Original Article

Diagnostic Hysterolaparoscopy for Evaluation of Infertility: Our Experience in a Tertiary Care Hospital

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Abstract

Objective: The objective of this study is to analyze the role of diagnostic hysterolaparoscopy (DHL) for evaluation of infertility in a tertiary care hospital. **Materials and Methods:** This retrospective study was conducted from July 2014 to June 2016. **Results:** Out of 151 patients, 58.28% and 41.72% had primary and secondary infertility, respectively. In primary infertility group 37.5% and in secondary infertility group 49.2% had abnormal findings. Most common finding was adnexal adhesions (pelvic inflammatory disease) and laparoscopic findings were more common than the hysteroscopic ones. **Conclusion:** DHL was helpful in finding some reversible causes of infertility such as adnexal adhesions, tubal blockade, and uterine synechiae, etc.

Keywords: *Hysterolaparoscopy, infertility, tubal blockade*

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] 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. Diagnostic hysterolaparoscopy (DHL) has emerged as the essential tool for the evaluation of female infertility and is the gold standard investigation for tubal patency. The importance of DHL lies in the fact that it gives a detailed, direct visualization and analysis of the uterine cavity, endometrium, tubal morphology and patency, uterine, ovarian, and adnexal pathology. These pathology findings are often missed in routine clinical examination and ultrasound scan. In addition to diagnosis, DHL also provides the additional benefit of therapeutic interventions in few conditions. This study was undertaken to find out the role of DHL in evaluation of female infertility.

Materials and Methods

A retrospective was study was conducted in a tertiary care hospital, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, India. Over a period of 2 years from July 2014 to July 2016, infertile couple with primary and secondary infertility aged between 20 and 45 years were included in the study. However, only those patients above 40 years of age who had good antimullerian hormone level, and hence, could be potentially benfitted from the DHL were included in this study. Total seven patients (six in the primary infertility group and one in secondary infertility group) belonged to 40–45 years age group. Primary infertility patients were those who had never conceived before whereas secondary infertility patients had one prior conception before regardless of the duration, site, and outcome. The mean duration of infertility in primary and secondary infertility was 5.1 ± 2.2 years and 4.9 ± 2.7 years, respectively.

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In our study for inclusion, as per definition, minimum 1 year of infertility was taken into account. That means, for primary infertility, inability to conceive after minimum of 1 year of unprotected sexual intercourse and for secondary infertility, the same duration and criteria after previous obstetrical event. Hence, the minimum period of infertility was 1 year. However, in our study, there was no upper limit of duration of infertility. Patients with abnormal hysterosalpingogram were also included in the study irrespective of the presence or absence of another male or female known etiology of infertility. It is an established fact that hysterosalpingography (HSG) gives false-positive result of bilateral tubal block due to reflex spasm of the uterine cornu after injection of the dye. We can overcome this fallacy by performing chromopertubation (CPT) where we have additional benefit of performing cannulation (although this was not included in study outcome). Therefore, in our institute, it is a routine protocol to perform DHL and CPT in a diagnosed case of tubal block by HSG. The patients with abnormal HSG findings (unilateral or bilateral tubal block and uterine anomaly) were included and confirmed by DHL. However, we did not compare the finding of HSG with that of DHL in our study.

Endocrine disorder causing chronic anovulation or oligoovulation such as polycystic ovarian syndrome, hyperprolactinemia, thyroid disorder, etc., was excluded from the study. Couples with abnormalities in semen analysis were also excluded. Patients having any relative and absolute contraindication to laparoscopy were also excluded. DHL with CPT was performed in the preovulatory (day 6–12 of menstrual cycle). Transvaginal sonography before DHL was not performed routinely. If at all performed, it was mainly to evaluate the antral follicular count. All the patients were selected based on abnormal HSG report (tubal block, hydrosalpinx, and uterine anomaly).

DHL was performed in the preovulatory period between days 6 and 11 of the cycle under general anesthesia 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.

Statistical analysis was performed using SPSS (IBM Corp.SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) software version 16. Student's *t*-test and Chi-square test were performed for comparison of continuous variable and proportions, respectively.

Results

A total number of 151 patients underwent DHL out of which 88 (58.28%) suffered from primary infertility and 63 (41.72%) suffered from secondary infertility. The mean age of patients with primary infertility was 27.2 ± 2.6 years while the mean age of secondary infertility group were 32.4 ± 2.2 years. The mean duration of infertility in primary and secondary infertility was 5.1 ± 2.2 years and 4.9 ± 2.7 years, respectively, which was not statistically significant [Table 1].

In the primary infertility group, 17 patients gave a history of dyspareunia and in the secondary infertility group, 11 patients gave similar history. In the primary infertility group, two patients were underweight, seven patients were overweight, 11 were obese, and the rest had normal body mass index [Table 2]. In the secondary infertility group, one patient was underweight, nine9 patients were overweight, 13 were obese, and the rest had normal body mass index [Table 2]. Among the primary infertility group, 22 had history of the previous ovulation induction and 9 had history of intrauterine insemination [Table 3]. Among the secondary infertility group, 17 had history of previous ovulation induction and 11 had history of intrauterine insemination [Table 3]. None of the patients had undergone *in vitro* fertilization (IVF) in the past.

