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Original Research Article

Efficacy of combined hysteroscopy and laparoscopy in the evaluation and management of female infertility at a tertiary care center

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ABSTRACT

Background: Infertility, defined by the World Health Organization (WHO) as the inability to achieve pregnancy after one year of unprotected intercourse, is a significant health concern. The study aimed to assess the efficacy of combined hysteroscopy and laparoscopy in diagnosing and managing female infertility, focusing on their impact on pregnancy success rates in a tertiary care setting.
Methods: A retrospective observational study was conducted on 170 infertile women aged 20 to 40 years at GSL Medical College from January 2022 to December 2023. Diagnostic and therapeutic hysterolaparoscopy was performed to identify and treat intrauterine and tuboperitoneal abnormalities. Data were analyzed to determine the prevalence of different infertility factors and the effectiveness of these procedures in enhancing fertility outcomes.
Results: Of the 170 cases, 129 (75.8%) were diagnosed with primary infertility, and 41 (24.1%) with secondary infertility. The most common abnormalities detected included tubal infertility (19.4%) and endometriosis (14.1%). The overall pregnancy success rate was 31.18%, with significant contributions from ovulation induction, IUI, and in vitro fertilization (IVF). Spontaneous pregnancies were infrequent, highlighting the importance of medical intervention.
Conclusions: Combined hysteroscopy and laparoscopy are effective tools for evaluating and managing female infertility. These procedures are particularly valuable in diagnosing and treating conditions like tubal infertility, endometriosis, and uterine anomalies, leading to improved pregnancy outcomes.

Keywords: Endometriosis, Hysteroscopy, Infertility, Laparoscopy, Pregnancy success rate, Tubal infertility

INTRODUCTION

Infertility is a significant global health issue, affecting approximately 15% of reproductive-age couples.[1] Defined by the World Health Organization (WHO) as the inability to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse, infertility has profound implications for affected individuals and couples.[2] Several causes of female infertility have been identified. These include anatomical issues like tuboperitoneal abnormalities, uterine cavity distortion by myomas, and congenital uterine anomalies. Ovulatory and menstrual disorders, such as amenorrhea, and endocrine disorders, including hypothalamic dysfunction, prolactinoma, and polycystic ovary syndrome (PCOS), are also contributing factors. Additionally, endometriosis, harmful lifestyle choices like smoking and drinking, and other diseases related to female infertility play significant roles.[3]

Hysterolaparoscopy, a combined procedure of hysteroscopy and laparoscopy, has emerged as a comprehensive diagnostic and therapeutic tool in the evaluation of female infertility. This approach allows for the direct visualization and simultaneous treatment of intrauterine and pelvic pathologies, which are often missed by conventional imaging techniques like hysterosalpingography (HSG).[4-7]

Hysterolaparoscopy has a high detection rate for abnormalities such as endometriosis, adnexal adhesions, and subseptate uterus, which are often missed by other imaging modalities.[5-7] This procedure can also detect structural abnormalities in the uterus, tubes, ovaries, and peritoneal cavity, making it a valuable tool in the evaluation of female infertility.[7] Studies have demonstrated the efficacy of hysterolaparoscopy in diagnosing and treating conditions such as endometriosis, adhesions, polyps, fibroids, and tubal blockages, thereby enhancing the chances of achieving pregnancy.

Hysterolaparoscopy has proven to be superior to other imaging modalities in identifying and treating these conditions.[8] The combined approach not only enhances diagnostic accuracy but also allows for immediate therapeutic interventions, reducing the need for multiple procedures and thereby improving patient outcomes. However, further research is needed to fully understand the role of hysterolaparoscopy in the diagnosis and treatment of infertility.

Hysterolaparoscopy can be considered as a definitive investigative procedure for the evaluation of female infertility.[7]

The current study aimed to evaluate the role of hysterolaparoscopy in the diagnosis and management of infertility in a tertiary care setting.

METHODS

This prospective observational study was conducted at the department of obstetrics and gynecology, GSL Medical College, Rajahmundry, from January 2022 to December 2023. The study included 170 women presenting with infertility. All participants provided informed consent and were pre-screened to meet the inclusion criteria.

Inclusion criteria

Women aged between 20-40 years. Diagnosed with primary or secondary infertility. Patients willing to participate and provide informed consent.

Exclusion criteria

Patients with contraindications to general anesthesia. Active pelvic infection or untreated genital tract tuberculosis. Severe medical or surgical comorbidities that preclude the use of hysterolaparoscopy.

Preoperative preparation

A detailed medical history and physical examination were conducted for each participant.

