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Diagnostic hysterolaparoscopy: An important tool in evaluation of female infertility, in beneficiaries of ESI scheme in Eastern India

Nita Singh[1], Kaushik Datta Pramanik[2], Manisha Bajaj[3], Rajib Roy[4]

[1]Assistant Professor, [3,4]Associate Professor, Department of Obstetrics and Gynaecology, ESI Post Graduate Institute of Medical Science and Research and MC, Kolkata, [2]Specialist Medical Officer, Department of Obstetrics and Gynaecology, West Bengal Health Service, West Bengal, India

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ABSTRACT

Background: The WHO estimates that 60–80 million couples worldwide suffer from infertility and the overall prevalence of the primary infertility in India is 3.9–16.8%. As usual tests and examinations are unable to appreciate majority of pelvic pathology in infertile women, diagnostic laparoscopy has become an essential part of infertility evaluation. Diagnostic laparohysteroscopy (DHL) gives the opportunity to directly visualize and manipulate pelvic organs which allow accurate diagnosis and give an option to treat at the same sitting. **Aims and Objectives:** The aims of this study were to detect pelvic organ abnormalities by diagnostic hysteroscopy and laparoscopy in the evaluation of female infertility in a tertiary care hospital. **Materials and Methods:** This cross-sectional observational study recruited 50 patients who attended the infertility clinic during 1 year period as per inclusion and exclusion criteria. Those with male factor and endocrine abnormality were excluded from the study. The patients having abnormal hystero-salpingography (HSG) findings and those who in spite of having normal HSG finding, did not conceive even after three cycles of ovulation induction, underwent DHL. **Results:** Out of the 50 patients, 35 (70%) suffering from the primary and 15 (30%) suffering from the secondary infertility. The mean age of the study population was 29.5 ± 5.3 years. Most of the cases presented with 3–6 years of infertility. The most common reported laparoscopic abnormality was ovarian in 58% cases, followed by 56% of pelvic and peritoneal abnormalities, 44% tubal factor abnormality, 36% having endometriosis at different stages, and 30% having uterine abnormality. **Conclusions:** Hystero -laparoscopy has good diagnostic accuracy in evaluating pelvic pathologies. The combination of hysteroscopy with laparoscopy done in a single setting improves the detection rate of abnormalities of uterus, fallopian tubes, ovaries, and pelvic peritoneum.

Key words: Diagnostic lap-hysteroscopy; Laparoscopy; Female infertility; Hysteroscopy; Hystero-salpingography

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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."[1] The term sub-fertility is used interchangeably to describe women or couples who may not be sterile but exhibit decreased reproductive efficiency. The primary infertility patients were those who had never conceived before, whereas the secondary infertility patients had one prior conception before regardless of the duration, site, and outcome of pregnancy.[2]

The prevalence of infertility is about 10–15% of reproductive age couples.[3] The World Health Organization (WHO) estimates that 60–80 million couples worldwide currently suffer from infertility and the overall prevalence of the primary infertility in India is between 3.9 and 16.8%.[4]

Address for Correspondence:
Dr. Rajib Roy, Plot No-34/1, Phase-1, Pailan Park Housing Project, Pailan, Kolkata - 700 104, West Bengal, India.
Mobile: +91-8335843388. **E-mail:** roy.rajib82@yahoo.in

The number of couples seeking medical help for infertility has increased dramatically from 8% to 15%.[5] Usually, infertility evaluation should only be initiated after 1 year of unprotected coitus. However, work up can be started after 6 months in women older than 35 years of age or in women with irregular cycles.[6]

The experience has shown that majority of pelvic pathology in infertile women are 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, visualizing the uterine cavity and identifying the possible pathology has made hysteroscopy an equally important tool in infertility evaluation. Diagnostic laparohysteroscopy (DHL) gives the opportunity to directly visualize and manipulate the uterus, fallopian tubes, and ovaries which allow accurate diagnosis and gives an option to treat at the same sitting. In addition, definitive surgical procedures such as adhesiolysis, ovarian drilling, ovarian cystectomy, myomectomy, polypectomy, and release of uterine synechiae can safely be combined together with hysterolaparoscopy making it more cost effective. Moreover, laparoscopic interventions for intra-abdominal abnormalities are more effective in terms of higher pregnancy rates after treatment.[7]

