


# Role of Hysteroscopy in Evaluation of Subfertility

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## ABSTRACT

**Introduction:** Diagnosing and treating subfertility is a most rapidly evolving area in modern medicine. Advances in endoscopic surgery have revolutionized the diagnostic and management approach to an infertile couple. Unlike USG and HSG, hysteroscopy single-handedly provides information regarding uterine, ovarian, tubal, as well as pelvic pathology.

**Materials and methods:** A prospective analysis was performed at BEST Institute and Research Centre, AV hospital, Bengaluru, over a period of 2 years. Couples presenting to the infertility clinic were subjected for thorough history taking, general examination, and gynecological examination. All necessary investigations were performed. Women who approached with fertility issues as a complaint and who could be potentially benefited from hysteroscopy were included in the study.

**Results:** A total of 102 patients were evaluated in the study, out of which 67 (65.7%) women had primary infertility and the rest (34.3%) had secondary infertility. Ovarian pathologies such as ovarian cysts, endometriosis of the ovary, and PCOS were the most common abnormality detected on laparoscopy followed by uterine pathologies. The most common hysteroscopic pathology was a polyp.

**Conclusion:** Combined hysteroscopy is a safe, effective, and reliable tool in comprehensive evaluation of subfertility. It should be considered as a definitive day-care procedure for evaluation and treatment of female subfertility.

**Keywords:** Diagnostic laparoscopy, Infertility, Hysteroscopy.

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## INTRODUCTION

The World Health Organization (WHO) defines infertility as “inability of a sexually active, non-contracepting couple to achieve pregnancy in one year”.<sup>1</sup> The couple who have never conceived before are classified as primary infertility and who have had at least one prior conception, irrespective of the outcome, are classified as secondary infertility. Subfertility describes any form of reduced fertility. The desire for children is not universal, but childlessness is a tragedy to many couples, even in developed countries. Relationships between couples can become strained when children are not forthcoming, and the onus of sub/infertility in most societies is placed on the woman. Infertility in women was ranked the 5th highest serious global disability.<sup>1</sup> World Health Organization estimates that 60–80 million couples worldwide currently suffer from infertility and the overall prevalence of primary infertility in India to be between 3.9 and 16.8%.<sup>2</sup>

Diagnosing and treating subfertility is the most rapidly evolving area in modern medicine. Whenever a sub-/infertile couple visits a specialist, they undergo thorough examination and a battery of tests to help pinpoint the cause of sub-/infertility. There are a number of diagnostic assessment methods such as evaluation of the female hormonal system, semen analysis, ultrasound, hysterosalpingography (HSG), and hysteroscopy. Ultrasound is most frequently used in detection of uterine pathologies and adnexal masses. Fallopian tubes are not routinely seen on ultrasound, unless if there is a hydrosalpinx. Hysterosalpingography has been a standard test in the workup of infertile couples for evaluating tubal patency. The sonohysterogram (SHG) is also an addition for intrauterine evaluation recently.<sup>3</sup>

Advances in endoscopic surgery have revolutionized the diagnostic and management approach to an infertile couple. Unlike USG and HSG, hysteroscopy single-handedly provides information regarding uterine, ovarian, tubal, as well as pelvic pathology. It is one of the most effective tools in diagnosing certain

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significant pathologies that are missed by above all diagnostic modalities such as pelvic inflammatory disease, endometriosis, adhesions, tubal pathology, and genital tuberculosis, and it is also proved effective in long-term unexplained subfertility.<sup>4</sup> Pelvic pathology is best identified by laparoscopy. Additionally, pathologies warranting surgical procedures and tubal patency testing can be done in the same sitting. Though hysteroscopy is effective in managing infertile women, it cannot be used as a primary diagnostic tool as it is an invasive procedure. However, due to its lower complication rates, minimal invasiveness, and a day-care facility, it is widely accepted among gynecologists. One of the significant causes of infertility in India, genital tuberculosis, can be easily diagnosed with laparoscopy.<sup>5</sup> The present study aims to highlight the effectiveness of hysteroscopy in evaluating female subfertility.

