

Diagnostic Hyster-Laparoscopy for Evaluation of Infertility: Our Experience in a Tertiary Care Hospital (A Study of 70 Cases)Akash J Patel¹, Zeel Vaghela², Anubhuti Patel³, Forum Trivedi⁴, Tirtha Shah⁵¹Assistant Professor, Department of Obstetrics & Gynecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, 380006²Resident Doctor, Department of Obstetrics & Gynecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, 380006³Resident Doctor, Department of Obstetrics & Gynecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, 380006⁴Resident Doctor, Department of Obstetrics & Gynecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, 380006⁵Resident Doctor, Department of Obstetrics & Gynecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, 380006

Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 26-07-2024

Corresponding Author: Dr. Akash J Patel

Conflict of interest: Nil

Abstract:

Aims and Objectives: According to WHO, the prevalence of infertility is about 10%–15% of reproductive age couples. Our aim of this study is to assess the demographic details of the patients of infertility, the role of hysteroscopy and laparoscopy in the evaluation of female anatomical etiology of infertility and the therapeutic role of these endoscopic modalities to correct anatomical pathology responsible for female infertility.

Material and Method: This retrospective data analysis of 70 cases of female infertility was conducted at Department of Obstetrics and Gynaecology, Smt. N.H.L. Municipal Medical College, Ahmedabad, Gujarat, Western India. Women aged 19-45 years with normal hormone profile without male factor infertility were included.

Results: Out of 70 cases, 46 (65.7%) patients had primary infertility. While laparoscopy detected abnormalities in 62.8% of the cases, significant hysteroscopy findings were noted in 18.6% of cases. While the most common laparoscopic abnormality was adnexal adhesion (17.1%), hysteroscopy synechiae as the most common abnormality in both groups.

Conclusion: Hysterolaparoscopy is an effective diagnostic tool for evaluation of certain significant and correctable tubo-peritoneal and intrauterine pathologies like peritoneal endometriosis, adnexal adhesions, and subseptate uterus, which are usually missed by other imaging modalities. It has proved to be diagnostic as well as therapeutic procedure for female pelvic pathologies responsible for infertility.

Keywords: Hysteroscopy, Laparoscopy, Infertility

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The WHO has defined infertility as “a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.” The prevalence of infertility is about 10%–15% of reproductive age couples.[1] The prevalence of infertility is about 10%–15% of reproductive age couples.[1] According to the WHO, the overall prevalence of primary infertility in India is between 3.9 and 16.8%.[2]

Sexually transmitted infections are among the leading cause of infertility worldwide, especially in developing countries [3] which can lead to pelvic inflammatory disease (PID) and tubal damage.

Among the causes of infertility female factor (40%–55%) remains the foremost reason followed by male factor (30%–40%), combined factor (10%), whereas in 10% cases etiology remains unexplained. The diagnosis and treatment of this disorder stands out as one of the most rapidly evolving area in medicine.

Experience has shown that majority of pelvic pathology in infertile women is frequently not well appreciated by routine pelvic examinations and the usual diagnostic procedures. The ability to see and manipulate the uterus, fallopian tubes, and ovaries during laparoscopy has made it an essential part of infertility evaluation. Similarly, visualising the

uterine cavity and identifying the possible pathology has made hysteroscopy an equally important tool in infertility evaluation. The question of tubal morphology and patency, ovarian morphology, any unsuspected pelvic pathology, and uterine cavity abnormalities can all be resolved with accuracy at one session. Additionally, hysteroscopic guided biopsy and therapeutic procedures like polypectomy, myomectomy, septal resection, and adhesiolysis can be done in the same sitting.

This study was undertaken to evaluate the role of diagnostic hystero-laparoscopy (DHL) in the comprehensive work up of infertility, which would help in planning appropriate management.

