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ORIGINAL ARTICLE

Role of Hysteroscopy in Diagnosis of Patients with Secondary Infertility

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Abstract

Background: ***In patients with a history of secondary infertility, hysteroscopy is used to identify potential intrauterine abnormalities that may be associated with a decreased rate of conception.***

Objective: ***Is to assessment of the role of hysteroscopy in identifying uterine cavity anomalies in females with secondary infertility who have a normal uterine cavity according to trans vaginal ultrasound and normal HSG.***

Patients and Methods: ***This study involved 163 individuals, aged 20 to 40, admitted to the Gynecological Department of Al-Hussein and Sayed Galal University Hospitals, Al-Azhar University, with secondary infertility and no identified uterine abnormality.***

Results: ***In our study, 64 (39.3%) women had abnormal hysteroscopy with more than one abnormalities in some cases with the following abnormalities; cervical stenosis in 19 women (11.7%), osteal fibrosis 18 in women (11%), uterine synechia in 14 women (8.6%), corneal inflammation in 13 women (8%), endometrial fibrosis in 12 women (7.4%), a deformed cavity in 8 women (4.9%), endometrial inflammation in 7 women (4.3%), cervical Polyp in 6 women (3.7%), septate uterus in 5 women (3.1%), uterine Polyp in 4 women (2.5%), atrophic endometrium in 2 women(1.2%) and hyperplastic endometrium in 2 women (1.2%).***

Conclusion: ***It is recommended that diagnostic hysteroscopy be done routinely in patients with unexplained secondary infertility, recurrent implementation failure and assisted reproduction due to its high accuracy of 85.7 % and extremely minimal risk of complications. The most frequent finding in secondary infertility was cervical stenosis; the other notable finding was cervical Polyp.***

Keywords: Hysteroscopy; SecondaryInfertility; Diagnosis

1. Introduction

Secondary infertility is the inability to conceive after a prior pregnancy, regardless of the outcome, after a year of regular, unprotected sexual activity.[1]

It is generally agreed upon that a workup for infertility should involve a uterine cavity assessment. One of the factors contributing to infertility is uterine anomalies, whether they are acquired or congenital.[2]

10% to 15% of couples seeking therapy are thought to have infertility due to abnormalities in their uterus. Moreover, 34% to 62% of infertile women had abnormal uterine results. Furthermore, in 25 per cent of patients who had multiple unsuccessful cycles of in vitro fertilization and embryo transfer (IVF-ET), major unanticipated intrauterine abnormalities were discovered only by hysteroscopy, according to other studies.[3]

Hysteroscopy is used in infertility investigations to look for potential intrauterine abnormalities that might affect the conceptus's ability to implant, grow, or do both.[4]

The percentage of married couples who are infertile is about 7.5%. According to reports, almost 50% of infertile women have an abnormal uterine finding. The majority of endometrial diseases linked to infertility lead to abnormalities in both structure and function.[5]

As a result, while evaluating an infertile couple, endometrial cavity assessment sought to be part of the process. This can be used for Transvaginal sonography, hysterosalpingography , and sonohysterography.[6]

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The two goals of uterine cavity examination are to collect a sample of the endometrium (hyperplasia or neoplasia) or to discover structural abnormalities such as polyps, myomas, or uterine septum.[7]

When assessing the endometrial cavity, hysteroscopic examination is most likely preferable to hysterography. Furthermore, patients with normal transvaginal ultrasonography or hysterosalpingography have been documented to have aberrant hysteroscopic results.[8]

However, the World Health Organization (WHO) advises using hysterosalpinography (HSG) alone for the treatment of infertile women since it may offer information on tubal patency.[9]

Nevertheless, hysteroscopy is more accurate since HSG has a higher frequency of false-positive and false-negative intrauterine abnormalities.[10]

Furthermore, as aberrant hysteroscopic results are much more common in patients with a history of ART failure, hysteroscopy may be seen as a positive predictor of success in a subsequent IVF procedure for women who have had recurrent implantation failure (RIF).[11]

The purpose of this study was to assess the utility of hysteroscopy in identifying uterine cavity anomalies in females with secondary infertility who had been having regular, unprotected sex for 12 months or more and who had normal uterine cavities as determined by transvaginal ultrasound and normal hysterosalpingography.