## MATERIALS AND METHODS

A prospective analysis was performed at BEST Institute and Research Centre, AV hospital, Bengaluru, over a period of 2 years. Couples presenting to the infertility clinic were subjected for

thorough history taking, general examination, and gynecological examination. All necessary investigations such as CBC, baseline endocrinal parameters (T3, T4, TSH, Prolactin, AMH, FSH, and LH), blood sugar, ultrasound of the abdomen pelvis for female partners, and husband semen analysis were performed. Women who approached with subfertility as a complaint in any group and who could be potentially benefitted from hysterolaparoscopy were included in the study. Patients with abnormal HSG findings were included in the study and confirmed by DHL. Patients having any relative and absolute contraindication to laparoscopy were excluded. Infertile couples fulfilling the inclusion criteria were counseled for hysterolaparoscopy with due explanation of the procedure, advantages, and risks. Written and informed consent was taken from all the patients.

Hysterolaparoscopy was performed in the preovulatory phase (6–11 days). Patients were admitted on the morning of the surgery and were advised to stay nil orally for 8 hours prior to surgery. Enema or catheterization was not followed routinely. They were asked to void completely before entering the operation theater. The procedure was carried out under general anesthesia with endotracheal intubation. Speculum and bimanual examinations were repeated under anesthesia.

Hysteroscopy was first performed with a 2.9 mm 30° deflection-angle hysteroscope with NS-distension media for all patients. Under vision, the hysteroscope was introduced in the cervical canal and examined. The uterine cavity was examined for polyp, septum, fibroid, synechiae, fibrotic bands, and uterine malformation. Bilateral tubal ostia were visualized and looked for patency. The condition of the endometrium all over the uterine cavity was noted. Any procedure that was indicated, depending upon the pathology, was performed.

Diagnostic laparoscopy was performed with a 5 mm 30° deflection-angle telescope and 5 mm ports after adequate pneumoperitoneum were created. Inspection of pelvic organs, pouch of Douglas, and upper abdomen was done through the laparoscope. Uterine size, shape, symmetry, position, and surface were noted and examined for fibroid, endometriotic spots, adenomyosis, and adhesions. Bilateral tubes were traced till the fimbrial end to note any pathology such as hydrosalpinx, kinking, stricture, and peritoneal adhesions. Bilateral ovaries and ovarian fossa were examined for PCOS, ovarian cysts, and endometriosis. Pelvic peritoneum near pouch of Douglas and bilateral uterosacral ligaments were examined for evidence of endometriosis. Upper-abdominal organs such as liver were examined for any signs of chlamydial infection.

Chromopertubation was performed to test the patency of the tubes. Leech Wilkinson cannula was inserted into the cervix, and dilute methylene blue was injected with a 20-mL syringe into the uterus. Free spillage of dye from the fimbrial end of the tube was visualized. Indicated therapeutic laparoscopic procedures were performed, depending upon the pathology noted. After the procedure, the patient was transferred to postoperative ward and monitored. For minor procedures, patients were started orally after 4 hours and discharged the same day.

All the findings of hysterolaparoscopy were tabulated in Microsoft Excel sheet, and statistical analysis was done using SPSS software version 16. The variables were expressed as mean ± SD and percentages.

