasonography both per abdominal and transvaginal and laparoscopy are recommended to detect ovarian factor.

Hysterosalpingography and laparoscopy are the important steps for evaluation of tubal and endometrio-uterine factor.

Sonography is well suited for showing and monitoring physiologic follicular growth. The process of ovulation could be identified by sonography, and also a important guidance procedure in reproductive techniques such as oocyte collection and gamete transfer in vitro fertilization programs. Laparoscopy remains the standard for determining the presence and extent of pelvic adhesions, and staging of endometriosis.

It is clear that imaging studies contribute greatly to the diagnosis and management of infertility in women. Hysterosalpingography remains the first-line radiologic examination for most women undergoing an infertility investigation.⁴

Hysterosalpingography is important in the diagnostic evaluation of tubal factors because it provides information about internal tubal architecture and tubal patency. Imaging studies contribute greatly to the diagnosis and management of infertility in women. Hysterosalpingography remains the first line of radiological examination for most women undergoing an infertility investigation. It can show uterine synechiae, abnormalities of tubal morphology such as, salpingitis isthmica nodosa or hydrosalpinx and tubal occlusion.³

Hysterosalpingography is the radiographic delineation of uterus and the fallopian tubes. Contrast materials introduced through the cervical os outlines the cavity of the uterus, lumen of the fallopian tubes and determines the tubal patency.

The present study was done to find the value of Hysterosalpingography for the evaluation of infertility problems. The specific aim of the study was to establish

the sensitivity and accuracy of Hysterosalpingography in the detection of causes of infertility.

Considering the cost-effectiveness, minimal hazards and easy performance, Hysterosalpingography may be regarded as preliminary procedure for every women undergone infertility investigation.

The main purpose of this study is to evaluate the role of Hysterosalpingography for the diagnosis of infertility and to establish it as the preliminary procedure for its minimal hazards & easy performance.

Material and Methods

This study was carried out at the Bangladesh Institute of Research and Rehabilitation of Diabetic Endocrine and Metabolic Disorders (BIRDEM), Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital (DMCH). A total number of 50 patients with complaints of infertility attending Gynecologist and referred to Radiology and Imaging Department for Hysterosalpingography. The selection criteria for the study was patients having the complaints of both primary and secondary infertility having age between 18-40 years. The patients who refused to undergo Hysterosalpingography examination and investigated directly by laparoscopy or laparotomy are exclude from the study. The diagnostic criteria for the study were Hysterosalpingographic findings and Laparoscopic or laparotomy findings.

History and Clinical Examination

Thorough history was taken regarding complaints of infertility. A brief survey of occupational history, menstrual history, contraceptive history, obstetrical history, past history of illness in relation to infertility was made. Findings of other investigations including routine laboratory investigations were also in consideration.

Hysterosalpingography

The patients had to undergo Hysterosalpingographic examination under fluoroscopic control. The test were performed with in 8-10 days for their menstrual period. A self retaining Foley's catheter or Leech-Wilkinson's cannula were applied.

Water soluble radiographic contrast medium 75% urovideo about 10ml. was instilled slowly under fluoroscopic control. To avoid the uterotubal spasm, the patients were constantly reassured, instrumentation was gently conducted and a delay of

5 minutes was observed between instrumentation and first radiograph. Though ionic contrast medium is generally used, some special circumstances like asthma and highly sensitive patients, we can use nonionic contrast medium. It causes less peritoneal irritation but its cost is higher than ionic medium.

Analgesia was not routinely used but antispasmodic drugs were administered intravenously in a few patients with tubal spasm. Radiographs are control film in supine position followed by spot A/P film, oblique film(Right and Left). In eight cases lateral films were taken.

Laparotomy or laparoscopic examination were done and reports prepared by gynecologists.

Data Collection

Relevant data for each patient were recorded in a predesigned individual data collection sheet.

Results

As a whole results of hysterosalpingographic evaluation of infertility is confirmed by review of the reports of laparoscopy or laparotomy findings on all patients. Here 26 (81.25%) cases of true infertility were diagnosed correctly, 3(20%) patients of without infertility problems were diagnosed wrongly. Again 12(80%) cases were diagnosed correctly as false infertility or normal; 6 (18.75%) cases wrongly interpreted as normal who has actually causes of infertility.