2. Patients and methods

This study involved 163 individuals, aged 20 to 40 years, who were admitted to the Gynecological Department of Al-Hussein and Sayed Galal University Hospitals, Al-Azhar University, from February 2023 to December 2023 with secondary infertility and no identified uterine abnormality with the following inclusion criteria. The study obtained approval from the Institutional Ethics Committee.

Ages 20 to 40 years, secondary infertility, a normal uterine cavity determined by transvaginal ultrasound, and hysterosalpingography after the last pregnancy. Women who have serious heart conditions, significant lung fibrosis, untreated cervicitis, or any uterine anomaly diagnosed by transvaginal ultrasound or hysterosalpingography were the exclusion criteria.

Study procedures

Each patient had a protocol for collecting their medical history and a general examination that included monitoring vital signs, assessing body mass index, examining the abdomen and pelvis, doing a baseline 2D transvaginal ultrasound, reviewing the most recent HSG (less than a year), and documenting the findings. The ultrasound machine used for the investigation of the patients is Versana Essential VA, GE Medical Systems China, Figure 1.

Figure 1. The ultrasound machine used for the investigation of the patients.

Technique of hysteroscopy

A diagnostic hysteroscopy was conducted during the proliferative phase of the menstrual cycle. This experiment utilized a durable hysteroscope with a diameter of 2.9 mm (manufactured by Karl Storz GmbH, Tuttlingen, Germany). The hysteroscope had an outer sheath diameter of 5 mm and a lens angled forward at 30°. The uterine cavity was dilated using a solution of distilled water. The pressure in the distension medium was maintained between 60 and 100 mm Hg. Hysteroscopy was carried out using a non-touch method called the vaginoscopic approach.[12]

The fundus, borders, and anterior and posterior walls of the uterine cavity were all carefully inspected first. The tubal orifices' size and equality were noted, and any pathology-such as adhesions, polyps, hyperemia, or inflammatory changes—was described. It was stated that any air bubbles in the irrigating fluid were moving toward the tubal ostea. We will inject 2 ml of air into the rubber end of the sterile infusion set so the hysteroscopist can see if there are no air bubbles. The hysteroscopic bubble suction test was deemed successful if the patient side exhibited air bubble suction by the ostium within a minute. Neither air injection nor elevated pressure was carried out throughout this time. If no gas bubbles are suctioned, the examiner will wait another minute. Once more, if there is no suction, the test is deemed unsuccessful.[13]

The observer assessed the diseases, duration of the process (from hysteroscope insertion via the vagina to its full removal), and subjective ease of the surgery.

Our investigations' results include primary: hysteroscopic findings (whether pathologic or

normal), secondary: accuracy of transvaginal ultrasound and hysterosalpingography in diagnosing uterine cavity abnormalities. In the middle of the picture, the thrown-up endometrium is shown, and in the rear part, the exit of the right tube can be seen.[14]

Figure 2. Hysteroscopic view of an inconspicuous cavum uterus.

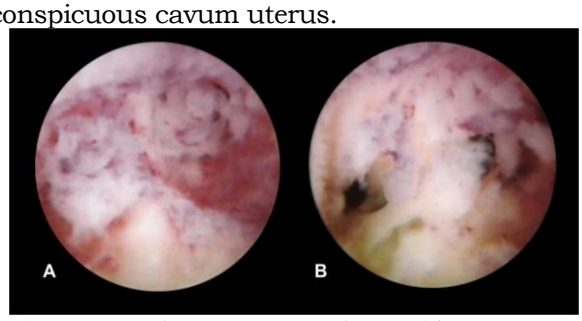

Figure 3. Asherman's Syndrome.[15]

Figure 4. A septate uterus on hysteroscopy.

Figure 5. Narrow cavity of T-shaped uterus.

Figure 6. Multiple endometrial polyps.

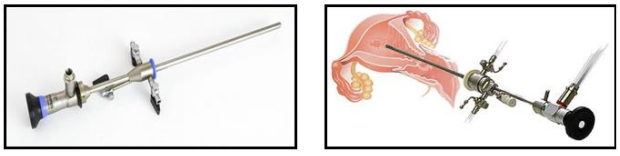

Figure 7: Rigid Hysteroscope.[16]

STATISTICAL ANALYSIS

With a sensitivity of 81.3% and a specificity of 88.5%. Furthermore, only two out of the 163 instances encountered complications associated with hysteroscopy.

