

Comparison between Laparoscopy and Hysterosalpingography for Tubal Assessment in Female Infertility

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Abstract

Backgrounds and Aim: Infertility is a rising and alarming problem. Assessment of fallopian tube is one of essential step to evaluate female factor infertility. Laparoscopy and HSG both are used in tubal assessment. My study was comparison of HSG with Laparoscopy, the gold standard method of tubal assessment.

Material and Method: This study was conducted in a tertiary level infertility centre of Dhaka, Bangladesh from 2005 to 2015. Total 246 patients were included in this study who did HSG and later on underwent Laparoscopy. Findings of these two procedures were compared in this study.

Result: Total 246 patients were included in this study. All the patients in the study group were complaining of infertility [7]. Among 246 patients, most of the patients were suffering from primary infertility (60.57%) and remaining were suffering from secondary infertility (39.43%). The age of patient was between 21 to 41 years. The duration of infertility was 1 to 15 years. HSG has a high sensitivity 96.51% and moderate specificity 41.88%, moderate positive predictive value 47.16% and high negative predictive value 95.71%, accuracy was 60.98%.

Conclusion: Though HSG has some limitation but Laparoscopy and HSG run side by side in tubal assessment in female factor infertility.

Keywords: Infertility; Hysterosalpingography; Laparoscopy

Introduction

Infertility is a distressing and rising alarming gynecological problem [1]. Approximately 15% of couples are affected by infertility in worldwide, which is defined as the inability to conceive within 12 months of regular unprotected coitus [2]. Male and female partner both are responsible for conception. Changes in life style, environmental pollution, seeking first child at relatively advanced age of female partner, staying apart due to professional cause, anovulation, Poor ovarian reserve, problem with semen parameter, anxiety and stress etc. lots of factors are affecting fertility outcome of the couples. Causes of infertility are almost equal in male and female partner. The male is responsible for 30 - 40% cases, female in 40 - 55% cases and both are responsible in 10% cases. The remaining 10% is unexplained [3].

FIGO classified causes of female infertility into different groups. They are:

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- Problem with fallopian tube and pelvic peritoneum (25 - 35%)
- No ovulation or infrequent ovulation (30 - 40%)
- Endometriosis (1 - 12%) [3].

Fallopian tube assessment is an important tool to evaluate female partner infertility.

HSG: It is an X-ray to evaluate fallopian tube. Radio-opaque dye is passed through cervix, dye enters into uterus and passes through the fallopian tubes. X-Ray is done, interior of uterus and course of tube is seen.

Laparoscopy: It is a surgical procedure usually done under G/A. One umbilical port and one or two lateral port is made and laparoscopy instruments are introduced through the port. Usually methylene blue dye is passed through the cervix and dye falls into peritoneum if fallopian tubes are patent.

HSG/Laparoscopy or both can be applied to evaluate tubal patency [4]. Both the procedure has some benefits and some limitations and one can't replace other but can run side by side.

Benefits of HSG

- HSG is less expensive than laparoscopy [1].
- It is a less invasive tool to screen up the patients [1].
- Done at OPD basis, no hospital stay is required.
- No need of anesthesia, sometimes analgesia may be required.
- Laparoscopy needs more surgical expertise. Hysterosalpingography is not a surgical procedure at all [5].
- By HSG uterine cavity abnormality like: polyp, submucous fibroid, synechia, septum or any filling defect etc. can be identified [2].
- The primary role of HSG is to evaluate the morphology and the patency of the fallopian tubes. Now a days by TVS and by 3D USG most of the intrauterine pathology can be diagnosed.

Complications of HSG [3]:

- Pelvic pain and irritation of peritoneum.
- Vasovagal attack followed by shock.
- Intravasation of dye (venous or lymphatic channel).
- Pelvic infection.
- Uterine perforation.
- Internal injury and hemorrhage.

- Specially in PID or endometriosis patient, HSG should be avoided.

Advantages of laparoscopy [3,8]:

- Post-operative recovery is earlier.
- Usually post-operative pain is less, so, use of analgesia is reduced.
- Less blood loss.
- Less or minimum adhesion formation.
- Duration of hospital stay is shorter.
- Patient compliance is better.
- It is more reliable procedure and false positive/negative result is less.
- It is a diagnostic and therapeutic procedure.
- It gives information regarding morphology, patency of fallopian tubes as well as evaluation of pelvis can be done.

Disadvantages of laparoscopy [3,8]:

- To become expert in laparoscopic surgery long time is needed, so, initially operation time may be longer.
- Instruments are costly and sophisticated and facilities are relatively less available.
- Surgeons should be more skilled so, number of expert surgeons are less.
- Possibility of iatrogenic complication is more during surgery.
- Some complications are life threatening and highly risky, like: gut perforation, vessel puncture etc.