Table I

Classification of patients based on test results (n=47)

Test Result	True state of patients		Total
	True Infertility	False Infertility	
Positive	True Positive 26 (81.75%)	False Positive 3 (20%)	Patients with positive test (TP + FP) 29
Negative	False Negative 6 (18.75%)	True Negative 12 (80%)	Patients with Negative test (FN + TN) 18
Total	6 (18.75%) All patients with true in fertility (TP+FN) 32	12 (80%) False infertility (FP+TN) 15	(FN + TN) 18 All Patient studied (TP +FP+FN+TN) 47

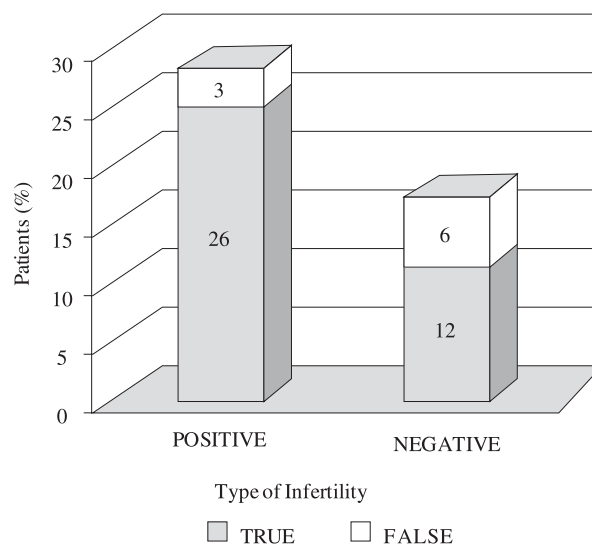


Fig.- 1: *Distribution of Patients based on test results.*

Among the three false positive cases -two cases were identified as cornuel spasm and remaining one may be due to other caeses like use of small volume of contrast medium was introduced in to uterine cavity. Among the six false negative cases, two cases not interpreted correctly due to extravasation of dye. Rest of the cases are due to free spillage from a pin point opening of an club shaped tube suggested normal fimbrial function.

Table-II

Distribution of patients according to Age Group. (n=47)

Age group	Number of patients	Percentage
18-21	3	6.38%
22-25	10	21.28%
26-29	14	29.79%
30-33	8	17.02%
34-37	7	14.89%
38-40	5	10.64%

47 selected patients having the complaints of infertility in the age group 18-40 years divided in to 6 groups and tabulated as follows:

about 30% patients were in the age group of 26-29 years, 21% were in the age group of 22-25 years.

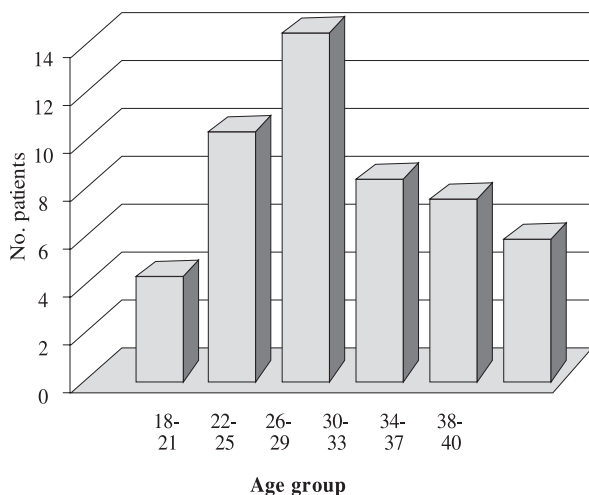


Fig.-2: Distribution of patients according to age group.

Table III

Distribution of Patients depending on types of infertility (n=47)

Type	No. of cases	Percentage
Primary Infertility	19	40.43%
Secondary Infertility	28	59.57%

Of 47 patient 19 cases presents as primary infertility and 28 cases presents as secondary infertility.

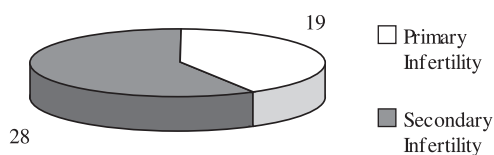


Fig.-3: Distribution of Patients depending on types of Infertility

Table IV

Distribution of Patients depending on occupation (n=47)

Occupation	No. of cases	Percentage
House-wife	12	25.53%
Service holder	21	44.68%
Student	11	23.41%
Others	3	6.38%

Maximum incidence of infertility was found among the service holder(44.68%).

