

The Role of Diagnostic Hysteroscopy in Evaluation of Intrauterine Adhesions in Infertile Females

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Abstract

Background: Sub-fertility is a growing reproductive health concern. While common causes like PCOS and endometriosis are well-known, intrauterine adhesions (IUA) remain an under recognized contributor. Intrauterine adhesions, often resulting from uterine surgeries, can impair fertility and are best diagnosed through hysteroscopy.

Objective: To observe the role of diagnostic hysteroscopy in the evaluation of intrauterine adhesion in sub fertile women.

Study type, settings & duration: This cross-sectional study was conducted at Department of Gynecology and Obstetrics, Hameed Latif Hospital, Lahore from June 2023 to June 2024.

Methodology: A total of 980 women aged 20 to 50 years, of which 620 suffered from primary subfertility and 360 from secondary subfertility. All patients with abnormal findings on hysteroscopy were noted to find the ratio of intra uterine adhesion which was then categorized into mild, moderate and severe IUAs. The Pearson Chi-Square test was performed. The level of significance was 5%.

Results: The mean age of patients was 34.31 ± 5.12 years and 51.1% of them suffered from subfertility for more than 5 years. Total 310 (31.63%) women had abnormal hysteroscopy of which 58/310 (18.70%) patients had adhesion in cavity. Adhesions remained to be significantly high (p -value = 0.01) among secondary type of subfertility.

Conclusion: Hysteroscopy play an important role as both diagnostic and therapeutic tools in the subfertility treatment. Diagnosing and treating intrauterine adhesions is essential for improving fertility outcomes. Positive results regarding pregnancy and live birth rates can be predicted after hysteroscopic adhesiolysis.

Key words: Hysteroscopy, intra uterine adhesion, in vitro fertilization, subfertility.

Introduction

Sub-fertility is a condition in which a couple is unable to conceive after 12 months of their unprotected sexual activity.¹ About 20% of people in developed nations experience subfertility. About 21.9% of females in Pakistan who are of reproductive age have subfertility, with 3.5%

experiencing primary subfertility and 18.4% experiencing secondary subfertility.²

Sub-fertility in women can occur due to a number of reasons such as PCOS, endometriosis, advanced age, uterine fibroids, obesity, etc. Not many are aware of intrauterine adhesions that can also lead to infertility.³ Sub-fertility is classified into primary (a woman has never conceived) and secondary subfertility (a woman has conceived at least one pregnancy in the past but has difficulty conceiving again).⁴ In sub-fertile women, the rate of pathologies of abnormal intrauterine cavity such as polyps, myomas, intrauterine adhesions (IUAs), or uterine septum is significantly higher, especially intrauterine adhesions (IUAs) can affect natural conception as well as the success of assisted reproductive technology (ART).⁵ IUAs are abnormal fibrous connections that link surfaces within the uterine cavity and grow after damage to the basal layer of the endometrium. Symptoms or signs associated with IUAs can vary widely, ranging from

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Authors Contribution

YLK conceptualized the project. RB & RG did the data collection. FA did the literature search. SJK performed the statistical analysis. Drafting, revision & writing of manuscript were done by RB & SR.

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no symptoms or vague indications to complete cessation of menstruation and reduced fertility. After any surgical procedure involving the uterus, fibrous bands that form within the endometrial cavity are referred to as IUA's.⁶

Sub-fertility, menstrual abnormalities, recurrent miscarriages, and lower abdominal pain are its clinical sequelae. In women with intrauterine adhesions, the most common symptom is sub-fertility, affecting approximately 43%. The chance of developing IUA's increases with the number of abortion surgeries; the risk associated with repeated procedures is two times higher. Sudden drops in estrogen and progesterone levels could play a role in promoting fibrosis.⁷

The incidence of intrauterine adhesions (IUA) is identified through a range of clinical symptoms and assessed through different surgical procedures, including sub-fertility, secondary amenorrhea, missed abortion, postpartum hemorrhage (PPH), recurrent pregnancy loss, retained products of conception (RPOC), and various uterine operations such as cesarean sections, myomectomies, adenomyomectomies, cytoreductive surgeries for adenomyosis, and intrauterine procedures like diagnostic dilation and curettage (D&C), polypectomy, submucosal myoma excision, abortion procedures, and metroplasty for uterine anomalies, among others.⁸

IUA's are classified into clinical categories to indicate prognosis and treatment outcomes, which are defined as mild, moderate, or severe based on the scoring of established classification systems. Moderate to severe adhesions can significantly affect fertility, posing risks for pregnancy complications and obstetric issues. It is generally accepted that mild IUA's do not adversely affect reproductive outcomes.⁹ Assessing the endometrial cavity is recommended as part of the evaluation for couples facing subfertility. This can be done through various techniques, including transvaginal sonography, hysterosalpingography, and hysteroscopy, but hysteroscopy is considered the gold standard.¹⁰

The aim of this study was to see the role of diagnostic hysteroscopy in the evaluation of intrauterine adhesions in sub-fertile women and to explore the crucial role of hysteroscopy in detecting and understanding these abnormalities, emphasizing the importance of identifying often-overlooked factors to enhance reproductive outcomes.