Laparoscopy is the gold standard (definitive method) for evaluation of tubal and pelvic factor infertility [3]. By laparoscopy direct visualization of pelvic peritoneum and morphological abnormality of fallopian tube along with any adhesion can be seen. So, it is generally accepted as the reference standard to determine the sensitivity of other method of tubal patency test like HSG, SIS, *Chlamydia* antibody testing [6].

RCOG also recommend laparoscopy to evaluate the condition of fallopian tube to evaluate female factor infertility [7].

Though laparoscopy is an invasive procedure but overview picture of pelvis can be evaluated by this method. Another benefit of Laparoscopy is that correction of the pathology can be done at same time [8]. Now a days with the aid of hysteroscopy and laparoscopy interior of the uterus as well as pelvic pathology can be identified at same sitting.

Objectives of the Study

- The objective of this study is to assess the diagnostic value of HSG with Laparoscopy, the gold standard method of tubal patency test and pelvic evaluation in women suffering from infertility.

- Another objective is to find out sensitivity and specificity of HSG.
- To sort out the limitation of HSG.
- To find out the accuracy of HSG.
- To find out beneficial effect of Laparoscopy.

Materials and Methods

This study was a retrospective study, conducted in a tertiary level infertility centre of Dhaka, Bangladesh over a period of 11 years (2005 - 2015). Total 246 patients were included in this study who underwent HSG previously for tubal patency test and later on laparoscopy for the same evaluation. Tubal patency, Hydro salpinx, Pelvic adhesion any congenital deformity of fallopian tubes were evaluated by laparoscopy and findings were compared with HSG which was done previously.

Data was collected from compiled information of all these patients in that infertility centre.

Results

All the patients in the study group were complaining of infertility [7]. Among 246 patients, most of the patients were suffering from primary infertility (60.57%) and remaining were suffering from secondary infertility (39.43%). The age of patient was between 21 to 41 years. The duration of infertility was 1 to 15 years. HSG has a high sensitivity 96.51% and moderate specificity 41.88%, moderate positive predictive value 47.16% and high negative predictive value 95.71%, accuracy was 60.98%.

On the other hand, adhesion was diagnosed by Laparoscopy in 24 patients (9.75%) and congenital deformity of the tubes was found in 10 patients (4.0%), like double fimbrial opening, too short length of fallopian tubes, which was not diagnosed by Hysterosalpingography.

Some interesting findings and comparisons

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	246	21.00	20.00	41.00	29.8333	4.58310
Infertility	246	14.00	1.00	15.00	4.7764	3.16531
Valid N (listwise)	246					

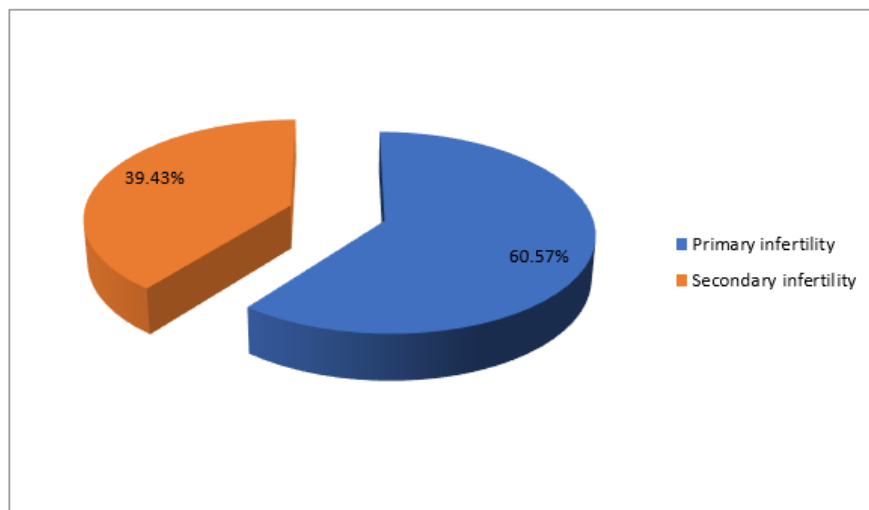
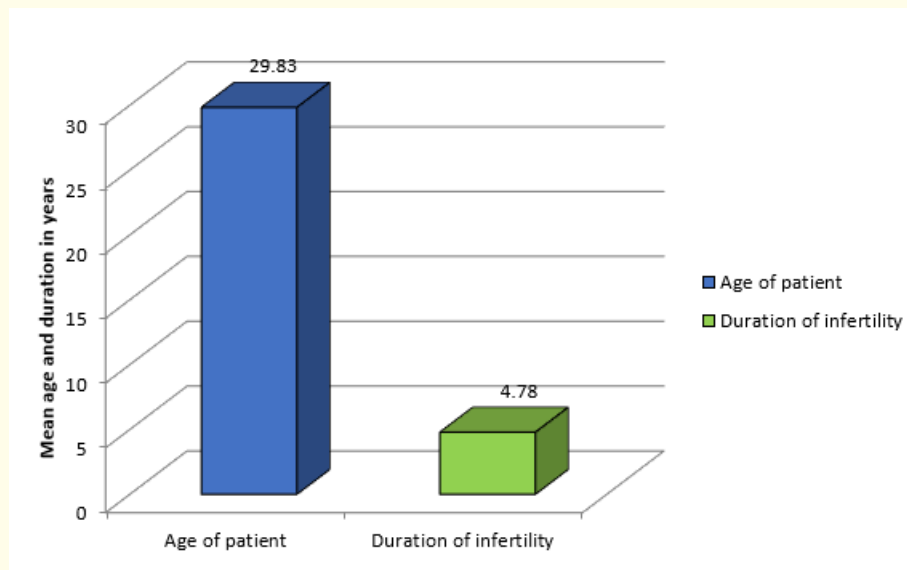
Table 1: Tubal status detected by hysterosalpingography and laparoscopy.

