Role of Diagnostic Hysterolaparoscopy in the Evaluation of Female Infertility at a Tertiary Care Hospital

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Abstract

Introduction: The prevalence of Infertility is about 10-15% in reproductive age couples. Diagnostic Hysterolaparoscopy (DHL) has become an essential investigation in the evaluation of female infertility.

Aims and Objectives: To find out the incidence of type of infertility, incidence of various contributing factors leading to infertility in the study population and to evaluate the various etiologies of all contributing factors.

Material and Methods: This is a retrospective study conducted in the department of obstetrics and gynaecology at Mahatma Gandhi Hospital, Sitapura, Jaipur for a period of 6 months from september 2019 to february 2020. The study consisted of 85 women who presented with primary or secondary infertility. After proper history and examination, hysterolaparoscopy with chromopertubation test (CPT) was performed in all 85 participants.

Results: In our study, 72.9% had primary infertility and 27.1% had secondary infertility. On hysteroscopy, 34.1% had abnormal findings. Most common abnormal finding was septum (11.8%) followed by polyp (5.9%) and myoma (4.7%). On laparoscopy, our study revealed abnormality in 89.4% cases. The most common factor found on laparoscopy was tubal pathology contributing to 42.3 % followed by peritoneal factors 35.3%, ovarian factors 20% and uterine factors 9.4%. In our study, peritubal adhesions (14.1%) was the most common tubal factor followed by hydrosalpinx (11.7%). Adhesions (16.5%) were also the most common pathology seen in peritoneal factor infertility. The most common ovarian factor found was polycystic ovarian disease (PCOD) 9.4% followed by ovarian cyst

7.1%. The most common uterine factor was fibroid 5.9%. On CPT, 5.9% had unilateral tubal block and 8.2% had bilateral tubal block.

Conclusion: Diagnostic hysterolaparoscopy has emerged as an effective and safe tool for evaluation of female infertility. The main advantage is that diagnosis as well as the correction of abnormality can be done at a single sitting.

Keywords: Diagnostic Hysterolaparoscopy, hysteroscopy, infertility, laparoscopy, primary infertility, secondary infertility

Introduction

The WHO 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."[1]

The prevalence of infertility is about 10-15% in reproductive age couples.[2] Infertility poses great psychosocial and emotional stress to the family. The incidence of infertility is increasing dramatically due to biological and social factors including stress, religious attitudes, increasing age of marriage, urbanization, higher literacy, contraceptive usage and nuclear families.[3]

Infertility can

Female factors are responsible for 40-45% of infertility etiologies followed by male factor 30-40%, combined factors 10%, whereas in 10% cases etiology remains unexplained.[4] Among female factor infertility, the most common cause is tubo-peritoneal pathology accounting for 30-35% cases.[5] followed by ovulatory dysfunction (20-30% cases) and uterine pathology (15% cases).[6]

Diagnostic Hysterolaparoscopy (DHL) has become an essential investigation in the evaluation of female infertility. It provides a direct and clear visualisation which helps in detailed analysis of the uterine cavity, endometrium, tubal morphology and patency, uterine, ovarian, and adnexal pathology. These pathological findings are often missed in routine clinical examination and ultrasound scan. In addition to diagnosis, therapeutic interventions can be done in the same sitting with the help of DHL. This study was undertaken to highlight the role of hysterolaparoscopy in the evaluation of female infertility and to identify the incidence of various pathological conditions in the females presenting with primary or secondary infertility.

Aims and Objectives

1. To find out the incidence of type of infertility in patients presenting with complaint of infertility
2. To find out the incidence of various contributing factors leading to infertility in the study population.
3. To evaluate the various etiologies of all contributing factors with the help of DHL.

Material and Methods

This is a retrospective study conducted in the department of obstetrics and gynaecology at Mahatma Gandhi Hospital, Sitapura, Jaipur, for a period of 6 months from September 2019 to February 2020. The study sample consisted of 85 women who presented with complaint of primary or secondary infertility in gynaecology OPD.