**RESULTS**

A total of 102 patients were evaluated in the study, out of which, 67 (65.7%) women had primary infertility and the rest (34.3%) had

**Table 1:** Number of abnormal findings and number of cases detected

Sl. no.	Abnormalities detected	Primary infertility (n = 67)	Secondary infertility (n = 35)
1	Total no. of abnormalities detected during DHL	53	29
2	Single	34	11
3	Multiple	19	18
4	% of abnormalities identified	79.1 %	82.8%

**Table 2:** Abnormal hysterolaparoscopic findings

Sl. no.	Abnormalities detected in laparoscopy	Primary infertility (n = 67)	Secondary infertility (n = 35)
1	Tubal	19 (28.4%)	19 (54.3%)
2	Uterine	28 (41.8%)	20 (57.1%)
3	Pelvic peritoneal	8 (11.9%)	11 (31.4%)
4	Ovarian	54 (80.6%)	20 (57.1%)

secondary infertility. The mean age of patients in the primary infertility group were 27.2 ± 2 SD years and 30.6 ± 2 SD years for those in the secondary group. The average duration of infertility in primary was 4.2 ± 2 SD years and 6.8 ± 2 SD years for secondary infertility.

Out of 102 women, 53 (79.1%) among primary infertility and 29 (82.8%) out of secondary infertility had single/multiple abnormalities detected on hysterolaparoscopy. Single pathology was noted in 34 cases of primary infertility (50.7%) as compared with 11 cases of secondary infertility (31.4%). Multiple (≥two) pathologies could be detected in 19 cases of primary infertility (28.3%) as compared with 18 cases of secondary infertility (51.4%). Major degree of pelvic adhesion with endometriosis, leiomyoma with polyp, leiomyoma with PCO, endometriotic cyst with adhesion, hydrosalpinx with PCO, and hydrosalpinx with adhesion, etc., were considered as multiple pathologies (Table 1).

Ovarian pathologies such as ovarian cysts, endometriosis of ovary, PCOS, etc., were the most common abnormality detected on hysterolaparoscopy followed by uterine pathologies (myoma, bicornuate uterus, septate uterus, polyp, etc.) and tubal pathologies (hydrosalpinx, tubal blocks). Peritoneal pathologies such as adhesions, features of PID, and endometriosis involving the POD were also detected as shown in Table 2.

The most common hysteroscopic pathology was endometrial polyp and its incidence being 13.4% in primary and 11.4% in secondary infertility. Other attributing pathologies in hysteroscopy were uterine septum (7.5% in primary and 2.8% in secondary), submucous myoma (4.5% in primary and 5.7% in secondary), bicornuate uterus (1.5%), synechiae (11.4% in secondary), periosteal adhesions, and deeply seated ostia (Table 3).

PCOS (58.2%) was the most common laparoscopic finding in primary infertility, whereas, in secondary infertility, both endometriosis (34.3%) and PCOS (34.3%) were the major abnormalities detected. Leiomyoma was found in 13.4 and 8.6% in primary and secondary groups, respectively. Endometriosis was found in 22.3% of primary infertility. Peritoneal adhesions were noted more in secondary (11.3%) than in primary (1.5%) infertility. Hydrosalpinx was found in 3 cases in secondary and 1 in primary group, where 2 cases had bilateral, and 2 cases had unilateral

**Table 3:** Abnormal hysteroscopic findings

Sl. no.	Abnormalities detected in hysteroscopy	Primary infertility (n = 67)	Secondary infertility (n = 35)
1	Septum	5 (7.5%)	1 (2.8%)
2	Myoma	3 (4.5%)	2 (5.7%)
3	Polyp	9 (13.4%)	4 (11.4%)
4	Bicornuate uterus	1 (1.5%)	0
5	Synechiae	0	4 (11.4%)
6	Deep-seated ostia	3 (4.5%)	1 (2.8%)
7	Periosteal adhesions	3 (4.5%)	0

**Table 4:** Laparoscopic abnormalities

Sl. no.	Abnormalities detected in hysteroscopy	Primary infertility (n = 67)	Secondary infertility (n = 35)
1	Myoma	9 (13.4%)	3 (8.6%)
2	Endometriosis	15 (22.3%)	12 (34.3%)
3	Adhesions	1 (1.5%)	4 (11.3%)
4	Hydrosalpinx	1 (1.5%)	3 (8.6%)
5	Ovarian cyst	7 (10.5%)	3 (8.6%)
6	PCOD	39 (58.2%)	12 (34.3%)
7	Uterine anomaly	1 (1.5%)	0

