International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Sireesha KV et al. Int J Reprod Contracept Obstet Gynecol. 2023 Nov;12(11):3237-3244
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20233153

Original Research Article

Hysterolaparoscopy as a comprehensive diagnostic and therapeutic tool in modern art

Karupothula V. Sireesha*, Yelamanchali Himabindu, Anam Ul Haq, Gogineni Kavitha, Donthu Kiranmai

Department of Reproductive Medicine and Surgery, GSL Medical College, Rajahmundry, Andhra Pradesh, India

Received: 17 September 2023
Accepted: 04 October 2023

***Correspondence:**
Dr. Karupothula V. Sireesha,
E-mail: sireesha.k.v10@gmail.com

ABSTRACT

Background: Infertility affects about 10-15% of reproductive age couple and is increasing globally. None of the laboratory findings alone are conclusive in diagnosing infertility. The ability to visualize and simultaneously treat the identified pathology makes hysterolaparoscopy an essential part of infertility management. Aim of the study was to evaluate hysterolaparoscopy as a comprehensive diagnostic and therapeutic tool in female infertility management. Objective of the study was to evaluate various etiological factors in infertility and the therapeutic interventions done during hysterolaparoscopy.
Methods: A cross-sectional study of 250 cases over one year from October 2021 to September 2022 at a teritiary care hospital. Women with primary or secondary infertility aged between 20-40 years were included. Patients with contraindications for general anaesthesia and active pelvic infection were excluded.
Results: Out of 250 patients, 195(78%) had primary infertility and 55(22%) had secondary infertility. In primary infertility group 69% and in secondary infertility group 87.7% had abnormal laparoscopy findings. The most common laparoscopic abnormality is tubal factor both in primary infertility (58%) and secondary infertility (58%) group and on hysteroscopy, endometritis is the commonest abnormality in both.
Conclusions: In experienced hands, hysterolaparoscopy is a very safe operation. The abnormalities of pelvic and uterus can be diagnosed and also resolved in hysterolaparoscopy at the same time. Also, the future plan of management can be taken in time after the evaluation.

Keywords: Infertility, Hysteroscopy, Laparoscopy, Hysterolaparoscopy, Tubal factor, Peritoneal factor, Primary, secondary, PCOS, Endometriosis, Myomectomy, Septal resection

INTRODUCTION

Infertility is a disease of reproductive system defined by failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.[1]

Infertility affects about 10–15% of reproductive-age couples. Approximately 13-19 million couples are likely to be infertile in India at any given time.[2] Leading cause of infertility includes tuboperitoneal disease (40–50%), ovulatory disorders (30–40%), uterine factor (15–20%) and male factor infertility (30–40%).[3,4]

In process of evaluation of female partner, clinical examination and radiological investigations do provide information about possible pathologies, albeit only indirectly.

Hysterolaparoscopy becomes the “third eye” in diagnosis and can be used for both diagnostic and operative purposes. Laparoscopy can reveal the presence of peritubal adhesions, periadnexal adhesions, tubal pathology, and endometriosis in 35–68% of cases even after normal HSG.[3] Diagnostic hysteroscopy is an equally important modality to detect uterine anomalies and other intrauterine

pathologies.[5] According to Lindemann et al, laparoscopy and hysteroscopy can be combined in one session to permit a full survey of the uterus and tubes and is useful in detecting and treating the cause of infertility in female.[6] This also minimizes the hospital stays of the infertile woman for investigations.

Hence, this study is taken up to evaluate the role of hysterolaparoscopy as an effective and safe tool in comprehensive evaluation and treatment of infertility.

METHODS

This clinical study is a prospective observational study of 250 cases with infertility admitted in the Department of Reproductive Medicine and Surgery, GSL Medical College, Rajahmundry, from August 2021 to July 2023.

Inclusion criteria

Women with primary or secondary infertility aged between 20-40 years.

Exclusion criteria

Contraindications for general anaesthesia and active pelvic infection.

Statistical methods

All data was entered into Microsoft office excel and statistical analysis was made with IBM statistical package for the social sciences (SPSS) 21.0 software.