Procedure	Bilateral Tubal Patency	Unilateral Tubal Patency	No Patency	Total
HSG	70	67	109	246
Laparoscopy	160	53	33	246

Table 2: Diagnostic value of hysterosalpingography and laparoscopy in bilateral tubal patency and bilateral tubal no patency (tubal block in one or both side).

Procedure	Bilateral tubal patency	Bilateral no patency (Unilateral/ Bilateral tubal block)	Total
HSG	70	176	246
Laparoscopy	160	86	246
Diagnostic Value (%)	Positive predictive value		
Sensitivity 96.51%	47.16%		
Specificity 41.88%	Negative Predictive value		
Accuracy 60.98%	95.71%		

Table 3



Discussion

Infertility is a stressful condition which affects about 8 - 12% of the couple in the reproductive age group worldwide [7]. Exploration of the female genital tract is one of the essential elements to identify the cause of infertility. Laparoscopy provides both a panoramic and magnified view of the pelvic reproductive anatomy and peritoneal surfaces. Diagnostic laparoscopy is the gold standard in diagnosing tubal pathology and other intra-abdominal causes of infertility [9-11]. If there is any problem identified then by operative laparoscopy that problem can be solved at same sitting.

In our study total 246 patients were included. These 246 patients had HSG outside of our centre and we did Laparoscopy after infertility treatment or when required. We compared the findings of HSG and Laparoscopy.

Sensitivity: Proportion of disease positive who are test positive. 100% sensitive means all sick individuals are correctly identified as sick.

Specificity: Proportion of disease negative who are test negative. 100% specific means no healthy individuals are incorrectly identified as sick.

Positive predictive value: It is the probability that subjects with a positive screening test truly have the disease.

Negative predictive value: It is the probability that subjects with a negative screening test truly don't have the disease.

HSG had a high sensitivity 96.51%, moderate specificity 41.88%, moderate positive predictive value 47.16%, high negative predictive value 95.71%. Accuracy was 60.98%.

Fatemah., *et al.* showed HSG has a sensitivity of 77.8% and specificity 52.9% [12]. This result showed that HSG is more accurate in diagnosis of tubal pathology. My study is comparable with this study.

Jean Dupont., *et al.* showed that HSG has a moderate sensitivity 51% and a high specificity 90% in the diagnosis of proximal tubal occlusion [13]. We did not categorized into proximal or distal tubal occlusion.

In another study done by Syeda Masuma Rizvi., *et al.* that HSG has a high sensitivity 90.91% and moderate specificity 77.78% with a positive predictive value 83.33% and negative predictive value 87.50% [7].

While analyzing tubal patency more number of tubal blocks are found in HSG than Laparoscopy. The reason might be:

1. Tubal Spasm, which was released during laparoscopy as patient is anaesthetized [14].
2. Small mucous plug may block the tube during HSG. But mucous plug usually washed out during Laparoscopy due to repeated forceful trying.
3. Release of peritubal adhesion during laparoscopy [15].

Limitations of the Study

1. We didn't consider the possible variability of HSG interpretation among radiologist.
2. All HSG were done outside of our centre. So, the quality control and facilities of all diagnostic centre couldn't be assured.

3. Time interval between HSG and Laparoscopy which could influence the difference in the result of these two diagnostic procedure [13].

Conclusion

Though HSG has some limitation but Laparoscopy and HSG run side by side in tubal assessment in female factor infertility.

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