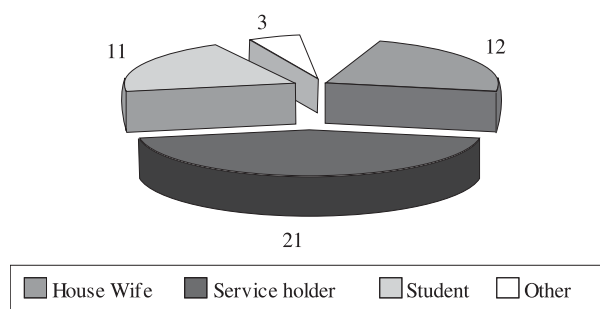


Fig.-4: Distribution of patients depending on Occupation

Table V

Distribution of Patients depending on Socioeconomic condition. (n=47)

Socioeconomic condition	Number of Cases	Percentage
Low	8	17.02%
Average	23	48.94%
Good	16	34.04%

Low : Not able to buy any medicine from outside the hospital.

Average : Able to buy fifty percent of the prescribed medicines from outside the hospital.

Good: Able to buy all the prescribed medicines from outside the hospital

In this series incidence of infertility was higher among average socioeconomic status group (48.94%) followed by good (34.04%) and low (17.02%).

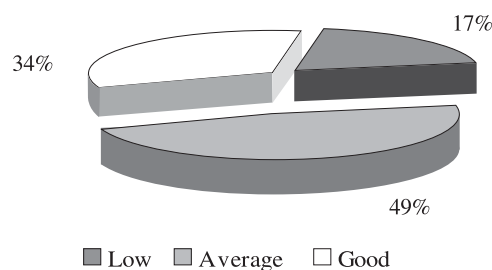


Fig.-5: Distribution of patients depending on socioeconomic condition

Table-VI

Result of Hysterosalpingographic findings. (n=47)

Findings	No. of cases	Percentage
Uterine cavity abnormality	7	14.89%
Tubal abnormality	18	38.30%
Uterine and tubal findings	4	8.51%
Normal findings	18	38.30%

Of the total 47 cases uterine cavity abnormalities were found 14.89% cases, tubal abnormality in 38.30% cases, normal findings were 38.30% cases.

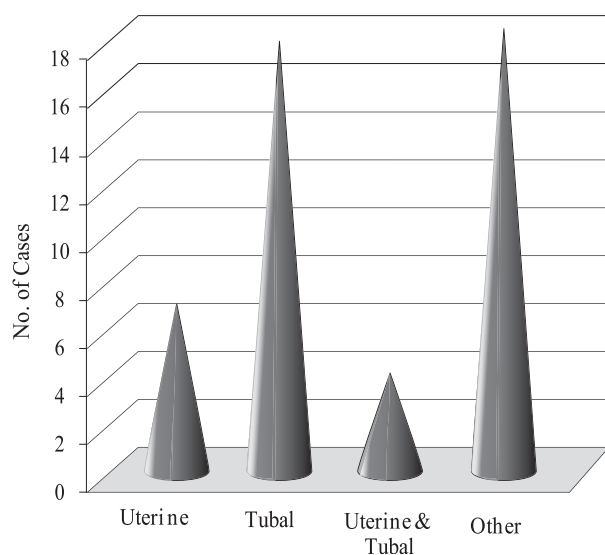


Fig.-6: Result of Hysterosalpingographic findings

Of 47 cases uterine cavity findings were 14.89% cases. Among the uterine pathology the highest percentage of patients were in congenital anomaly group like unicornat uterus(28.57%).

Table VII

Distribution of patients according to uterine cavity findings by hysterosalpingograph (n=7).

Findings	No. of cases	Percentage
Uterine cavity abnormality	7	14.89%
Tubal abnormality	18	38.30%
Uterine and tubal findings	4	8.51%
Normal findings	18	38.30%

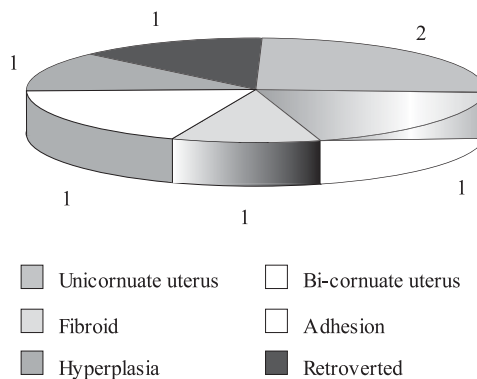


Fig.-7: Distribution of patients depending on uterine findings.

Among the tubal pathology the incidence of hydro salpinx with bilateral tubal blockage was 27.78% and corneal obstruction 22.22%.

Table-VIII

Hysterosalpingographic findings in tubal abnormalities (n=18).

