Research article

Does hysteroscopy surgery enhance subsequent reproductive outcomes in women with unexplained infertility?

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ABSTRACT

Introduction and Aim: Embryo implantation and a healthy placenta depend on the uterine cavity and endometrium, thus any reproductive surgery for unexplained infertility must evaluate these. Hysteroscopy cures intrauterine adhesions, submucous fibroids, endometrial polyps, and endometriosis and directly visualizes the uterus cavity. This study investigated whether hysteroscopy could diagnose uterine disorders in women with recurrent, unexplained miscarriages and improve reproductive outcomes.

Methods: This observational retrospective study included 58 patients who had recurrent pregnancy loss and were hospitalized in the Kamal AL-Samarrai Hospital's reproduction unit / Physiopathology section in Baghdad, Iraq between January 2021 and February 2022. The participants were divided into two groups based on whether they had received hysteroscopic surgery. IVF was performed on patients who underwent hysteroscopy surgery. A comparative analysis was made for clinical factors and uterine pathology among the two groups. Data were subjected to statistical analysis.

Results: The patients in this study ranged in age from 20 to 42 years, with an average of 3265 years, and a BMI ranging from (20-39) with an average of 29.270.48 kg/m2. Out of the 58 women analyzed, 31 (53.4%), 13 (22.4%), and 48 (82.7%) had a previous cesarean, laparoscopy, and HSG procedures, respectively. 28 patients (48.2%) who underwent hysteroscopic surgery were detected with uterine disorders; IUA (28%), fibroids (25%), submucosal polyps (21.4%), endometrial hyperplasia (17.8%), and endometriosis (7.1%). No significant difference was seen for the duration of infertility, type of infertility, or previous IVF attempt failure between the hysteroscopic and control groups ($p>0.05$). In women who underwent IVF procedures after hysteroscopic surgery, the clinical pregnancy rate was lower as compared to women without surgery.

Conclusion: Hysteroscopy can diagnose some intrauterine diseases early enough for surgery. Undiagnosed infertility in women with RPL suggests a hysteroscopic examination before in vitro fertilization.

Keywords: Unexplained infertility; Uterine pathology; Hysteroscopy; RPL; IVF outcomes.

INTRODUCTION

Among the variables that cause infertility are ovulatory (30%), male (25%), tubal (25%), coital (5%), and cervical (<5%) abnormalities; each of these factors might function "individually" or have a "combined effect" (1). Anti-testicular antibodies (ATCA) were most prevalent in infertile men patients that contributed to infertility (2) .When traditional reproductive testing is performed and no obvious reason for infertility is found, the phrase "unexplained" infertility is used (3). Successful fertility-restoring procedure in women with unexplained infertility examines the uterine component since it is thought that the uterus cavity and its lining, the endometrium, are necessary for embryo implantation and a healthy placenta (3, 4). The best method for uterine factor assessment is "hysteroscopy," which allows for direct observation of the uterine cavity and any associated pathological conditions (congenital and acquired), like intrauterine adhesions, submucous fibroids, endometrial polyps, and endometriosis, and which can also be treated in the same location (5). In addition, hysteroscopy provides precise information and is considered less unpleasant in comparison to procedures such as transvaginal sonography (TVS), hysterosalpingography (HSG), and saline infusion/gel instillation sonography (SIS/GIS; 6).

Furthermore, in individuals with repeated pregnancy losses (RPL) caused naturally or due to recurrent in vitro fertilization (IVF) failure, the choice of hysteroscopic treatment option could be advantageous (7,8). Pre-IVF hysteroscopy, on the other hand, has been shown to effectively improve pregnancy rates in sub-fertile women with or without any symptoms (9). According to the National Institute for Health and Clinical Excellence (NICE) fertility assessment and treatment recommendations, hysteroscopy should not

be performed on women as part of the initial screening unless clinically essential (10). This is owing to a lack of understanding about whether this operation will improve reproductive outcomes. Hence, in this study, we aimed to investigate the reproductive consequences of hysteroscopic therapy, as well as to examine uterine pathologies in women with RPL and unexplained infertility after IVF and see if the removal of such pathologies increased the rate of pregnancy.

MATERIALS AND METHODS

Study subjects

This retrospective study included fifty eight infertile women admitted to the Physiopathology section of the Reproduction Unit at Kamal AL-Samarrai Hospital, Baghdad between January 2021 and February 2022. The inclusion criteria considered were women with idiopathic causes, previous RPL, cesarean, HSG, and 2 ≥ previous IVF attempt failures. Women excluded from the study included those with no history of RPL, infertility due to male-associated factors, and women who do not intend to become pregnant. The 58 participants were divided into two groups based on whether or not they had received hysteroscopic surgery. Group I (n=28) included women who underwent hysteroscopy with diagnosed intrauterine abnormalities while Group II (n=30) included women on whom hysteroscopy was not performed due to abnormalities being unsuspected.