Materials and Methods

The present study is a retrospective data analysis conducted in a tertiary care centre, at the Department of Obstetrics and Gynaecology, Smt. N.H.L Municipal Medical College, Ahmedabad, Gujarat, Western India. Over a period from January 2023 to May 2024. Infertile couple with primary and secondary infertility aged between 19 and 45 years were included in the study. However, only those patients above 40 years of age who had good anti-mullerian hormone level, and hence, could be potentially benefited from the DHL were included in this study.

Primary infertility patients were those who had never conceived before, while secondary infertile patients had at least one prior conception, irrespective of the outcome. Hormonal abnormalities known to cause anovulation like thyroid dysfunction, hyperprolactinemia, and polycystic ovarian syndrome were excluded. Couples with abnormal semen analysis were also not included in this study. Patients having any relative and absolute contraindication to

laparoscopy were also excluded. Transvaginal sonography before DHL was performed routinely to evaluate the antral follicular count. DHL with CPT was performed in the preovulatory (day 6–12 of menstrual cycle). DHL was performed in the preovulatory period between days 6 and 11 of the cycle under general anaesthesia using a 7 mm Karl Storz laparoscope with a 30° deflection angle telescope. First, hysteroscopy was performed—vagina and cervix were examined for any abnormality (growth, polyp etc.), uterine cavity was examined for the presence of septum, any congenital malformation, fibrotic bands or synechiae, polyps, fibroid, and condition of the endometrium. Both the tubal ostia were visualized and looked for patency. Pneumoperitoneum was created, and laparoscopy was performed and the following structures were carefully examined for any abnormality—fallopian tubes, ovaries, pelvic peritoneum, pouch of Douglas, and peritoneal cavity. On laparoscopy, pelvic cavity and organs were inspected. Uterus was inspected for its shape, size, position, surface, and presence of fibroid. Cul-de-sac was examined for any adhesions, obliteration, endometriotic nodules or fluid. Ovaries were viewed for size, shape, surface, color, presence of cysts, and relation with tubes. Fallopian tubes were inspected carefully for size, shape, surface, kinking, dilatation, stricture or hydrosalpinx. Any features suggestive of infertility were looked for.

At last, CPT was performed to check for testing tubal patency on both the sides. Methylene blue dye was injected with a 20 ml syringe through Leech Wilkinson cannula or a 14F foley's catheter inserted in the uterine cavity (the catheter bulb inflated with 5 ml of normal saline). Spillage of the dye from the fimbrial end of tube visualized.

Results

Table 1: Demographic Data

Age (Years)	Primary (n-46)	Secondary (n-24)
19-25	21 (30%)	10 (14.3%)
26-30	13 (18.6%)	8 (11.4%)
>30	12 (17.1%)	6 (8.6%)
Duration of infertility (Years)	Cases (n-70)	Nandhini et al (n-50)
1-6	49 (70%)	36 (72%)
7-12	16 (22.9%)	11 (22%)
13-18	5 (7.1%)	3 (6%)
Education	Cases (n-70)	Sachdev et al (-50)
Illiterate	8 (11.4%)	19 (38%)
Primary (Class 1-8)	27 (38.5%)	22 (44%)
Secondary (Class 9-10)	12 (17.1%)	5 (10%)
High (Class 11-12)	16(22.9%)	3 (6%)
Graduate	7 (10%)	1 (2%)

A total number of 70 patients underwent DHL out of which 46 (65.7%) suffered from primary infertility and 24 (34.3%) suffered from secondary infertility. Majority of patient of primary as well as secondary infertility were from age group of 19-25 years, and most of the cases of infertility were hav-

ing the condition for around 1-6 years (70%), while 72% women had infertility of the same duration in a study by Nandhini et al. Most of the cases (38.5%) had primary education. In PK Sachdev et al study 44% women had primary level education. [Table 1].