Prior to commencement of the study, ethical clearance was obtained from Institutional Ethics Committee. Patients satisfying the selection criteria were informed in detail about the nature of study, and a written informed consent was obtained prior to procedure.

A detailed history and clinical examination and demographic data such as age, religion, education, and socioeconomic status were obtained and a relevant examination of the husband was done. The scheduled investigations were done to determine fitness for surgery. Patient was admitted one day prior to the procedure, and preanesthetic checkup was done. Hysterolaparoscopy was scheduled in preovulatory period between day 5 and day 10 of cycle and done under general anesthesia. Diagnostic laparoscopy was performed using a 30-degree deflection angle telescope powered with a fiber-optic cable for light source. Panoramic view of the abdomen was obtained a stepwise evaluation was made.

To start with a general assessment of peritoneal cavity especially the lower part of the abdomen and pelvis was made to note any obvious pathology in the form of adhesions or any gross deviations from the normal appearances assessment of other intraabdominal organs like liver and spleen in a clockwise direction. The size and shape of the uterus, any apparent congenital malformations, and any adhesions between the uterus, adnexae, omentum etc., were looked for and recorded. Tubes were identified and any pathology was looked for and recorded. With respect to ovaries, size, shape, surface, color, presence of cysts and relation with tubes was noted. Bilateral ovarian fossae, pouch of Douglas, peritoneal cavity, omentum, sub hepatic and perihepatic space inspected. Any pathology was recorded. Laparoscopic chromopertubation was performed for testing tubal patency.

In hysteroscopy, vaginoscopy was done followed by endocervical canal and uterine cavity. Both the tubal ostia were visualized. Presence of pathology such as septum, any congenital malformation, fibrotic bands, polyps, myomas, abnormal endometrial appearance are recorded.

Surgical interventions were carried out when required during the procedure. Patients were managed postoperatively as per hospital protocol and discharged and called for follow up.

RESULTS

Out of 250 subjects, 195 (78%) had primary infertility and 55 (22%) had secondary infertility (Figure 1 and Table 1).

Table 1: Distribution of cases according to type of infertility.

Type of infertility	No of patients (N)	%
Primary infertility	195	78
Secondary infertility	55	22
Total	250	100

The most common age group among the primary infertility is 20-25 years (53.3%) whereas in secondary infertility the most common age group is 26-30 years (58.2%). Overall, majority (49.2%) cases were in the 20-25 years of age group (Table 2).

The distribution of patients according to duration and type of infertility is shown in (Table 3). Among the primary infertility couples, most of them (62%) were married for 1–5 years and in the secondary infertility couples, majority (54.5%) were married for 6-10 years.

Out of 250 cases studied, 68 (27.2%) had normal findings on laparoscopy (Table 4). The tubal pathology is the most common detected in both primary (58%) and secondary (58%) infertility.

The features of salpingitis secondary to pelvic inflammatory disease such as hydrosalpinges, tuboovarian mass, tuberculosis (caseous material), peritubal adhesion, tubal congestion, sacculated tubes and fimbrial and inclusion cysts altogether constituted the most common tubal pathology in both primary (57%) and secondary

infertility (63.2%). Congenital single tube is seen in 2% of primary and 13.3% of secondary infertility. One case of rectovaginal septum was noted in primary infertility group (Table 5).

Laparoscopic findings of uterus in 250 cases for infertility findings were as follows: 14 (5.6%) of them had fibroid uterus. Mullerian anamolies were noted in 33 (13.2%) cases. Out of these, 21 (8.4%) had septate uterus, 6 (2.4%) had unicornuate uterus, 2 (0.8%) had bicornuate uterus and 4 (1.6%) had arcuate uterus (Table 5).

Laparoscopic findings of ovaries are depicted in (Table 5). Polycystic ovaries (bulky ovaries) were seen in 6.4% of cases, and features of endometriosis was noted in 26 (10.4%) cases.

Laparoscopic findings of pelvic pathology showed endometriosis in 46 (18.4%) cases of which minimal endometriosis was seen in 20 (8%), moderate in 16 (6.4%), and severe in 10 (4%) cases. Pelvic congestion was seen in 8 (3.2%) cases (Table 5).

