



Assessment of Tubal Factors of Infertility by Hysterosalpingography and Diagnostic Laparoscopy

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Article History

Volume 6, Issue 12, 2024

Received: 05 June 2024

Accepted: 16 June 2024

Doi:

10.48047/AFJBS.6.12.2024.5760-5766

Abstract

Introduction: 60 to 80 million couples all over the world can be labelled as suffering from infertility. 25 to 40% cases of infertility are attributed to male factor. Female factors contribute 40 to 45 % in etiology of infertility. Tubal factors contribute to 20 to 40% in female infertility. The aim of this study is to assess tubal factors of infertility using HSG (hysterosalpingography) and diagnostic laparoscopy.

Methods: Present study was carried out on 50 infertile women who attended SMGS OPD during a period of 1 year from Oct 2019 to Nov 2020 after recruiting the patients according to inclusion criteria. HSG was carried out and findings were recorded. After that, the patients were subjected to the procedure of diagnostic laparoscopy and the results were recorded in a set proforma.

Results: Out of 50 patients, 34 had primary infertility and 16 had secondary infertility. Majority of the patients (32%) belonged to the age group of 25 to 29 years. Duration of infertility was 1 to 5 years in majority of the patients (50%). On HSG, 28 patients had bilaterally patent tubes and 22 had tubal block out of which 7 had hydrosalpinx. On diagnostic laparoscopy, 52% patients had tubal factors in the form of peritubal adhesions, hydrosalpinx and tubo ovarian mass. On chromopertubation, 38 patients had bilaterally patent tubes. 12 patients had tubal block on chromopertubation during diagnostic laparoscopy.

Conclusion: HSG is the first line diagnostic technique for evaluating tubal patency in female infertility. Diagnostic

laparoscopy is a still better option for checking the tubal patency.
Keywords: Hysterosalpingography (HSG), Diagnostic laparoscopy

Introduction

60 to 80 million couples all over the world can be labelled suffering from infertility [1]. About 25 to 40% cases of infertility are attributed to male factor. Female factors contribute to 40 to 45% in etiology of infertility [2]. Important factors responsible for female infertility are tubal factors (20 to 40%), anovulatory disorders (20 to 40%), miscellaneous (10 to 15%) [3].

Tubal factors lead to anatomic abnormalities preventing union of sperm and ovum. Proximal tubal occlusion prevents sperm from reaching the distal fallopian tube where fertilization usually occurs. Distal tubal occlusion prevents ovum uptake thus inhibiting fertilization [3]. Proximal, distal or peritubal damage is caused by a number of factors such as endometriosis, inflammation, pelvic inflammatory disease or surgical trauma [4]. Evaluation of fallopian tube is necessary for deciding the plan of fertility [4].

Sensitivity and specificity of HSG in assessing tubal patency is 96% and 61% respectively [5]. However, HSG has limitations in detecting tubal pathology [6].

Potential benefits of laparoscopy in infertile women

- It is possible to avoid fertility treatments and their direct as well as indirect social costs like multiple pregnancies [7]
- Intraoperative findings can guide post surgical management circumventing treatments that are of low benefit and are costly [8]
- Surgically corrected endometriosis may enhance response to fertility treatments or mitigate comorbidities like chronic pelvic pain [9]
- Using laparoscopy as standard test for tubal function would reduce apparent incidence of unexplained infertility from 10% to 3.5% [10].

However, WHO recommends HSG alone for management of infertile women [11]. The explanation for this discrepancy is that HSG provides information on tubal patency or blockage. Hence this study was carried out to assess tubal factors of female infertility using HSG and diagnostic laparoscopy.

Materials and methods

The study was carried out in department of obstetrics and gynecology at SMGS Hospital over a period of 1 year after obtaining clearance from ethical committee. It was a prospective observational study and 50 patients were chosen as per inclusion and exclusion criteria using non random sampling. Informed consent was taken prior to the study.

Inclusion Criteria

Women with primary or secondary infertility

Women with failed ovulation induction

Women willing to undergo HSG and diagnostic laparoscopy for evaluation of infertility

Exclusion Criteria

Medical disorders contraindicated for general anesthesia

Active uterine bleeding

Active pelvic infections

Active TB

Couples with male infertility

After selecting patients, HSG was carried out on day 6 to day 10 of menstrual cycle.

Procedure

Appointment for HSG was given on day 6 to day 10 of menstrual cycle. Basic investigations in the form of blood grouping, complete blood count and triple serology were done.