Aims and objectives

The aims of this study were to detect pelvic organ abnormalities by diagnostic hysteroscopy and laparoscopy in the evaluation of female infertility in a tertiary care hospital catering to beneficiaries of ESI scheme

MATERIALS AND METHODS

The present cross-sectional observational study was conducted in the Department of Obstetrics and Gynecology, ESI-PGIMSR, ESIC Medical College, Joka, a tertiary care center in Kolkata. It was conducted over a period of 1 year, from July 2019 to June 2020. Ethical clearance was obtained from the Institutional Ethics Committee. The study recruited 50 patients who attended the infertility clinic during the period satisfying the inclusion criteria and gave informed consent. Taking prevalence of infertility as 15% and precision as 0.1, the sample size was approximately 50 (48.98).

Inclusion criteria

The following criteria were included in the study:

1. Women aged 19–40 years
2. Primary or secondary infertility according to the WHO criteria
3. Normal TSH, LH, FSH, and Prolactin levels
4. Normal Husband's seminogram
5. Abnormal hystero-salpingography (HSG) finding
6. Normal HSG findings but not conceiving even after three cycles of ovulation induction.

Exclusion criteria

The following criteria were excluded from the study:

1. Patient not willing to provide written informed consent
2. Male factor infertility
3. Abnormal hormonal parameters
4. Relative/absolute contraindication for laparoscopy

The procedure was done in the follicular phase (day 8–11) of menstrual cycle. The selected patients underwent laparohysteroscopy in operation theater in a single sitting after fulfilling all prerequisite criteria. Hysteroscopy followed by laparoscopy was performed. The endometrial biopsy was taken and the specimen sent for histopathology.

Statistical analysis

Appropriate statistical analysis tests were done using the Statistical Package for the Social Sciences software version 25. The continuous variables were expressed as mean±SD and categorical variables as proportions. The student t-test was used for comparison of means of continuous variables and Chi-square test and Fisher's exact test for proportions. $p<0.05$ has been considered as statistically significant.

RESULTS

In the present study, 50 infertile couples were recruited, in which the primary infertility and secondary infertility cases were 35 (70%) and 15 (30%), respectively. The mean age was 29.5 years (±5.3), minimum age being 20 years, and maximum 39 years. Majority (56%) cases were in the 25–34 years of age group. Among the primary infertility couples, most of them (34.4%) were married for 1–4 years and in the secondary infertility couples, majority (46.6%) were married for 4–7 years. About 60% of the patients reported within 1–6 years of infertility. The menstrual cycle was regular in 56% patients and irregular in 44%.

The HSG findings in 50 cases: Cavity normal in 52%, irregular in 24%, bicornuate/septate in 10%, arcuate 6%, filling defects in 6%, and unicornuate in 2% (later diagnosed as uterine didelphys by DHL). In HSG dye test, 56% had negative spillage, 18% unilateral spillage, and 26% had bilateral spillage.

On performing the hysteroscopy, the observations, as shown in Table 1, were documented.

Subsequently laparoscopy was performed; the uterine, ovarian, and tubal findings are reported in Tables 2-4, respectively.

In this study, significant correlation was found between abnormal menstrual history and ovarian pathological morphology detected by laparoscopy {Chi-square value=4.18, df=1.p value=0.041 (<0.05)}. In the secondary infertility group, most of them (60%) had one or more spontaneous abortions in the past obstetric history.

The tubo-ovarian relationship was maintained in 17 cases of the primary infertility and 12 cases of the secondary infertility. The same was disrupted in 18 and three cases of the primary and secondary infertility, respectively. Hence, in 58% cases, relationship was maintained, while, in 42% cases, it was not.