Chromopertubation findings of 250 cases showed bilateral spillage in 184 (73.6%) patients. Unilateral spillage was seen in 25 (10%), and there was tubal block in 37 (14.8%) cases (Table 6).

Hysteroscopy findings were normal in 70 (36%) cases of primary and 11 (20%) cases of secondary infertility. In the rest, 45 (18%) had endometrial polyps, 26 (10.4%) had fibroid, 19 (7.6%) had septate uterus, 57 (22.8%) had congested and hyperemic endometrium, and 58 (23.2%) had intrauterine adhesions and 20 (8%) had atrophic endometrium. The triad of chronic endometritis i.e., polyps, adhesions and hyperemia were noted in 160 (64%) cases (Table 7).

Laparoscopic interventions were performed in the form of ovarian cystectomy in 27 (10.8%), paraovarian cystectomy in 4 (1.6%), adhesiolysis in 25 (10%) cases, drilling of polycystic ovaries in 10 (4%) cases, fulguration or excision of endometriosis nodules in 16 (6.4%), myomectomy in 8 (3.2%) cases), endometriotic cystectomy in 14 (5.6%), endometrioma puncture and drainage in 8 (3.2%) and salpingectomy done in 8 (3.2%) (Table 8).

Operative hysteroscopic interventions such as cannulation under laparoscopy guidance in 37 (14.8%), fibroid resection in 26 (10.4%), polypectomy in 45 (18%), septal resection 19 (7.6%) and adhesiolysis in 58 (23.2%) cases were done (Table 9). Following tubal cannulation patency could be restored in 12 (4.8%) unilateral and 10 (4%) bilateral blocks (Table 10).

Table 2: Distribution of the patients according to age group.

Age in years	Primary infertility		Secondary infertility		Total	
	N	%	N	%	N	%
20-25	104	53.3	19	34.5	123	49.2
26-30	66	33.8	32	58.2	98	39.2
31-35	17	8.7	2	3.6	19	7.6
36-40	8	4.1	2	3.6	10	4
Total	195	100	55	100	250	100

Table 3: Distribution of cases according to duration of infertility.

Duration of infertility in years	Primary infertility		Secondary infertility		Total	
	N	%	N	%	N	%
20-25	104	53.3	19	34.5	123	49.2
26-30	66	33.8	32	58.2	98	39.2
31-35	17	8.7	2	3.6	19	7.6
36-40	8	4.1	2	3.6	10	4
Total	195	100	55	100	250	100

Table 4: Distribution of cases according to findings in laparoscopy.

Findings	Primary infertility		Secondary infertility	
	N	%	N	%
Normal	104	53.3	19	34.5
Tubal pathology	66	33.8	32	58.2
Ovarian pathology	17	8.7	2	3.6
Uterine pathology	8	4.1	2	3.6
Pelvic pathology	195	100	55	100

Table 5: Distribution of cases according to tubal, uterine, ovarian and pelvic pathology findings in laparoscopy.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Tubal findings in laparoscopy						
Hydrosalpinx	20	11	8	13.3	28	11.2
Sacculations	25	13	5	10	30	12
Peritubal adhesions	16	8	9	16.6	25	10
Tubo ovarian mass	4	2	2	3.3	6	2.4
Pyosalpinx (caseous)- TB	4	2	2	3.3	6	2.4
Congenital single tubal aplasia	4	2	8	13.3	12	4.8
Rectovesical septum	1	0.5	-	-	1	0.4
Fimbrial cysts	25	13	5	10	30	12
Tubal congestion	16	8	4	7	20	8
Uterine findings on laparoscopy						
Fibroids	12	6	2	3.3	14	5.6
Mullerian anamolies	14	7	19	34	33	13.2
Septate uterus	8	4	13	23.6	21	8.4
Unicornuate	4	2	2	3.3	6	2.4
Bicornuate	2	1	-	-	2	0.8
Arcuate	-	-	4	6.	4	1.6
Ovarian findings on laparoscopy						
Ovarian cyst	16	8	8	13.3	24	9.6
Adhesions	16	8	5	10	21	8.4
Tubo ovarian mass	4	2	2	3.3	6	2.4
Endometrioma	16	8	6	9.9	22	8.8
Superficial endometriosis	4	2	-	-	4	1.6
Congenital single ovary	6	3	-	-	6	2.4
Paraovarian cyst	6	3	-	-	6	2.4
Pcos	12	6	4	6.6	16	6.4
Dermoid	-	-	2	3.3	2	0.8
Pelvic pathology findings in laparoscopy						
Minimal endometriosis	16	8	2	3.3	20	8
Moderate endometriosis	12	6	4	6.6	16	6.4
Severe endometriosis (POD obliteration)	8	4	2	3.3	10	5
Congestion	4	2	4	3.3	8	3.2