Baseline investigations, including hormonal profiles, semen analysis for the male partner, and imaging studies such as ultrasound and HSG or SSG, were performed.

Patients were admitted one day prior to the procedure for pre-anesthetic evaluation and preparation.

Hysterolaparoscopy procedure

The procedure was scheduled in the preovulatory phase (between day 5 and day 10 of the menstrual cycle) and performed under general anesthesia.

Diagnostic laparoscopy involved the insertion of a 30-degree telescope to inspect the peritoneal cavity, uterus, fallopian tubes, ovaries, and adnexae for any abnormalities such as adhesions, endometriosis, or tubal blockages. Chromopertubation with methylene blue dye was used to assess tubal patency.

Diagnostic hysteroscopy was performed to evaluate the uterine cavity, including the endometrium, tubal ostia, and the presence of intrauterine anomalies like septa, polyps, or fibroids.

Therapeutic interventions, such as adhesiolysis, endometriosis fulguration, polypectomy, myomectomy, and tubal cannulation, were carried out during the same session if indicated.

Postoperative care

Patients were monitored postoperatively for complications and managed according to standard protocols. They were discharged on the next day, and were scheduled for follow-up visits to assess outcomes and any further treatment needs.

RESULTS

A slightly higher percentage of normal findings were observed in secondary infertility cases (53.7%) compared to primary infertility cases (48.1%) (Table 1). The difference in the prevalence of normal and abnormal findings between primary and secondary infertility was not statistically significant (p=0.6563).

Table 1: Prevalence of normal and abnormal hysterolaparoscopic findings.

Procedure	Primary Infertility (n=129)	Secondary Infertility (n=41)	χ^2	P value
Hysterolaparoscopy	**N (%)**	**N (%)**		
Normal	62 (48.1)	22 (53.7)	0.1981	0.6563
Abnormal	67 (51.9)	19 (46.3)		

Table 2: Distribution of patients according to age group.

Age in years	Primary infertility	Secondary infertility	Total
	N (%)	N (%)	N (%)
20-25	53 (41.1)	10 (24.4)	63 (37.1)
26-30	49 (38.0)	22 (53.7)	71 (41.8)
31-35	15 (11.6)	5 (12.2)	20 (11.8)
36-40	12 (9.3)	4 (9.8)	16 (9.4)
Total	129 (100)	41 (100)	170 (100)

The majority of patients with primary infertility are in the 20-25 age group (41.1%), followed by the 26-30 age group (38.0%). For secondary infertility, most patients are in the 26-30 age group (53.7%). Overall, the 26-30 age group constitutes the largest proportion of the study population (41.8%) (Table 2).

Tubal infertility and endometriosis were common laparoscopic findings in both groups. Secondary infertility patients had a higher prevalence of peritoneal adhesions and ovarian/para-ovarian cysts compared to primary infertility patients (Table 3).

Table 3: Laparoscopic findings among the studied groups.

Findings	Primary infertility (n=129) (%)	Secondary infertility (n=41) (%)	Total (n=170) (%)
Normal	62 (48.1)	22 (53.7)	84 (49.4)
Tubal infertility	24 (18.6)	9 (22.0)	33 (19.4)
Endometriosis	18 (14.0)	6 (14.6)	24 (14.1)
Peritoneal adhesions	12 (9.3)	7 (17.1)	19 (11.0)
Ovarian and para-ovarian cysts	10 (7.8)	8 (19.5)	18 (10.5)
Uterine anomalies	6 (4.7)	5 (12.2)	11 (6.5)
PCO	12 (9.3)	4 (9.8)	16 (9.4)
Myoma	2 (1.6)	1 (2.4)	3 (1.8)
Unexplained infertility (DHLS)	23 (17.8)	0 (0.0)	23 (13.5)
Endometrioma	10 (7.8)	4 (9.8)	14 (8.2)

Table 4: Hysteroscopic findings among the studied groups.

Findings	Primary infertility (n=129) (%)	Secondary infertility (n=41) (%)	Total (n=170) (%)
Normal	80 (62.0)	22 (53.7)	102 (60.0)
Septum	21 (16.3)	5 (12.2)	26 (15.3)
Polyp	9 (7.0)	3 (7.3)	12 (7.1)
Myoma	3 (2.3)	1 (2.4)	4 (2.4)
Synechiae	11 (8.5)	10 (24.4)	21 (12.4)
Thickened polypoidal endometrium	4 (3.1)	1 (2.4)	5 (2.9)

Table 5: Prevalence of chromo-perturbation findings.

