Al-Azhar International Medical Journal

Volume 3 | Issue 9 Article 16

9-1-2022

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How to Cite This Article

Nourag, ibrahim; Mohamed, Mohamed; and Elmazzaly, Saged (2022) "Role of Diagnostic Hysteroscopy in Cases with Unexplained Infertility," *Al-Azhar International Medical Journal*: Vol. 3: Iss. 9, Article 16.
DOI: https://doi.org/10.21608/aimj.2022.128782.1882

OPEN AIMJ ORIGINAL ARTICLE

Role of Diagnostic Hysteroscopy in Cases with Unexplained Infertility

Obstetrics & Gynecology

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Received *for publication March 21, 2022;* ***Accepted*** *September 24, 2022;* ***Published online*** *September 24, 2022.*

doi: *10.21608/aimj.2022.128782.1882*

Citation: *Ibrahim M. , Mohamed A. and Saged M. Role of Diagnostic Hysteroscopy in Cases with Unexplained Infertility. AIMJ. 2022; Vol.3-Issue9 : 88-95.*

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ABSTRACT

Background: Infertility is a growing concern of the society. Hysteroscopy has become the gold standard for diagnosis of intrauterine abnormalities. Intrauterine lesions such as adhesions, uterine septum polyps or submucous myomas are diagnosed much more precisely by hysteroscopy and are detectable in 10-15% of women seeking subfertility therapy.

Aim of the work: To assess the role of hysteroscopy in the detection of undiagnosed uterine abnormalities in cases with unexplained infertility.

Patients and methods: This is a cross-sectional study that was carried out at the endoscopy unit in Al-Hussein and Sayed Galal hospitals on 100 women with unexplained infertility over a period of 6 months from January to June 2020.

Results: Hysteroscopy was significant with sensitivity of 97.8% and specificity of 100% while PPV was 100% and NPV was 84.6% with accuracy of 98%.

Conclusion: A hysteroscopy should be performed as being among the standard procedures in the programme of reproductive work-up prior to a final diagnosis of inexplicable infertility being made. Because of the significant enhancement in pregnancy results after the hysteroscopic operation, this approach is not only regarded as the optimal gold standard for finding numerous intrauterine anomalies that are undiscovered with other standard techniques, but it further validates the previously stated recommendation. Furthermore, it is proposed that further research be performed to back up this claim.

Keywords: *Hysteroscopy; infertility; HSG.*

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

Authorship: *All authors have a substantial contribution to the article.*

INTRODUCTION

Following a year or more of regular unprotected sexual contact, infertility is characterized as an incapacity to have children. The American Society for Reproductive Medicine (ASRM) has the most recent definition, which was amended in 2013.

According to current agreement (UI), male factor, anovulation, endometriosis, tubal factor, cervical factor, as well as inexplicable infertility are among the causes of infertility[2]. UI is an exclusionary diagnosis. When fundamental studies such as tubal patency, ovulation, and analysis of semen have all been normal [3], the phrase has traditionally been employed. Furthermore, there are two types of infertility: male infertility and female infertility. Infertility in a woman who has never become pregnant is known as primary infertility. Secondary infertility occurs when a woman is unable to conceive following at least one gestation (whether or not this resulted in a live birth).

Consequently, UI ought to be divided into two categories: unexplained primary infertility and unexplained secondary infertility. The term "unexplained female infertility" must be utilized when the female reproductive system has been tested as per present agreed-upon criteria and no anomalies have been discovered. Given at least two analyses of normal semen and no visible physical or endocrine abnormalities, male factor infertility should've been excluded [4].

Convenient reports denote that the incidence of unexplained infertility ranges between 6 and 30%, and the prevalence varies greatly depending on the diagnostic criteria utilised. It's possible that nations with poor diagnostic resources have a higher frequency of unexplained or undiscovered infertility [5].

Unsuspected intrauterine anomalies detected by hysteroscopy prior to IVF accounted for 11–45 percent of cases [6].

