

Original Research

Role of Diagnostic Hysteroscopy (DHL) For Evaluation of Infertility at A Tertiary Care Hospital

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Abstract

Background: Infertility affects a large population of reproductive age group couples. The diagnosis and treatment of infertility stands out as one of the most rapidly evolving area in the field of medical science. The incidence of primary infertility in Indian population ranges from 3.9% to 16.8%. Since hysteroscopy offers a direct view of the uterine chamber to identify any potential abnormalities, it has become an essential method for detecting infertility. The objective of this research is to evaluate the use of diagnostic hysteroscopy (DHL) for evaluation of infertility.

Materials and Methods: This study was a retrospective observational study conducted at Rama Medical College, Hospital & Research Centre a tertiary care hospital of North India. Total 185 female patients aged 25-40 years with normal hormonal profile who had a previous history of infertility were included. Cases with male factor infertility were excluded from the study. The study was conducted throughout the year in 2023. Characteristics variables on the social and demographic of individuals and their medical history pertaining to infertility were collected in Microsoft Excel. The significance threshold was established at 5% with a significance level of $\alpha = 0.05$.

Results: Out of the 300 infertility cases, 191 (63.7%) had primary infertility, whereas 109 (36.3%) had secondary infertility. Diagnostic laparoscopy detected abnormalities in 68 (35.6%) of the individuals with primary infertility and 52 (47.7%) of the cases with secondary infertility. Significant hysteroscopy findings were noted in 43 (22.5%) cases of primary infertility. Diagnostic hysteroscopy detected abnormalities in 29 (26.6%) cases of secondary infertility. Together, diagnostic hysteroscopy detected abnormalities in 24% cases of the infertile patients in both groups. Abnormalities identified during hysteroscopy were 29 (15.2%) of the individuals with primary infertility and in 13 (6.8%) of the cases with secondary infertility. The prevalent abnormalities detected during hysteroscopy were endometriosis, fibroids, adnexal adhesion and uterine septa. The incidence of tubal obstructions was higher in the primary infertility group compared to the secondary infertility group.

Conclusions: Diagnostic Hysteroscopy (DHL) is an effective diagnostic method for evaluation of different significant and correctable tubo-peritoneal and intrauterine pathophysiological conditions like adnexal adhesions, peritoneal endometriosis, and subseptate uterus, which are usually missed by other imaging technologies.

Keywords: Hysteroscopy, Infertility, Diagnosis, Treatment, Hysteroscopy

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Introduction

According to World Health Organisation (WHO), Infertility is a clinical condition of the reproductive system that is marked by the inability to produce a

clinical pregnancy even after engaging in frequent, unprotected sexual activity for duration of 12 months or longer.¹ Around the world, infertility affects more than

10% of couples who are able to conceive. Infertility affects more than 60 million couples worldwide, according to WHO estimates. According to recent WHO reports the prevalence of primary infertility in India ranges from 3.9% to 16.8%.² The percentage of married women of reproductive age who do not have children has significantly increased, rising from 13% to 16%, according to an examination of Indian census data from 1981 to 2001.³ Changes in lifestyle, increased stress, and a trend toward later marriage have all contributed to an increase in the prevalence of infertility.⁴ Several pelvic disorders in infertile women are frequently missed by standard diagnostic procedures and conventional pelvic examinations.⁵ Because, laparoscopy allows for direct observation and manipulation of the uterus, fallopian tubes, and ovaries, it is crucial in infertility evaluations. Furthermore, hysteroscopy is essential for assessing infertility because it provides a clear view of the uterus, making it easier to spot any potential anomalies.⁶ In order to help with the development of appropriate care and management strategies, this study aims to analyze the function of diagnostic hysterolaparoscopy (DHL) in the comprehensive assessment of infertility.

Objective of the Study

The objective of the study was to assess the role of Diagnostic Hysterolaparoscopy (DHL) for evaluation of infertility in a tertiary care hospital.

Materials and Methods

A retrospective observational research was conducted with 300 female patients who had a history medical condition of infertility. This research was conducted in the Department of Obstetrics and Gynecology, Dr. B. S. Kushwah Institute of Medical Sciences, Kanpur, UP for duration of 3 years, starting from July 2021 to July 2024.

