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Original Research Article

A study on the role of endoscopic evaluation in subfertile couples undergoing treatment for infertility

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ABSTRACT

Background: Infertility affects approximately 10-15% of couples globally, with increasing numbers seeking medical assistance. Endoscopic procedures such as laparoscopy and hysteroscopy play a pivotal role in identifying and managing anatomical causes of female subfertility. This study aimed to evaluate the diagnostic and therapeutic value of endoscopic evaluation in subfertile couples undergoing infertility treatment.

Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynaecology, Government Medical College, Akola, from September 2023 to June 2025. A total of 116 subfertile women aged 18-35 years with primary or secondary infertility underwent combined laparoscopy and hysteroscopy. Demographic, clinical, and endoscopic findings were analysed, and patients were followed up for six months to assess conception outcomes.

Results: The majority of participants (87.93%) were aged 26-35 years, with primary infertility comprising 66.38% of cases. Laparoscopic abnormalities were found in 44.83% of patients tubal (27.58%), ovarian (17.24%), uterine (13.79%), and peritoneal (5.17%) factors. Hysteroscopy revealed abnormalities in 32.76% of women, the most common being endometrial polyps (12.94%) and submucous fibroids (6.90%). Therapeutic procedures such as adhesiolysis, septal resection, and polypectomy were performed in 41 patients. Within six months, 59.72% of women achieved conception.

Conclusions: Combined laparo-hysteroscopic evaluation serves as a safe, effective, and comprehensive modality for both diagnosis and treatment of female infertility. Early integration of endoscopy in infertility work-up enhances detection of correctable pathology and improves conception outcomes, particularly in unexplained or long-standing infertility.

Keywords: Conception rate, Endoscopic evaluation, Infertility, Subfertility

INTRODUCTION

Infertility, defined as the inability to conceive after one year of regular unprotected intercourse, is a significant global reproductive health issue affecting 8-12% of couples and carrying substantial emotional and social consequences.[1] The World Health Organization estimates that 60-80 million couples worldwide experience infertility, with a particularly high burden in low- and middle-income countries such as India, where prevalence ranges from 3.9% to 16.8%.[2] Infertility may be classified as primary, when conception has never occurred, or secondary, when pregnancy does not occur after a previous conception.[3]

Its etiology is multifactorial: female factors account for about 37% of cases, male factors for 8%, combined causes for 35%, and 10–20% remain unexplained.[4] Major female contributors include ovulatory disorders, tubal disease, endometriosis, and uterine or cervical abnormalities.[5] Although first-line investigations such as transvaginal ultrasound and hysterosalpingography (HSG) are widely

used, they may miss subtle but clinically relevant findings including minimal endometriosis, peri-tubal adhesions, small polyps, submucous fibroids, intrauterine adhesions, or congenital anomalies.[6]

Endoscopic evaluation laparoscopy and hysteroscopy has strengthened the diagnostic framework for infertility.[7] Laparoscopy is the gold standard for tubal patency, adhesions, endometriosis, and pelvic pathology, with the added benefit of therapeutic intervention.[8] Hysteroscopy allows direct visualization of the uterine cavity and accurately detects pathologies such as septa, adhesions, fibroids, and polyps that may impair implantation.[9] Combined hystero-laparoscopy provides a comprehensive, single-session assessment and improves detection of correctable lesions often missed by routine imaging.

However, its routine use in all infertile women remains debated due to its invasive nature and resource requirements, particularly in low-resource settings. There is a continuing need for real-world evidence to evaluate its diagnostic yield, therapeutic benefit, and impact on fertility outcomes.

Against this background, the present study was undertaken to assess the diagnostic and therapeutic role of combined hystero-laparoscopy in subfertile women attending a tertiary care hospital.

METHODS

This was a prospective observational study conducted in the Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Akola, Maharashtra, from September 2023 to June 2025, after obtaining approval from the Institutional Ethics Committee. A total of 116 women of reproductive age (18-35 years) presenting with primary or secondary infertility were enrolled after written informed consent. Women with male factor infertility, active pelvic infection, gynecological malignancy, or contraindications to surgery were excluded. Detailed history, clinical examination, and baseline investigations were carried out in all participants.

Combined diagnostic hystero-laparoscopy was performed during the follicular phase (day 5-12 of the menstrual cycle) under general anesthesia. Laparoscopy included systematic inspection of the uterus, tubes, ovaries, and peritoneal cavity; tubal patency was assessed by chromopertubation using methylene blue dye. Hysteroscopy was performed using a rigid hysteroscope to examine the uterine cavity, endometrium, and tubal ostia for polyps, septa, fibroids, or adhesions. Wherever indicated, operative interventions such as adhesiolysis, polypectomy, septal resection, endometrioma removal, or tubal block correction were carried out in the same sitting.

Post-procedure, patients were monitored and followed up for six months to assess conception outcomes, either spontaneous or assisted. Data regarding demographic variables, endoscopic findings, and conception rates were recorded, tabulated, and analysed using descriptive statistics, with results expressed as frequencies and percentages.

RESULTS

Demographic profile

Out of 116 patients, the majority (45.68%) were aged 26-30 years, followed by 42.25% aged 31-35 years. Only 1.73% were below 20 years (Table 1).