3. Results

Table 1. Demographic characteristics among studied patients.

		PATIENTS (N=163)
AGE(YEARS) MEAN ± SD		29.47±7.30
RANGE		20 – 40
BMI(KG/M^2) MEAN ± SD		28.37 ± 4.03
RANGE		22 – 32
RESIDENCE	Urban	71 (43.6%)
	Rural	92 (56.4%)

The patients' ages varied from 20 to 40 years old (mean age of 29 years) with a mean BMI of 29.47 kg/m2. There were 92 patients (56.4%) who were rural in nature.

Table 2. Hysteroscopy indications among studied patients.

	PATIENTS (N=163)	
	N	%
AS PER INFERTILITY WORKUP	126	77.3%
BEFORE IVF TREATMENT	29	17.8%
AFTER IVF TREATMENT FAILURE	8	4.9%

The majority of the patients underwent hysteroscopy as per infertility workup (77.3%).

Table 3. Hysteroscopy findings among studied patients.

	PATIENTS (N=163)	
	N	%
NORMAL	99	60.7%
ABNORMAL	64	39.3%

This table shows that majority of the patients were normal hysteroscopy (60.7%).

Table 4. Abnormal hysterocopic finding ordered by frequency.

ABNORMALITY	PATIENTS (N=163)	
	N	%
CERVICAL STENOSIS	19	11.7%
CORNUAL FIBROSIS	18	11.0%
UTERINE SYNECHIA	14	8.6%
CORNUAL INFLAMMATION	13	8.0%
ENDOMETRIAL FIBROSIS	12	7.4%
DEFORMED CAVITY	8	4.9%
ENDOMETRIAL INFLAMMATION	7	4.3%
CERVICAL POLYP	6	3.7%
SEPTATE UTERUS	5	3.1%
ENDOMETRIAL POLYP	4	2.5%
HYPERPLASTIC(THICK) ENDOMETRIUM	2	1.2%
ATROPHICE NDOMETRIUM	2	1.2%

The majority of abnormality hysterocopic finding were cervical stenosis was 19 patients (11.7%), followed by cornual fibrosis was 18 patients (11%), then uterine synechia was 14 patients (8.6%); 13 patients (8.0%) were cornual inflammation; 12 patients (7.4%) were endometrial fibrosis; 8 patients (4.9%) were deformed cavity; 7 patients (4.3%) wereendometrial inflammation; 6 patients (3.7%) were cervical polyp; 5 patients (3.1%) were septate uterus; 4 patients (2.5%) were endometrial polyp; 2 patients (1.2%) were hyperplastic endometrium and 2 patients (1.2%) were atrophic endometrium.

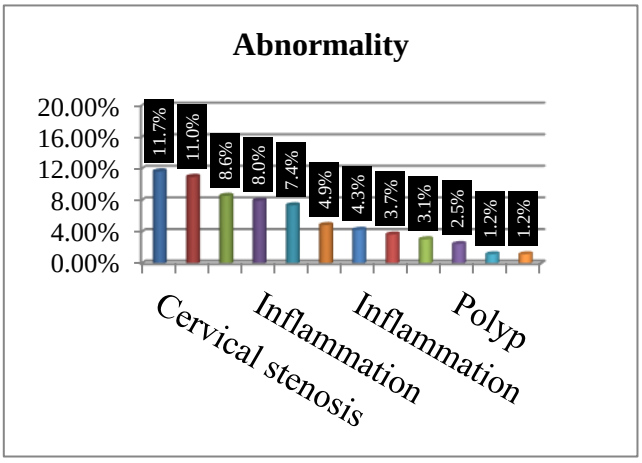

Figure 8. Abnormal hysterocopic finding ordered by frequency.

Table 5. Complications distribution among study group.

COMPLICATIONS	PATIENTS (N=163)	
	N	%
FLUID OVERLOAD	1	0.6%
PERFORATION	1	0.6%
CAUSE OF PERFORATION		
DILATION	0	0.0%
HYSTEROSCOPE	1	0.6%
INSTRUMENTAL	0	0.0%
TOTAL COMPLICATIONS	2	1.2%

The total complications were 2 patients (1.2%) in the form: one patient suffering from fluid overload and one patient suffering from perforation.