Table 1: Hysteroscopic findings

Hysteroscopic findings	Primary infertility (n=35) (%)	Secondary infertility (n=15) (%)	Total
Normal	13 (37.1)	5 (33.3)	18 (36)
Transverse cervical band	1 (2.9)	0 (0)	1 (2)
Rudimentary horn	1 (2.9)	0 (0)	1 (2)
Adhesions	8 (22.9)	0 (0)	8 (16)
Uterine septum	2 (5.7)	3 (20)	5 (10)
Endometrial polyp	3 (8.6)	1 (6.7)	4 (8)
Submucous fibroid	1 (2.9)	1 (6.7)	2 (4)
Endometritis	3 (8.6)	1 (6.7)	4 (8)
Endometrial flecks	1 (2.9)	0 (0)	1 (2)
Bicornuate uterus	1 (2.9)	0 (0)	1 (2)
Complete utero vaginal septum	1 (2.9)	1 (6.7)	2 (4)
Fundal indentation	0 (0)	2 (13.3)	2 (4)
Cervical diverticulum	0 (0)	1 (6.7)	1 (2)
Total	35 (100)	15 (100)	50 (100)

Table 2: Laparoscopic findings of uterus

Lap findings of uterus	Primary infertility (n=35) (%)	Secondary infertility (n=15) (%)	Total
Normal	26 (74.3)	9 (60)	35 (70)
Bulky adenomyotic	3 (8.6)	2 (13.3)	5 (10)
Uterus didelphys	1 (2.9)	-	1 (2)
Fibroid	1 (2.9)	2 (13.3)	3 (6)
Fundal indentation	1 (2.9)	1 (6.7)	2 (4)
Multiple tubercles	1 (2.9)	1 (6.7)	2 (4)
Adhesions	1 (2.9)	-	1 (2)
Bicornuate	1 (2.9)	-	1 (2)
Total	35 (100)	15 (100)	50 (100)

Table 3: Laparoscopic findings of ovaries

Findings	Right ovary (%)	Left ovary (%)
Normal	21 (42)	21 (42)
Chocolate cyst	2 (4)	1 (2)
PCOM*	17 (34)	19 (38)
Endometriotic spots	6 (12)	4 (8)
Tubo Ovarian mass	4 (8)	4 (8)
Complex cyst	-	1 (2)
Total	50 (100)	50 (100)

*PCOM: Polycystic ovarian morphology

In the whole study population, 22% patients have negative spillage, 60% have bilateral positive spillage, and 18% have unilateral positive spillage (Table 5).

The pouch of Douglas was clear in 60% cases, had endometriotic deposits in 16%, dense adhesions in 12%, flimsy adhesions in 2%, and fluid collection in 10%.

In this study, in the laparoscopic findings of pelvis and peritoneum: 44% had normal findings, 22% flimsy adhesions,14% dense adhesions, 14% endometriotic spots, 4% peritoneal pocketing, and 2% had multiple tubercles.

DISCUSSION

In the present cross-sectional observational study, out of 50 cases, 35 cases (70%) had primary infertility and 15 cases (30%) secondary infertility, which are similar to the study done by Boricha et al.,[8] and comparable with observations made by two Indian studies, where the primary infertility ranged from 64 to 70.9% and secondary from 29 to 36%.[9,10] This signifies that prevalence of the primary infertility is higher than secondary infertility.

In this study, the age of patients ranged from 20 to 39 years. The mean age was 29.5±5.3 years which is comparable with the studies done by Vaid et al.,[11] Sharma et al.,[9] and Puri et al.[12]

In this study, it is seen that maximum number of the primary infertility cases are in the 25–29 years age group (11/35, 31.4%) and maximum number of the secondary infertility cases are in the 30–34 years age group which is comparable with the studies done by Madhuri et al.,[13] Patients of the secondary infertility are somewhat elder than the primary infertility group.[14,15] Overall, the maximum numbers of cases

Table 4: Laparoscopic findings of tubes

Lap findings	Right tube (%)	Left tube (%)
Normal	31 (62)	28 (56)
Adhesions	6 (12)	9 (18)
Hydrosalpinx	3 (6)	3 (6)
Parafimbrial cyst	2 (4)	-
Convoluted	6 (12)	8 (16)
Convolutions with tubercles and adhesions	2 (4)	2 (4)
TOTAL	50 (100)	50 (100)