Currently, the standard work-up for evaluating the cavity of the uterus before IVF is transvaginal ultrasonography, perhaps accompanied by saline infusion sonography (SIS), hysterosalpingography (HSG), or hysteroscopy. HSG was found to have poor accuracy in determining the integrity of the cavity of

uterus in infertile individuals [7]. SIS is becoming more widely accepted as a tool for detecting intrauterine disorders. It's a non-invasive, low-cost diagnostic test that's been shown to be extremely precise[7].

More critically, appropriate therapy interventions increased the number of clinical pregnancies in women who had an atypical uterine cavity during hysteroscopy.

Minor intrauterine lesions that may influence fertility can be diagnosed significantly more precisely with hysteroscopy than with HSG or even transvaginal ultrasonography.

In light of the foregoing, we feel that hysteroscopy should be used to assess uterine and endometrial integrity in the population with unexplained infertility.

The study's goal is to assess the role of hysteroscopy in the detection of undiagnosed uterine abnormalities in cases of unexplained infertility.

PATIENTS AND METHODS

The study was conducted as a cross sectional study .The research was performed at the endoscopy unit in Al-Hussein and Sayed Galal hospitals on 100 women with unexplained infertility at a period of 6 months from January to June 2021.

Study population:

A: Inclusion criteria

Age group: The cases included in this study were 100 women in the reproductive age between (20-35 years old).

Unexplained infertility: follicles were monitored by TVS to establish ovulation and serial measures of serum estradiol (E2) and/or mid-luteal progesterone linked to a regular menstrual period throughout a natural (non-therapy) cycle. HSG and pelvic laparoscopy were used to confirm tubal patency. Semen characteristics that satisfied World Health Organization requirements were used to rule out male infertility cases [1].

Fit for surgery

B:Exclusion criteria

The age

Any cases over 35 or less than 20 years old

Explained infertility

Any cases with a known cause of infertility, such as ovulation disorders (as polycystic ovary syndrome), tubal factor (as tubal obstruction), uterine/cervical factor (as uterine anomalies, uterine synechia, polyps or fibroids) endometriosis, endocrinal factors, or male factor, were excluded from the study.

Unfit for surgery.

Interventions:

Transvaginal ultrasound:

All cases were evaluated by transvaginal ultrasound (TVU) (SAMSUNG, SONOACER3) with 5Hz transvaginal probe. TVS was conducted after the cessation of bleeding and prior to diagnostic hysteroscopy during the cycle's late follicular phase (between the 7th and 11th day of the cycle). The patient was instructed to empty the bladder, and then the uterus was examined in the sagittal plane. The double-layer endometrial thickness has been evaluated in the sagittal plane at the broadest point across the endometrial-myometrial interfaces.

Diagnostic hysteroscopy:

A diagnostic hysteroscope has been performed between the seventh and eleventh days of the cycle. The procedure was conducted under anesthesia. Hysteroscopy has been done utilizing a 5-mm outer-diameter continuous flow hysteroscopy (Tekno-Skope medical, Germany) with a 30º direction of view placed transcervically into the uterus with a light source: Xenon, 180 watt manufactured by TEKNO-MEDICAL and camera: CAM 2000S PRO manufactured by TEKNO-MEDICAL.

When the external cervical os was discovered, the scope was passed through the cervical canal which was seen at 6 or 12 o'clock (anteverted or retroverted) respectively.

At a rate of 300 ml/min, normal saline has been given to dilate the uterine cavity for better viewing, with a different amount used for each case (1000-1500 ml).

The intrauterine cavity has been examined by rotating the scope's body 90° (right and left) for the examination of the tubal ostia, and the scope was then retracted to the internal cervical os level in order to get a panoramic view of the uterus. The presence of vaginal septa or cervical septa or adhesions was recorded.