Table 6: Findings of chromotubation test.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Bilateral spill	156	81	28	50	184	73.6
Unilateral spill	16	8	9	17	25	10
Unilateral tubal block	12	6	6	10	18	7.2
Bilateral tubal block	10	5	9	17	19	7.6

Table 7: Distribution of cases according to findings on hysteroscopy.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Normal	70	36	11	20	81	32.4
Abnormal	125	64	44	80	169	67.6
Hyperemia (congestion)	49	25	8	14	57	22.8
Polyp	37	15	8	14	45	18
Septum	8	4	13	23.6	19	7.6
Atrophy/scarred	12	6	8	15	20	8

Continued.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Adhesions	39	20	19	35	58	23.5
Fibroid	16	8	10	18	26	10.4

Table 8: Distribution of cases according to operative interventions on laparoscopy.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Endometrioma excision	10	5	4	6.6	14	5.6
Superficial endometriosis fulguration	14	7	2	3.3	16	6.4
Endometrioma puncture and drainage	6	3	2	3.3	8	3.2
Ovarian cystectomy	16	8	11	20	27	10.8
Paraovarian cystectomy	4	2	-	-	4	16
Adhesions	16	8	9	16.6	25	10
Myomectomy	6	3	2	3.3	8	3.2
Pcos drilling	6	3	4	6.6	10	4
Salpingectomy	4	2	4	6.6	8	3.2

Table 9: Distribution of cases according to operative interventions on hysteroscopy.

Findings	Primary infertility		Secondary infertility		Total	
	n=195	%	n=55	%	n=250	%
Septal resection	8	4	11	20	19	7.6
Polypectomy	37	15	8	14	45	18
Adhesiolysis	39	20	19	35	58	23.2
Myomectomy	16	8	10	18	26	10.4

Table 10: Distribution of cases according to tubal cannulation outcome.

Findings	Unilateral				Bilateral			
	Patency restored		Patency not restored		Patency restored		Patency not restored	
	n=195	%	n=195	%	n=55	%	n=55	%
Primary infertility	10	5	2	1	4	2	6	3
Secondary infertility	2	3.3	6	2.4	10	4	6	2.4

DISCUSSION

Infertile couple undergo multiple investigations such as seminogram, hormonal profiles, hysterosalpingogram (HSG)/ sonosalpingogram (SSG) and receive ovulation induction for anovulatory cases, timing ovulation with follicular tracing by transvaginal ultrasound and following timed coitus and controlled ovulation stimulation for unexplained infertility as part of management. The ovulatory women with normal male factor and patent tubes have higher possibility of having tuboperitoneal and subtle endometrial pathologies. Performing hysterolaparoscopy as single step procedure straightway in these patients proves to be more fruitful as therapeutic interventions or early decisions for ART or both can be undertaken simultaneously.[7]

Hysterolaproscopy may appear to be invasive, but it may become more beneficial, as diagnosis and therapeutic interventions can be done at the same sitting. The decisions for artificial reproductive technique can be taken in time after the evaluation of hysterolaparoscopy.[8] Mettler reported that the complication rate of hysteroscopy was 1.65%.[9] Monitored by laparoscopy, the complication rate of hysteroscopy declined significantly. Hysterolaparoscopy is a very safe operation. Other than mild abdominal pain, there were no major surgical or anesthetic complications in any of our patients. Combined hysterolaparoscopy make it possible to evaluate completely and treat in the same sitting.