Table 5: Laparoscopic dye test

Spillage of dye	Primary infertility (n=35) (%)	Secondary infertility (n=15) (%)	Total
Negative	11 (31.4)	0 (0)	11 (22)
Unilateral positive	4 (11.4)	5 (33.3)	9 (18)
Bilateral positive	20 (57.1)	10 (66.7)	30 (60)
TOTAL	35 (100)	15 (100)	50 (100)

were in the 30–34 years of age group. This may be due to shift in age of marriage and child-bearing among females due to the present changed socioeconomic scenario. After that, the number of cases decreased.

The duration of infertility in maximum cases of both primary (12/35, 34.2%) and secondary (7/15, 46.6%) infertility was 3–6 years. The mean duration of infertility among primary cases is 6.95±3.86 years and among secondary cases is 5.4±2.5 years. In this study, there is not much difference in the mean duration of infertility between the primary and secondary cases. These findings are comparable with the study done by Chaudhary et al.,[5] Chanu et al.,[16] showed in their study, the mean duration of infertility in the primary and secondary infertility was 5.1±2.2 years and 4.9±2.7 years, respectively.

Among the primary infertility cases, 60% (21/35) had normal and 40% (14/35) had abnormal menstrual history. Among the secondary infertility cases, 46.7% (7/15) had regular and 53.3% (8/15) had irregular menstrual cycle. Kolstad et al.,[17] showed in their study that women with irregular cycles had a fecundity of 0.12 compared with 0.16 in women who reported regular periods.

There is significant association of menstrual history and ovarian pathology. In majority of cases, irregular cycles often followed by heavy menstrual bleeding had anovulatory cycles. Sasaki et al.,[18] observed in their study that the patients having irregular cycles had more than 6 times the likelihood of not ovulating in a menstrual cycle.

Table 6 depicts the hysteroscopic findings of various studies.

In this study, the DHL report is pathological in 48 (96%) of cases and no abnormality in 2 (4%) cases. As all the patients were evaluated for male factor abnormality and hormonal parameters, so in these 4% cases (n=50), no reason for infertility was apparent. Hence, these 4% cases were labeled as unexplained infertility. In the population, among the infertile females,10% cases have been found as unexplained infertility by different studies.[21] However, it has been estimated that using laparoscopy as a standard test reduce the apparent incidence of unexplained infertility from 10% to 3.5%.[22]

In the current study, the maximum reported laparoscopic abnormality was ovarian in 58% cases. This was followed by 56% of pelvic and peritoneal abnormalities in the form of adhesions, endometriotic spots, peritoneal pocketing, PID, fluid collection, etc., 44% tubal factor abnormality, 36% having endometriosis at different stages, and 30% having uterine abnormality.

Table 6: The hysteroscopic findings in different studies

Hysteroscopic findings	Madhuri et al.,[13]	Wadhwa et al.,[19]	Ugboaja et al.,[20]	Present study (%)
Normal	67			18 (36)
Transverse cervical band				1 (2)
Rudimentary horn				1 (2)
Adhesions	6	4.67	41.3	8 (16)
Uterine septum	7	10.25		5 (10)
Endometrial polyp	10	4.67	20	4 (8)
Submucous fibroid	3		16.1	2 (4)
Endometritis				4 (8)
Endometrial flecks				1 (2)
Bicornuate uterus				1 (2)
Complete utero vaginal septum				2 (4)
Fundal indentation				2 (4)
Cervical diverticulum				1 (2)
Obliterated ostium	3	9.34		
Unicornuate uterus	1			
Hypoplastic uterus	1			
Atrophic endometrium		7.45		
Mullerian abnormalities			14.8	
Total				50 (100)

Mishra and Sudhir[14] study found that the most common pathology detected by laparoscopy in both primary and secondary infertility groups was ovarian pathology, accounting for 25% of all abnormalities.