Chromo-perturbation findings	Group-A (PI) (n=129) (%)	Group-B (SI) (n=41) (%)	Total abnormalities detected (%)
Normal patency	106 (82.17)	29 (70.73)	135 (79.41)
B/l block	6 (4.65)	2 (4.88)	8 (4.71)
U/l block	9 (6.98)	4 (9.76)	13 (7.65)
One tube absent, 2nd tube patent	2 (1.55)	2 (4.88)	4 (2.35)
One tube absent, 2nd tube blocked	2 (1.55)	1 (2.44)	3 (1.76)
Delayed spills	5 (3.88)	3 (7.32)	8 (4.71)
Total	129 (100.00)	41 (100)	170 (100.00)

The most common hysteroscopic abnormality in primary infertility was the septum (16.3%), while synechiae were more prevalent in secondary infertility cases (24.4%) (Table 4).

Normal tubal patency was observed in the majority of both primary (82.17%) and secondary infertility (70.73%) cases. Unilateral block was more common in secondary infertility cases (9.76%) (Table 5).

Operative interventions on laparoscopy such as ovarian cystectomy and adhesiolysis were more frequent in secondary infertility cases. Endometrioma excision was similarly distributed among both groups (Table 6).

On hysteroscopy adhesiolysis was a common therapeutic procedure in secondary infertility cases (24.4%), while septal resection was more prevalent in primary infertility cases (16.3%) (Table 7).

The overall success rate for restoring tubal patency was relatively low across all categories. Bilateral tubal block cases had some restoration success, but a majority were not restored. Unilateral tubal block cases also had low restoration success, slightly lower than bilateral block cases. Cases with one tube blocked and the second tube absent had the poorest outcomes, with no restorations achieved (Table 8).

Table 6: Distribution of cases according to operative interventions on laparoscopy.

Findings	Primary infertility (n=129)	Secondary infertility (n=41)	Total (n=170)
Endometrioma excision	6 (4.65)	2 (4.88)	8 (4.71)
Superficial endometriosis fulguration	4 (3.10)	0 (0.00)	4 (2.35)
Endometrioma puncture and drainage	4 (3.10)	2 (4.88)	6 (3.53)
Ovarian cystectomy	7 (5.43)	8 (19.51)	15 (8.82)
Paraovarian cystectomy	3 (2.33)	0 (0.00)	3 (1.76)
Adhesiolysis	12 (9.30)	7 (17.07)	19 (11.18)
Myomectomy	2 (1.55)	1 (2.44)	3 (1.76)
PCOS drilling	4 (3.10)	2 (4.88)	6 (3.53)
Salpingectomy	4 (3.10)	3 (7.32)	7 (4.12)

Table 7: Distribution of cases according to operative interventions on hysteroscopy.

Findings	Primary infertility (n=129)	Secondary infertility (n=41)	Total (n=170)	Percentage (%)
Septal resection	21 (16.3)	5 (12.2)	26 (15.3)	15.3
Polypectomy	9 (7.0)	3 (7.3)	12 (7.1)	7.1
Adhesiolysis	11 (8.5)	10 (24.4)	21 (12.4)	12.4
Myomectomy	3 (2.3)	1 (2.4)	4 (2.4)	2.4

Table 8: Distribution of cases according to tubal cannulation outcome.

Tubal Block Type	Restored status	Group-A (PI) (n=129)	Group-B (SI) (n=41)
Bilateral tubal block	Unilateral restored	1	0
	Bilateral restored	1	0
	Not restored	4	2
Unilateral tubal block	Restored	2	1
	Not restored	7	3
One tube blocked 2nd tube absent	Restored	0	0
	Not restored	2	1

Table 9: Distribution of cases according to pregnancy outcome.

Categories	Primary infertility	Secondary infertility	Total	%
Ovulation induction	12	6	18	10.59
IUI	8	4	12	7.06
IVF	10	6	16	9.41
Spontaneous pregnancy	5	2	7	4.12
Total	35	18	53	31.18

Pregnancy success rate

53 out of 170 patients achieved pregnancy through various methods during follow up of 8 months, yielding an overall pregnancy success rate of 31.18% (Table 9). Ovulation induction, IUI and IVF were the most effective methods, contributing significantly to the total pregnancies achieved. Both primary and secondary infertility cases had

comparable outcomes in terms of the proportion of patients achieving pregnancy through each method. A small number of patients achieved spontaneous pregnancies, indicating the importance of medical intervention in achieving pregnancy for these patients.