The findings of a hysteroscopic examination were classified as normal, congenital, or acquired uterine anomalies. The arcuate uterus (with a distinct protrusion of the fundus into the cavity of the uterus), septate uterus (with a septum greater than 1cm in height), and the bicornuate uterus were the three types of congenital malformations identified. Acquired anomalies include intrauterine adhesions, endometrial polyps, and submucous myomas.

classification		Score
Extent of cavity involved	<1/3	1
	1/3 –2/3	2
	>2/3	4
Type of adhesion	Filmy	1
	Filmy and dense	2
	Dense	4
Menstrual pattern	Normal	0
	Hypomenorrhea	2
	Amenorrhea	4

Stage 1 (Mild): 1–4

Stage 2 (Moderate): 5–8

Stage 3 (Severe): 9–12

Intrauterine adhesions are classified according to The American Fertility Society classification system for intrauterine adhesions:

As per the European Society of Hysteroscopy, submucous fibroids are divided into three categories: Type 0: are pedunculated and do not expand intramural; type 1: are pedunculated and do not extend intramural; type 2: are peduncul Type I sessiles have less than 50% intramural involvement, while Type II sessiles have more than 50% intramural extension.

Therapeutic hysteroscopy:

Fibroids: The processes through which submucous leiomyomas influence fertility are unknown. Fibroids' ability to interfere with fertility is largely determined by their location. Regardless of the size or existence of symptoms, submucous fibroids interfere with conception and ought to be excised in infertile individuals[8].

Concerning submucous myomas, HSG is less sensitive and specific. In the identification of submucous fibroids, hysteroscopy exhibited great sensitivity, specificity, and accuracy, as well as a good association with histological diagnosis [9].

Intracavitary and submucous myomas that include at least half of their volume inside the uterine cavity are candidates for hysteroscopic myomectomy, according to the ASRM [10]. Following a thorough examination, myomectomy must have been taken into account only in infertile women and those who have had recurrent pregnancy loss.

Hysteroscopic myomectomy is a less invasive, safe, and successful procedure when performed by a skilled surgeon.

Mullerian Anomalies: While HSG is a beneficial screening tool for determining whether a uterine cavity is normal or abnormal, and it has a high sensitivity for detecting uterine abnormalities, it is unable to accurately distinguish between various forms of congenital uterine defects and thus does not allow for proper categorization [11].

In the diagnosis of uterine abnormalities, the combined application of laparoscopic and hysteroscopy is the gold standard [12].

In several countries, hysteroscopic metroplasty is used to enhance reproductive results in women who experience repeated miscarriages and a septated uterus.

Endometrial Polyps: In comparison to diagnosis by hysteroscopy and polyp biopsy alone, hysteroscopic excision of polyps before IUI enhances the chances of clinical pregnancies.

In a cohort of females who had repeated implantation failures following IVF, hysteroscopic polypectomy resulted in a statistically significant improvement in implantation and clinical pregnancy rates.

Ethical considerations:

The study protocol was submitted for approval to the Ethical Committee of AL Azhar University's Faculty of Medicine—Ethical Committee of the Obstetrics and Gynecology Department. After an explanation of the purpose and procedures of the study, informed verbal and written consent were obtained from every patient participating in the study. Confidentiality and personal privacy were respected at all levels of the study.

Statistical Analysis

SPSS 22.0 for Windows was used to gather, tabulate, and statistically analyse all of the data (SPSS Inc., Chicago, IL, USA).

The Shapiro Walk test has been employed to see if the data has a normal distribution. Frequencies and relative percentages were used to depict qualitative data. The difference between qualitative variables was calculated employing the Chi-Square test (2) and Fisher exact as specified. For parametric data, mean SD (standard deviation) was used, and for non-parametric data, median and range were used.

All statistical comparisons were done with a two-tailed significance level. A significant difference is defined by a P-value of less than 0.05. P 0.001 shows a highly significant difference, and P > 0.05 shows no difference.

RESULTS

		Patients (n=100)
Age (years) **Mean ± SD** **Range**		28.63 ± 5.12 20 – 35
BMI (kg/m^2) **Mean ± SD** **Range**		27.54 ± 3.65 22 – 32
Residence	Urban	60 (43.5%)
	Rural	78 (56.5%)

Table 1: Demographic characteristics among studied patients

This table shows that patients' age ranged 20 – 40 years with mean BMI 27.54 kg/m2. Majority of the patients were rural.

	Patients (n=100)
Infertility duration (years) **Mean ± SD** **Range**	6.74 ± 4.35 1 – 14

Type	Primary	68 (68%)
	Secondary	32 (32%)

Table 2: Clinical characteristics among studied patients

This table shows that infertility duration ranged 1 – 14 years. Majority of the patients were primary type of infertility.