Table 2: Hysteroscopic Findings

Finding	Cases (n-70)	Prasanta K N et al (n-300)
Normal	57 (81.4%)	244 (81.3%)
Myoma	2 (2.9%)	8 (2.6%)
Polyp	2 (2.9%)	16 (5.3%)
Septum	3 (4.3%)	29 (9.6%)
Synechiae	5 (7.1%)	1 (0.3%)
Cervical Stenosis	1 (1.4%)	0

Table 3: Laparoscopic Findings

Finding	Cases (n-70)	Ramalingappa c et al (n-668)	Prasanta K N et al (n-300)
Normal	26 (37.1%)	270 (40.4%)	199 (66.3%)
Unilateral Tubal Block	10 (14.9%)	30 (4.5%)	30 (10%)
Bilateral Tubal Block	4 (5.7%)	25 (3.7%)	31 (10.3%)
Ovarian Cyst	8 (11.4%)	184 (27.5%)	22 (7.3%)
PCOS	8 (11.4%)		
Pelvic Inflammatory Disease	4 (5.7%)	72 (10.8%)	
Adhesions	12 (17.1%)	128 (19.2%)	26 (8.7%)
Fibroid Uterus	11 (15.7%)	42 (6.3%)	15 (5%)
Endometriosis	7 (10%)	59 (8.8%)	37 (12.3%)
Anomaly	2 (2.8%)	12 (1.8%)	3 (1%)

In the present study laparoscopic abnormalities were more common than the hysteroscopic [Table 2] [Table 3]. In both, the group's laparoscopic abnormalities were significant. The most common abnormalities found during laparoscopy were features of adnexal adhesion and hydrosalpinx [Table 3]. The most common abnormality in hysteroscopy

was uterine synechiae (7.1%) [Table 2]. One patient in primary infertility group had cervical stenosis. Unilateral block was more common than the bilateral one. Patients did not suffer from any major complication during or after the procedure. Mild abdominal pain in the perioperative site was the only complaint.

Table 4: Operative Procedure Performed during Diagnostic Hysterolaparoscopic Evaluation:

Procedure	Cases (n-70)	Keya vaid et al (n-193)
PCO Drilling	6 (8.5%)	10 (5.2%)
Ovarian Cystectomy	2 (2.9%)	2 (1%)
Adnexal Adhesiolysis	9 (12.9%)	71 (36.8%)
Fulguration of Endometriotic Spots	3 (4.3%)	29 (15%)
Salpingectomy	5 (7.1%)	2 (1%)
Fimbrioplasty	3 (4.3%)	-
Laparoscopic/ Hyteroscopic Myomectomy	7 (10%)	50 (25.9%)
Hysteroscopic Septal Resection	2 (2.9%)	-
Unilateral Tubal cannulation+ Selective chromopertubation	8 (11.4%)	4 (2.1%)
Hysteroscopic Polypectomy	2 (2.8%)	10 (5.2%)

In the present study, apart from diagnostic use, hysteroscopy was used for myomectomy for fibroid cases (2.9%), septal resection (2.9%), and polypectomy (2.8%). Laparoscopy was used for PCO drilling in 8.5% cases, cystectomy in 2.9% cases, adhesiolysis in 12.9% cases, fulguration of endometriotic spots in 4.3%, salpingectomy in 7.1%, unilateral tubal cannulation followed by selective chromopertubation in 11.4% cases, fimbrioplasty in 4.3%

cases, and myomectomy in 7.1% cases. The results were comparable to study done by Keya Vaid t al.

