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ORIGINAL ARTICLE

Role of Office Hysteroscopy in Detection of Uterine Abnormalities in Women with Unexplained Infertility

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ABSTRACT:

Background: Hysteroscopy is considered the gold standard for the diagnosis of small uterine abnormalities undetected by previous procedures like hysterosalpingography (HSG), as well as uterine abnormalities such adenomyosis, myoma, and polyps. Evaluation of hysteroscopy's use in the diagnosis of female infertility without apparent cause was our aim.

Methods: This prospective cross-sectional study included sixty individuals with unexplained infertility. It was carried out at the Zagazig University Hospital's, Endoscopic Unit in the Department of Obstetrics and Gynecology from October 2023 to May 2024, all patients were subjected to office hysteroscopy.

Results: 28.3% of the 60 women who were the subject of the study reported abnormal hysteroscope results in their uteri. Of the patients, 40% had secondary infertility and 60% had primary infertility. 15% had intrauterine polyps found, which hysterosalpingography and ultrasonography failed to detect. It was shown that 8.3% had uterine niches. There were only one (1.7%) woman with a tiny uterine septum and 3.3% of women with submucous fibroids (grades 0 to 2).

Conclusion: When hysteroscopy is performed, uterine pathology is found in a considerable number of infertile women for unknown reasons. Because office hysteroscopy allows for simultaneous operational correction, patient tolerance, and safety, it is the gold standard for the diagnosis and treatment of intrauterine disease.

Keywords: Office hysteroscopy; uterine abnormalities; unexplained infertility.

INTRODUCTION

A year of unprotected sexual activity without conception is considered infertility, and it affects 10–15% of couples. Most young, healthy couples who are in good health get pregnant in less than a year, usually in only six months. The primary reasons for infertility include uterine disease, male factor, tubal and peritoneal pathology, ovulatory dysfunction (20–40%), and the other causes are unknown [1].

After "standard" tests, unexplained infertility (UI) is identified when there are no anomalies in the male or female reproductive systems. unexplained infertility in pairs with appearently normal ovarian, fallopian tube, uterine, cervical, and pelvic anatomy; as well as normal genito-urinary anatomy, ejaculate, and testicular function [2].

A global issue, infertility has a profound effect on families and society. Infertility is thought to impact 186 million people worldwide and 48 million couples. Both sexes are susceptible to this illness. illnesses of the female reproductive system, including abnormalities of the uterus, tubules, and ovaries, as well as endocrine illnesses resulting in abnormalities of reproductive hormones, are the cause of female infertility [3].

These days, hysteroscopy—a direct visual examination of the uterus and cervical canal—is often employed in gynecological treatment. When assessing the uterine cavity for anomalies, it has evolved into the gold standard. An improved method

of treating female infertility is offered by recent technical advancements in the domains of both surgical and diagnostic hysteroscopy [4].

Hysteroscopy is a procedure where a gynecologist uses a telescopic instrument (hysteroscope) inserted into the cervix and vagina to examine the uterine cavity. The purpose of hysteroscopy is to evaluate or treat pathologies of the endocervical canal, tubal orifices, and uterine cavity. Abnormal uterine bleeding (AUB), the retention of IUDs or other foreign objects, uterine septal abnormalities, retained products of conception, recurrent early pregnancy loss, and hypofertility are a few conditions that may require hysteroscopy [5].

Chronic endometritis, endometrial polyps, submucosal myomas, intrauterine adhesions, adenomyosis, thin endometrium, endometrial hyperplasia, and/or cancer, as well as uterine malformations like the uterine septum, T-shaped uterus, arcuate uterus, and unicornuate uterus, are among the pathologies found during hysteroscopy in infertile women [6].

Comparing office-based hysteroscopy to hospital-based operational hysteroscopy, the former is linked to greater patient satisfaction and quicker recovery. Office hysteroscopy may also assist patients and physicians in the following ways: it can save general anesthesia, reduce patient anxiety associated with unfamiliarity with the office, be more cost-effective, and make better use of the operating room for more complex hysteroscopic cases [7].