Methodology

It was a cross-sectional study, non-probability, consecutive sampling technique conducted at the Department of Gynecology and Obstetrics, Hameed Latif Hospital, Lahore from June 2023 to June 2024. The Informed consent was obtained from the patient for undergoing hysteroscopy. The sample size was 1300 calculated by adding the values of effect size was 0.10, level of significance was 0.05, and Power was 0.95 in the software G-POWER.¹¹ All women aged 20 to 50 years suffering from primary (a women had never conceived) and secondary (a women had conceived at least one pregnancy in the past but has difficulty to conceiving again) subfertility were included in this study while women with history of any pathology, normal male, and those who were not medically fit for local or general anesthesia were excluded.

Patients were physically evaluated, and all preliminary hormonal testing was completed. ECG, chest X-ray, endometrial biopsy, ultrasonography, and hysterosalpingography were all performed before the surgery. Demographic data name, age, address, and subfertility duration were recorded and baseline investigations were done. Pre-operative assessment by the anesthetic was conducted. The procedure was done in the follicular phase of the menstrual cycle under short general anesthesia. Hysteroscopy was done by standard sequence using a Karl Shorz 4mm hysteroscopy. Distension of the cavity was obtained using normal saline. The endo-cervical Canal, the uterine cavity, its fundus, and anterior and posterior walls were checked for the presence of any polyp or myoma adhesion, uterine septum, endometrial hyperplasia and hypoplasia, and tubal ostia, all the findings were recorded. At the same time, a laparoscopy was also performed. A Veress needle was placed via the intra-umbilical incision to administer carbon dioxide (CO₂), followed by a trocar. A Douglas pouch and the uterosacral ligaments were examined in the pelvis. Tubal blockage, peri-tubal, peri-ovarian adhesions, endometriotic deposits, polycystic ovaries, fibroids, presence of fluid in the pouch of Douglas, and any other pathology were seen. By injecting 10-15 ml of 0.5% methylene blue into the uterus and seeing the liquid fill and spill through the fimbrial ends and the fallopian tubes patency was assessed.

All patients with abnormal findings on hysteroscopy were noted. After the procedure, the patient was sent to the post-operative ICU for 4 hours of observation. In case of no problem arose in ICU, the patient was discharged. All findings were

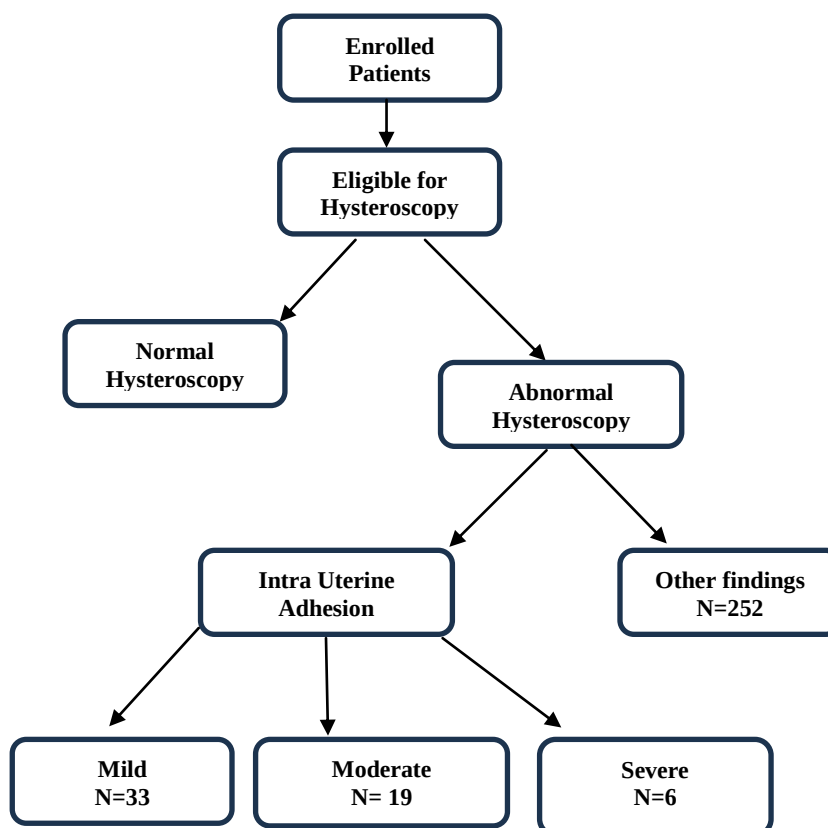


Figure 1: Flow chart of data stratification.

carefully taken and were recorded on the predesigned proforma attached.