Ethical clearance from the institutional ethical committee was taken before the start of the study.

Inclusion criteria

- All infertile patients with primary and secondary infertility of age group 20-40 years were included in the study after their informed consent.
- Normal semen analysis of husband.

Exclusion criteria

- Patients with male factor infertility

- Couple not living together for ≥12 months.
- Women with active genital infections, abnormal thyroid or prolactin levels.
- Patients in whom hysteroscopy/laparoscopy is contra-indicated.
- Patients not willing for surgery.

All patients with complaint of infertility were subjected to detailed history taking followed by physical examination including the examination of secondary sexual characters, thyroid examination, and breast examination. It was followed by per abdomen examination, per speculum and per vaginal examination. Husband's semen analysis was done to rule out male factor infertility. All baseline investigations were done which included CBC, blood group, VDRL, HIV, HbsAg, LFT, KFT, blood sugar, serum electrolytes, urine analysis. Transvaginal sonography and Hysterosalpingography was done for all patients.

Diagnostic hysterolaparoscopy with chromopertubation test was performed in the follicular phase of menstrual cycle, in all 85 patients who participated in the study. During laparoscopy, careful evaluation of tubal pathology, ovarian pathology, uterus size and shape, adhesions, endometriosis, abnormalities in pouch of douglas and peritoneal cavity was done. During hysteroscopy, abnormalities of endocervical canal, uterus and bilateral tubal ostium were noted. Chromopertubation test (CPT) was done to check tubal patency by instilling 10-15 ml of diluted methylene blue dye inside the uterine cavity using Rubin's cannula and the spill of dye was seen from the fimbrial end of fallopian tubes on both sides laparoscopically.

The data was collected on a set proforma and was analyzed to see the frequency of various abnormalities in primary and secondary infertility.

Statistical analysis

Data was entered using Statistical Package for Social Sciences and in Microsoft excel software. Continuous variables were summarized in the form of mean and standard deviation. Categorical variables were summarized as percentage.

Observations and Results

Table1: Age wise distribution of Infertility among the study population

Age in years	Primary(N = 62)		Secondary (N = 23)		Total	
	No.	%	No.	%	No.	%
20-25	23	33.9	2	8.7	25	29.4
26-30	26	41.9	14	69.6	40	47.1
31-35	11	17.7	4	17.4	15	17.6
36-40	2	3.2	3	13.0	5	5.9
Mean±SD	26.12±3.56		27.23±3.57		P value= 0.56	

In the present study, majority of women, 47.1% belonged to age group of 26-30 years followed by 29.4% who belonged to the age group of 20-25 years, 17.6% belonged to the age group of 31-35 years, and the least 5.9% belonged to the age group of 36-40 years. The mean age of patients with primary infertility was 26.12±3.56 years and with secondary infertility was 27.23±3.57 years.

Table 2: Duration of infertility among study cases

Duration of infertility (years)	Primary infertility (N= 62)		Secondary infertility (N=23)		Total	
	No.	%	No.	%	No.	%
1- 5	39	62.9	14	60.9	53	62.3
6-10	13	21	6	26.1	19	22.4
11-15	8	12.9	2	8.7	10	11.8
16-20	2	3.2	1	4.3	3	3.5
Mean±SD	3.11±2.78		4.2±2.13		P value= 0.78	

In the present study, majority of patients 62.3% presented with 1-5 years of duration of infertility, among them 73.58% had primary infertility patients and 26.42% had secondary infertility. 22.4% patients had duration of 6-10 years, 11.8% patients had duration of 11-15 years and only 3.5% patients had duration of infertility between 16-20 years. Mean duration of infertility in the patients of primary and secondary infertility was 3.11±2.78 years and 4.2±2.13 years respectively.

