

## Original Research Article

# Diagnostic evaluation of tubal patency in a tertiary care hospital

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## ABSTRACT

**Background:** Infertility has always been one of the most elusive symptom complexes that perplex the best gynecologists. Amongst female factors, tubal factors are responsible for 25-30% of infertility. Hysterosalpingography and diagnostic laparoscopy with chromopertubation are widely used in the evaluation of tubal factors of infertility. Aim of the study was to compare hysterosalpingography and laparoscopy in the diagnosis of tubal patency in infertile patients.

**Methods:** In this study 50 patients of infertility were evaluated prospectively in the Department of Obstetrics and Gynecology, Government Medical College, Jammu from April 2019 to March 2020. The findings of HSG and laparoscopy were compared.

**Results:** Mean age at presentation for primary infertility was 28.6±4.20 years and for secondary infertility it was 32.1±3.84 years. Majority of patients of primary (77.6%) and secondary infertility (54.5%) had duration of infertility of 1-5 years in our study. The sensitivity of HSG was 90.91% and specificity was 77.78 % with positive predictive value of 83.33% and negative predictive value of 87.50%, when tubal pathology was defined as any form of tubal occlusion detected at laparoscopy, either one sided or two sided.

**Conclusions:** HSG demonstrates high sensitivity in our study. So, it should be used as the initial investigation for identifying tubal patency. As the specificity is less, we suggest that laparoscopy is necessary to recognize those cases of tubal block which were unrecognized or wrongly recognized on HSG. In addition, the patients who were found to have tubal block on HSG, laparoscopy helps in finding the cause of infertility like existence of peritubal adhesions and endometriosis that can guide appropriate therapy.

**Keywords:** Hysterosalpingography, Infertility, Laparoscopy

## INTRODUCTION

Infertility is one of the most common disorders confronting gynecologists and is defined as the inability to conceive after one year of regular unprotected intercourse.<sup>1,2</sup> Infertility affects about 10-15% of reproductive age couples. Tubal pathology is one of the main causes of infertility. It accounts for 25-35% of the cases of infertility.<sup>1</sup>In the routine workup of infertility patients, the ability of the current tests to evaluate tubal

function is limited. But tubal damage can be assessed by tubal patency and the extent of peritubal adhesions.<sup>3</sup> HSG is widely used as first line approach to assess the patency of fallopian tubes and uterine anomalies in the routine infertility workup.<sup>4</sup> However, despite tubal patency being demonstrated by HSG, laparoscopy has been suggested as a mandatory step to rule out peritubal adhesions and endometriosis.<sup>5</sup> Though, HSG and laparoscopy, both are invasive techniques, HSG is much less invasive than laparoscopy. Further, HSG being relatively inexpensive,

simple and rapid diagnostic test it continues to be the first line approach in assessing the tubal patency. Laparoscopy and dye insufflation is recommended by Royal College of Obstetricians and Gynecologists as the tubal patency investigation of choice for infertility.<sup>6</sup> The laparoscope is a valuable clinical tool that has changed the practice of gynecology. It can confirm a clinical impression, establish a definite diagnosis, follow the course of disease and modify therapy. The objective of the present study was to compare hysterosalpingography and laparoscopy in the diagnosis of tubal patency in infertile patients.

## METHODS

This study was conducted in the postgraduate department of obstetrics and gynecology, GMC Jammu from April 2019 to March 2020. It was an observational study in which the findings of HSG and laparoscopy were compared.

HSG was performed prior to ovulation between menstrual cycle days 7 and 12 to avoid potential pregnancy and to take advantage of thinner proliferative phase endometrium. With the patient in dorsal lithotomy position, balloon catheter was inserted through the cervix and past the internal cervical os. Contrast dye (radiopaque material) was dissolved in 10-20 cc of water, and was injected into the uterine cavity. An X-ray examination was performed twice: first in the filling phase of uterine cavity by contrast material and second in the spreading period of the abdomen.

