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## Role of diagnostic hysteroscopy in establishing the diagnosis of female infertility

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### Abstract

**Background:** Infertility has always been one of the most elusive symptom complexes that perplex the best gynecologists and affects about 10-15% of reproductive age couples.

**Aim:** To highlight the role of diagnostic hysteroscopy in establishing the diagnosis of female infertility.

**Materials and Methods:** This Descriptive study was conducted in the department of Obstetrics and Gynaecology at Government Medical College, Jammu for one year in which 100 infertile females attending OPD for infertility workup were subjected to detailed relevant history taking followed by physical examination. Diagnostic hysteroscopy carried out after written informed consent including minimal therapeutic interventions if required.

**Results:** Out of 100 patients included in the study, 67 (67%) presented with primary infertility and 33 (33%) presented with secondary infertility. Abnormal hysteroscopic findings were noted in 47% patients. Most common abnormality observed was submucous myoma (8%) and unilateral ostial block (8%) followed by endometrial polyp (7%), hyperplastic endometrium (6%) and cervical stenosis (6%). In the patients of primary infertility, most common abnormality observed on hysteroscopy was submucous myoma (11.9%) followed by endometrial hyperplasia (9%), unilateral ostial block (9%), endometrial polyp (7.5%) and cervical stenosis (6%). In the patients of secondary infertility, most common abnormality noted was intrauterine adhesions in about 12.1% patients.

**Conclusion:** Hysteroscopy is a quintessential tool that provides cost-effective, comprehensive and a diagnostic aid in infertile patients.

**Keywords:** infertility, hysteroscopy

### Introduction

Childbearing and raising of children are extremely important events in every human's life and are strongly associated with the ultimate goals of completeness, happiness and family integration. It is widely accepted that human existence reaches completeness through a child and fulfils the individual's need for reproduction. Infertility is defined as "inability to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse."<sup>[1]</sup> Infertility can be Primary in which no previous pregnancies has occurred and Secondary in which a previous pregnancy, although not a live birth has occurred. It affects about 10-15% of reproductive age couples.

Advent of minimal access procedures has redefined the evaluation and treatment of infertile couple. The various forms of endoscopic procedures have been shown to demystify and redefine the bounds of infertility by producing new diagnostic evidence. One of the basic steps of infertility workup is to evaluate the shape and regularity of the uterine cavity. Infertility related to uterine factor abnormalities has estimated to be etiology in 10-15% couples seeking treatment. Hysteroscopy permits direct visualization of the cervical canal and uterine cavity, enabling observation of the shape and vascular pattern of any abnormality. It can detect fibroids, endometrial polyps, Ashermans syndrome, foreign bodies, uterine anomalies like septate uterus, bicornuate uterus, arcuate uterus, unicornuate uterus contributing to infertility. It also helps in detecting abnormalities of cervix like cervical stenosis or polyps and aids in the visualization of tubal ostia thereby detecting lesions of uterotubal junction<sup>[3]</sup>. In addition, hysteroscopic approach offers the possibility of obtaining endometrial biopsies under visual control<sup>[4]</sup>. The main advantage of hysteroscopy over hysterosalpingography is its capacity to inspect the uterine cavity. Filling defects and partial failure of mullerian ducts can be suspected, but not always proven by hysterosalpingography. Hysteroscopy can diagnose much more precisely, compared with HSG and even trasvaginal ultrasonography, small intrauterine lesions that might affect fertility<sup>[5]</sup>.

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Acquisition of minimal access surgical skills by gynaecologist will increase access of infertility patients to these procedures with the benefits of improved diagnosis, better treatment options, faster recovery and better patient satisfaction and reduced healthcare cost.

### Materials and Methods

This descriptive study was conducted in the Postgraduate Department of Obstetrics and Gynaecology at Government medical college Jammu, for a period of one year after obtaining ethical clearance from institutional ethical committee. Sample size: 100 infertile females

### Inclusion Criteria

- Married women of reproductive age group with primary/secondary infertility willing for infertility workup.
- Normal semen analysis of husband.

### Exclusion Criteria

- Couples with Male factor infertility.
- Couples who have not lived together for 12 months.
- Patients with absolute/relative contraindications for hysteroscopy
- Patients not willing for surgery.