In both the ovaries, most common abnormal finding was PCOM. According to ASRM-sponsored consensus workshop group, polycystic ovary syndrome is the most common cause of anovulation or oligo-ovulation in women presenting with infertility.[23]

In Nanaware et al.,[24] study of 85 infertile women, laparoscopic observations were 16.47% normal pelvic organs, 43.52% tubal pathology, 40% adhesions, 10.5% PCOM, 7% endometriosis, 3.52% anomalous uterus, and 2.35% uterine fibroid.

Madhuri et al.,[13] in their 96 cases study, on doing laparoscopy, documented 39% normal finding, 20% ovarian pathology, 19% endometriosis, 13% tubal pathology, 15% adhesions, 15% uterine abnormalities, and 1% abdominal TB. While

diagnostic hystero-laparoscopy in Vaid et al.,[11] study reported pelvic adhesions in 33.67% cases, fimbrial agglutination in 16.02% cases, pelvic endometriosis in 15.54% cases, fimbrial cyst in 9.84% cases, PCOM in 5.18% cases, beaded tube in 4.14% cases, TO mass in 3.62% cases, fibroids in 3.1% cases, peritoneal adhesions in 3.1% cases, hydrosalpinx in 2.59% cases, ovarian cyst in 1.03% cases, and accessory tube in 1.03% cases.

In the present study, to relationship was maintained more in the secondary infertility cases (80%) than primary infertility cases (48.6%). After chromopertubation, bilateral negative spill was observed in 11 (22%), unilateral positive spill in 9 (18%), and bilateral positive spill in 30 (60%) cases in our study, while the same in Madhuri et al.,[13] study were 8%, 13%, and 74%, respectively. Dawle et al.,[25] in their study, reported 11.4% bilateral tubal block, 7.29% having unilateral tubal block and 82.29% having bilateral open tubes.

Chanu et al.,[16] in their studies, found 9.3% cases having endometriosis in laparoscopy while our study reported 10% stage 1, 8% Stage 2, 12% Stage 3, and 6% Stage 4 endometriosis.

On diagnostic laparoscopy in the present study, 57% primary infertility and 46% secondary infertility had pelvic adhesions. The same in Chaudhary et al.,[5] study was observed in 44% primary infertility cases and 24% secondary infertility cases.

Limitations of the study

A larger sample size is needed to extrapolate the results of above study to represent the entire population. Moreover, we could not analyze whether the anatomical abnormalities observed have any real implication on physiological and functional effect on fertility potential as it needs a long-term study.

CONCLUSION

Some important pathology such as septate uterus, uterine synechiae, endometrial polyp, submucus myoma, distorted tubo-ovarian relationship, peritoneal adhesions, and peritoneal endometriosis which are often missed by conventional imaging techniques can be effectively diagnosed by DHL. It also helps in planning the management and has the added advantage of therapeutic interventions such as endometrial deposit fulguration, polypectomy, and adhesiolysis that can be done in the same sitting if needed. It is concluded that while investigating female infertility, DHL should be performed in all cases specially those who are having abnormal HSG reports and those who failed to conceive after three cycles of treatment with ovulation induction agents in spite of other normal reports (such as normal male factor, biochemical parameters, and hysterosalphingogram). DHL appears to be far better than HSG, as it gives more definitive diagnosis. Furthermore, it is possible to identify patients who will need ART and they can be referred to ART center at the earliest, thus expediting treatment. This helps in preventing further compromise in ovarian reserve and progression of disease especially in endometriosis cases and thus reducing financial burden to the couples.

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Authors Contribution:
NS- Interpreted the results, review of literature, and manuscript preparation, **KDP**- Data collection, Interpreted the results, review of literature, and manuscript preparation. **MB**- Interpreted the results, manuscript preparation, and coordination. **RR**- Concept and design critical revision of the manuscript.

Work attributed to:
ESI- PGIMSR & ESIC Medical College, Joka, Kolkata, West Bengal, India.

Orcid ID:
Dr. Nita Singh - https://orcid.org/0000-0002-5520-8373
Dr. Kaushik Datta Pramanik - https://orcid.org/0000-0002-6262-1254
Dr. Manisha Bajaj - https://orcid.org/0000-0001-8783-2018
Dr. Rajib Roy - https://orcid.org/0000-0001-7342-3336

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