

Hysteroscopy: An Essential Tool in the Workup of Infertility

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ABSTRACT

Introduction: Uterine cavity pathologies often lead to decreased rates of infertility. Correction of these anomalies has been associated with improved pregnancy rates. Diagnostic hysteroscopy can be performed with minimal discomfort and superior sensitivity, and specificity in the evaluation of the uterine cavity, even before *in vitro* fertilization (IVF) or intracytoplasmic sperm injection (ICSI). To date, there are many centers where hysteroscopy is being ignored as an essential preliminary workup. This study was done to evaluate the importance of hysteroscopy in the workup of such infertile women.

Aim: To study the role of hysteroscopy in the workup of infertility.

Objectives: Hysteroscopic evaluation of infertile patients fulfilling the inclusion criteria. To determine the importance of hysteroscopy in treating endometrial lesions.

Materials and methods: A retrospective cohort study was done at a tertiary care hospital in Himachal Pradesh, India, for a period of 12 months, where case sheets of 90 patients, who underwent hysteroscopy as a workup of infertility, were assessed. Inferences were noted and conclusions were made. Statistical analysis was performed using Fisher's exact test. The *p*-value of <0.05 was considered significant.

Results: Among a total of 90 patients included in the study, 65 patients (72.2%) presented with primary infertility, and the remaining 25 patients (27.8%) had secondary infertility. Normal findings on ultrasound were seen in 65 patients (72.2%). This was in contrast to 38 patients (42.2%), who had normal hysteroscopic findings. This revealed that hysteroscopy had a greater sensitivity and a 30% higher rate of detection of uterine abnormalities as compared to the ultrasound done routinely in the infertility workup. Therapeutic hysteroscopy was performed in 29 cases (32.22%) to correct uterine cavity defects and to improve fertility rates. Hence it was found that hysteroscopy can diagnose uterine cavity defects even in patients with normal ultrasound findings. Therefore hysteroscopy should be used as a primary tool in the infertility workup.

Conclusion: This study concluded that routine infertility workups should include hysteroscopy as a primary tool.

Keywords: Hysteroscopy, Intrauterine abnormalities, Primary infertility, Secondary infertility.

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INTRODUCTION

Infertility is the inability of a couple to become pregnant after 12 months of regular sexual activity without any contraceptive use.¹ It is seen in almost 7.5% of married couples. According to reports 34–62% of this is attributed to abnormal uterine findings.²

Maximum endometrial pathologies occur due to structural and functional abnormalities.³ Hence, an inspection of the endometrial cavity is of utmost importance in the workup of infertile couples. This can be done by transvaginal sonography, hysterosalpingography (HSG), sonohysterography, and hysteroscopy. The main aim of hysteroscopy is to identify abnormalities in a structure such as polyps, myomas, or uterine septum or to obtain a sample of the endometrium (hyperplasia or neoplasia).

Hysteroscopy plays a major role in evaluating the endometrial cavity,⁴ having high sensitivity and specificity. As it allows direct visualization of the uterine cavity, it is superior to other blind and indirect diagnostic tests. Although HSG alone is recommended by the World Health Organization for the evaluation of infertile women, it can yield information about the patency of the fallopian tubes.⁵ Yet, because of the high false-positive and false-negative results of uterine cavity abnormality with HSG, hysteroscopy is a preferred procedure.⁶ It also has a role in the evaluation of intrauterine pathologies in patients undergoing *in vitro* fertilization. Thereby having a beneficial effect on pregnancy outcomes and the cost of treatment. Previous assisted reproductive technology failures are associated with abnormal findings on hysteroscopy and therefore it is a positive predictor

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for the success of IVF procedure in cases of recurrent implantation failure. Many physicians still regard hysteroscopy as just a supplementary test in case of abnormal findings detected by other methods (primarily HSG and ultrasound). So this study was conducted to establish the role of diagnostic hysteroscopy as a primary integral tool in the workup of infertility.

MATERIALS AND METHODS

This is a hospital-based retrospective cohort study conducted for a period of 12 months, on 90 infertile women who underwent diagnostic hysteroscopy during their workup as an inpatient in the department of obstetrics and gynecology, at a tertiary care hospital

in Himachal Pradesh, India. Case sheets of these patients were assessed to collect the data and an analysis was made.