Discussion

Infertility is a serious problem to the couple and brings about family unhappiness and mental trauma and is a matter of financial burden. Among female factor infertility, the most common cause is tuboperitoneal pathology accounting for 30%–35%

cases. [4] Followed by ovulatory dysfunction (20%–30% cases) and uterine pathology (15% cases). [5] The gold standard for evaluating tuboperitoneal pathology is laparoscopy. [6] In our study, pelvic adhesion and hydrosalpinx were the two most common tubopelvic pathologies as seen in laparoscopy. Adnexal adhesion is an established feature of PID. [7] The important etiologies of hydrosalpinx are PID and pelvic tuberculosis. [8] It is a proven fact that hydrosalpinx is associated with infertility and even poor IVF outcome. [9] Now, the prevalence of PID in India ranges from 1% to 17%. [10] Even subclinical PID is substantially associated with infertility and women with subclinical PID achieved 40% less pregnancies compared to women without the same. [11] Tubal factor infertility is the foremost reason of infertility among female patients, the majority of which is due to PID. [12] In our study, apart from hydrosalpinx, few other features such as caseous material in the pelvis, pouch of Douglas, and tubercles on the tubes or pelvic serosa were present. The prevalence of genital tract TB in female ranges from 1% to 19% depending on the region. [13] A study conducted in India found that more than 25% infertile patients (40 out of 150) had genital tuberculosis. [14] In the present study, overall, 10% patients had findings of endometriosis during laparoscopy in the form of endometrioma, endometriotic nodules, chocolate cyst of ovary and other characteristic endometriotic lesions such as powder burn lesions. Laparoscopy remains the gold standard for diagnosing endometriosis by visual inspection of the lesions. [15] It is estimated that around 30%–50% patients with endometriosis suffer from infertility. [16] 15.7% patients in present study during laparoscopy and 2.9% patients during hysteroscopy were found to have myoma. Pritts et al. concluded that submucosal fibroids (International Federation of Gynecology and Obstetrics [FIGO] L0–L2) which cause distortion of the uterine cavity resulted in the decreased rates of clinical pregnancy, implantation, and ongoing pregnancy/live birth, as well as an increased rate of spontaneous miscarriage. [17] The review by Pritts et al. also concluded that women with fibroids with no submucosal involvement, i.e., pure intramural fibroids (FIGO L3–L4), had decreased rates of implantation and ongoing pregnancy/live birth, and an increased rate of spontaneous miscarriage when compared with controls without fibroids. [18] In addition, there was no evidence to suggest that subserosal (FIGO L5–L7) fibroids decreased any measure of fertility. [17]

The prevalence of uterine anomaly in infertility patient is 8%, the foremost reason being septate uterus. Arcuate uterus is most common in the population without any high risk, and its prevalence is not increased in high-risk groups, for example, having infertility. [18] In our study, 2.8% patients in laparoscopy were found to have uterine anomaly.

Intrauterine adhesions (Asherman syndrome) are a rare but significant cause of menstrual disturbance and infertility. [19] It is an established fact that unlike developed countries genital tuberculosis is an important cause of Asherman syndrome in India. [20] In our study, the most common finding in hysteroscopy was intrauterine adhesions (7.1%).

In this study, 14.9% patients had unilateral tubal block whereas 5.7% patients had bilateral tubal block. Our hospital is a tertiary one and majority of the patients are referred here with already diagnosed tubal block on hysterosalpingogram. That can explain the high prevalence of tubal block on chromopertubation in our study.

Knowledge is a key factor associated with fertility self-care. Educated couples tend to know more about STDs and other genital tract infections. They have knowledge regarding the fertility period and also seek medical hospital faster. [21] Diagnostic hystero-laparoscopy is a very safe procedure. Other than mild abdominal pain, there were no major surgical or anesthetic complications in any of our patients.

Conclusion

Diagnostic hysterosalpingoscopy is an effective and safe tool in comprehensive evaluation of infertility, particularly for detecting peritoneal endometriosis, adnexal adhesions, and septum in the uterus. These are correctable abnormalities that are unfortunately missed by routine pelvic examination and usual imaging procedures. Needless to emphasize that, it is a very useful tool that can detect various structural abnormalities in multiple sites like pelvis, tubes, and the uterus in the same sitting in patients with normal ovulation and seminogram. When done by experienced hands and with proper selection of patients, hystero-laparoscopy can be considered as a definitive investigative day-care procedure for evaluation of female infertility. This helps in formulating specific plan of management.