	Patients (n=100)	
	N	%
Normal	11	11%
Abnormal	89	89%

Table 3: Hysteroscopy findings among studied patients

Abnormality hysteroscopy was found in 89% of the studied patients.

	Patients (n=100)	
	N	%
Cervix		
Cervicitis	2	2
Cervical stenosis	1	1
Cervical polyp	4	4
Uterine		
Septum	3	3
Arcuate uterus	2	2
Unicornuate uterus	2	2
Bicornuate uterus	1	1
Endometrial		
Endometritis	13	13
Intrauterine Synechia	8	8
Endometrial polyp	30	30
Submucous myoma	9	9
Hyperplastic	14	14

Table 4: Abnormal hysteroscopy findings among studied patients

TVS	Hysteroscopy		Total	p
	Abnormal	Normal		
Abnormal	87 (97.8%)	0	87 (87%)	<0.001
Normal	2 (2.2%)	11 (100%)	13 (13%)	
Total	89 (100%)	11 (100%)	100	

Table 5: Diagnosis role of hysteroscopy among the studied patients

Statistic	Value	95% CI
Sensitivity	97.75%	92.12% - 99.73%
Specificity	100%	71.51% - 100%
Positive Predictive Value	100%	--
Negative Predictive Value	84.62%	58.28% - 95.59%
Accuracy	98%	92.96% - 99.76%

Table 6: This table shows that hysteroscopy was significant with sensitivity of 97.8% and specificity of 100% while PPV was 100% and NPV was 84.6% with accuracy of 98%.

DISCUSSION

After a year of unprotected regular intercourse, infertility is described as the inability to conceive. It affects about ten to fifteen percent of marriages. The most common causes of infertility are male factor (30–40%), uterine factor (15–20%), ovulatory disorders (30–40%), and tuboperitoneal illness (40–50%). Hysteroscopy is a great diagnostic tool for detecting concealed pathology in people who have no obvious symptoms. Even after a normal HSG, laparoscopy can reveal the existence of peritubal adhesions, periadnexal adhesions, tubal pathology, and endometriosis in 35–68% of patients. [15].

Infertility is a problem that many physicians encounter on a daily basis. Only a few people are able to conceive with only diagnostic methods; others, despite extensive investigations and treatment, are unable to conceive. Cervical, uterine, tubal, and ovulatory variables are all evaluated in the early stages of female infertility. Historically, hysterosalpingography was used to assess the uterine cavity (HSG). Nevertheless, for direct visualization of the cavity of the uterus, hysteroscopy is becoming more popular, and many researchers believe it is preferable to HSG [14].

Unexplained infertility affects about 15% of people who are experiencing infertility. The diagnosis tests to be conducted, their predictive usefulness, and the

normalcy criteria are not agreed upon by infertility specialists. The basic diagnostics for diagnosing unexplained infertility are reported to be levels of serum progesterone for identifying ovulation, HSG and/or laparoscopic for tubal patency, and analysis of semen [16].

In contrast to the other indirect and purely diagnostic techniques, such as transvaginal sonography (TVS), hysterosalpingography (HSG), and saline infusion/gel instillation sonography (SIS/GIS), hysteroscopy is currently the gold standard approach for uterine factor assessment since it allows direct visualization of the cavity of the uterus and its related clinical diseases, and also therapy of any diagnosed aberration. Nonetheless, there is no agreement on the effectiveness and efficiency of hysteroscopy as a standard treatment in the infertility work-up or on its effectiveness and efficiency in enhancing infertile couples' prognosis [17].

Because the usefulness of hysteroscopy in enhancing reproductive outcome has not been shown, the NICE recommendations on fertility evaluation and treatment advise that, unless clinically warranted, women ought not to be provided hysteroscopy as a portion of the first inquiry [18].

Hysteroscopy involves a rapid, painless, and well-tolerated procedure that allows direct visibility of the cervical canal and cavity of the uterus, allowing any abnormality's form and vascular patterns to be observed [19].