Findings	No. of cases	Percentage
Uterine cavity abnormality	7	14.89%
Tubal abnormality	18	38.30%
Uterine & tubal findings	4	8.51%
Normal findings	18	38.30%

Discussion

This Prospective study was carried out to determine the diagnostic accuracy of hysterosalpingography for the evaluation of infertility and correlation with laparoscopic findings. During this study out of total fifty patients, forty seven selected patients presenting with the complaints of infertility were studied by hysterosalpingography. Three cases were excluded from the study because two patient refused to under go hysterosalpingographic examination and the other one was directly investigated with laparoscopy. Most of the patients were managed at Bangladesh Institute of Research and Rehabilitation for Endocrine and Metabolic Disorders (BIRDEM), Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital(DMCH). The patients underwent hysterosalpingography, laparoscopy or lapartomy as independent procedures. The final

diagnosis was made on the basis of laparoscopic or lapotomy findings.

The age group of the patients for this infertility study were between 18-40 years. The patients were arranged in six groups. After analysis of the data it was found that the peak incidence of infertility was in the age group of 26-29 years. This result differs from the study of Moghissi that the peak age group of infertility in USA is in the gate of 35 years. This may be due to late marriage and tendency to delay child bearing in USA. than in Bangladesh. Another cause for this early age group findings may be due to people come for investigation after 2 to 3 years of unprotected coitus. The girls of our country get married around the age of 20 years.

The trend of infertility among the women under this study increases up to the age group of 26-29 years and the decreased slightly. It looks like a half wave sinusoidal curve having a peak in the middle position. The cause of early age infertility is due to early marriage and expectation of child in the early age group.

Patients who has failed to conceive at all are primary infertility. Secondary infertility is one that occurs after one or more pregnancy and is more amenable to treatment generally. It was found that most of the patients (59.57%) were presented as secondary infertility and remaining 40.43% patients with primary infertility. The ratio of primary to secondary infertility is about 0.67.

The present study shows that about 49% patients came from the average socioeconomic condition. This may be related to nutritional condition. It is claimed that smoking and alcohol consumption has a role in female reproductive failure in affluent society, this differs from our study in that point due to generally non consumption of alcohol by women in our country(8). Also highest infertility was found in the working women due to stress and separation from the family for different working place.

The mechanical causes of female infertility which can be radiologically elucidated, include hydrosalpinges and other tubal obstructions. Peritubal adhesion, leiomyoma, congenital malformations of the uterus and intrauterine adhesion, retroversion of uterus. hydrosalpinx was found in 56% of the tubal abnormalities. In about 4% of the total investigations Hysterosalpingography was unable to detect the

Hydrosalpinx because of proximal obstruction of the fallopian tubes. As our result demonstrates, with good technique, high accuracy can be anticipated in the diagnosis of hydrosalpinges. On the other hand in about 11% of total investigations, inappropriate diagnosis was may be due to under filling of the affected tube for technical reasons or corneal spasm. Distal obstruction and hydrosalpinx were differentiated because of some spillage of contrast occurred in distal obstruction and in case of hydrosalpinx spillage caused by pressure separation of fimbriae.

Evaluation of tubal dysfunction is of particular importance in the investigation of female infertility. The only tubal factors responsible for infertility was found to be about 38% which agrees with the study of Arronet.⁹

Among the uterine findings, the most common cause for primary infertility was found as congenital anomaly. Of the various congenital anomalies, unicornuate uterus was about 28%. Submucosal leiomyoma was accurately diagnosed.

The overall result of the Hysterosalpingography was correlated with the findings of laparoscopy/ laparotomy. The diagnostic reliability of Hystersalpingogarphy in terms of sensitivity was 81.25%, accuracy was 80.85% and specificity was 80.00% so, Hysterosalpingography has definite part to play in every infertility investigation, reduces the need for many laparoscopies.

Summary

Forty seven patients with the complaints of infertility were studied during the study period. The patients investigated under this study have complaints of inability to conception and they were not responded to treatment. The peak incidence of infertility was found in between 26-29 years of age group, Hysterosalpingography examination detected tubal and uterine pathology correctly in 26 cases (81.25%) out of 29 cases of complaints of infertility. Of 18 negative cases, 12 cases(80%) and diagnosed correctly as normal by Hysterosalpingography. After an laparoscopic examination it was established that three(20%) were false positive and 6 cases were false negative. If a longer series are analyzed, these findings may vary slightly but still it is a very useful diagnostic tool for detection of infertility. Hysterro-

salpingography will give utmost benefit to the patients of our country. In our study we found that Hysterosalpingography is still the best technique for intrauterine and tubal pathology.

Conclusion

This study established the fact that Hysterosalpingography should be the first approach in the diagnosis of infertility which gives valuable information about both uterine cavity and fallopian tubes at low risk and minimal hazard. As a result of our findings, it is our contention that Hysterosalpingography has a proven role in the investigation of female infertility due to its potential accuracy and easy performance.

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