Hysteroscopy was performed between the 7th and 11th day of the menstrual cycle after explaining the entire procedure to the patients. Written informed consent was taken. A 4 mm diameter continuous flow endoscope was used. Normal saline or glycine was used to distend the uterine cavity. This procedure allowed the direct visualization of the cervical canal, uterine cavity, ostia, and any lesions of the uterotubal junction. All infertile patients undergoing hysteroscopy as a routine workup, including those who received three cycles of ovulation induction in the past and/or had ultrasound combined with laparoscopy, were included in this study. The incomplete procedure, any perforations during the procedure and patients undergoing second-look hysteroscopy were not included in this study. The main objectives of this study were to evaluate all infertile patients by hysteroscopy, who fulfilled the inclusion criteria and to determine the importance of this procedure in treating endometrial lesions.

The findings were based on the status of the cervical canal, uterine cavity, endometrium, visualization of the ostium, and lesions of the uterotubal junction. Patients were segregated into various groups based on the findings of hysteroscopy. These findings were compared in patients with primary vs secondary infertility. The data collected from the case sheets of such patients were recorded and all the findings were noted and then the results were analyzed.

Statistical Analysis

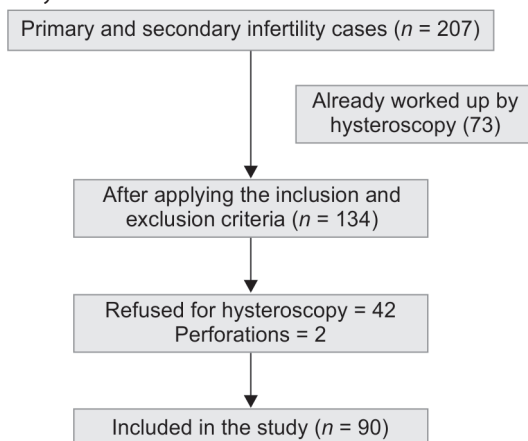
Data were analyzed using the Statistical Package for the Social Sciences program. Descriptive statistics and multivariate linear regression was used to calculate the mean and percentages. Proportions were represented by numbers and percentages. Appropriate tables and graphs were used to elicit the data (Flowchart 1).

RESULTS

Hysteroscopy was performed on 90 infertile women. Out of these 65 patients (72.2%) presented with primary infertility and the remaining 25 patients (27.8%) had secondary infertility (Fig. 1).

In patients of secondary infertility, 84% of patients had no live issues, either abortion or ectopic, and only 16% had a previous live issue.

Flowchart 1: Flowchart showing the final number of cases included in the study



The majority of patients with primary infertility belonged to the age group of 31–35 years whereas secondary infertility was more prevalent in the age group of 36–40 years (Fig. 2).

A total of 36 out of 90 (40%) belonged to rural areas whereas 54 women (60%) resided in urban areas. In 26 women (28.8%) duration of infertility was from the past 1–4 years, 47 women (52.2%) had infertility of 5–8 years, and 13 women (14.4%) were infertile from the past 9–12 years and in four women (4.4%) the duration of infertility was >12 years (Fig. 3).

Nearly 10 patients had hypothyroidism, three had diabetes mellitus, three had a history of polycystic ovarian syndrome, and one patient had a history of tuberculosis in the past. Ultrasound was normal in 65 (72.2%) of the total infertile patients whereas 25 (27.7%) of them showed abnormalities like adenomyosis, fibroids, ovarian cysts, polycystic ovary syndrome, polyps, or tubo-ovarian masses. 78 patients (86.7%) had normal HSG findings (Fig. 4 and Tables 1 and 2).

Husband semen analysis was normal in 78% (86.75) of the cases. Hysteroscopy revealed normal findings in 31 women (34%), polypoidal endometrium in 33 cases (36.66%), adhesions in 11 cases (12.22%), septum in four cases (4.44%), cornual block in four cases (4.44%), three cases of the fibrotic band (3.33%), and three cases of endometrium atrophy (3.33%) and a single case of canal stenosis (1.11%) (Table 3).

