International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Chouhan T et al. Int J Reprod Contracept Obstet Gynecol. 2025 Sep;14(9):3004-3008
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20252732

Role of hystero-laparoscopy in evaluation of infertility: a retrospective observational study

Tulika Chouhan[1]*, Vinita Singh[2]

[1]Department of Obstetrics and Gynecology, Norfolk and Norwich University Hospital, United Kingdom
[2]Department of Obstetrics and Gynecology, All India Institute of Medical Sciences Raipur, Chhattisgarh, India

Received: 15 July 2025
Revised: 12 August 2025
Accepted: 13 August 2025

***Correspondence:**
Dr. Tulika Chouhan,
E-mail: chouhantulika@gmail.com

ABSTRACT

Background: Infertility affects 8-10% of couples worldwide. Hystero-laparoscopy offers a dual diagnostic and therapeutic advantage in evaluating infertility, particularly where standard imaging falls short. Objective was to assess the diagnostic value of hystero-laparoscopy in female infertility and identify associated pelvic and intrauterine pathologies.
Methods: A retrospective observational study was conducted at AIIMS, Raipur from June 2021 to June 2023, including 140 infertile women (83 with primary and 57 with secondary infertility). Patient records were reviewed for clinical, sonographic, hysteroscopic, and laparoscopic findings, including interventions. Data were analysed using SPSS v22.
Results: Mean age was 28.6±4.3 years; mean infertility duration was 4.4±2.2 years. 73.57% of hysteroscopies were normal; uterine septum (15.71%) was the most frequent abnormality. Laparoscopy revealed adhesions (30%), ovarian pathologies (28.57%), and endometriosis (15.71%). Tubal block was noted in 57.85% by HSG. Interventions included adhesiolysis (28.57%), cystectomy (20.71%), and myomectomy (8.57%).
Conclusions: Hystero-laparoscopy provides a comprehensive approach to evaluate and treat underlying causes of infertility, especially those undetected by non-invasive imaging.

Keywords: Diagnostic laparoscopy, Hystero-laparoscopy, Infertility, Reproductive health, Tubal factor, Uterine anomalies

INTRODUCTION

Infertility, defined as the inability to conceive after one year of unprotected intercourse, is a significant public health issue affecting 8-10% of couples worldwide.[1] In India alone, 15-20 million couples face infertility annually. Female infertility is multifactorial and often includes uterine, tubal, ovarian, or peritoneal pathologies that may not be detectable by routine investigations. Despite advancements in ultrasonography and hysterosalpingography (HSG), these techniques often fall short in identifying subtle or coexisting abnormalities.

Hystero-laparoscopy, a combination of hysteroscopy and laparoscopy, is increasingly recognized as a gold-standard procedure for evaluating infertility. This dual approach allows direct visualization and the opportunity for simultaneous therapeutic intervention, making it superior to imaging-based diagnostics. The present study was undertaken to evaluate the diagnostic and therapeutic role of hystero-laparoscopy in infertile women presenting to a tertiary care center.

METHODS

It was a retrospective observational study carried out at the department of obstetrics and gynecology, AIIMS Raipur,

Chhattisgarh, India for a period of 2 years from June 2021 to June 2023. The study included 140 patients.

Inclusion criteria

Women aged 18-40 years; diagnosed with primary or secondary infertility; underwent diagnostic hystero-laparoscopy.

Exclusion criteria

Incomplete medical records; History of infertility <1 year.

Methodology

All women underwent diagnostic hystero-laparoscopy during the preovulatory phase (day 6-11) under general anesthesia in the lithotomy position. Following aseptic preparation and draping, a uterine manipulator was inserted to facilitate visualization. Chromopertubation was routinely performed using methylene blue dye to assess tubal patency. Hysteroscopy involved inspection of the cervix, uterine cavity, tubal ostia, and endometrium using a rigid hysteroscope, with targeted interventions such as septal resection or polypectomy when indicated. Diagnostic laparoscopy was performed via infraumbilical trocar insertion to evaluate the uterus, fallopian tubes, ovaries, adnexa, and peritoneal surfaces for adhesions, endometriosis, fibroids, or other pelvic pathologies. Operative procedures, including adhesiolysis, cystectomy, myomectomy, and ovarian drilling, were performed as required. Intraoperative findings and interventions were documented in detail in the patient records.