All the data was entered in Statistical Package for the Social Sciences (SPSS) version 25. After analysis, the quantitative variables were represented in mean $\pm$ SD. To check the association between categorical variables, the Pearson Chi-Square test was performed. The level of significance was 0.05.

The ethical approval was obtained from the Ethics Board Committee of Hameed Latif Hospital, Lahore vide letter no. HLH/IRB/20.

Results

A total of 1300 patients were recruited initially of which 320 were not eligible for this study due to laparoscopy procedure only (Figure-1). The main focus of this study was on diagnostic hysteroscopy in the evaluation of intrauterine adhesion in sub fertile women. The mean age of remaining 980 patients who were selected for this procedure was 34.31 $\pm$ 5.12 years. In most patients, duration of subfertility was more than 5 years (51.1%). Out of 980 patients, primary subfertility

was present in 620 (63.24%) patients and secondary in 360 (36.73%) (Table-1).

The patients with primary subfertility 471 (70.29%) had normal, and 199 (29.71%) had abnormal hysteroscopy findings while with secondary subfertility 149 (48.1%) had normal, and 161 (51.9%) had abnormal hysteroscopy findings with the significant p-value 0.01* (Table-2).

Table 1: Demographic characteristics of study population.

Variables	n (%)
Age (years) [(mean $\pm$ S.D)]	34.31 $\pm$ 5.12
Type of Subfertility	
Primary	620 (63.26)
Secondary	360 (36.73)
Duration of Subfertility (years)	
$\leq$ 2 years	130 (13.27)
2.1-5 years	330 (33.67)
> 5 years	520 (53.06)
Hysteroscopy	
Normal	670 (68.37)
Abnormal	310 (31.63)

Patients with primary subfertility, 20 (13.4%) had Adhesion in cavity, 48(32.2%) had Endometrial polyps, 13 (8.7%) had Uterine septum, 15 (10.1%)

had Cervical Stenosis, 12 (8.1%) had Submucous Myoma, 26 (17.4%) had endometrial abnormalities and 15 (10.1%) had tubal Ostia. On the other hand patients with secondary subfertility, 38 (23.5%) had Adhesion in cavity, 25 (15.5%) had Endometrial polyps, 18 (11.2%) had Uterine septum, 17 (10.6%) had Cervical Stenosis, 14 (8.7%) had Submucous Myoma, 36 (22.4%) had endometrial abnormalities and 13 (8.1%) had tubal Ostia.

Table 2: Distribution of hysteroscopy findings with type of subfertility.

Hysteroscopy	Type of subfertility		p-value
	Primary	Secondary	
Normal (n=670)	471 (70.29)	199 (29.71)	0.01*
Abnormal (n=310)	149 (48.1)	161 (51.9)	

*Indicates statistical significant

Adhesion in the cavity, endometrial polyps, Uterine septum, and endometrial abnormalities had a significant association with the type of subfertility with p -value <0.05 . The number of exposed abnormalities exceeded the number of individuals with such abnormalities since numerous lesions were seen in some cases and are expressed separately (Table-3).

Table 3: Hysteroscopy abnormalities.

Hysteroscopy Abnormalities	Type of subfertility n (%)		p-value
	Primary (n=149)	Secondary (n=161)	
Adhesion in cavity	20 (13.4)	38 (23.5)	0.01*
Endometrial Polyps	48 (32.2)	25 (15.5)	0.00*
Uterine Septum	13 (8.7)	18 (11.2)	0.00*
Cervical Stenosis	15 (10.1)	17 (10.6)	0.89
Submucous Myoma	12 (8.1)	14 (8.7)	0.23
Endo Abnormalities	26 (17.4)	36 (22.4)	0.02*
Tubal Ostia	15 (10.1)	13 (8.1)	0.10

*Indicates statistical significant

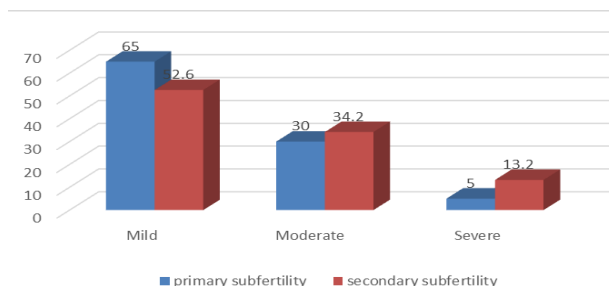


Figure 2: Severity of intra uterine adhesion and subfertility type

About 252 (81.30%) patients were included in others abnormal hysteroscopy like (Endometrial Polyps, Uterine Septum, Cervical Stenosis,

Submucous Myoma, Endo Abnormalities, Tubal Ostia) while 58 (18.70%) patients had adhesion in cavity.