Laparoscopy was done under general anesthesia at least 3 months after HSG. After preoperative evaluation and preparation of the patient, laparoscopy was performed in the premenstrual phase. The patient was put in the supine position under effect of general anesthesia, cleaning and sterilization of abdomen up to midhigh and vagina was done. Sims's speculum was introduced into the vagina so that cervix could be visualized clearly. Meanwhile a small incision about 1 cm was made above the umbilicus through which camera was passed into the abdominal cavity. Another probe called Morilands probe was passed through incision in right or left iliac fossa or both according to need for handling. Meanwhile catheter is passed through cervix through which methylene blue dye is forced into the uterine cavity to the fallopian tubes in order to see for patency of fallopian tubes, which is seen as spill of dye into the peritoneal cavity, and visualized by the camera.

The data regarding age, symptoms, clinical signs, the investigations, and the histopathological reports were analyzed. Ethical clearance was taken from the institutional ethical clearance committee. All the patients had a chest physician checkup and clearance.

All the participants in the study were included only after written informed consent from them even if it was a simple minimally invasive procedure. The data was

entered in MS excel spreadsheet and analysis was done using statistical package for social sciences (SPSS) version 21.0 and results were tabulated.

## RESULTS

Of the 50 patients of infertility, 40 had primary infertility and 10 had secondary infertility. In our study, majority of patients of primary infertility (49.3%) belonged to age group of 25-30 years and majority of patients of secondary infertility (48.5%) belonged to age group 30-35 years. Minimum and maximum age for primary infertility was 20 years and 38 years respectively. Minimum and maximum age for secondary infertility was 22 years and 38 years respectively. Mean age at presentation for primary infertility was 28.6±4.20 years and for secondary infertility it was 32.1±3.84 years (Table 1).

**Table 1: Age distribution of infertile patients.**

Age	Primary	Secondary	Total
	%	%	%
<b>20-25</b>	11.9%	6.1%	10%
<b>25-30</b>	49.3%	15.2%	38%
<b>30-35</b>	26.9%	48.5%	34%
<b>≥35</b>	11.9%	30.3%	18%
<b>Total</b>	100%	100%	100%
<b>Mean±SD</b>	28.6±4.20	32.1±3.84	P-value <0.001*

\*Statistically Significant Difference (P-value <0.05)

Majority of patients of primary (77.6%) and secondary infertility (54.5%) had duration of infertility of 1-5 years in our study. Longest duration of infertility in the primary group was 9 years and in that of secondary group was 10 years. Mean duration of infertility in the patients of primary and secondary infertility was 3.4±1.82 years and 4.8±2.26 years respectively.

There was no menstrual abnormality in 68% patients while 32% patients presented with menstrual abnormalities. Most common menstrual abnormality in the infertile patients was menorrhagia (11%) followed by oligomenorrhea (9%) and dysmenorrhea (9%). In the primary group, most common abnormality was menorrhagia (11.9%) and least was polymenorrhagia (1.5%) and polymenorrhea (1.5%). In the secondary group, maximum patients had menorrhagia (9.1%) and dysmenorrhea (9.1%).

**Table 2: Comparison of tubal status between HSG and laparoscopic chromopertubation.**

HSG	Laparoscopic chromopertubation		Total
	Abnormal	Normal	
<b>Abnormal</b>	24 (48%)	6 (12%)	30 (60%)
<b>Normal</b>	4 (8%)	16 (32%)	20 (40%)
<b>Total</b>	28 (56%)	22 (44%)	50 (100%)

**Table 3: Comparison of findings between HSG and laparoscopic chromopertubation.**

Laparoscopy	Normal	U/L tubal block	B/L tubal block	Total
<b>HSG</b>				
<b>Normal</b>	16 (32%)	4 (8%)	0 (0%)	20 (40%)
<b>U/L tubal block</b>	0 (0%)	6 (12%)	2 (4%)	8 (16%)
<b>B/L tubal block</b>	6 (12%)	2 (4%)	14 (28%)	22 (44%)
<b>Total</b>	22 (44%)	12 (24%)	16 (32%)	50 (100%)

Total 50 patients underwent HSG, 4 patients had normal findings and 24 patients had abnormal findings. Table 2 and 3 show comparison between tubal findings on laparoscopy and HSG.