All couples attending gynaecology OPD for infertility workup were thoroughly counselled and all the possible causes for their infertility were explained to them. The female partners were subjected to detailed relevant history taking followed by physical examination with special reference to secondary sexual characters, thyroid examination, and breast examination, abdominal examination, per speculum and per vaginal examination. Husband's semen analysis was carried to rule out male factor infertility according to WHO criteria for normal male semen analysis. All baseline investigations including CBC, blood group, VDRL, HIV, HbsAg, LFT, KFT, blood sugar, serum electrolytes, urine analysis was done in the hospital. Serum progesterone (mid luteal progesterone on day 21 of 28 day cycle or 1 week before expected period of >10ng/ml), FSH and LH on day 3 was done. AMH levels were also obtained. Serum Prolactin and thyroid function tests were carried out to rule out hyperprolactinemia and thyroid function abnormalities. Transvaginal sonography was carried out before the procedure. All the selected patients were admitted 2 days prior to surgery in the secretory phase after investigations. Preanaesthetic evaluation was carried out in the evening and preparation of the patient for hysteroscopy was done. Prophylactic antibiotic was given a night before and at the time of induction.

Diagnostic hysteroscopy was carried out along with minimal therapeutic interventions if required, after obtaining written informed consent from the patients. The initial step at hysteroscopy was to identify the uterine cavity and the ostia and to evaluate the right and left cornua, fundus, anterior and posterior walls and lateral walls for specific lesions, as well as to evaluate the overall contour of the uterine cavity. A biopsy was taken to diagnose out of phase endometrium, endometritis, neoplastic lesion etc and sent for HPE and AFB culture. When diagnostic survey was complete, the hysteroscope was slowly withdrawn while carefully inspecting the endocervical canal

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. Frequency distribution tables, bar charts and pie charts were

used for data presentation. Chi square or Fisher's exact test whichever appropriate was used to assess the independence of 2 categorical variables. Unpaired t test was used to test the hypothesis of no difference between 2 means

### Results

Out of 100 patients included in the study, 67 (67%) presented with primary infertility and 33 (33%) presented with secondary infertility. (Table: 1) Mean age at presentation for primary infertility was  $28.6 \pm 4.20$  years and for secondary infertility it was  $32.1 \pm 3.84$  years. The difference between mean age of primary and secondary infertility was statistically significant ( $p$  value < 0.001). Mean duration of infertility in the patients of primary and secondary infertility was  $3.4 \pm 1.82$  years and  $4.8 \pm 2.26$  years respectively. The difference between mean duration of primary and secondary infertility was statistically significant ( $p$  value = 0.001). There was no menstrual abnormality in 68% patients while 32% patients presented with menstrual abnormalities. Most common menstrual abnormality in the infertile patients was menorrhagia (11%) followed by oligomenorrhea (9%) and dysmenorrhea (9%). In the primary group, most common abnormality was menorrhagia (11.9%) and least was polymenorrhagia (1.5%) and polymenorrhea (1.5%). In the secondary group, maximum patients had menorrhagia (9.1%) and dysmenorrhea (9.1%).

Transvaginal ultrasound was performed in all patients. 55 (55%) patients had normal TVS finding and there was abnormality in 45% of the patients. Most common abnormality noted on TVS was fibroid uterus. In the patients of primary infertility, most common TVS finding was fibroid uterus (24.2%) and polycystic ovaries (24.2%) followed by increased endometrial thickness (15.2%) and endometrial polyp (15.2%). Least common abnormality was atrophic ovaries noted in (3%) patients. In the patients of secondary infertility, there were 2 patients (16.7%) each with fibroid, intrauterine adhesions, endometrial, polyp, uterine septum and ovarian cyst respectively. Hysteroscopy was performed in all the infertile patients included in our study. The endocervical canal was first examined followed by uterine cavity; endometrium and finally bilateral ostia were examined. All the findings were then tabulated.