Table 6. Association between Pre-hysteroscopic diagnosis and Hysteroscopy findings among the studied patients.

Statistic	Value	95% CI
Sensitivity	81.30%	71.5%-91.1%
Specificity	88.90%	78.2%-99.6%
Positive Predictive Value	82.50%	72.6%-92.4%
Negative Predictive Value	88.00%	77.4%-98.6%
Accuracy	85.90%	75.6%-96.2%

This data demonstrates that out of 86 females who had standard hysterography and US, 19 of them had abnormal hysteroscope findings, resulting in an NPV of 88% for both hysterography and ultrasonography.

4. Discussion

In our study, patients' mean BMI was 28.3 kg/m2, and their ages ranged from 20 to 40. The patients were mostly from rural areas. The majority of patients (77.3%) had hysteroscopy as part of their infertility workup.

The result of our study showing 60.7% of the patients had normal hysteroscopy. Atypical hysteroscopic observations in 39.3% of cases. As a result, there are 19 women (11.7%) with cervical stenosis, 18 with osteal fibrosis, 14 with uterine synechia, 13 with corneal inflammation, 12 with endometrial fibrosis, 8 with deformed cavities, 7 with endometrial inflammation, 6 with cervical polyp, 5 with septate uterus, 4 with uterine polyp, 2 with atrophic endometrium, and 2 with hyperplastic(thick) endometrium.

Ajayi et al. found similar results, stating that the 432 infertile patients they treated had a mean age of 27.6 years (18–41 years) during hysteroscopy. Hysteroscopy was performed due to infertility in 290 women (67.13%), while pre-ART was performed in 142 women (32.87%).[17]

A Single Comprehensive Review In 2016, Di Spiezio Sardo et al. assessed the value of diagnostic hysteroscopy for women undergoing IVF and infertile couples. The results contradict our study's hypothesis for subfertile women who want to conceive spontaneously. Little data supports the use of hysteroscopy as a screening method for infertile women in the early stages of diagnosis. Further investigation is required.[18]

El-Toukhy et al. found a substantial increase in clinical pregnancy following hysteroscopy (RR = 1.75, 95% CI 1.51 to 2.03) after combining the data from the randomized and non-randomized studies. According to the authors, correcting intracavitary abnormalities, negotiating the cervical canal to make future embryo transfers easier, or inadvertently hurting the endometrium during a hysteroscopy might all be beneficial. The results align with the latest studies indicating that screening hysteroscopy might be advantageous, especially for women who have had failed IVF cycles.[19]

Furthermore, two-thirds of hysteroscopic findings did not correspond with hysterography findings, according to a previous study published in Kessler & Lancet. Research has shown that a direct hysteroscopic examination did not reveal 54.3% of intrauterine adhesions detected by hysterography.[20]

Furthermore, abnormal hysteroscopic results were discovered in 35.71% (10/28) of the women with secondary infertility, according to Wadhwa et al. [21]

The most common abnormality found in about 12.1% of patients with secondary infertility was intrauterine adhesions. A study conducted in 2014 by Vaid et al. found that 11.91% of patients had intrauterine adhesions due to prior curettage. The investigation revealed that uterine myoma was the prevailing anomaly observed during hysteroscopy.[22]

A recent study by Siddiqui et al. indicated that endometritis affected 3.8% of cases, and cervical stenosis affected 1% of cases of secondary infertility, which contradicts our findings. Uterine synechiae accounted for 14.4% of the causes, while endometrial polyps accounted for 15.4%. Uterine adhesions, or uterine synechiae, were found in fifteen cases of secondary subfertility.[23]

Since Hucke et al. were dubious about which endometrial alterations influenced fertility and which did not and how the underlying hysteroscopic image is clearly defined, they removed synechia from their list of pathological abnormalities. The so-called "strawberry-like pattern" of the endometrium, for example, which is characterized by a more reddish appearance with multiple white spots that represent the endometrial gland openings and is often classified as "endometritis," was not presented because morphological or microbiological testing was unable to establish the presence of endometritis in these patients.[24]