In both primary and secondary infertility patients, laparoscopic abnormalities (37.5% and 49.2%) were more common than the hysteroscopic ones (7.95% and 14.29%) [Table 4]. In both, the groups laparoscopic

abnormalities were significant. Thirteen patients belonging to primary infertility group and 5 in secondary infertility had more than one abnormal finding during DHL. The most common abnormalities found during laparoscopy in both the primary and secondary infertility group were features of PID (adnexal adhesion and hydrosalpinx) [Table 5]. Six patients in primary and three in secondary infertility had findings suggestive of tuberculosis, for example, caseous material in pelvis and visible tubercles on fallopian tubes and pelvic serosa (tuberculosis was confirmed later on by polymerase chain reaction). The most common abnormality in hysteroscopy was uterine synechiae [Table 6]. One patient in primary infertility group had cervical stenosis and one patient with secondary infertility had arcuate uterus. Tubal block was more common in primary than secondary infertility [Table 7]. Bilateral block was more common than the unilateral 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 1: Duration of infertility

	Primary infertility	Secondary infertility
Mean duration of infertility (years)	5.1±2.2	4.9±2.7

Table 2: Body mass index (BMI)

BMI	Primary infertility	Secondary infertility
<18.5	2	1
18.5-24.9	68	40
25-29.9	7	9
>30	11	13

BMI=Body mass index

Table 3: Previous treatment history

	Primary infertility	Secondary infertility
Ovulation induction	22	7
IUI	9	11
IVF	0	0

IUI=Intrauterine insemination, IVF=*In vitro* fertilization

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 prevalance 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

Table 4: Prevalence of hysteroscopic and laparoscopic abnormalities

Procedure	Primary infertility (88)		Secondary infertility (63)	
	Normal (%)	Abnormal (%)	Normal (%)	Abnormal (%)
Laparoscopy	55 (62.5)	33 (37.5)	32 (50.8)	31 (49.2)
Hysteroscopy	81 (92.05)	7 (7.95)	54 (85.71)	9 (14.29)
Total	136 (77.27)	40 (27.73)	86 (63.25)	40 (31.75)

Table 5: Laparoscopy findings

Findings	Primary infertility (88) (%)	Secondary infertility (63) (%)	Total (151) (%)
Fibroid	7 (7.95)	3 (4.8)	10 (6.6)
Endometriosis	8 (9)	6 (9.6)	14 (9.3)
Adnexal adhesion	18 (20.45)	14 (22.22)	32 (21.2)
Hydrosalpinx	15 (17.05)	10 (15.9)	25 (16.6)
Tubal pathology	3 (3.4)	4 (6.35)	7 (4.6)
Ovarian pathology	9 (10.23)	11 (17.47)	20 (13.2)
Uterine anomaly	2 (2.3)	0	2 (1.3)
Others	6 (6.8)	3 (4.8)	9 (6)

Table 6: Hysteroscopy findings

Findings	Primary infertility (88) (%)	Secondary infertility (63) (%)	Total (151) (%)
Fibroid	2 (2.3)	1 (1.6)	3 (1.99)
Polyp	2 (2.3)	1 (1.6)	3 (1.99)
Septum	0	3 (4.8)	3 (1.99)
Synechiae	2 (2.3)	3 (4.8)	5 (3.3)
Others	1 (1.14)	1 (1.6)	2 (1.3)

Table 7: Prevalence of tubal block (chromopertubation test)

Findings	Primary infertility (88) (%)	Secondary infertility (63) (%)	Total (151) (%)
Unilateral	19 (21.6)	8 (12.7)	27 (17.9)
Bilateral	36 (41)	21 (33.3)	57 (37.7)

region.[13] A study conducted in India found that more than 25% infertile patients (40 out of 150) had genital tuberculosis.[14]

In our study, overall 9.3% patients had findings of endometriosis during laparoscopy in the form of endometrioma, endometriotic nodules, 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]

In our study, 6% patients during laparoscopy and 1.99% patients during hysteroscopy were found to have myoma. In 7 patients with fibroid in primary infertility Group 4 were submucosal and 3 were intramural in location whereas in secondary infertility Group 2 were intramural and 1 was submucosal in location.

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, 1.3% patients in laparoscopy and 1.99% patients during hysteroscopy were found to have uterine anomaly, the majority being septate and arcuate uterus.

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.

In our study, 17.9% patients had unilateral tubal block whereas 37.7% 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.

Postoperarative period was uneventful for most of the patients. Mild postoperative pain was the only minor complaint which could be controlled with mild analgesics. No hemorrhagic or infective complications were seen during or after the procedure

Conclusion

Reversible causes of infertility such as adnexal adhesions, tubal blockade, uterine synechiae, etc., can easily be diagnosed and treated by hysterolaparoscopy. However, in the era of advanced ultrasound, in developing countries diagnostic hysterolaparosccopy may still offer some hope to the infertile couple.

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Conflicts of interest

There are no conflicts of interest.

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