Hysteroscopy procedure

Hysteroscopy was performed after 2 months of HSG using a hysteroscope (Karl Storz, Germany), which has a 30-degree view with a 2.9 mm Bettocchi continuous-flow sheath. The uterine distention was performed using normal saline with an electronic pump (Hysteromat; Karl Storz) (11). Surgical video-assisted hysteroscopy was performed using a bipolar electric resectoscope (Karl Storz) and intrauterine bigatti shaver. Endometrial pathology was detected and before removal of the resectoscope, the endometrium was scraped from the fundus, lateral, anterior, and posterior walls of the uterus. Patients were discharged 2 to 3 days after surgery.

Ovarian Stimulation Protocol

Three months after hysteroscopy surgery, an antagonist stimulation protocol was applied on day 2 (CD2) to produce natural or artificially induced menstruation. A follow-up, transvaginal ultrasonography was performed to assess the size of the follicles. Oocyte punctures were conducted when at least three follicles were 16-18 mm in diameter. IVF was performed 1-2 hours after retrieval with 3 embryos on average, being transferred to the uterine cavity. Positive serum B-HCG levels (>100 mUI/mL) 14 days after embryo transfer were used to identify whether a woman was pregnant (12).

Statistical analysis

All data were analyzed using the Statistical Analysis System- SAS (13). Comparisons between means were carried out using T-test. Statistical comparisons between groups were performed using the Chi-squared test. A p-value of <0.05 was considered statistically significant (13).

RESULTS

Among the 58 participants included in this study, Group I included 28 (48.2%) individuals with abnormal hysteroscopies while Group II included 30 (51.7%) individuals with no history of hysteroscopies performed. The study participants were all aged between 20 and 42 years (average of 32.08±0.65) and had a BMI ranging from 20-38 kg/m2 (average of 29.27 ±0.48) (Table 1). Among the 58 participants 22.4 %, 82.7%, 53.4%, and 48.2% were found to have undergone laparoscopy, HSG, cesarean, and uterine pathology respectively (Table 1).

Table 1. Demographic data of study subjects

Descriptions	Value
Total number of patients	58
Average age (years)	32.08±0.65
BMI (Kg/m^2)	29.27 ±0.48
Previous Laparoscopy	13 (22.4%)
Previous HSG	48(82.7%)
Previous cesarean	31(53.4 %)
Numbers of patients with uterine pathology	28 (48.2%)

BMI: body mass index

Hysteroscopy studies

The findings of uterine pathologies in 28 patients following hysteroscopic surgery are shown in Table 2 and Fig. 1. The pathologies detected were fibroids (7 patients), submucosal polyps (6 patients), endometrial hyperplasia (5 patients) IUA (8 patients) and endometriosis (2 patients).

Table 2: Uterine pathology associated with patients who underwent hysteroscopy

Uterine pathologies	n %
Fibroids	7 (25)
Sub mucosal polyps	6 (21.4)
Endometrial hyperplasia	5(17.8)
IUA	8 (28.5)
Endometriosis	2 (7.1)

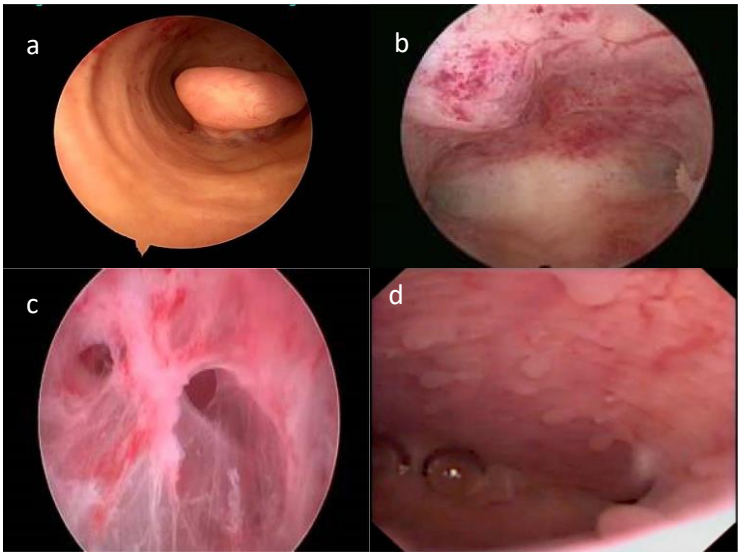

Fig 1. Hysteroscopic images showing a) Small polyp arising from the posterior wall of uterus b) Fibroids from the anterior wall of uterus c) IUA and d) Chronic endometriosis

Table 3: Comparison of clinical factors and uterine pathology among study subjects