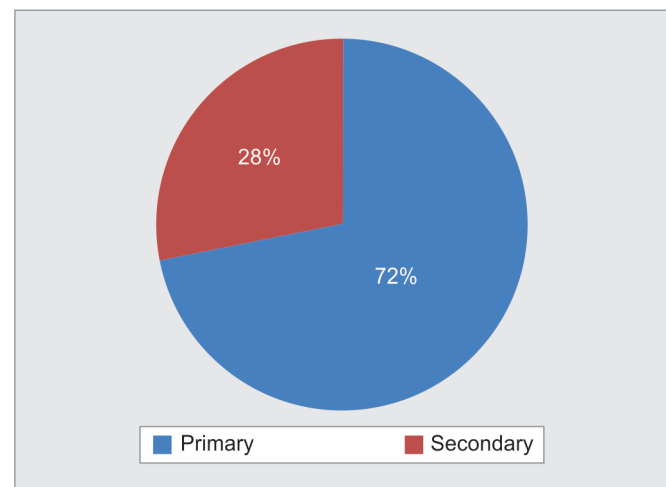


Fig. 1: Distribution of patients according to the type of infertility

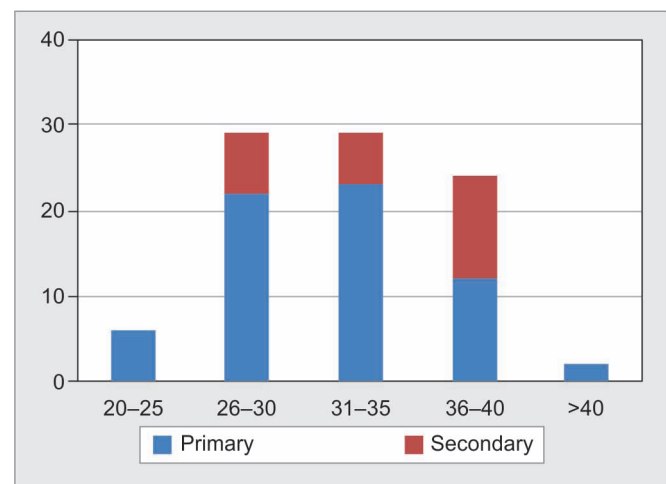


Fig. 2: Distribution of patients according to age and type of infertility

Therapeutic procedures like adhesiolysis, septum resection polypectomy, and cannulation, curettage followed by copper T insertion and/or high dose estrogen were done in 29 cases (32.2%). Postprocedure, 69 women (75.5%) were advised ovulation induction, and 13 were given the option of *in vitro* fertilization including ICSI. Four patients were counseled for second look hysteroscopy, antituberculosis treatment was started in three patients, and adoption was advised in one patient.

Around 12 patients who came after IVF failure had incomplete infertility workups and underwent hysteroscopic procedures where two patients conceived spontaneously postprocedure.

DISCUSSION

Evaluation of the uterine cavity is very important for the initial workup of infertility patients. Various pathologies like polyps, adhesions, and fibroids can interfere with the implantation of the embryo and the subsequent growth. Hysteroscopy has been used for a long time for the visualization of the uterine cavity and the diagnosis of associated abnormalities.

Several studies have revealed that this is a better diagnostic test as compared to noninvasive or indirect methods like ultrasonography or HSG. In our study, ultrasound was normal in