Table 3: Distribution of cases according to type of infertility

Type of infertility	No.	%
Primary	62	72.9
Secondary	23	27.1
Total	85	

Out of 85 patients included in the study, 62 cases (72.9%) were of primary infertility and 23 cases (27.1%) were of secondary infertility

Table 4: Menstrual history profile among study cases

Menstrual history	Primary (N=62)		Secondary (N=23)		Total (N=85)	
	No.	%	No.	%	No.	%
Menorrhagia	3	4.8	2	8.8	5	5.9
Oligomenorrhea	11	17.7	1	4.3	12	14.1
Polymenorrhea	1	1.6	1	4.3	2	2.3
Hypomenorrhoea	4	6.4	2	8.7	6	7.1
Amenorrhoea	0	0	1	4.3	1	1.2
Regular menses	43	69.4	16	69.6	59	69.4

Out of 85 patients in the study, 69.4% had regular menses and no menstrual complaints and 30.6% patients had menstrual complaints. The most common menstrual complaint was oligomenorrhea in 14.1% patients followed by hypomenorrhea in 7.1%, menorrhagia in 5.9%, polymenorrhea in 2.3% and amenorrhea in 1.2% patients.

Table 5: Obstetric profile in Secondary infertility cases

Past obstetrics history	No of cases	%(out of 23)
Abortion	16	69.5
FTVD	9	39.1
LSCS	4	17.4
Ectopic	3	13.0

* Multiple Findings - In many cases, there were more than one factor. Therefore no. of findings were more than no. of cases taken.

In the present study, out of 23 secondary infertility cases, 16 cases (69.5%) had history of abortion, 9 cases (39.1%) had history of FTVD, 4 cases (17.4%) had history of LSCS and 3 cases (13.04%) had history of ectopic.

Table 6: Hysteroscopic findings in the study population

Hysteroscopic findings	Primary (N=62)		Secondary (N=23)		Total	
	No.	%	No.	%	No.	%
Normal	45	72.6	11	47.8	56	65.9
Septum	6	11.3	4	17.4	10	11.8
Polyp	4	6.5	3	13.04	7	8.2
Myoma	2	3.2	3	13.04	5	5.9
Synechiae	2	3.2	1	4.34	3	3.5
Bicornuate uterus	2	3.2	1	4.34	3	3.5
Cervical stenosis	0	0	1	4.34	1	1.2

P value = 0.01 (S)

In the present study, on hysteroscopy out of 85 patients, 56 (65.9%) patients had no abnormal findings and (34.1%) had abnormal hysteroscopic findings which comprised of most common finding as septum in 11.8% patients followed by polyp in 8.2%, myoma in 5.9%, synechiae in 3.5%, bicornuate uterus in 3.5% and cervical stenosis in 1.2%. Cervical stenosis was found only in 1 patient who had secondary infertility which contributed to 1.2% of total. The most common hysteroscopic finding was septum in both primary and secondary infertility cases.

Table 7: Distribution of cases according to laparoscopic findings

Laparoscopic findings	Primary (N=62)		Secondary (N=23)		Total		P value
	No.	%	No.	%	No.	%	
TUBAL	24	38.7	12	52.1	36	42.3	0.01 (S)
Peritubal adhesions	8	12.9	4	17.4	12	14.1	
Hydrosalpinx	6	9.7	4	17.4	10	11.7	
Bilateral block on CPT	6	9.7	1	4.3	7	8.2	
Unilateral block on CPT	3	4.8	2	8.7	5	5.9	
Fimbrial cyst	1	1.6	1	4.3	2	2.4	
PERITONEAL	22	35.5	8	34.7	30	35.3	0.01 (S)
Adhesions	9	14.5	5	21.7	14	16.5	
Endometriosis	7	11.3	2	8.7	9	10.6	
TB tubercles	6	9.7	1	4.3	7	8.2	
OVARIAN	13	20.9	4	17.4	17	20	0.02 (S)
PCO	6	9.7	2	8.7	8	9.4	
Ovarian cyst	4	6.4	2	8.7	6	7.1	
TO mass	3	4.8	0	0	3	3.5	
UTERUS	6	9.67	2	8.69	8	9.4	0.34
Uterine fibroid	4	6.45	1	4.3	5	5.9	
Bicornuate uterus	2	3.22	1	4.3	3	3.5	
Normal Study	6	9.7	3	13.04	9	10.6	