Statistical analysis

SPSS v22 was used. Categorical data were presented as percentages; continuous variables as mean±SD. Chi-square and t-tests were used where applicable.

RESULTS

Demographics

Out of 140 women, 59.28% had primary infertility and 40.71% had secondary infertility. The majority (42.14%) were aged 26–30 years. Mean duration of infertility was 4.43±2.25 years.

Table 1: Demography of patient population.

Age group of patients (in years)	Primary infertility	Secondary infertility	Total	%
21 to 25	27	11	38	27.14
26 to 30	39	20	59	42.14
31 to 35	12	20	32	22.85
36 to 40	5	6	11	7.85
Total	83	57	140	100

Table 2: Duration of infertility.

Duration in years	Primary infertility	Secondary infertility	Total	%
<5	59	18	77	55
5 to 10	24	39	63	45
>10	0	0	0	0
Total	83	57	140	100

Symptoms

43.57% of patients were asymptomatic. Common symptoms included pelvic pain (32.14%), menstrual irregularity (22.14%), and dysmenorrhoea (12.85%).

Ultrasound findings

Normal findings in 37.85% cases. Common abnormalities included adnexal masses (27.85%), uterine septum (12.14%), fibroids (14.28%), and PCOS (7.85%).

Table 3: Symptoms.

Symptoms	Primary infertility	Secondary infertility	Total	Percentage
Asymptomatic	37	24	61	43.57
HMB/menstrual irregularity	24	7	31	22.14
Chronic pelvic pain/ pain abdomen	21	24	45	32.14
Dysmenorrhoea	12	6	18	12.85

Table 4: Ultrasound findings.

USG findings	Primary infertility	Secondary infertility	Total	Percentage
Normal	35	18	53	37.85
Uterine septum	1	16	17	12.14
Myoma/Polyp	15	5	20	14.28
PCOS	11	0	11	7.85
Adnexal mass	21	18	39	27.85
Total	83	57	140	100

Table 5: HSG findings.

HSG findings	Primary infertility	Secondary infertility	Total	Percentage
Normal	33	26	59	42.14
Unilateral block	23	11	34	24.28
Bilateral block	27	20	47	33.57
Total	83	57	140	100

Table 6: Hysteroscopy findings.

Hysteroscopic findings	Primary infertility	Secondary fertility	Total	Percentage
Normal	74	29	103	73.57
Bilateral ostia normal	73	50	123	87.85
One ostia obliterated	4	0	4	2.85
Both ostia obliterated	5	4	9	6.42
Myoma	5	5	10	7.14
Polyp	4	3	7	5
Septum	3	19	22	15.71
Synechia	0	3	3	2.14

Table 7: Hysteroscopic interventions.

Hysteroscopic treatment	Primary infertility	Secondary infertility	Total	Percentage
Septal resection	1	19	20	14.28
Polypectomy	4	3	7	5
Cannulation	5	2	7	5
Myomectomy	3	4	7	5
Adhesiolysis	0	3	3	2.14

Table 8: Laparoscopic findings.

Laparoscopic findings	Primary infertility	Secondary infertility	Total	Percentage
Normal	33	24	57	40.71
Tubal	32	20	52	37.14
Unilateral hydrosalpinx	11	8	19	13.57
Bilateral hydrosalpinx	6	8	14	10
Ovarian	30	10	40	28.57
Fibroids	10	2	12	8.57
Endometriosis	16	6	22	15.71
Adhesions	20	22	42	30

Table 9: CPT findings.

CPT findings	Primary infertility	Secondary infertility	Total	Percentage
Spill	49	33	82	58.57
Unilateral absent	15	9	24	17.14
Bilateral absent	19	15	34	24.28

Table 10: Laparoscopic intervention.