Inclusion criteria: The cases female patients who had previously been diagnosed with infertility were included in this study. The subjects were between the ages of 20 and 40 years, and their infertility durations varied from 1 to 10 years.

Exclusion criteria: The study excluded the cases with atypical results in semen analysis of male partner.

The research comprised female patients with a previous diagnosis of infertility who visited the Obstetrics and Gynecology outpatient and inpatient departments at Department of Obstetrics and Gynecology, Dr. B. S. Kushwah Institute of Medical Sciences, Kanpur, UP Prior to the initiation of the investigation, approval was sought from the institutional ethics committee. Primary infertility is characterized by patients who have never experienced conception, while secondary infertility

refers to individuals who have had at least one previous pregnancy, regardless of the result. Routine ultrasound examination was performed on all patients as an initial examination. A Diagnostic Hysterolaparoscopy (DHL) was performed during the pre ovulatory phase, namely between days 6 and 11 of the menstrual cycle, while the patient was under general anesthesia. The method used a 7 mm Karl Storz laparoscope equipped with a telescope that had a tilting at 30 degree of angle. Hysteroscopy was initially used to check the vagina and cervix for irregularities such as over growths or polyps, and to evaluate the uterine cavity for septa, fibrotic bands or synechiae, congenital deformities, fibroids, polyps, and the state of the endometrium. Openings of the fallopian tubes were checked to make sure both were clear and unblocked. After the establishment of pneumo-peritoneum, laparoscopy was performed to check the fallopian tubes, ovaries, pelvic peritoneum, pouch of Douglas, and peritoneal cavity for any irregularities. Through examination of the pelvic cavity and its associated organs was performed, with particular emphasis on the morphology, dimensions, location, and texture of the uterus in addition to the presence of fibroids. An evaluation was performed on the cul-de-sac to detect the presence of any adhesions, endometriotic nodules, obliteration, and fluid. An evaluation was conducted on the ovaries to check their dimensions, outer appearance, configuration, colour, existence of cysts, and proximity to the fallopian tubes. An examination was performed on the fallopian tubes to assess their texture, dimensions, bending, configuration, widening, narrowing, or existence of fluid accumulation particularly focus on finding any feature suggestive of infertility. A chromoperturbation test (CPT) was performed to evaluate the patency of the bilateral fallopian tubes. The administration of methylene blue dye was performed using a 20 ml syringe, which facilitated injection through either a Leech Wilkinson cannula or a 14F Foley catheter inserted into the uterine cavity. Following this, the catheter bulb was inflated with 5 ml of normal saline. Tubal patency was confirmed by observing the dye exiting from the fimbrial ends of the fallopian tubes.

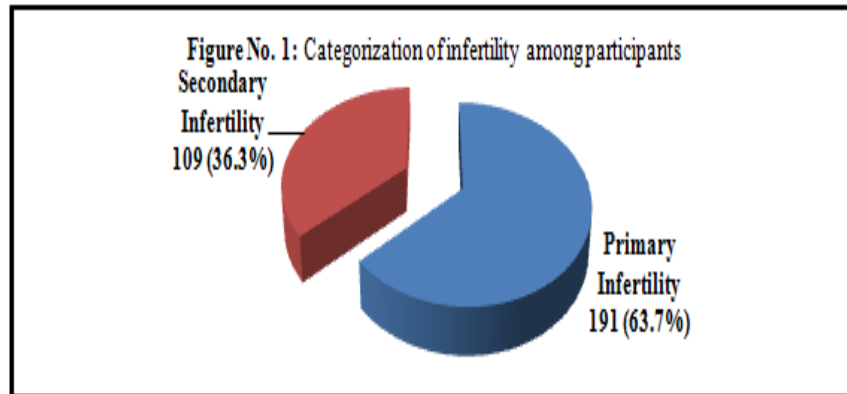
Statistical Analysis

The data was collected and organized in Micro Soft Excel version 2010. The data has been presented using descriptive statistical analysis. The data was analysed using Micro Soft Excel version 2010. The significance level was established at 5% ($\alpha = 0.05$). Qualitative factors are depicted through frequency and percentages, while quantitative variables are expressed in terms of mean and standard deviation.