A separate systematic review was carried out by Pundir et al. to evaluate the usefulness of regular hysteroscopy before the first IVF. It included five non-randomized trials and one RCT. After combining the data, the authors found a significantly higher clinical pregnancy rate (RR, 1.44, 95% CI 1.08 to 1.92). The pooled RR for live birth was 1.30 (95% CI 1.00 to 1.67). The authors suggested regular hysteroscopy for women undergoing their first IVF therapy as a step toward improved IVF results. In the subgroup population of women receiving their first IVF, the present research demonstrated no increase in live births or clinical pregnancies after screening hysteroscopy. The difference between the previous study and the US may be due to the inclusion of non-randomized trials, which often overstate the treatment effect; 19 females had abnormal hysteroscope findings, with an NPV of 88% for both hysterography and ultrasonography.[25]

Hysteroscopy did not increase the rate of live births, continuing pregnancies, clinical pregnancies, or lower the risk of miscarriages, according to a 2019 analysis by Saleh et al.[26]

This outcome is consistent with the findings of the previous two extensive randomized controlled trials (RCTs). This endeavour aims to explore the concept of wisdom. An open-label, multicenter trial conducted by Smit et al. Encompassing a cohort of 750 women who were unable to conceive naturally, this study focused on those undergoing their initial cycle of in vitro fertilization (IVF) treatment. Research findings indicate that undergoing a hysteroscopy prior to in vitro fertilization (IVF) did not significantly increase women's likelihood of achieving pregnancy.[27]

The meta-analysis only included one randomized controlled trial (RCT) and four non-randomized trials, totalling 31,779 people. This might increase the possibility of selection bias and, thus, impair the quality of the results Higgins,. However, only RCTs (N = 2636 patients) were included in our pooled analysis since they are clearly the best quality of evidence and, thus, the least likely to be biased.[28]

The most frequent abnormal hysteroscopy findings among the patients under investigation, according to the current study, were cervical stenosis (11.7%), corneal 18 (11.0%), uterine synechia 14 (8.6%), and endometrial fibrosis (7.4%). 38.4% of group 1 and 9.5% of group 2 in the Sharma et al. study had the highest prevalence of grade 4 adhesions. The next most prevalent grades were grade 2 (15.1% in group 1 and 14% in group 2) and grade 3 (15.1% in group 1 and 42.9% in group 2).[29]

Because cervical stenosis obstructs sperm from entering the uterus, it may affect natural fertility. Cervical stenosis can make using in vitro fertilization or intrauterine insemination more difficult or impossible for treating infertility.

Hysteroscopy provides infertile people with a comprehensive, cost-effective diagnostic technique and concomitant therapeutic therapy, claims Gandotra. If surgery is required, it provides a clear picture of the illness and the opportunity to treat it. It also complements the treatment regimen for infertile people. In every patient with secondary infertility, five individuals (16.7%) had uterine septa, endometrial polyps, fibroid, and intrauterine adhesions.[30]

Ultimately, our study found a correlation between the patients' pre-hysteroscopic diagnosis and the hysteroscopy results. The accuracy of the diagnostic hysteroscopy was 85.7 per cent, with a sensitivity of 81.3 per cent and a specificity of

88.5 per cent. Moreover, two out of the 163 cases experienced problems related to hysteroscopy.

Our results were supported by Draz et al. A study revealed that hysteroscopy demonstrated higher sensitivity (100% versus 85%) and accuracy (100% versus 94%) compared to saline infusion sonography. When assessing patients with unexplained infertility, hysteroscopy shows superior performance compared to saline infusion sonography. Hysteroscopy had a negative predictive value of 100% compared to 90% for saline infusion sonography, and both procedures had a positive predictive value of 100%.[31]

4. Conclusion

It is recommended that diagnostic hysteroscopy be done routinely in situations of unexplained secondary infertility, repeated implementation failure and assisted reproduction due to its high accuracy of 85.7 % and extremely minimal risk of complications. The most common finding in secondary infertility was cervical stenosis; the other notable finding was cervical polyp. Uterine adhesions, or synechia, were the lesions most often observed in the uterus. Deformed cavities were the next most common finding. Corunal fibrosis was the second most typical lesion. Moreover, endometrial fibrosis, or synechia, was the most prevalent endometrial lesion in the endometrium. Atrophic lesions and endometrial hyperplasia were the least common and comparable lesions.

Disclosure

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All authors have a substantial contribution to the article

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