Female age is an important factor in infertility. In our study, maximum number of patients 104 (53.3%) belonged to 20-25 years in primary infertility group and 32 (58.2%) patients belonged to 26-30 years in case of secondary infertility group. In a study done by Parihar et al, the age group of patients was 26-30 years in primary infertility group and 31-36 years in secondary infertility group.[10] This difference could be explained on the grounds of social and cultural differences influencing age of marriage in different regions. The patients in secondary infertility group were comparatively older to primary infertility group. This may be due to shift in age of marriage and

child-bearing among females due to the present changed socioeconomic scenario.

The duration of infertility in maximum cases of primary was 1-5 years (121/195, 62%) and secondary was 6-10 years (30/55, 54.5%). In the study done by Chaudhary et al and Chanu et al, the mean duration of infertility in the primary and secondary infertility was 5.1±2.2 years and 4.9±2.7 years, respectively.[11,12]

In the present study, laparoscopic abnormalites were more common than hysteroscopy abnormalites both in primary infertility group and secondary infertility group. These findings were similar to studies done by Mehta et al and Zhang et al.[13,14]

In the present study the number of cases with abnormal findings both on laparoscopy (72.8%) and hysteroscopy (67.6%) are more than those with normal findings. In a cross-sectional observational analytical investigation done by Selim et al, diagnostic hysteroscopy was normal in 160 cases 160/202 (79.2%) and diagnostic laparoscopy was normal in 150 cases 150/202 (74.3%).[15] This difference could explained on the fact that the present study was done at a teritiary care centre where most cases taken up for hysterolaparoscopy were those with an obvious pathology requiring surgical intervention and those who have not conceived despite multiple cycles of ovulation induction with history of long marital life and normal findings on routine investigations. This also highlights the capability of hysterolaparoscopy in unravelling the hidden pathology contributing to infertility which are hitherto undiagnosed on routine clinical and radiological examination.

In the present the most common abnormal findings on laparoscopy were seen in relation to the fallopian tubes and pelvic factors in both primary (76%) and secondary (94.3%) infertility. The most common pathology noted on diagnostic hysteroscopy were features suggestive of chronic endometritis in both primary (60%) and secondary (63%) infertility. The findings in the current study are similar to those with Jayakrishnan et al and Mehta et al in which pelvic pathology was detected in 26.8% and 30% cases respectively.[14,18]

Pelvic inflammatory disease and endometriosis were the most common abnormalities in two groups. The higher prevalence of STI and PID and TB in this geographical area are due to several factors like early age at marriage and sexual life, poor socioeconomic status and nourishment and personal hygiene and also insufficient knowledge on precautionary measures and treatment and possible consequences on fertility outcome of these diseases. Synechiae formation was more seen in secondary infertility and could be due to prior dilatation and curettage. Tubal and peritoneal pathology accounts for approximately 30 to 35% of infertile couples.[16] The gold standard technique for diagnosing these disorders is hysterolaparoscopy, which is a better predictor of future spontaneous pregnancy in couples with infertility.[17] Also, simultaneous therapeutic procedures such as adhesiolysis (laparoscopy – 25 (10%); hysteroscopy – 58 (23.2%), salpingectomy (8 (3.1%) can be done. This allows the clinician to make an appropriate treatment plan to increase the fertility rate at a short interval of time.

Endometriosis was the second common pathological finding (15.2%), similar to study by Wadadekar et al (17.5%) and Puri et al (18%).[18,19] This can be staged and treated in the same sitting with the help of hysterolaparoscopy and were subclassified according to ASRM criteria. Fulguration of endometriotic spots was performed in 16 (6.4%) and endometrioma resection was done in 14 (5.6%) and endometrioma puncture and drainage in 8 (3.2%). The surgical removal of endometriotic implants in minimal– mild severity endometriosis was shown to improve fertility in two randomized controlled studies. Thus, all patients with endometriosis should have all visible implants excised during laparoscopic diagnosis. According to Adamson, in the more severe stages of endometriosis, a surgical approach that normalizes pelvic anatomic distortion and provides adhesiolysis can enhance fertility.[20,21,30]

However, even though surgical removal of endometrioma has a benefit of symptomatic improvement and removal of pathology, it has the disadvantage of damaging normal ovarian tissue and thereby has a negative impact on ovarian reserve. Therefore, the patients are selected for laparoscopy based on their fertility needs and ovarian reserve and endometrioma size. In few cases (n=8), endometrioma puncture and drainage was done as excision could not be performed in view of dense adhesions to surrounding structures.