Patients were given injection atropine 0.6mg and injection voveron 75 mg intramuscularly half an hour before the procedure. They were asked to empty bladder before the procedure. Patients were put in lithotomy position. Posterior vaginal wall speculum was introduced and cervix was visualized. Anterior lip of cervix was held with vulsellum. A 20 ml syringe filled with 10 ml of urograffin dye (sodium amidotrizoate and amidotrizoate meglumine) was attached to the Leech Wilkinson cannula. The cannula was inserted inside the internal os in such a way that the tip was just inside the os. Two and half rotations were given and the cannula was fixed. Posterior vaginal wall speculum was removed. Initially 2 ml of dye was injected and a film was taken. The second film was taken after injecting 5 to 7 ml of dye. The two films were studied. The patient was followed for 2 hours after the procedure and sent home.

The findings were recorded. The same patients were subjected to diagnostic laparoscopy in follicular phase of the cycle.

Procedure for diagnostic laparoscopy

All patients underwent pre anesthetic check up and were kept nil per oral 24 hours prior to the surgery. They were given preoperative antibiotics and were asked to prepare bowel by proctolytic enema. Patients were kept in Trendelenburg position and general anesthesia was given. Patients were cleaned, painted and draped, veres needle inserted and pneumoperitoneum created using 2 to 3 litres of carbon dioxide till liver dullness was obliterated. Abdominal wall was elevated and trocar cannula inserted at 45 degrees, tip being inserted towards the hollow of the sacrum. As tip entered peritoneal cavity, we heard of the gas to escape. Laparoscope was inserted after removing the trocar. Pelvic cavity was visualized systematically.

Sim's speculum was inserted and anterior lip of cervix was held with vulsellum. Leech Wilkinson cannula attached to syringe filled with 20 ml of methylene blue dye was just inserted in internal os and dye was injected with pressure. If the blue dye was seen as a spill from the fimbrial ends of the tube, the tubes were labelled patent. Final survey was made to rule out any abdominal trauma or bleeding. The air in the peritoneal cavity was deflated. Then Leech Wilkinson cannula was removed. The skin incision was sutured with ethicon mattress sutures. The patients were shifted to the ward and post operative management was done. Patients were discharged the next day.

Results

Table 1: Type of infertility

34 cases were of primary infertility and 16 belonged to secondary infertility

Type of infertility	Number	Percentage
Primary infertility	34	68
Secondary infertility	16	32
Total	50	100

Table 2: Age distribution of study patients

Majority of the patients belonged to the age group of 25 to 29 years (32%).

Age	Number	Percentage
20-24	12	24
25-29	16	32
30-34	15	30
>35	7	14

Total	50	100
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Table 3: Duration of infertility in study patients

Majority (50%) of the patients belonged to infertility duration of 1 to 5 years followed by 38% which belonged to the study duration of 6 t to 10 years

Duration of infertility	Number	Percentage
1 to 5 years	25	50
6 to 10 years	19	38
11 to 15 years	5	10
>15 years	1	2
Total	50	100

Table 4: Findings on HSG

Out of 50 patients, 28 patients i.e. 56% had spill on both sides on HSG.22 patients had tubal block. Also, it was found that in those among tubal block, 5 had unilateral hydrosalpinx and 2 had bilateral hydrosalpinx (swollen tubes, typical golf club appearance)

HSG finding	Number	Percentage
Bilateral tubal block	14	28
Unilateral tubal block	8	16
Bilateral tubes patent	28	56
Unilateral hydrosalpinx	5	10
Bilateral hydrosalpinx	2	4

Table 5: Tubal factors of infertility on diagnostic laparoscopy

In the present study, 26 out of 50 patients i.e. 52% had tubal findings on laparoscopy. Rest 24 patients (48%) had normal tube anatomy on laparoscopy. The most common finding was hydrosalpinx which was seen in 9 out of 50 patients (18%) followed by peritubal adhesions seen in 7 patients (14%).

Tubal factors	Number	Percentage
Peritubal adhesions	7	14
Hydrosalpinx	9	18
Paraovarian cyst	4	8
Endometriosis	4	8
Tubo ovarian mass	2	4
Total	26	52

Table 6: Status of chromopertubation on diagnostic laparoscopy in study patients

On diagnostic laparoscopy, it was found that out of 50 infertile patients,38 had patent tubes on both sides i.e.76%.Unilateral tubal block and bilateral tubal block was found in 6 patients in each category.