During hysteroscopy, first the endocervical canal was examined. Cervix was primed by tablet misoprostol given a day prior to the procedure. Cervical dilatation was then performed prior to hysteroscopy. 10 patients (10%) had cervico-isthmic abnormalities on hysteroscopy out of which, 6 (9%) patients presented with primary infertility and 4 (12%) patients with secondary infertility. (Table 2). Uterine cavity was examined by hysteroscopy in all the patients. 23% patients had abnormal findings in the uterine cavity during hysteroscopy Most common abnormality found in the uterine cavity was uterine myoma found in 8% patients. In the primary infertility group, endometrial polyp was found in 7.5% patients (5) and uterine septum in 3% (2) patients. In patients of secondary infertility, endometrial polyp and uterine septum was found in 6.1% (2) patients each. (Table 3).

8% patients had abnormalities in the endometrium on hysteroscopy. Endometrial hyperplasia was found in 6% patients and endometrial atrophy was found in 2% patients, all belonging to primary infertility group. The difference in the endometrial findings during hysteroscopy in primary and secondary infertility group was statistically significant. ( $p=0.049$ ) (Table: 4). Both the ostia were examined during hysteroscopy and findings were tabulated. 12% patients had abnormalities in the ostia out of which, 8% patients had unilateral ostial block and

4% patients had bilateral ostial block. (Table 5). On hysteroscopy, maximum patients had abnormalities in the uterine cavity (23%). 6% patients had abnormal findings in more than one parameter on hysteroscopy. Summing up, 47% patients had abnormalities on hysteroscopy, most common being submucous myoma (8%) and unilateral ostial block (8%) followed by endometrial polyp (7%), hyperplastic endometrium (6%) and cervical stenosis (6%).

Endometrial biopsy was taken following hysteroscopy and laparoscopy and histopathological evaluation was done. 71% patients had secretory endometrium in the report followed by proliferative endometrium in 15% patients, endometrial hyperplasia in 6% patients and endometrial atrophy in 4% patients. Chronic granulomatous inflammation with Giant cells was noted in 4 patients (TB). Proliferative endometrium was found in 19.4% patients with primary infertility who had anovulation and 6.1% patients with secondary infertility. (table 6). AFB culture was sent for all patients in our study. Out of 4 suspected patients of tuberculosis on laparoscopy, AFB culture was positive in 2 patients (2%) in rest of the patients (98%), AFB culture was negative.

**Discussion**

In the present study, out of 100 infertile patients, 67% (67) presented with primary infertility and 33% (33) presented with secondary infertility. It was comparable with studies conducted by Nayak KP *et al* (2013)<sup>[6]</sup>, Shetty KS *et al* (2013)<sup>[7]</sup> and Vaid K *et al* (2014)<sup>[8]</sup>. Mean age of patients with primary infertility was 28.6±4.20 years and with secondary infertility was 32.1±3.84 years (34%) similar to the study conducted by Nayak KP *et al* (2013)<sup>[6]</sup>, mean age of patients with primary infertility was 28.8 ± 3.7 years and for secondary infertility, it was 31.1 ± 4.5 years. As recommended by American Society of Reproductive Medicine, these women should be referred after 6 months of failure to conceive for infertility workup because of decline in fertility and increased time to conception after 35 years of age<sup>[9]</sup>. NICE recommendation states that women over

35 years of age should be referred early from primary care for investigation and treatment<sup>[10]</sup>.

47% patients had abnormal findings on hysteroscopy. In the patients of primary infertility, most common abnormality observed on hysteroscopy was submucous myoma (11.9%) followed by endometrial hyperplasia (9%), unilateral ostial block (9%), endometrial polyp (7.5%) and cervical stenosis (6%). In the patients of secondary infertility, most common abnormality noted was intrauterine adhesions in about 12.1%. In the study conducted by Vaid k *et al* (2014)<sup>[8]</sup>, intrauterine adhesions were observed in about 11.91% patients as a result of previous history of curettage done in them. In our study, uterine myoma was the most common abnormality found on hysteroscopy. Myomas were also observed in various other studies: Puri S *et al* (2015)<sup>[11]</sup> (8%) and Bhat V *et al.* (2012)<sup>[12]</sup> (7.05%) thereby depicting that myomas influence infertility. Myomas distort uterine cavity, impairing implantation and pregnancy rates in women. Several theories have been proposed regarding this issue, including alteration of uterine contractility interfering with ovum or sperm transport or embryo implantation and poor regional blood flow resulting in focal endometrial attenuation or ulceration, induction of inflammatory and vascular changes leading to less receptive implantation site.<sup>12</sup> Cervical stenosis was found in 6% patients in our study, which correlated with studies conducted by Makled KA *et al* (2013)<sup>[13]</sup> (6%) and Sahu L *et al* (2012)<sup>[14]</sup> (6.48%). Uterine septum was noted in 4% patients in our study which correlated with the study conducted by Kokas *et al* (2006)<sup>[15]</sup> (4%) and Puri S *et al* (2015)<sup>[11]</sup> (3.8%).