Table 1: Age distribution of patients (n=116).

Age (years)	No. of patients	Percentage
18-20	2	1.7
21-25	12	10.3
26-30	53	45.7
31-35	49	42.2

Infertility characteristics

Primary infertility was observed in 66.4%, while 33.62% had secondary infertility (Table 2). Most patients (31.04%) had an infertility duration between 2-4 years, followed by 23.27% with 4-6 years.

Table 2: Type and duration of infertility.

Variable	No. of patients	Percentage
Primary infertility	77	66.4
Secondary infertility	39	33.6
Duration 2-4 years	36	31.0
Duration >6 years	53	45.7

Comorbidities

The most common comorbidities were obesity (6.9%), diabetes mellitus (6.0%), and hypothyroidism (5.2%).

Endoscopic Findings

Laparoscopic findings

Among 116 patients, 64 (55.2%) had normal findings. Abnormalities included tubal factors (27.6%), ovarian factors (17.24%), uterine factors (13.8%), and peritoneal adhesions (5.2%) (Table 3).

Table 3: Laparoscopic findings.

Factor	No. of patients	Percentage
Tubal factors	32	27.6
Ovarian factors	20	17.2
Uterine factors	16	13.8
Peritoneal adhesions	6	5.2
Normal findings	64	55.2

Specific tubal findings

Hydrosalpinx (11.2%) and peritubal adhesions (12.0%) were most common, followed by tubo-ovarian mass (2.6%).

Hysteroscopic findings

Normal hysteroscopic findings were seen in 67.24%. The most common abnormalities were endometrial polyps (12.94%), submucous fibroids (6.9%), intrauterine adhesions (6.0%), and septate uterus (5.2%) (Table 4).

Table 4: Hysteroscopic findings.

Finding	No. of patients	Percentage
Normal	78	67.2
Endometrial polyp	15	12.9
Submucous fibroid	8	6.9
Intrauterine adhesions	7	6.0
Septate uterus	6	5.2

Operative procedures and conception outcome

Therapeutic interventions were done in 41 (56.9%) of 72 abnormal cases. The most common were adhesiolysis (12.5%), septal resection (12.5%), and polypectomy (9.7%).

On six-month follow-up, 43 (59.72%) of 72 treated patients conceived spontaneously or after minimal ovulation induction therapy (Table 5).

Table 5: Conception outcome after endoscopic evaluation.

Outcome	No. of patients	Percentage
Conceived	43	59.7
Not conceived	29	40.3

DISCUSSION

Infertility remains a growing global concern, and its successful management relies heavily on accurate identification of underlying etiologies. Endoscopic procedures, by providing direct visualization of pelvic anatomy, bridge the diagnostic gap left by imaging modalities such as ultrasound and HSG.[10]

In this study, the majority of women belonged to the 26-35-year age group, similar to studies by Sharma et al and Boricha et al, who also reported peak infertility prevalence in the late twenties to early thirties.[11,12] Primary infertility was more prevalent (66%), aligning with findings by Kavitha et al.[13]

Laparoscopic evaluation revealed tubal pathology in 27.6% and ovarian factors in 17.2% figures consistent with Godinjak et al who observed tubal and ovarian abnormalities in 30% and 20% of their cases, respectively.[14] Hydrosalpinx and peritubal adhesions were predominant findings, supporting previous evidence linking pelvic inflammatory disease and post-infective adhesions as major tubal causes.[15]

Uterine factors such as fibroids and endometriosis contributed to 13.8% of cases, comparable to Sharma et al, who reported 14% uterine abnormalities.[11] Hysteroscopy detected intrauterine lesions in 32.7% of women, corroborating the results of Muzio et al, who found 30-35% diagnostic yield in patients with unexplained infertility.[16]

The therapeutic advantage of endoscopy was notable; combined diagnostic and operative procedures in a single sitting improved conception rates to nearly 60%, consistent with studies by Vitale et al and Genovese et al, who demonstrated improved live birth and clinical pregnancy rates after correction of endoscopically detected abnormalities.[17,18]

The dual diagnostic-therapeutic role of hystero-laparoscopy makes it a "single-window" approach for infertility management.[19] It enables detection and treatment of correctable factors such as adhesions, septa, fibroids, and polyps that directly interfere with implantation or tubal function.

This study has few limitations. The present study was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. The follow-up period was restricted to six months, and long-term reproductive outcomes such as live birth rates could not be assessed. Additionally, male factor infertility and hormonal profiles were not evaluated in detail, which may have influenced conception outcomes. Future multicentric studies with larger cohorts and extended follow-up are recommended to validate and expand upon these findings.

CONCLUSION

Combined laparo-hysteroscopic evaluation provides a comprehensive, safe, and effective approach for both diagnosis and treatment of female infertility. By enabling direct visualization and simultaneous correction of pelvic and intrauterine abnormalities, it significantly enhances conception outcomes, particularly in unexplained or long-standing infertility. Early integration of endoscopic procedures into the infertility workup at tertiary care centers can thus optimize patient management and improve overall reproductive success rates.

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