References

1. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: Potential need and demand for infertility medical care. *Hum Reprod.* 2007; 22:1506–12.
2. Infecundity, Infertility, and Childlessness in Developing Countries. DHS Comparative Reports No. 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
3. 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; 14:605–21.
4. Miller JH, Weinberg RK, Canino NL, Klein NA, Soules MR. The pattern of infertility di-

- agnoses in women of advanced reproductive age. *Am J Obstet Gynecol.* 1999; 181:952–7.
5. Wallach EE. The uterine factor in infertility. *Fertil Steril.* 1972; 23:138–58.
 6. 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.
 7. Molander P, Finne P, Sjöberg J, Sellors J, Paavonen J. Observer agreement with laparoscopic diagnosis of pelvic inflammatory disease using photographs. *Obstet Gynecol.* 2003; 101:875–80.
 8. Boukaidi SA, Delotte J, Steyaert H, Valla JS, Sattonet C, Bouaziz J, et al. Thirteen cases of isolated tubal torsions associated with hydrosalpinx in children and adolescents, proposal for conservative management: Retrospective review and literature survey. *J Pediatr Surg.* 2011; 46:1425–31.
 9. Harb H, Al-Rshoud F, Coomarasamy A. The effect of presence and management of hydrosalpinx on miscarriage in IVF. *Fertil Steril.* 2014; 1:102–298.
 10. Latha K, Kanani SJ, Maitra N. Prevalence of clinically detectable gynaecological morbidity in India: Results of four community-based studies. *J Fam Welf.* 1997; 43:8–16.
 11. Wiesenfeld HC, Hillier SL, Meyn LA, Amortegui AJ, Sweet RL. Subclinical pelvic inflammatory disease and infertility. *Obstet Gynecol.* 2012; 120:37–43.
 12. Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted Reproductive Technology. 2007 Assisted Reproductive Technology Success Rates: National Summary and Fertility Clinic Reports. Atlanta (GA): U. S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2009.
 13. Varma TR. Genital tuberculosis and subsequent fertility. *Int J Gynaecol Obstet.* 1991; 35:1–1.
 14. Gupta N, Sharma JB, Mittal S, Singh N, Misra R, Kukreja M, et al. Genital tuberculosis in indian infertility patients. *Int J Gynaecol Obstet.* 2007; 97:135–8.
 15. Kennedy S, Bergqvist A, Chapron C, D'Hooghe T, Dunselman G, Greb R, et al. ESHRE guideline for the diagnosis and treatment of endometriosis. *Hum Reprod.* 2005; 20:2698–704.
 16. Counsellor VS Endometriosis. A clinical and surgical review. *Am J Obstet Gynecol.* 1938; 36:877.
 17. Pritts EA, Parker WH, Olive DL. Fibroids and infertility: An updated systematic review of the evidence. *FertilSteril.* 2009; 91:1215–23.
 18. Chan YY, Jayaprakasan K, Zamora J, Thornton JG, Raine-Fenning N, Coomarasamy A, et al. The prevalence of congenital uterine anomalies in unselected and high-risk populations: A systematic review. *Hum Reprod Update.* 2011; 17:761–71.
 19. Thomson AJ, Abbott JA, Deans R, Kingston A, Vancaillie TG. The management of intrauterine synechiae. *Curr Opin Obstet Gynecol.* 2009; 21:335–41.
 20. Sharma JB, Roy KK, Pushparaj M, Gupta N, Jain SK, Malhotra N, et al. Genital tuberculosis: An important cause of Asherman's syndrome in India. *Arch Gynecol Obstet.* 2008 277:37–41.
 21. Bunting L, Boivinm J. Knowledge about infertility risk factors, fertility myths and illusory benefits of healthy habits in young people. *Hum Reprod.* 2008 Aug; 23 (8):1858-64. Doi: 10.1093/humrep/den168.