Observation and Results

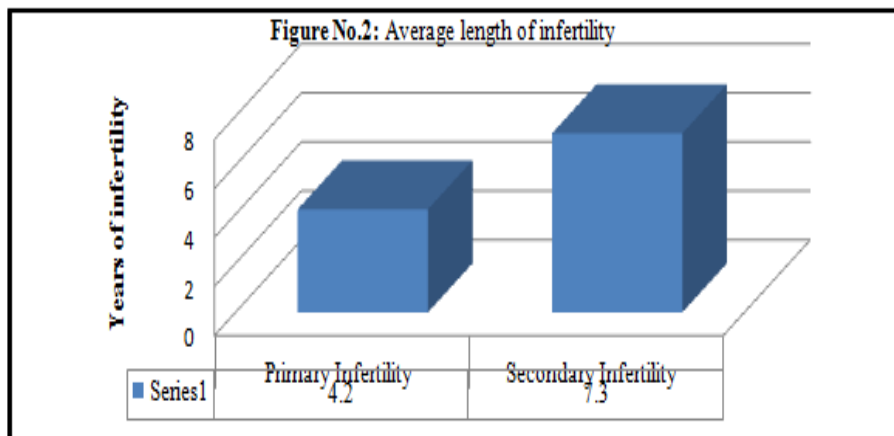
A total of 300 individuals participated in the Diagnostic Hysterolaparoscopy (DHL) procedure. Out of total participants, 191 (63.7%) had primary infertility, and 109 (36.3%) had secondary infertility (Figure No.1). The average age of patients experiencing primary

infertility was 27.5 with a standard deviation of 2.8 years, whereas average age for patients with secondary infertility was 32.6 with a standard deviation of 2.6 years. A history of dyspareunia was recorded in 24 (12.6%) participants from the primary infertility group and in 36 (33.0%) from the secondary infertility group.



The mean BMI of individuals in the primary infertility group was recorded at 24.3 Kg/m² with a standard deviation of 1.3 Kg/m², and 23.6 Kg/m² with a standard deviation of 2.4 Kg/m² in the secondary infertility group. The average length of infertility was recorded as 4.2 years with a standard deviation of 1.2 years for those experiencing primary infertility while it was 7.3

years with a standard deviation of 3.1 years for secondary infertility (Figure No. 2). In the primary infertility cohort, 56 individuals (29.3%) had previously experienced ovulation induction, while in the secondary infertility cohort, 36 individuals (33%) reported a history of ovulation induction (Table No.1).



	Primary Infertility	Secondary Infertility
OI	56 (29.3%)	36(33%)
IVI	00	00
IVF	00	00

In the current study, laparoscopic abnormalities were more prevalent than hysteroscopic abnormalities. Among primary infertility patients, laparoscopy identified 43 abnormalities (22.5%), while hysteroscopy

identified 29 abnormalities (15.2%). Among secondary infertility cases, laparoscopy identified 29 abnormalities (26.6%), while hysteroscopy identified 13 abnormalities (6.8%) (Table No.2). Among the patients in the primary

infertility cohort, 38 individuals (19.9%) had more than one aberrant finding during DHL. In the secondary infertility cohort, 17 patients (15.5%) also had more than one abnormal result. The most prevalent abnormalities seen during laparoscopy in both the primary and secondary infertility groups were Adnexal adhesion (65; 21.7%) and Hydrosalpinx (46; 15.3%), which are types of Pelvic Inflammatory Disease (PID) (Table 3). Out of the patients with primary infertility, 12 (6.2%) showed symptoms indicating TB, such as caseous material in the pelvis and visible tubercles on the fallopian tubes and pelvic serosa. Similarly, out of the patients with secondary infertility, 5 (4.6%) had

similar characteristics indicative of tuberculosis (Table 3). The most prevalent abnormalities detected during hysteroscopy were uterine synechiae, fibroids, and uterine septum, as shown in (Table 4). The occurrence of tubal blocks was higher in the primary infertility group compared to the secondary infertility group, as seen in (Table 5). Bilateral blocks were more prevalent than unilateral blocks, as seen in (Table 5). There were no significant complications noticed or reported during or after the surgery. The patient reported experiencing mild stomach discomfort at the surgical location as their only complaint.