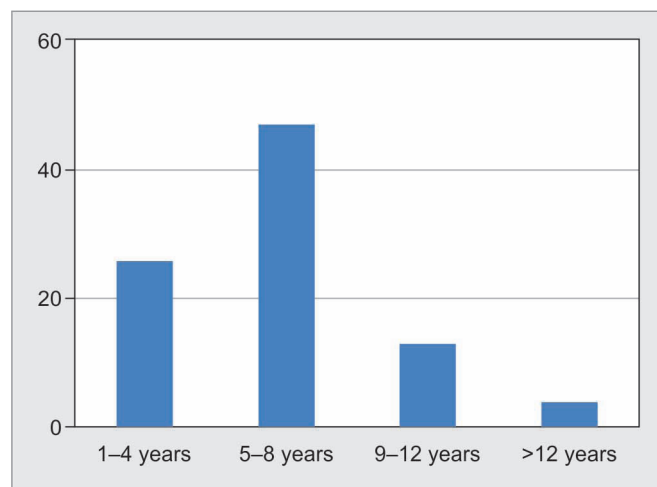


Fig. 3: Distribution of patients according to the duration of infertility

Table 1: Hysteroscopic findings in patients with normal ultrasound

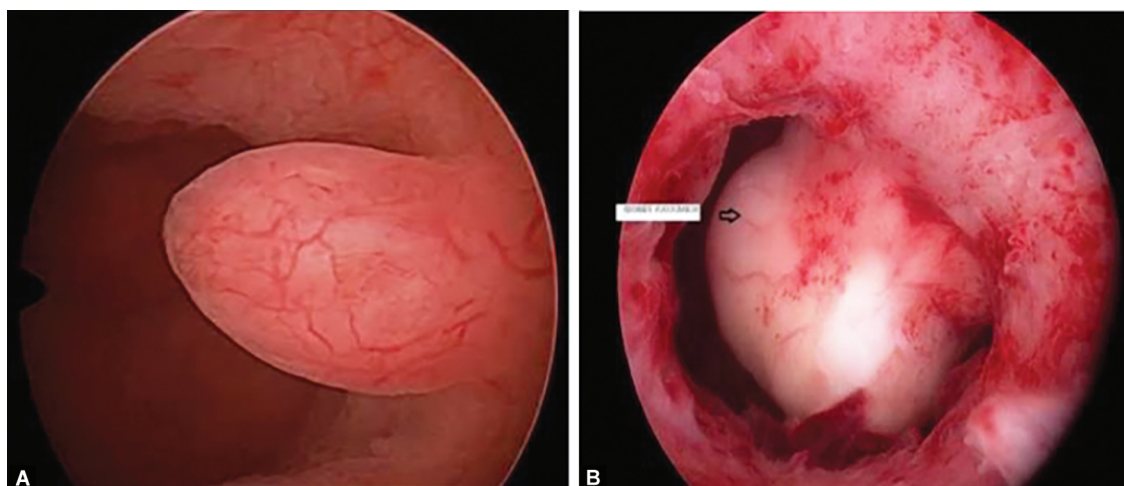
Hysteroscopic findings	Primary infertility	Secondary infertility	p-value
Normal (26)	20	6	0.613
Abnormal (39)			
Cornual block	3	1	0.796
Polyp	18	3	0.426
Septum	4	0	0.302
Adhesions	5	3	0.186
Endometrial atrophy	2	0	0.473

Table 2: Hysteroscopic findings in patients with abnormal ultrasound

Hysteroscopic findings	Primary infertility	Secondary infertility	p-value
Normal	1	4	0.109
Canal stenosis	1	0	0.327
Polyp	8	4	0.158
Adhesions	1	2	0.490
Endometrial atrophy	0	1	0.288
Fibrotic band	2	1	0.588

Table 3: Hysteroscopic findings in all women

Hysteroscopic findings	Primary infertility	Secondary infertility	Total (%)
Normal	21	10	31 (34%)
Canal stenosis	1	0	1 (1.11%)
Cornual block	3	1	4 (4.44%)
Polyp	26	7	33 (36.66%)
Adhesions	6	5	11 (12.22%)
Endometrial atrophy	2	1	3 (3.33%)
Fibrotic band	2	1	3 (3.33%)
Septum	4	0	4 (4.44%)



Figs 4A and B: Hysteroscopic image showing (A) endometrial polyp; (B) submucous fibroid

72% of cases, which later underwent hysteroscopy where 60% had uterine abnormalities. Hysteroscopy was significantly more sensitive than two-dimensional transvaginal ultrasound (2D TVS) for the detection of uterine pathologies in patients with repeated implantation failure and recurrent abortion. There were better detection rates of hysteroscopy in cases of polyps, Asherman's syndrome, and septate uterus as compared to TVS as seen in a similar study conducted by Shiva et al.⁷

In a study done by Bajaj et al.,⁸ maximum number of patients belonged to the age group of 25–35 years. Similar findings were found by Amirian et al.,⁹ Mali and Mohanty,¹⁰ Latika et al.,¹¹ Wadhwa et al.,¹² and in our study also.

In our study, 72.2% of women had primary infertility and 27.8% had secondary infertility. Where in a study by Bajaj et al.⁸ 65.71% had primary infertility and secondary infertility was seen in 34.29% of cases. Similar studies found 70–75% of cases with primary infertility and 25–30% with secondary infertility.^{9,11–13}

Bajaj et al.,⁸ reported the majority of patients (57.14%) in their study with <5 years of infertility which was similar to the study conducted by Mali and Mohanty,¹⁰ while Amirian et al.⁹ reported <5 years of infertility in 80% cases whereas in our study 52.2% patients presented with a duration of infertility 5–8 years.

Bajaj et al.⁸ found that out of 105 subjects, normal hysteroscopic findings were seen in 62.86% of women and the abnormal uterine cavity was found in 37.14% of women. Among abnormal hysteroscopy 11 patients presented with congenital uterine defects and 28 patients with the acquired uterine lesion. But in our study, hysteroscopy showed normal findings in 35% of patients, while 65% had abnormal findings. Among these abnormal findings, only 4.44% were congenital and the rest were acquired.