**Table 5:** Chromopertubation

Sl. no.	Chromopertubation	Primary infertility (n = 67)	Secondary infertility (n = 35)	Total (n = 102)
1	B/L spill	49 (73.1%)	19 (54.3%)	68
2	Unilateral spill	16 (23.9%)	12 (34.3%)	28
3	No spill	2 (2.9%)	4 (11.4%)	6
	Total	67	35	102

hydrosalpinx. The ovarian cyst was found in 10.5% of primary infertility, out of which 2 were dermoid cysts. Three patients with secondary infertility had ovarian cysts (Table 4).

On chromopertubation, there was no spillage in 2.9% of primary and 11.4% of secondary infertile women. Unilateral spillage of dye was found in 23.9 and 34.3% of women in the primary and secondary groups, respectively, the rest of them had free bilateral spillage of dye (Table 5).

Pathologies warranting simultaneous surgical procedures were identified. Necessary surgical interventions were carried out either by laparoscopy or by hysteroscopy, namely adhesiolysis, ovarian drilling, ovarian cystectomy, myomectomy, removal of subserous fibroid, fulguration of endometriotic spots, salpingostomy, and polypectomy.

## DISCUSSION

Perspectives of evaluating infertile women have changed recently due to developments in gynecological endoscopy. Current approach to infertility is no longer based on diagnosing an exact etiology. The investigation of infertile couples should be rapid and inexpensive, using minimally invasive tests.<sup>6</sup> Laparoscopy is

the gold standard technique in evaluating tubal and peritoneal pathology, as these can be missed easily on ultrasound. It also plays an important role in predicting future pregnancy outcomes in many infertile women.<sup>7</sup>

The present study showed ovarian pathology to be the most common one detected by hysterolaparoscopy in women with primary infertility, similar to the previous literature.<sup>8,9</sup> In the secondary-infertility group, tubal, uterine, and ovarian pathology were almost in similar distribution. Tubal pathology was found to be about 28.4 and 54.3% in both groups, and pelvic peritoneal pathology in about 11.9 and 31.4%, these pathologies could solely be detected by laparoscopy, and the following corrective measures were taken in the same setting. Without the help of these endoscopic surgeries, this class of pathologies causing subfertility would be missed.

Major hysteroscopic abnormalities in the present study were polyp followed by septate uterus, myoma, periosteal adhesions, and deep-seated Ostia in primary infertility, whereas among the secondary infertility group, polyp and synechiae were the most common causes. This finding is consistent with the findings of other studies.<sup>10,11</sup> PCOS and endometriosis were major abnormalities found on laparoscopy in both the groups. The incidence of tubal blockage was high in the secondary subfertility group.

The goal of endoscopic surgeries is to restore the anatomy as far as possible. The major advantage of these endoscopic surgeries is that they follow the principles of microsurgery. "Microsurgery" is a set of principles developed to improve fertility surgery outcomes. Laparoscopy and hysteroscopy are the cornerstones of reproductive microsurgery with fertility outcome as the endpoint. Postoperative adhesions are the key cause of failure of fertility-enhancing surgeries, laparoscopy primarily addresses this issue with its ability to reduce postoperative adhesions to minimum by following microsurgical principles.

## CONCLUSION

Combined hysterolaparoscopy is a safe, effective, and reliable tool in comprehensive evaluation of infertility. Correctable structural abnormalities in the pelvis may be unfortunately missed by routine pelvic examination and imaging procedures that can be detected by hysterolaparoscopy. Reversible causes such as adnexal adhesions, tubal blockade, uterine synechiae, etc., can easily be diagnosed and treated by hysterolaparoscopy in the same sitting. It should be considered as a definitive day-care procedure for evaluation and treatment of female infertility. Fertility-enhancing endoscopic procedures can be performed easily as there is minimal handling of pelvic organs due to better application of microsurgical principles and very limited side effects.

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