Tubal patency can be detected by HSG/SSG. However, they have several disadvantages. False positives result of tubal block may be due to tubal cornual spasm. Snowden et al[22] reported that the false negative rate of HSG was 13% and the false positive rate was 16%. This can be effectively confirmed and managed to the possible extent at hysterolaparoscopy. In our study tubal block was present in 22 (11%) cases of primary infertility and 15 (27%) cases of secondary infertility. Tubal cannulation was done under hysterolaparoscopy guidance in 22 (11%) cases of tubal occlusion and patency could be restored in 14 (7%) i.e. in 63.6% of attempted cases. The results correlated well with Wadadekar et al study where tubal patency of at least one tube could be successfully restored in 75% of attempted cases.[18] Monitored by laparoscopy, the complication rate of hysteroscopy declined significantly. Hysteroscopy and laparoscopy are the two methods for evaluation and treatment of tubal pathology and are complementary to each other. Hysteroscopy is good at treatment of proximal obstruction of fallopian tube and laparoscopy is good at treatment of peritubal adhesions and hydrosalpinx.

In the present study, the most common uterine pathology detected in both the primary (7%) and secondary infertility (34%) is müllerian anamoly and the most common one is

septate uterus (8.4%). The results correlated with Mehta et al and Kabadi et al.[14,24]

Uterine pathologies can be the contributing factor for infertility in as many as 15% of couples seeking treatment.[19,25-27] Developmental uterine anomalies have long been associated with pregnancy loss and obstetric complications, but the ability to conceive is generally not affected. The pooled data suggest that the prevalence of septate uterus is similar in infertile and fertile women (approximately 1%), but is significantly higher in women with recurrent pregnancy loss (approximately 3.5%).[28] This can be explained why the incidence of uterine anomalies in secondary infertility group was higher compared to those in primary infertility group in this study. In the present study, septal resection was performed in {19(7.6%)} using resectoscope. Monitored by laparoscopy, the complication rate of hysteroscopy declined significantly. With the advent of 3d USG, hysterolaparoscopy was now rarely used for diagnosis of mullerian anamolies. Also, in the present study, routine septal resection was not offered to all cases but limited only to those with recurrent pregnancy losses not explained with other causes and those with complete septate uterus.

In the present the number of cases with PCOS were 16 (6.4%) and PCOS drilling was done in 10 (4%) cases. Although the prevalence of PCOS in our centre is about 15-18%, the lower number of PCOS cases observed at laparoscopy is less because most of these were managed medically and PCOS drilling is reserved only for those cases which are resistant to ovulation induction. This is to avoid the risk of premature ovarian insufficiency, a complication noted post drilling.

Other than septate uterus, the major hysteroscopic abnormalities in our study were myomas and polyps similar to study by Mehta et al and Pet al.[14,29] The evidence to suggest that uterine myomas decrease fertility is inferential and relatively weak; the bulk of it is derived from studies that had compared the prevalence of myomas in fertile and infertile women or the reproductive performance of women with otherwise unexplained infertility before and after myomectomy.[13,29] Proposed mechanisms by which myomas might adversely affect fertility include cornual myomas that involve or compress the interstitial segment of the tube, dysfunctional uterine contractility interfering with sperm transport or embryo implantation, and poor regional blood flow resulting in focal endometrial attenuation or ulceration. In our study, laparoscopic myomectomy was done in 8 (3.2%) cases and hysteroscopic myomectomy in 26 (10.4%) cases where endometrial cavity was shown to be distorted.