**Table 1:** Distribution of patients according to the type of infertility

Type of Infertility	No.	%age
Primary	67	67%
Secondary	33	33%
Total	100	100%

**Table 2:** Hysteroscopic findings of infertile patients in endocervical canal

Cervix	Primary Infertility		Secondary Infertility		Total		P-value
	No.	%age	No.	%age	No.	%age	
Cervical Stenosis	4	6.0%	2	6.1%	6	6%	0.887#
Cervical Polyp	2	3.0%	2	6.1%	4	4%	
Total	6	9%	4	12%	10	10%	

#Statistically Non-significant Difference (P-value >0.05)

**Table 3:** Hysteroscopic findings of infertile patients in uterine cavity

Cavity	Primary Infertility		Secondary Infertility		Total		P-value
	No.	%age	No.	%age	No.	%age	
Myoma	8	11.9%	0	0.0%	8	8%	0.834#
Adhesions	0	0.0%	4	12.1%	4	4%	
Polyp	5	7.5%	2	6.1%	7	7%	
Septum	2	3.0%	2	6.1%	4	4%	
Total	15	22%	8	24%	23	23%	

#Statistically Non-significant Difference (P-value >0.05)

**Table 4:** Hysteroscopic findings of infertile patients in endometrium

Endometrium	Primary Infertility		Secondary Infertility		Total		P-value
	No.	%age	No.	%age	No.	%age	
Hyperplastic	6	9.0%	0	0.0%	6	6%	0.049*
Atrophic	2	3.0%	0	0.0%	2	2%	
Total	8	12%	0	0%	8	8%	

\*Statistically Significant Difference (P-value <0.05)

**Table 5:** Hysteroscopic findings of infertile patients in ostia

Ostia	Primary Infertility		Secondary Infertility		Total		P-value
	No.	%age	No.	%age	No.	%age	
U/L Block	6	9.0%	2	6.1%	8	8%	0.979#
B/L Block	2	3.0%	2	6.1%	4	4%	
Total	8	12%	4	12%	12	12%	

#Statistically Non-significant Difference (P-value &gt;0.05)

**Table 6:** Histopathological findings of endometrium in infertile patients

HPE	Primary Infertility		Secondary Infertility		Total	
	No.	%age	No.	%age	No.	%age
Secretory endometrium	42	62.7%	29	87.9%	71	71%
Proliferative endometrium	13	19.4%	2	6.1%	15	15%
Atrophic endometrium	3	4.5%	1	3.0%	4	4%
Hyperplastic endometrium	6	9.0%	0	0.0%	6	6%
Chronic granulomatous inflammation with Giant cells (TB)	3	4.5%	1	3.0%	4	4%
Total	67	100%	33	100%	100	100%

**Conclusion**

Hysteroscopy provides cost-effective, comprehensive and a diagnostic aid and simultaneous therapeutic treatment in infertile patients. It provides direct visualization of the diseased condition and also an opportunity to treat the same if surgical intervention is required. It also contributes to the treatment plan in the infertile patients. Based on the severity of endoscopic findings, the initial treatment decision can be changed to one giving better chances of success. It especially concerns the patients initially qualified for intrauterine insemination (IUI). Additional abnormalities found during laparoscopy may suggest a referral for in vitro fertilization (IVF) or on the contrary- performing a fertility improving corrective surgery, thereby increasing the success rate after a simpler and cheaper treatment.

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**Conflict of Interest:** NIL**References**

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