Laparoscopic intervention	Primary infertility	Secondary infertility	Total	Percentage
LOD	11	0	11	7.85
Cystectomy	19	10	29	20.71
Adhesiolysis	18	22	40	28.57
Myomectomy	10	2	12	8.57

HSG and chromopertubation findings

HSG showed bilateral block in 33.57% and unilateral block in 24.28%. Chromopertubation confirmed absent spill in 24.28% (bilateral) and 17.14% (unilateral).

Hysteroscopy

Normal in 73.57%. Common findings were uterine septum (15.71%), myoma (7.14%), polyps (5%), and synechiae (2.14%).

Laparoscopy

Normal in 40.71%. Common pathologies were adhesions (30%), ovarian cysts (28.57%), endometriosis (15.71%), and fibroids (8.57%).

Interventions

Performed in 65.71% patients. Included adhesiolysis (28.57%), cystectomy (20.71%), myomectomy (8.57%), ovarian drilling (7.85%), and hysteroscopic septal resection (14.28%).

DISCUSSION

The findings of the present study reaffirm the pivotal role of combined hysteroscopy and laparoscopy in the comprehensive evaluation of female infertility. Tubal factor infertility emerged as the predominant etiology, accounting for 57.85% of cases, which is consistent with the observations reported by Kumar et al and Tsuji et al.[1,2] Similar prevalence rates have been documented by Kabadi et al and Chanu et al, where tubal pathology, particularly distal blockages and adhesions, represented a major cause of infertility.[3,4] The high incidence of tubal involvement underscores the importance of direct laparoscopic visualization and chromopertubation for accurate diagnosis.

In our cohort, pelvic pathologies such as adhesions, ovarian cysts, and endometriosis were frequently encountered, findings that align with studies by Varlas et al and Sahu et al, who reported endometriosis in up to one-third of patients undergoing diagnostic laparoscopy.[5,6] The distribution of pelvic abnormalities also mirrors the results of Kelekci et al, where combined pelvic adhesions and cystic lesions were prevalent among infertile women.[7]

Hysteroscopic evaluation in our study revealed uterine septum as the most common intrauterine abnormality. This finding parallels the work of Kumar et al and Bosteels et al, who emphasized the significant reproductive impact of congenital uterine anomalies, particularly septate uterus, on implantation and miscarriage rates.[1,8] Our detection rate was slightly higher than that reported by Nayak et al, which may reflect differences in patient selection or referral patterns.[9]

Regarding the assessment of tubal patency, chromopertubation demonstrated greater diagnostic reliability compared to hysterosalpingography (HSG), corroborating prior research by Tsuji et al and Swart et al, both of whom highlighted the limitations of HSG in detecting peritubal adhesions and proximal occlusions.[2,10] The superiority of laparoscopic chromopertubation in identifying both functional and anatomical abnormalities is further supported by the meta-analysis conducted by Bosteels et al.[8.]

A notable strength of our approach was the integration of diagnostic and therapeutic interventions within the same sitting. This strategy, consistent with the operative principles described by Varlas et al and Watrelot et al, reduces the psychological and logistical burden on patients while enabling immediate correction of surgically amenable lesions.[5,11] Similar improvements in treatment outcomes with single-session hystero-laparoscopy have been documented by Sharma et al.[12]

However, the retrospective design and absence of post-procedure fertility follow-up remain significant limitations of our study. Prospective studies, such as those conducted by Sahu et al and Kelekci et al have demonstrated the value of long-term monitoring in correlating intraoperative findings with eventual pregnancy outcomes.[6,7] Future research should therefore focus on assessing reproductive performance and live birth rates following hystero-laparoscopic management of infertility.

Limitations of this are retrospective design and lack of follow-up on post-intervention fertility outcomes.

CONCLUSION

In summary, our results are in close agreement with several published studies, further validating the role of hystero-laparoscopy as both a diagnostic and therapeutic modality in infertility work-up. Its capacity to detect a wide spectrum of pelvic and uterine abnormalities while facilitating immediate intervention offers a distinct clinical advantage over conventional sequential diagnostic pathways.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Chouhan T, Singh V. Role of hystero-laparoscopy in evaluation of infertility: a retrospective observational study. Int J Reprod Contracept Obstet Gynecol 2025;14:3004-8.