Peritubal adhesions were found in 46.7% of the blocked tubes on laparoscopy. Endometriosis was detected in 22% of the blocked tubes and suspected intratubal block in 29.7% patients (Table 4).

**Table 4: Tubal findings on laparoscopy.**

Laparoscopic findings	Blocked tubes	Patent tubes
<b>Adnexal adhesions</b>	12 (24%)	2 (4%)
<b>Endometriosis</b>	6 (12%)	4 (8%)
<b>Suspected intratubal block</b>	7 (14%)	0 (0%)

The sensitivity of HSG was 90.91% (95% CI: 76.43-96.86) and specificity was 77.78% (95% CI 59.24-89.39) with positive predictive value of 83.33% (95% CI 68.11-92.13) and negative predictive value of 87.50% (95% CI 69.0-95.66), when tubal pathology was defined as any form of tubal occlusion detected at laparoscopy, either one sided or two sided.

## DISCUSSION

Infertility is a painful condition which affects about 8-12% of the couples in the reproductive age group worldwide.<sup>7</sup> Of the etiologies of infertility, tubal factor is one of the most common causes (25-35%).<sup>8</sup> In the present study we compare HSG and laparoscopy in the diagnosis of tubal factor infertility. HSG is the initial investigation to assess the patency of fallopian tubes. It is less invasive, more cost effective with less complication rate as compared to laparoscopy.

The disadvantages of laparoscopy are possibilities of allergic reactions to iodine, pelvic infections, endometriosis, tubal rupture (due to contrast material given under pressure in patients with hydrosalpinx) and radiation exposure. Laparoscopy being a more invasive technique than HSG is considered as a gold standard in diagnosing tubal pathology and peritoneal factors in

infertility. The percentage of cases of unexplained infertility and wrongly interpreted causes of tubal factor infertility would be much less if, laparoscopy was routinely included in the evaluation of infertility, since it can diagnose conditions that might otherwise go unrecognized such as endometriosis, TB, PID and tubal factor (Wrongly recognized or unrecognized on HSG).<sup>9</sup>

In our study, we consider diagnostic laparoscopy as the reference standard in detecting tubal blockage. We compared HSG findings of tubal patency with laparoscopic chromotubation and found a sensitivity of 90.91% (95% CI :76.43-96.86) and specificity was 77.78% (95% CI 59.24-89.39) which were comparable with study from Goynumer G et al which showed sensitivity and specificity of 80% and 75% respectively when tubal block was defined as any form be it unilateral or bilateral.<sup>10</sup> The positive and negative predictive values were 83.33% (95% CI 68.11-92.13) and 87.50% (95% CI 69.0- 95.66) respectively. The false positive and false negative rates were 10% and 5% respectively. Of the 22 patients shown to have bilaterally occluded tubes on HSG only 14 had bilaterally occluded tubes on laparoscopy. In other studies laparoscopy has been shown to reveal abnormal findings in 21-68% of women with abnormal HSG.<sup>11-13</sup> On laparoscopy, adnexal adhesions were noted in 12, endometriosis in 6 and suspected intratubal block in 7 patients. The superiority of laparoscopy over HSG in assessing extratubal pathology has been shown in our study as has been demonstrated in other studies.<sup>14,15</sup>

## Limitations

Small sample size of the study was limitation of the study.

## CONCLUSION

HSG demonstrates high sensitivity in our study. So it should be used as the initial investigation for identifying tubal patency. As the specificity is less, we suggest that laparoscopy is necessary to recognize those cases of tubal block which were unrecognized or wrongly recognized on HSG. In addition, the patients who were found to have tubal block on HSG, laparoscopy helps in finding the cause of infertility like existence of peritubal adhesions and endometriosis that can guide appropriate therapy.

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