The incidence of asymptomatic endometrial polyps in women with infertility has been reported to range from 10% to 32%.[31,32] A prospective study of 224 infertile women who underwent hysteroscopy observed a 50% pregnancy rate after polypectomy.[23]

Limitations

The main limitation of hysterolaparoscopy is that it is an invasive procedure with the need for general anaesthesia and its associated risks and intraoperative and post-operative complications.

CONCLUSION

Hysterolaproscopy may appear to be invasive, but is more beneficial, as diagnosis and therapeutic interventions can be done at the same sitting. Furthermore, it is possible to identify patients who will need ART at the earliest, thus expediting treatment. This helps in preventing further compromise in ovarian reserve and progression of disease and thus reducing financial burden to the couples. The important consideration prior to the procedure is appropriate patient selection in view of the limitations assosciated with the procedure. In judiciously selected cases, it provides critical information to the clinician, guiding him to design an individualized and evidence-based treatment plan for the couple. Based on results of this study it can be concluded that hysterolaparoscopy although is invasive, it is an effective and safe tool in comprehensive evaluation of infertility to diagnose and treat the various pathological conditions at the same time and therefore it holds its place even in this era of modern ART.

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

REFERENCES

1. World Health Organization. WHO definition of infertility in the International Classification of Diseases (ICD 10). Available at: https://www.who.int/news-room/fact-sheets/detail/infertility. Accessed on 12 August 2023.
2. Ombelet W, Cooke I, Dyer S, Serour G, Devroey P. Infertility and the provision of infertility medical services in developing countries. Hum Reprod Update. 2008;14(6):605-21.
3. Jahan S. Role of laparoscopy in infertility: review article. BIRDEM Med J. 2012;2:99-103.
4. Howkins J, Bourine GL. The pathology of conception. In: Howkins J, Bourine GL, editors. Shaw's text book of gynaecology. 13th edition. New York: Elsevier. 2004.
5. Hucke J, De Bruyme T, Balan P. Hysteroscopy in infertility— diagnosis and treatment including falloscopy. Gynecol Obstet. 2000;20:13-20.
6. Jones HW, Rock JA. Murphy – diagnostic and operative laparoscopy. Te- Linde's operative gynaecology. 7th edition J.B. Lippincott company Anaalvarez. 2015;361-84.
7. Begum J, Samal S, Ghose S, Palai P, Samal R. Combined hysterolaparoscopy as an early option for