Table No.2: Prevalence of hysteroscopy and laparoscopy abnormalities

Procedures	Primary		Secondary	
	Normal	Abnormal	Normal	Abnormal
Laparoscopy	148 (77.5%)	43 (22.5%)	80 (73.4%)	29 (26.6%)
Hysteroscopy	80 (84.8%)	29 (15.2%)	88.1%	13 (6.9%)

Table No.3: Laparoscopic findings among participants

Findings	Primary (n=191)	Secondary (n=109)	Total (n=300)
Adnexal adhesion	65(34.0%)	43(39.4%)	107(35.7%)
Tuberculosis	12(6.3%)	05(4.6%)	17(5.7%)
Fibroid	08(4.2%)	14(12.8%)	22(7.3%)
Uterine Synechiae	06(3.1%)	09(8.2%)	15(5.0%)
Endometriosis	03(1.6%)	09(8.2%)	12(4.0%)
Hydrosalpinx	02(1.3%)	05(4.6%)	07(2.3%)
Tubal pathology	02(1.3%)	03(2.8%)	05(1.7%)
Ovarion Pathology	02(1.3%)	01(0.9%)	03(1.0%)
Other	01(0.5%)	00(%)	01(0.3%)

Table No.4: Hysteroscopic findings among participants

Findings	Primary (n=191)	Secondary (n=109)	Total (n=300)
Uterine synechiae	17	15	32
Fibroid	15	12	27
Uterine septum	15	08	23
Polyp	11	06	17
Septum	09	02	11
Synechiae	08	01	09
Other	01	00	01

Table No.5: Chromopertubion findings among patients experiencing infertility

Findings	Primary (n=191)	Secondary (n=109)	Total (300)
Unilateral	43 (22.5%)	21 (19.3%)	64 (21.3%)
Bilateral	76 (39.8%)	49 (44.9%)	125 (41.7%)

Discussion

Tubal and peritoneal disorders are the primary diagnosis in roughly 30 to 35% of couples experiencing infertility.³ The gold standard method for diagnosing these condition is laparoscopy, which serves more reliable indicator of future spontaneous pregnancy in

infertile couples experiencing unexplained infertility.⁴ According to a study reported by Jayakrishnan *et al.*,⁵ from India identified pelvic disorders in 26.8% cases of infertile cases by laparoscopic evaluation. Our findings are closer (pelvic pathology: 21.7% in primary infertility cases and 15.3% in infertility cases) to the

study conducted by Jayakrishnan. Furthermore, endometriosis and adnexal adhesions emerged as the two primary abnormalities identified in infertile patients across various studies, consistent with our findings.^{6,7} Infertile couples often face significant challenges including financial strains, emotional distress, and difficulties in familial dynamics. Research conducted by Wallach EE and Miller JH et al. have revealed that the main contributors to female infertility factor include ovulatory dysfunction (20-30%) followed by uterine pathology (15%), and tuboperitoneal disorder (30-35%).^{8,9} Laparoscopy is commonly considered the most dependable technique for diagnosing issues related to infertility and serves as a more precise indicator of the chances of natural conception in couples experiencing unexplained infertility.¹⁰ A retrospective research was carried out involving 495 infertile women diagnosed with unexplained infertility, during which a significant proportion of abnormalities were identified through laparoscopy prior to treatment.¹¹ As a result, these modifications led to adjustments in the chosen treatment strategy, highlighting the importance of laparoscopy as an exceptionally effective diagnostic tool for infertility. According to the World Health Organization (WHO), the primary infertility rate in India varies between 3.9% and 16.8%.²

Conclusion

Diagnostic hysterolaparoscopy serves as a reliable and secure method for the thorough assessment of infertility, especially in identifying peritoneal endometriosis, adnexal adhesions, and uterine septum. These abnormalities can be corrected, yet they are often overlooked during standard pelvic examinations and conventional imaging techniques. It is important to highlight that this method serves as a valuable tool for identifying various structural irregularities across multiple areas, including the pelvis, fallopian tubes, and uterus, all within a single session for patients exhibiting normal ovulation and semen analysis. Hystero-laparoscopy, when performed by skilled professionals and with appropriate patient selection, can be regarded as a conclusive investigative outpatient procedure for assessing female infertility. This approach aids in the development of a targeted management plan.

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