DISCUSSION

Prevalence of normal and abnormal findings

In our study, 48.1% of women with primary infertility and 53.7% of those with secondary infertility had normal findings on hysterolaparoscopy. This aligns with the study by Dawle et al where 66% of women had normal findings, and Agrawal et al, where 37.5% of women had normal findings.[9,10] However, the proportion of abnormal findings was higher in our study (51.9% in primary and 46.3% in secondary infertility), reflecting the comprehensive diagnostic capability of hysterolaparoscopy in detecting subtle pathologies.

Laparoscopic findings

Our study found that tubal infertility was the most common abnormality detected laparoscopically (19.4%), followed by endometritis (14.1%) and peritoneal adhesions (11%). These findings are comparable to those reported by Nayak et al, where tubal pathology was observed in 7% of cases, and endometriosis and adnexal adhesions were common findings.[5] Agrawal et al reported adhesions (23.2%) and tubal blocks (19.7%) as the most common findings, supporting our results on the significance of tubal and peritoneal factors in infertility.[10] Tubal factors were also reported by other studies such as Pande et al (25.22%) and Wael Hussein Al-Bromboly et al (11.1% in secondary infertility).[11,12] Varlas et al reported tubal pathology in 11.8% of cases.[4]

Endometriosis was found in 14.1% of our cases, similar to Al-Bromboly et al finding of 12.5% in primary infertility.[11] Pande et al reported a slightly higher prevalence of endometriosis at 13.81%, while Varlas et al found it in 17.2% of cases.[4,12]

Peritoneal adhesions were identified in 11% of our cases, consistent with Al-Bromboly et al finding of 12.2% in secondary infertility.[11] This was lower than the 17.1% reported by Varlas et al but higher than Pande et al 7.8%.[4,11]

Hysteroscopic findings

The most frequent hysteroscopic finding in our study was a septum found in 15.3% of cases, followed by synechiae (12.4%) and polyps (7.1%). These results are consistent with the findings of Agrawal et al, who reported septum (7.1%) and polyps (5.4%) as common abnormalities.[10] Similarly, Dawle et al found synechiae to be the most important abnormality (7.29%), highlighting the role of hysteroscopy in detecting intrauterine pathologies that may not be evident on other imaging modalities.[9] Uterine septum was the most common hysteroscopic finding in our study (15.3%), aligning with Pande et al (12.61%) and Al-Bromboly et al (17.3% in primary infertility).[11,12] Our study found synechiae in 12.4% of cases, higher than Al-Bromboly et al 13.4% in secondary infertility and Pande et al 2.41%.[11,12]

Chromopertubation findings

In our study, chromopertubation results indicated that 79.4% of cases had normal tubal patency, while 20.59% exhibited tubal blockages. These findings are consistent with Agrawal et al, who reported a similar incidence of tubal blockages at 19.7%.[10] Dawle et al observed a slightly higher rate of normal tubal patency at 82.29%, but this is still within a comparable range, highlighting the significance of chromopertubation in evaluating tubal patency.[9] Furthermore, our study's rate of normal patency slightly exceeds the results of Al-Bromboly et al.[11] Notably, both bilateral and unilateral tubal blocks were less prevalent in our study compared to others, emphasizing the variations in tubal assessment across different populations.

Operative interventions

In terms of operative interventions, our study showed that adhesiolysis was the most common procedure performed laparoscopically (11.1%), followed by ovarian cystectomy (8.8%) and endometrioma excision (4.7%). These results are comparable to the findings of Agrawal et al where adhesiolysis (14.3%) and myomectomy (17.9%) were frequently performed.[10] Hysteroscopic procedures in our study were dominated by septal resection (15.3%) and adhesiolysis (12.4%), similar to Agrawal et al who reported myomectomy and adhesiolysis as common interventions.[10] More frequent in secondary infertility cases in our study (24.4%), consistent with Al-Bromboly et al (23.5%).[11] Similar distributions were found across studies, with our study showing 8% for endometrioma excision.

Pregnancy outcomes

Our study reported a 31.18% overall pregnancy success rate, comparable to other studies, indicating the effectiveness of hysterolaparoscopy in managing infertility.

Comparison with literature

Our findings align well with the broader literature on the role of hysterolaparoscopy in infertility. The prevalence of various abnormalities and the types of operative interventions performed are consistent with those reported in other studies, demonstrating the utility and effectiveness of hysterolaparoscopy as a diagnostic and therapeutic tool in infertility management.

CONCLUSION

Our study supports the use of hysterolaparoscopy in the comprehensive evaluation and management of female infertility. The comparison with other studies reinforces the significance of this approach in identifying and addressing a wide range of infertility-related pathologies. This alignment with existing literature validates the robustness of our findings and underscores the critical role of hysterolaparoscopy in infertility work-up.

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