METHODS

This prospective cross-sectional study included sixty individuals with unexplained infertility. It was carried out at the Zagazig University Hospital's Endoscopic Unit in the Department of Obstetrics and Gynecology October 2023 to May 2024. The study was approved by ethical committee of Faculty of Medicine, Zagazig university (IRB number 10125-22-11-2022). Informed written consent was obtained from all patients.

Inclusion Criteria included patients between the ages of 20 and 40 who had either primary or secondary infertility, normal prolactin and thyroid levels as well as normal semen analysis and normal serum FSH and LH levels. Unexplained infertility (UI) is identified when there are no anomalies in the male or female reproductive systems. Infertility that cannot be explained in couples with acceptable coital frequency, fallopian tubes, uterus, cervix, and pelvis, as well as testicular function, genito-urinary anatomy, and a normal ejaculate. Ultrasonography was done and was normal in all cases.

Exclusion Criteria includes people with advanced or uncontrolled medical conditions like diabetes, rheumatic fever, or tuberculosis; women with active bleeding; and women with any contraindications for hysteroscopy, such as chronic chest disease, heart disease, and extreme obesity.

All Patients prior to the procedure, the following were done: a complete medical history; an obstetric history that included information about previous labor (including the duration of the pregnancy, antenatal care, mode of delivery, fetal outcome, and postpartum complications); a previous abortion or ectopic pregnancy (including information about the duration of the pregnancy, mode of interference, post-abortive complications, and any follow-up investigations with their outcomes); and a menstrual history that included information about the age at menarche, the duration of the bleeding, the rhythm, the duration of the cycle, dysmenorrhea, abnormal uterine bleeding, and the first day of the last regular menstrual period.

***Hysteroscope**:*

Karl Storz's (Germany) hysteroscope was utilized in our investigation. This rigid continuous flow panoramic hysteroscopy has a diameter of 2.9 mm and a length of 25 cm. It has an exterior sheath of 3.2 mm and a 30 degree fibro-optic lens. Saline 0.9% at a pressure of 50 mmHg was utilized with Hysteromate 3700 to produce uterine distension. In this experiment, a 150-Watt metal halide automatic light source from Circon Acmi G71A/Germany was used.

***The procedure**:*

Hysteroscopy was performed in two or three days after the menstrual flow has stopped. The patients were put in a lithotomy posture, a bimanual pelvic examination was performed. Regular system checks were conducted prior to initiating the procedure. Hysteromate 3700 was used to dilate the uterus using 0.9% saline at a pressure of 50 mmHg. The vagina is positioned with the vaginal endoscope under direct visual control. The cervical canal is easily recognized as a constricted opening with the same diameter. To locate the external cervical os, the scope is gradually moved backward. After accomplishing its distention until the black hole (internal os) is visible, the scope is inserted into the cervical canal at this point. Maintaining the scope in the middle, it is slowly and gently advanced with minimal harm to the internal cervical os and finally to the uterine cavity. A 30ml/minute delivery of saline is achieved by

adjusting the flow rate. Systematic inspection should begin as soon as the telescope is inserted into the cavity. First, we get a panoramic image of the cavity. Next, we look at the fundus, uterine anterior, posterior, and lateral walls. Finally, we can see the tubal ostia. After identifying the anatomical markers (such as the tubal ostia), the uterine cavity is methodically examined with a rotating scope to look for any anomalies in the fundus, laterals, anterior, posterior, or right or left tubal ostia. To minimize patient discomfort at this point, it's critical to prevent lateral motions as much as possible. Without a calibrated probe, it is challenging to determine the true size of hysteroscopic results due to visual distortion. Any pathology detected was recorded, tabulated and subjected for statistical analysis.