* Multiple Findings

In the present study, out of 85 cases, 76 cases (89.4%) had abnormal findings on laparoscopy. In many cases, there were more than one factor. Therefore no. of findings were more than no. of cases taken. However, no abnormality was seen in 10.6 % contributing to unexplained infertility. The most common factor was tubal factor 42.3% followed by peritoneal factor 35.3%, ovarian factor 20% and uterine factor 9.4% respectively.

In our study, Tubal factors contributed to 42.3% of total infertility. Out of which majority (14.1%) had peritubal adhesions, 11.7% had hydrosalpinx and 2.4% had

fimbrial cyst. 8.2% had bilateral block and 5.9% had unilateral block on CPT.

Peritoneal factors contributed to 35.3% of total infertility. Out of which adhesions were seen in majority (16.5%), endometriosis was seen in 10.6% and TB tubercles were noted in 8.2%.

Ovarian factors contributed to 20% of total infertility. Out of which maximum had polycystic ovaries were

seen in 9.4%, 7.1% had ovarian cyst and 3.5% had tubo-ovarian mass.

Uterine factor contributed to 9.4% of total infertility. Out of which 5.9% was due to fibroid and 3.5% due to bicornuate uterus.

Table 8: Findings of Chromopertubation Test

CPT Findings	Primary (N=62)		Secondary (N=23)		Total (N=85)	
	No.	%	No.	%	No.	%
Unilateral positive	3	4.8	2	8.7	5	5.9
Bilateral positive	53	85.5	20	86.9	73	85.9
Bilateral negative	6	9.7	1	4.3	7	8.2

In the present study, CPT was bilateral positive in 85.9% suggestive of patent tubes, unilateral positive in 5.9% suggestive of tubal block on one side, bilateral negative in 8.2% suggestive of tubal block on both sides.

Discussion

Age distribution : In the present study, 47.1% cases belonged to the age group of 26-30, 29.4% of women were of age group 20-25 years. This was similar to the study conducted by Sharma et al[7] who found majority cases of infertility, 61.5% in the age group of 26-30 years. Mean age of patients with primary infertility was 28.6±4.20 years and with secondary infertility was 32.1±3.84 years

Duration of infertility : In our study, 62.9% cases of primary infertility and 60.9% cases of secondary infertility had duration of infertility between 1-5 years. This correlates with the study conducted by Shetty SK et al[8] who found 67% cases of primary infertility and

56% cases of secondary infertility had duration of infertility between 1-5 years.

Type of infertility: In the present study, out of 85 cases, 72.9% presented with primary infertility and 27.1% presented with secondary infertility, which correlates with the study conducted by Nanaware et al[9] who found similar result as 78.82% cases of primary infertility and 21.17% cases of secondary infertility.

Menstrual history : In our study, 30.6% patients had menstrual problems and 69.4% had no menstrual complaints. Majority of patients 14.1% had oligomenorrhea, 7.1% had hypomenorrhea, 5.9% had menorrhagia, 2.3% had polymenorrhea, 1.2% had amenorrhea. This correlates with the study conducted by Dhananjay Shobha et al[10], in which 26% had menstrual abnormality and oligomenorrhoea was the most common cause. Menstrual abnormalities are related to anovulation which can be a cause of infertility.

Obstetric history: In our study, 69.5% cases had previous history of abortion, 39.1% had previous full term vaginal delivery, 17.4% had history of caesarean section. It is similar to study conducted by Kale PS et al[11], 80% had previous abortions and 35% had previous full term deliveries.

History of previous abortion is significant as it may lead to endometritis, adhesions resulting in poor implantation of embryo and causing infertility. Thus, obstetric history has an important role in future conception.