This study focused on the severity of adhesion, which was categorized in 3 categories, mild, moderate and severe. Patients who had primary infertility, 21 (67.7%) had mild adhesion, 8 (25.8%) had moderate and only 2(6.5%) had severe adhesion while patients with secondary infertility 22 (52.2 %) had mild adhesion, 13 (30.9 %) had moderate and 7 (16.6%) had severe adhesion (Figure-2).

Discussion

The main focus of this study was on the severity of adhesion, which was categorized in 3 categories, mild, moderate and severe. Patients who had primary infertility, 21 (67.7%) had mild adhesion, 8 (25.8%) had moderate and only 2(6.5%) had severe adhesion while patients with secondary infertility 22 (52.2 %) had mild adhesion, 13 (30.9 %) had moderate and 7 (16.6%) had severe adhesion.

According to Borrelli, et al.¹² intrauterine adhesions were found to be less prevalent in patients aged 35 and older. Abnormalities were observed more often in women experiencing primary infertility compared to those with secondary infertility (71.8% versus 28.1%).

Hysteroscopy revealed abnormal pathology in 30% of cases, including Myoma (2.4%), endometrial hyperplasia (2.4%), polyp (8.7%), adhesions (11.1%), and septum (5.4%).¹³ This is similar to another study in which hysteroscopic abnormalities were significantly more common in patients with secondary subfertility (31%) than those with primary subfertility (18%).¹⁴ Abnormalities were more common in women with primary infertility than secondary infertility (71.8% versus 28.1%, $p = 0.002$). This finding is in contrast to that reported by another study, which showed that pathologies were more common in secondary infertility.¹⁵ This may be associated with different types of abnormalities. Intrauterine adhesions were the most common type of abnormality in their analysis, whereas polyps were most common in our study. Intrauterine adhesions are mostly secondary to uterine trauma.¹⁵ In present study hysteroscopic abnormality were also more common in secondary as compare to primary sub-fertility.

Furthermore, it was shown that the incidence of intrauterine adhesion steadily rose with age, which might be linked to decreased ovarian function and endometrial reparability.¹⁵ Our study outcome is consistent with this study.

The notable difference in the preoperative diagnosis based on clinical symptoms between patients with primary and secondary infertility (17.3% vs. 61%, $p = 0.001$) aligns with the earlier studies that secondary infertility is more likely to involve identifiable risk factors, such as previous intrauterine surgeries, which could prompt clinical suspicion of IUAs.¹⁶ Two dimensional (2D) and three-dimensional (3D) transvaginal ultrasonography (US) aligns with the general understanding, revealing an increased diagnosis rate for IUAs in secondary infertility group (68.3%) compared to primary infertility group (26.9%). In our study, 42 (57.53%) IUAs were found in secondary sub fertility.

Hysteroscopy often involves classifying and grading the location and severity of intrauterine adhesions Mild intrauterine adhesions were the most frequently observed abnormality during hysteroscopy.¹⁴ Intrauterine adhesions were significantly more prevalent in patients with secondary subfertility compared to those with primary subfertility. Similar results were found in our study.

The differences towards tubal patency assessment between primary and secondary patients with IUAs reiterated other studies which suggested that secondary infertility is more frequently correlated with partial or maintained fallopian tubes function even when the IUAs are associated.¹⁷ Present study showed an increase rate of bilateral tubal patency indicating that tubal functionality may be preserved in this group even though IUAs are associated.

The literature findings on the development of IUAs suggest that a history of uterine trauma from surgical interventions plays a significant role in the pathogenesis of IUAs and affects reproductive performance. Furthermore, it is important to guide patients properly about the potential risks. Effective counseling is crucial when addressing the necessity for intrauterine surgery.

This study concluded that hysteroscopy play an important role as diagnostic tool in the subfertility treatment. It is recommended in the evaluation of female subfertility. Intra Uterine Adhesion development is a significant and often misunderstood contributor to considerable morbidity associated with the disruption of the endometrium's basal layer, a condition that impacts female reproductive health and negatively affects reproductive outcomes. The effects of intrauterine scarring on fertility are intricate, and comprehending the associated causes and mechanisms behind impaired reproductive performance is crucial.

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Conflict of interest: None declared.

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