Statistical analysis

Version 18 of the SPSS program was used to analyze the data (USA). The information displayed as mean ± SD. One way ANOVA and the independent student t test for parametric data were used for the statistical comparisons. The frequency and percentage were used to represent the categorical data, and the Fischer exact and chi square test was used for analysis. At $P<0.05$, the significance level was determined.

RESULTS:

Among the 60 women studied, 28.3 % had abnormal hysteroscopic findings and 71.7% had normal uterine cavity. Sixty percent of patients had primary infertility while 40% had secondary infertility (Table 1). Between the groups with aberrant and normal hysteroscopic findings, there was no significant difference (Table 2).

28.3% of the 60 women who were the subject of the study reported abnormal hysteroscope results in their uteri. Among the women surveyed, 71.7% had normal uteruses. Table 3 shows that of the women, fifteen percent (15%) had intrauterine polyps, eight percent (8.3%) had uterine niches, three thirds had submucous fibroids with grades 0 to 2 and tiny size, and one woman (1.7%) had a small uterine septum.

Patients' ages ranged from 21 to 37 years old, with a mean age of 27.56 ± 4.34. The range of infertile length was 2 to 10 years, with a mean of 4.8 ± 1.83. Most of patients were nulligravida (60%). Only 10% had previous appendectomy, 6.7% had diabetes, 3.3% had hypertension and 5% had previous abortion (Table 4).

Age was significantly higher in 2ry infertility group than 1ry infertility group. All patients (100%) were nulligravida in 1ry infertility group while most of patients in 2ry infertility were P1 CS (58.3%) (Table 5). Hysteroscopic findings did not significantly differ between individuals with initial infertility and patients with subsequent infertility (Table 6). Based on baseline data, there was no statistically significant distinction between the groups with abnormal and normal hysteroscopic findings except uterine niche that was higher in patients with 2ry infertility (20.8%) while no patient had uterine niche in 1ry infertility (Table 7).

Table (1): Baseline data of the studied group.

		Patients (n=60)
Age (years)	Mean ± SD	27.56±4.34
	Range	21-37
Duration of infertility (years)	Mean ± SD	4.8±1.83
	Range	2-10
Parity	P1 CS	14 (23.3%)
	P1 NVD	2 (3.3%)
	P2 CS	5 (8.3%)
	Number of Abortion	3 (5%)
	Nulligravida	36 (60%)
Surgical history	No	53 (88.3%)
	Appendectomy	6 (10%)
	Cholecystectomy	1 (1.7%)
Medical history	No	54 (90%)
	Diabetes mellitus	4 (6.7%)
	Hypertension	2 (3.3%)

Table (2): Hysteroscopic findings and Type of infertility among the studied group

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		Patients (n=60)
Normal uterine cavity		43 (71.7%)
Abnormal uterine cavity		17 (28.3%)
Type of Infertility	1ry infertility	36 (60%)
	2ry infertility	24 (40%)

Table (3): Comparison between normal and abnormal findings regarding type of infertility.

		Normal hysteroscopic findings (43)	**Abnormal hysteroscopic findings (17)**	**P value**
Type of Infertility	**1ry infertility**	**25 (58.10%)**	**11 (64.70%)**	**0.647**
	2ry infertility	18 (41.90)	6 (35.30%)	

Table (4): Hysteroscopic findings among the studied group.

	Patients (n=60)
Normal uterine cavity	43 (71.77%)
Abnormal uterine cavity	17 (28.3%)
Polyp	9 (15%)
Uterine Niche	5 (8.3%)
Sub-mucus fibroid	2 (3.3%)
Uterine septum	1 (1.7%)

Table (5): Comparison between primary and secondary infertility groups regarding baseline data.