Hysteroscopy findings : In our study, 29 out of 85 patients (34.1%) had abnormal findings on hysteroscopy. Most common abnormal finding was septum (11.8%) followed by polyp (5.9%) and myoma (4.7%) respectively. This correlates with the study conducted by Sharma et al[7] who also found septate uterus as the most common anomaly (10.7%). Similar result was noted in the study done by Nayak et al[12] who detected the most common intrauterine pathology was uterine septum (10%). Mali et al[13] did a study and found abnormalities on hysteroscopy in 24% cases, 8% had fibroid, septum was detected in 4% and polyp in 4%.

Laparoscopy findings: On laparoscopy, our study revealed abnormality in 76 cases out of 85 (89.4%) and no abnormal finding was seen in the rest 9 cases (10.6 %). The most common abnormality found on laparoscopy was tubal pathology contributing to 42.3 % followed by peritoneal factors 35.3%, ovarian factors 20% and uterine factors 9.4% respectively.

This correlates with the study conducted by Gandotra et al[14] who found abnormal laparoscopic findings in 73% patients. Most common abnormal laparoscopic finding was tubo-peritoneal pathology (47%) followed by ovarian (31%) and uterine (5%).

Shah SJ et al[15] conducted a study and found tubo-peritoneal factors were responsible for infertility in 38% cases, ovarian factors in 31% cases and PCOS in 12% cases.

In the study done by Sharma et al[7] the most common pathology detected on laparoscopy was ovarian pathology accounting for 31.5% of all cases.

In the present study, peritubal adhesions (14.1%) was the most common tubal pathology followed by hydrosalpinx (11.7%). Adhesions (16.5%) were also the most common pathology seen in peritoneal factor infertility followed by endometriosis (10.6%) and TB tubercles (8.2%). This is similar to the study conducted by Chanu et al[4] in which pelvic adhesions (21.2%) and hydrosalpinx (16.6%) were the two most common tubopelvic pathologies seen on laparoscopy and 9.3% patients had findings of endometriosis. Similar results were seen in study done by Nanaware et al [9] who found tubal pathology (43.2%) and pelvic adhesions (40%) were the most common abnormalities detected in laparoscopy in both groups.

In the study done by Nayak et al[12] endometriosis (12%) and adnexal adhesions (8%) were the two major abnormalities found on laparoscopy.

In our study, ovarian factor infertility contributed 20%. The most common ovarian factor found was polycystic ovarian disease (PCOD) 9.4% followed by ovarian cyst 7.1%. In the study done by Sachdeva PK et al[16] ovarian factor was responsible for infertility in 29% cases which included 14% patients with PCOD and 6% with ovarian cyst.

In the present study, on CPT, tubal block was seen in 14.1% patients and rest 85.9% had patent tubes. Among them 5.9% had unilateral block and 8.2% had bilateral block. Bilateral block was more common than the unilateral block and tubal block was seen more in the

primary infertility group than the secondary infertility. This is similar to Sharma et al [7] who found bilateral block in 5.38% and unilateral block in 4.6% cases. Postoperative period was uneventful in all our patients. There were no anaesthetic or major surgical complications noted other than mild abdominal pain.

Conclusion

Diagnostic hystero-laparoscopy is a definite investigative day care procedure with minimal invasive surgery. Laparoscopy aids in direct visualization of various conditions like tubal block, endometriosis, adhesions, PCOD, ovarian cyst, tuberculosis, uterine anomalies which can be treated simultaneously in the same sitting with the help of operative procedures like adhesiolysis, ovarian drilling, cystectomy, fulguration of endometriotic spots and myomectomy. Similarly hysteroscopy helps in visualizing cervical canal, uterine cavity, endometrium and bilateral ostia and various pathologies like myoma, polyp, septum, synechiae, congenital uterine anomalies can be identified. Therapeutic procedures like polypectomy, myomectomy, septal resection and adhesiolysis and hysteroscopic guided biopsy can be done at the same time. Thus, Diagnostic Hysterolaparoscopy has emerged as an effective and safe tool for evaluation of females presenting with infertility.

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