In our study, no statistically significant difference was there between primary and secondary infertility with respect to uterine cavity abnormalities, similarly observed by Bajaj et al.,⁸ Latika et al.,¹¹ and Pansky et al.¹⁴

The most common abnormal hysteroscopic finding was an endometrial polyp in our study similar to many other studies, and improved reproductive outcomes were reported after polypectomy. Thus it is logical to say that hysteroscopic removal of a polyp is necessary as it may increase chances of conception.

In our study, no significant difference was found in the number of intrauterine adhesions in cases of primary and secondary infertility similar to the study by Bajaj et al.,⁸ despite the known fact that adhesions are more common after curettage and postabortal residua.

In our study uterine septum was seen in 4.44% whereas, in a study by Bajaj et al.,⁸ uterine septum was seen in 1.90% of cases and sub septum in 5.71% of cases. Almost similar results were found by Pansky et al.¹⁴ which is 5.4%. Hysteroscopic resection of the uterine septum improves fertility, probably by improving implantation rate as it removes unfavorable implantation sites and improving endometrial function by revascularization of the fundus.

Although there was no case of submucosal fibroid in our study, in another study like in Bajaj et al.⁸ Intramural fibroids deforming the cavity were found in 0.95% of cases. However, studies by Latika et al.¹¹ and Koskas et al.¹⁵ showed similar fibroids in 3.71% and in 3.1% of cases. Hence we can infer that the presence of submucosal fibroid in the cavity causes a deformed endometrial cavity thereby reducing the pregnancy rate. Therefore hysteroscopy can not only diagnose but can also remove the fibroid, thereby improving fertility.

From the discussion, we can say that hysteroscopy not only correctly diagnoses intrauterine abnormalities but also can be used for the treatment of infertility patients like hysteroscopic septal resection, adhesiolysis, fibrotic band resection, polypectomy, submucosal myomectomy, intrafallopian cannulation for the corneal block. These conditions prevent effective implantation and prevent successful pregnancy outcomes, so by using hysteroscopy we can diagnose and manage things simultaneously and save time. Thus proving hysteroscopy is a valuable, simple, and gold standard procedure in the initial workup of infertility cases.

Hysteroscopy allows a complete and accurate identification of the abnormalities of the uterine cavity that might affect the implantation and subsequently lead to infertility. The procedure findings can help the physician to apply appropriate therapy which can further improve the rate of conception.

Many times infertile patients undergoing hysteroscopy can conceive even without treatment because evaluation may have been incomplete and issues were not properly addressed without hysteroscopy.

We found that certain uterine pathologies like polyps, septum, and adhesions were often missed on radiological investigations like 2D transabdominal and TVS, which could easily be detected on hysteroscopy. This was also advocated by Kandeel et al. in their study comparing hysteroscopy with TVS where hysteroscopy was found superior.¹⁶

There is evidence that hysteroscopy done prior to IVF/ICSI enhances the chance of pregnancy and childbirth, even in cases of prior IVF failure. A similar conclusion was achieved by the study of Pundir et al.¹⁷

Prior studies revealed the benefits of hysteroscopic evaluation before ICSI/IVF. This procedure may diagnose many unsuspected intrauterine abnormalities, which can otherwise lead to an increase in ICSI/IVF failure rate.^{18,19}

Our study had certain limitations and strengths. One of the major strengths was that all the hysteroscopies were conducted by a single, experienced surgeon. Hence there was a consistent evaluation of the uterine cavity and reduced source of variability. However, being a retrospective, single-center study with a limited sample size was the main limitation. Therefore, large multicentric studies should be conducted to establish whether hysteroscopy along with laparoscopy could replace the various noninvasive tests like HSG and Sion tests in infertility workups.

CONCLUSION

Our study showed that 59 (65.55%) out of 90 patients with primary and secondary infertility, had abnormalities of the uterine cavity. Out of these, in 29 patients (32.2%) therapeutic procedures were performed during a hysteroscopy which increased the rate of conception. This justifies the need for diagnostic and therapeutic hysteroscopy as an essential modality in the workup of infertility. Moreover many times we are able to diagnose and treat endometrial cavity abnormalities which are otherwise missed by radiology.

As there was no significant difference in the findings in primary and secondary infertility patients, we conclude that it plays an equal role in both cases.

In all cases of infertility requiring advanced workup, hysteroscopy should never be skipped, especially before going for IVF/ICSI.

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