			1ry infertility (36)	**2ry infertility (24)**	**P value**
Age (years)	Mean ± SD		25.41±2.97	30.79±4.09	0.001
	Range		21-32	24-37	
Duration of infertility (years)	Mean ± SD		4.58±1.93	5.12±1.67	0.26
	Range		2-8	3-10	
	Parity	P1 NVD	0 (0.00%)	2 (8.3%)	0.001
		P1 CS	0 (0.00%)	14 (58.3%)	
		P2 CS	0 (0.00%)	5 (20.8%)	
		Number of Abortion	0 (0.00%)	3 (12.5%)	
		Nulligravida	36 (100%)	0 (0.00%)	
Surgical history	No		31 (86.10%)	22 (91.70%)	0.894
	Appendectomy		5 (13.90%)	1 (4.20%)	
	Cholecystectomy		0 (0.00%)	1 (4.20%)	
Medical history	No		32 (88.9%)	22 (91.70%)	0.39
	Diabetes mellitus		2 (5.6%)	2 (8.30%)	
	Hypertension		2 (5.5%)	0 (0.00%)	

Table (6): Comparison between primary and secondary infertility groups regarding hysteroscopic findings.

	1ry infertility (36)	2ry infertility (24)	P value
Normal uterine cavity	29(80.6%)	14(58.3%)	0.06
Polyp	5(13.9%)	4 (16.7%)	0.76
Uterine Niche	0 (0.00%)	5(20.8%)	0.004
Sub-mucus fibroid	1 (2.80%)	1 (4.16%)	-
Uterine septum	1 (2.80%)	0 (0.00%)	-

Table (7): Comparison between normal and abnormal hysteroscopic finding groups regarding baseline data.

		Normal hysteroscopic finding (N=43)	Abnormal hysteroscopic finding (N=17)	P value
Age (years)	Mean ± SD	27.60±3.87	27.47±5.48	0.915
	Range	21-37	21-37	
Duration of infertility (years)	Mean ± SD	4.95±1.717	4.41±2.12	0.308
	Range	2-8	2-10	
Parity	P1 CS	12 (27.9%)	2 (11.8%)	0.36
	P2 CS	2 (4.7%)	3 (17.6%)	
	P1 NVD	1 (2.3%)	1 (5.9%)	
	Number of Abortion	2 (4.7%)	1(5.9%)	
	Nulligravida	26 (60.4%)	10 (58.8%)	
Surgical history	No	39 (90.70%)	14 (82.40%)	0.6
	Appendectomy	3 (7%)	3 (17.60%)	
	Cholecystectomy	1 (2.30%)	0 (0%)	
Medical history	No	40 (93%)	14 (82.4%)	0.46
	Diabetes mellitus	2 (4.7%)	2 (11.8%)	
	Hypertension	1 (2.3%)	1 (5.8%)	

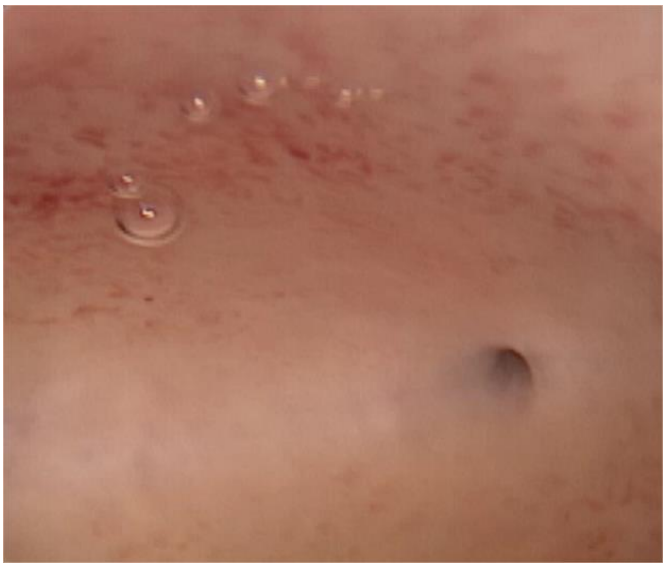

Figure (1): Normal hysteroscope with normal left tubal ostium.