Chromopertubation test	Number	Percentage
Bilateral tubal block	6	12
Unilateral tubal block	6	12
Bilateral tubes patent	38	76

Total	50	100
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Table 7: Comparison of tubal block between HSG and diagnostic laparoscopy

Patency of tube	HSG	Diagnostic laparoscopy
Patent	28/50 (56%)	38/50(76%)
Blocked	22/50 (44%)	12/50(24%)

Discussion

A prospective observational study was carried at post graduate department of gynecology and obstetrics at SMGS Hospital to assess tubal factors of female infertility using HSG and diagnostic laparoscopy.

Regarding type of infertility

In the present study, 34 cases were of primary infertility (68%) and 16 cases belonged to secondary infertility (32%). These findings are consistent with previous findings by Nagareshi et al., (2016) which supported primary infertility in 70% and secondary infertility in 30% of the study patients. [12]

Regarding age

Female age is an important factor for infertility. Majority of the patients (32%) in our study lie in the age group of 26 to 30 years followed by 31 to 35 years (30%) which is consistent with findings of Sharma et al., (2016) where majority 61% of patients lied in the age group of 26 to 30 years followed by 25% in 31 to 35 years [13]. Women reach maximum fertility potential at the age of 24 and it starts to decline at the age of 30 years. So, diagnosis and treatment should be quick and meticulous.

Regarding duration of infertility

In the present study, most common duration of infertility was 1 to 5 years (50%) which was consistent with study conducted by Wani Q et al., (2014), where it was 51% followed by 6 to 10 years (38%) which was 40% as reported by Wani Q et al., (2014), followed by 11 to 15 years duration (10%) which was 9% as per Wani Q et al., (2014) [14].

Regarding findings on HSG

In the present study, 56% patients had bilaterally patent tubes, 28% patients had bilateral tubal block, 16% patients had unilateral tubal block. Out of those with tubal block, 10% had unilateral hydrosalpinx and 4% had bilateral hydrosalpinx. These findings are compared with 2 studies by Bello TO (2004) and Devada KM et al., (2020) [15,16]

Comparison of results of HSG Findings

HSG Finding	Bello TO(2004)[15]	Devada KM et al.,(2020)[16]	Present study
Bilateral tubes patent	60%	55.7%	56%
Unilateral tubal block	9.3%	22.8%	16%
Bilateral tubal block	7.5%	15.7%	28%
Bilateral hydrosalpinx	33%	2.8%	4%
Unilateral hydrosalpinx	7.5%	15.7%	10%

Regarding tubal causes on laparoscopy

In the present study, hydrosalpinx was the most common tubal finding found in 18% of the subjects, followed by peritubal adhesions seen in 14%, followed by endometriosis in 8%. However, Akhtarunnessa et al., (2013) reported peritubal adhesions to be the most common finding seen in 11.33% of the subjects. [17]

Hydrosalpinx is chronic cystic swelling of fallopian tube caused by distal tubal obstruction, major cause being PID and endometriosis. In developing countries, genital TB accounts for 3 to 5% of infertility cases.

Adhesions are seen even if surgery is done meticulously in the pelvis. Adhesions prevent tubal movement, ovum pick up and transfer of embryo to uterus.

Even if previous ectopic was treated medically, it increases the chances of tubal damage.

Regarding chromopertubation on diagnostic laparoscopy

In present study, 76% of the patients had bilaterally patent tubes .12% had bilateral tubal block and rest 12 % had unilateral tubal block. These can be compared with results by Devada KM et al., (2020) where 75.71% had bilateral patent tube, 11.42% had unilateral blockage and 12.85% had bilateral blockage [16].

So, HSG has limitations in detecting tubal patency. HSG had a sensitivity of 0.65 and specificity of 0.85 for the tubal patency [18]. HSG was not reliable in detecting peritubal adhesions.

Compared to laparoscopy, HSG has moderate sensitivity, but relatively high specificity. If an occlusion is detected by HSG, there is 49% possibility of tubes to be actually patent because injection of dye during HSG can result in misdiagnosis of tubal block due to cornual spasm [16]

Conclusion

HSG is not a reliable indicator of tubal occlusion. Patients with suspicious HSG often have normal tubes. So, HSG should be used as a preliminary procedure for the management of infertile couple and should always be followed by diagnostic laparoscopy if suspicion arises.

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