Influencing Factors	Uterine pathology		P-value
	Present (n =28)	Absent (n=30)	
Duration of infertility	7.50 ±0.78 years	7.67 ±0.83	0.885 NS
Previous RPL (%)	13 (46.43)	7 (23.33)	0.0372 *
Type of infertility (%)	Primary:12 (42.86)	14 (46.67)	0.559 NS
	Secondary:16 (57.14)	16 (53.33)	
Previous IVF attempt failures	1.78 ± 0.30	1.13 ± 0.25	0.104 NS
Oocyte retrieval	8.71 ± 0.96	10.76 ± 1.22	0.197 NS
Fertilization rate	78.09 ± 3.61	78.51 ±4.02	0.837 NS
Embryo transfer	3.42 ± 0.22	3.10 ± 0.21	0.298 NS
Clinical pregnancy (%)	14 (50)	20 (66.6)	0.0301*

* (P≤0.05), NS: Non-Significant

Table 3 reveals non-significant differences (p=0.885) in M±SE for the duration of infertility between patients in Group I (7.50 ±0.78 years) and patients in Group II (7.67 ±0.83 years). On the other hand, this Table shows that 13 (46.43%) of patients with uterine pathologies in Group I had previous RPL which is significantly (p= 0.0372) higher than 7 (23.33%) among patients without uterine pathology in Group II. Concerning the result of the type of infertility, there were no significant differences (p=0.559) seen for primary and secondary infertility 12 (42.86%) vs. 14 (46.67 %) and 16 (57.14%) vs 16 (53.33%) respectively between the two groups.

Furthermore, there is no statistical difference (p= 0.104) in previous IVF attempt failures in Group I (1.78±0.30) and in Group II (1.13± 0.25). Although there are no significant differences in oocyte retrieval between women with uterine pathology (8.71 ±0.96 oocyte) and those with unsuspected uterine pathology (10.76 ±1.22 oocyte, p= 0.197). No significant difference (p= 0.197) for oocyte retrieval between women with uterine disease and those without oocytes was observed. Similarly, the fertilization rate, as well as embryo transfer, was observed to be not significantly different in both groups (Table 3). According to the findings of this study, clinical pregnancy was found to be significantly higher in women without uterine abnormalities (p=0.301) than in women with uterine abnormalities (Table 3).

DISCUSSION

In infertile women and women who have had repeated miscarriages, hysteroscopy is considered as a useful diagnostic procedure for evaluating the pathologies connected with the uterine cavity and providing gynecologists with treatment options for intrauterine disease (9, 14). In this study, a significant number (48.2%) of infertile patients were diagnosed as having uterine pathology. According to Pansky *et al*., (14) women with primary or secondary infertility had a 30% incidence of "congenital and acquired" uterine disorders, while another study suggested that such abnormalities occur between 30 and 60% of the time and that both naturally occurring and assisted pregnancies may be harmed by these abnormalities (15).

Uterine polyps and fibroids, which are known to hinder implantation in a variety of ways, may modify the endometrial cavity, causing aberrant vascularization, increased uterine contractions, and, most significantly, persistent inflammation (17, 18). Endometritis is thought to be the primary factor in 9.7% to 67% of women who have RPL and in 30.3% of women who experience recurrent implantation failure. This is due to the possibility that endometritis could delay endometrial maturation, causing asynchrony with implantation (19). IUA is another important infertility factor that can be easily detected by hysteroscopy (5). In this study, together with fibroids, IUA represented the commonest hysteroscopic uterine cavity abnormalities (>50%), followed by polyps (21.4%), endometrial hyperplasia (17.8%), and endometriosis (7.1%). In a similar study, Vaid *et al.*, (20) reported that (11.91%) of their patients had IUA, (4.14%) had polyps, (3.62%) had endometrial hyperplasia, and only (2.07%) had fibroids. Interestingly, after repeated implantation failure in IVF cycles, uterine cavity reevaluation by hysteroscopy is thought to increase pregnancy rates (15, 21). However, this contrasts the observations made in this study wherein, clinical pregnancies were recorded to be higher in women without hysteroscopy. Karayalcin *et al*., (22) in their study with hysteroscopies before IVF, attributed endometrial abnormalities as the cause of poor outcomes of IVF. Cenksoy *et al*., (23) based on hysteroscopic studies in women with recurrent IVF failures reported endometrial abnormalities as the main cause, treatment of which subsequently increased the pregnancy rates. In contrast, Spiewankiewicz *et al.*, (24) reported a higher rate (78.3%) of pregnancy after polypectomy in contrast to a 42.1% pregnancy rate in women with normal uterine cavities. A 20% rise in clinical pregnancy was also noted in women with RIF as they have a higher chance of subsequent IVF conceptions after undergoing hysteroscopic surgery to remove any overlooked uterine abnormalities (25). Thus, based on our findings and previous research, we conclude that diagnostic hysteroscopy improves conception in women with unexplained infertility.

CONCLUSION

Women with unexplained infertility and a history of repeated miscarriages should undergo a hysteroscopic evaluation for the type of uterine abnormality and subsequent treatment, prior to undergoing IVF.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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