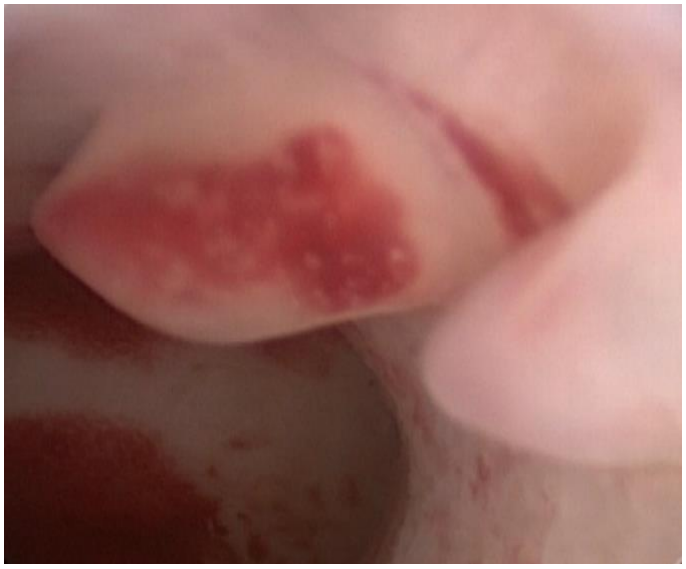

Figure (2): Uterine polyp

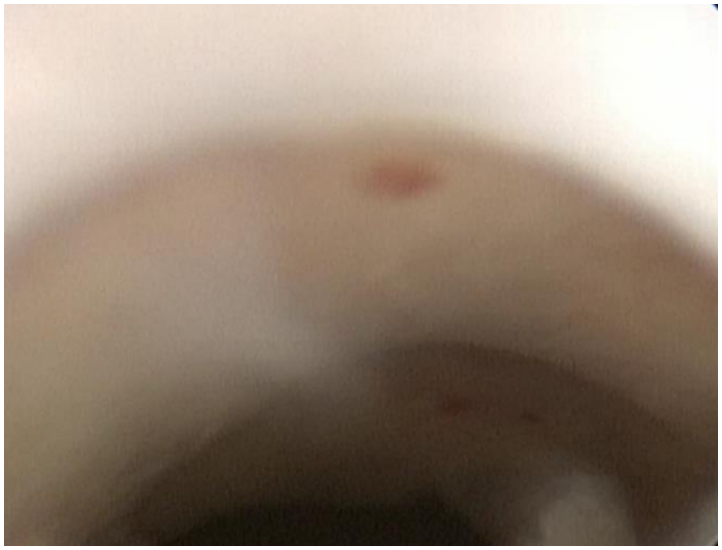

Figure (3): CS scar niche

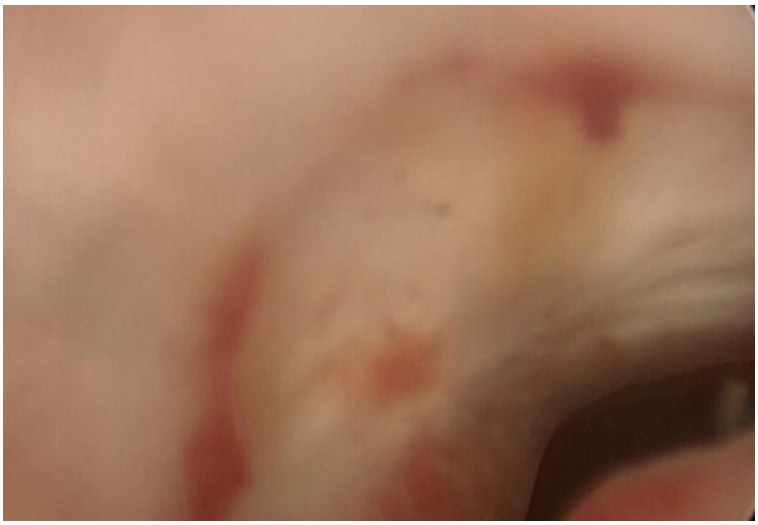

Figure (4): Fibroid

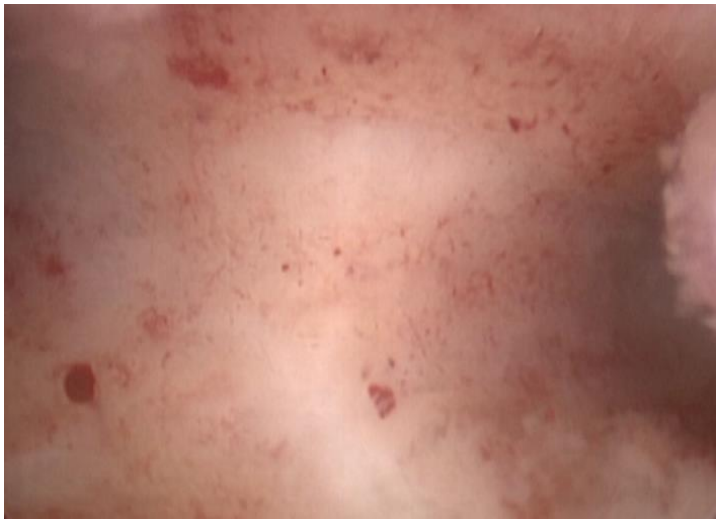

Figure (5): Uterine septum.

DISCUSSION

Numerous observational studies have demonstrated that hysteroscopic identification and treatment of endometrial polyps, submucous fibroids, intrauterine adhesions, and intrauterine septum improves the rates of spontaneous pregnancy in couples with infertility that cannot be explained.[8] Congenital or acquired uterine anomalies are significant contributors to infertility as a result of unsuccessful implantation. Therefore, hysteroscopy examination of the uterus is a mandatory procedure for evaluating couples experiencing infertility that cannot be explained [9].

For this procedure, hypteroscopy is the gold standard and more accurate than other instruments, particularly HSG [8]. The current study aimed to determine uterine factors causing female infertility and to determine role of hysteroscopy in diagnosis of female with unexplained infertility.

In this study, there was 60% of cases had primary infertility, while 40% had secondary infertility. Similar findings were published by Gad et al., [10], who examined the use of laparoscopy and hysteroscopy in the evaluation of infertility that cannot be explained in 200 women between the ages of 20 and 40, 116 of whom (58%) had primary infertility and 84 (42%) had secondary infertility. This distribution is similar to that reported by Mohamed and Elmazzaly [11], who found 68% primary infertility and 32% secondary infertility in their study.

However, it differs from results reported by Ali et al. [8], who found that 70% primary infertility and 30% secondary infertility. Different findings were also reported by Gammo [12], who discovered that most patients in the case and control groups had primary infertility (70% and 75%, respectively). Additionally, the function of hysterolaparoscopy in the diagnosis and management of female infertility was examined by Al-Bromboly et al. [13]. The groups under study were split into primary and secondary categories of infertility. They found that there were 30.3% of cases of secondary infertility and 69.7% of cases of primary infertility; these findings conflict with those of our investigation. These variations might be due to differences in study populations or regional factors affecting fertility patterns.