initial evaluation of female infertility: a retrospective study of 135 patients. Int J Reprod Contracept Obstet Gynecol. 2015;4:584-8.
8. Vaid K, Mehra S, Verma M, Jain S, Sharma A, Bhaskaran S. Pan endoscopic approach "hysterolaparoscopy" as an initial procedure in selected infertile women. J Clin Diagn Res. 2014;8(2):95-8.
9. Mettler L, Wendland EM, Patel P, Caballero R, Schollmeyer T. Hysteroscopy: an analysis of 2-years' experience. JSLS. 2002;6(3):195-7.
10. Parihar BC, Gowri S. Role of hysterolaparoscopy in the evaluation of female infertility in a tertiary care centre. Int J Reprod Contracept Obstet Gynecol. 2019;8:4955-9.
11. Chaudhary A, Chauhan M, Nanda S, Malhotra V and Student P. Endoscopic evaluation of infertile women. Int J Healthc Biomed Res. 2017;15(6):36-48.
12. Chanu S, Pal GR, Panda S, Singh AS. Diagnostic hysterolaparoscopy for evaluation of infertility: Our experience in a tertiary care hospital. J Hum Reprod Sci. 2018;11(1):19-23.
13. Zhang E, Zhang Y, Fang L, Li Q, Gu J. Combined hysterolaparoscopy for the diagnosis of female infertility: a retrospective study of 132 patients in china. Mater Sociomed. 2014;26(3):156-7.
14. Mehta AV, Modi AP, Raval BM, Munshi SP, Patel SB, Dedharotiya SM. Role of diagnostic hysterolaparoscopy in the evaluation of infertility. Int J Reprod Contracept Obstet Gynecol. 2016;5:437-40.
15. Selim R, Gergawy AESA, Shaheen KAE, Balaha MH. The role of combined diagnostic hysterolaparoscopy in unexplained infertility. Int Surg J. 2022;9:1395-405.
16. Miller JH, Weinberg RK, Canino NL, Klein NA, Soules MR. The pattern of infertility diagnoses in women of advanced reproductive age. Am J Obstet Gynecol. 1999;181:952-7.
17. Mol BW, Collins JA, Burrows EA, van der Veen F, Bossuyt PM. Comparison of hysterosalpingography and laparoscopy in predicting fertility outcome. Hum Reprod. 1999;14:1237-42.
18. Wadadekar GS, Inamdar DB, Nimbargi VR. Role of hysterolaparoscopy in management of infertility a retrospective clinical analysis. Int J Reprod Contracept Obstet Gynecol. 2020;9:4437-43.
19. Puri S, Jain D, Puri S, Kaushal S, Deol SK. Laparohysteroscopy in female infertility: A diagnostic cum therapeutic tool in Indian setting. Int J App Basic Med Res. 2015;5:46-8.
20. Marcoux S, Maheux R, Bérubé S. Laparoscopic surgery in infertile women with minimal or mild endometriosis. Canadian collaborative group on endometriosis. N Engl J Med. 1997;337(4):217-20.
21. Vaid K, Mehra S, Verma M. Pan endoscopic approach 'Hysterolaparoscopy' as an initial procedure in selected infertile women. J Clin Diagn Res. 2014;8(2):95-8.
22. Snowden EU, Jarrett JC, Dawood MY. Comparison of diagnostic accuracy of laparoscopy, hysteroscopy, and hysterosalpingography in evaluation of female infertility. Fertil Steril. 1984;41(5):709-13.
23. Shokeir TA, Shalan HM, EI-Shafei MM. Significance of endometrial polyps detected hysteroscopically in eumenorrheic infertile women. J Obstet Gynaecol Res. 2004;30:84-9.
24. Kabadi YM, Harsha B. Hysterolaparoscopy in the Evaluation and Management of Female Infertility. J Obstet Gynaecol India. 2016;66(1):478-81.
25. Wallach EE. The uterine factor in infertility. Fertil Steril. 1972;23:138-58.
26. Brown SE, Coddington CC, Schnorr J, Toner JP, Gibbons W, Oehninger S. Evaluation of outpatient hysteroscopy, saline infusion hysterosonography, and hysterosalpingography in infertile women: a prospective, randomized study. Fertil Steril. 2000;74(5):1029-34.
27. Mooney SD, Milki AA. Effect of hysteroscopy performed in the cycle preceding controlled ovarian hyperstimulation on the out- come of in vitro fertilization. Fertil Steril. 2003;76:637-8.
28. Homer HA, Li TC, Cooke ID. The septate uterus: A review of management and reproductive outcome. Fertil Steril. 2000;73:1-14.
29. Kamiński P, Wieczorek K, Marianowski L. Usefulness of hysteroscopy in diagnosing sterility. Ginekol Pol. 1992;63(12):634-7.
30. Parazzini F. Ablation of lesions or no treatment in minimal-mild endometriosis in infertile women: a randomized trial. Gruppo Italian per lo studio dell'Endometriosi. Hum Reprod 1999;14(5):1332-4.
31. Hinckley MD, Milki AA. 1000 office-based hysteroscopies prior to in vitro fertilization: Feasibility and findings. JSLS. 2004;8:103-7.
32. Shalev J, Meizner I, Bar-Hava I, Dicker D, Mashiach R, Ben-Rafael Z. Predictive value of transvaginal sonography performed before routine diagnostic hysteroscopy for evaluation of infertility. Fertil Steril. 2000;73:412-7.

.

Cite this article as: Sireesha KV, Himabindu Y, Haq AU, Kavitha G, Kiranmai D. Hysterolaparoscopy as a comprehensive diagnostic and therapeutic tool in modern art. Int J Reprod Contracept Obstet Gynecol 2023;12:3237-44.