One of the most significant findings of our study was that 28.3% of women had abnormal findings on hysteroscopy, despite having normal hormonal profiles, HSG, and semen analysis. This highlights the importance of hysteroscopy in detecting uterine abnormalities that may be missed by other diagnostic methods. Fifteen percent (15%) were discovered to have intrauterine polyps. It was shown that 8.3% had uterine niches. There were only one (1.7%) woman with a tiny uterine septum and 3.3% of women with submucous fibroids (grades 0 to 2). Similar results were reported by Ali et al. [8], who found abnormal hysteroscopic findings in 29% of infertile women with unexplained infertility. Furthermore, a research conducted by Zargar et al. [14] that included 54 women experiencing infertility without a known cause found that 33 cases (61.2%) had normal hysteroscopic results and 21 cases (38.8%) had abnormal results. These results are consistent with our findings. Moreover, 70 (70%) of the women with infertility that cannot be explained had normal hysteroscopic results, according to Gammo [12]. Furthermore, it was found by Gad et al. [10] that 64.3% of women with infertility that cannot be

explained had normal hysteroscopic results. In agreement of our study, Aboubakr et al. [15] reported that, normal hysteroscopy was found in 50 cases of unexplained infertility (62.5%) and abnormal hysteroscopy was found in 30 cases (37.5%). Mohamed and Elmazzaly [11] reported different findings, indicating that 89% of the patients under study had abnormal hysteroscopy findings. Furthermore, 14% of the women with infertility that could not be explained did not have a hysteroscopic anomaly, according to Makled et al. [16].

In our study, the most common abnormality detected was intrauterine polyps (15%), followed by uterine niche (8.3%), submucous fibroids (3.3%), and uterine septum (1.7%). These findings are generally consistent with other studies, although the prevalence of specific abnormalities may vary. For example, Malhorta and Sood [17] assessed the usefulness and diagnostic accuracy of hysteroscopy in 32 infertile women between the ages of 21 and 35. During hysteroscopy, physically identifiable abnormalities were found in 19 instances (59.4%). Among these were Mullerian fusion defect (6.1%), uterine septum (6.1%), submucous fibroid (9.4%), and intrauterine adhesions (25%). In contrast to the current study, the percentage of those hysteroscopic findings is different. The smaller sample size in their study could be the cause of this discrepancy.

Mohamed and Elmazzaly [11] also reported different results, finding that endometrial polyps (30%) are the most common in women, followed by hyperplastic (14%), endometritis (13%), submucous myoma (9%), intrauterine synechia (8%), cervical polyp (4%), septum (3%), cervicitis (2%), arcuate uterus (2%), unicornuate uterus (2%), bicornuate uterus (1%) and cervical stenosis (1%). Furthermore, hysteroscopy revealed endometrial polyps in roughly 25% of women with primary infertility that could not be explained De Sa Rosa e de Silva et al., [18].

Interestingly, hysteroscopic findings did not significantly differ between primary and secondary infertility groups in our investigation. This is consistent with research conducted by Ali et al. [8], which indicated that there was no discernible difference in the rate of uterine anomalies between women with primary and secondary infertility (70% and 30%, respectively). Contrary to what some studies have shown, women with arcuate uteri, bicornuate uteri, and extremely small uterine cavities are more common in the initial infertility group (20%, 15%, and 10%, respectively) than in the secondary infertility group Aboubakr et al., [15]. Additionally, compared to the primary infertility group, the secondary infertility group had a considerably higher proportion of women (30% of both) with intrauterine synechia and bilateral thin corneal ends.

As regards type of infertility in our study, there was no significant difference between normal and abnormal hysteroscopy groups ($P > 0.05$), this means that infertility, either primary or secondary didn't affect on the hysteroscopic findings. In another similar retrospective study undertaken by Karayalcin et al. [19], there was agreement with our results that no significant difference between normal and abnormal hysteroscopy groups regarding type of infertility was discovered. Additionally, Fatemi et al. [20] concurred that there was no discernible difference in the kind of infertility between the groups with normal and bad hysteroscopy.

Conclusion:

When hysteroscopy is used in unexplained infertility, uterine pathology is discovered in a significant portion of women. Because office hysteroscopy allows for simultaneous operational correction, patient tolerance, and safety, it is the gold standard for the diagnosis and treatment of intrauterine disease.

Conflict of interest: None.

Financial Disclosures: None.

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