It is a first-line diagnostic technique for uterine anomalies in individuals who have abnormal uterine hemorrhage and/or infertility because it can be done in the office. Furthermore, the hysteroscopic method allows for the collection of endometrial/myometrial samples under visual supervision [20].

The main goal of this research was to assess the role of hysteroscopy in the detection of undiagnosed uterine abnormalities in cases with unexplained infertility.

The study was a cross sectional study. The research was conducted at the endoscopy unit in Al-Hussein and Sayed Galal hospitals on 100 women with unexplained infertility at a period of 6 months from January to June 2021.

The following were the study's major findings:

Regarding the demographic data of the studied group, we revealed that patients' mean (range) age was 28.63 ± 5.12 (20 – 40) years with mean BMI 27.54 ± 3.65 kg/m2. The patients were mostly from rural areas. And the infertility mean duration was 6.74 ± 4.35(1 – 14) years. Majority of the patients were primary type of infertility (68%).

In a study by Gammo 21, the pregnancy outcomes following hysteroscopy in patients experiencing unexplained infertility were investigated. They enrolled 200 infertile women who had been identified with unexplained infertility earlier. They were divided into 2 groups: A. the study group of 100 infertile females who had been shortlisted for the hysteroscopic surgery under study with a mean age 25±5 years and a mean BMI 24±3.6 and B. the control group of 100 females having unexplained infertility who were followed up on but did not get the recommended hysteroscopic procedure with a mean age 26±3 years and a mean BMI 23±1.7. Thy also reported that the mean infertility duration of the cases and control groups were 2 + 2.1 and 2.1 + 1.3 years respectively and the majority of the patients of cases and control groups were primary type of infertility (70% and 75% respectively).

As well, the study by Al-Bromboly et al. [15] investigated the role of hysterolaparoscopy in the assessment and treatment of infertility in women. They divided the studied groups into primary and secondary types of infertility. They found no significant differences between the studied groups regarding age, they also, revealed that there were 42.7% of primary infertility and 59.5% of secondary infertility cases.

An observational cross-sectional study by Gad et al., 2019 investigated the role of hysteroscopy and laparoscopy in the assessment of unexplained infertility in 200 women aged 20–40 years old, of whom 116 (58%) experienced primary infertility and 84 (42%) experienced secondary infertility.

The study by Sharma et al., 2017 performed a retrospective study of hysterolaparoscopy results of unexplained infertility cases in a tertiary care hospital. The study included 130 patients, with 82 patients (63.07%) having primary infertility and 48 patients (36.92%) having secondary infertility. The majority the patients (80, 61.5%) were between the ages of 26 and 30. Ten cases (7.7%) were between the ages of 20 and 25, 32 (24.6%) were between the ages of 31 and 35, and eight (6.1%) were between the ages of 36 and 40.

In addition, Makled et al. [14] evaluated the effects of hysteroscopy and endometrium biopsy in women who were infertile for no apparent reason. The study included 100 women with infertility. Participants ranged in age from 18 to 45 years old, with an average age of 30.77 4.82 years. With a range of 18.5–33.5 kg/m2, the average BMI was 27.7 3.51 kg/m2. Parity was 0.88 0.38 on average (range 0–2). Forty women (40%) experienced primary infertility, while 60 women experienced subsequent infertility. Infertility lasted anywhere from two to ten years.

Regarding Hysteroscopy findings among studied patients, the present results revealed that abnormality hysteroscopy was found in 89% of the studied patients.

Our study was supported by the findings by Al-Bromboly, et al. [15] as they revealed that abnormality hysteroscopy was found in 72.5 % and 71.5 of the primary and secondary type of infertility patients respectively.

Also, the study by Makled et al. [14] reported that no hysteroscopic abnormality was discovered in 14% of the women who had unexplained infertility.

In contrast with our findings the study by Gammo [21] they found that 70 (70%) of the women with unexplained infertility have normal hysteroscopic findings.

As well the study by Gad et al. [19] revealed that 64.3% of the women with unexplained infertility have normal hysteroscopic findings, with 58.3% and 72.0% of the primary and secondary type of infertility patients respectively.

Also, the study by Sharma et al. [20] reported that 77.7% of the women with unexplained infertility have normal hysteroscopic findings.

Also, in disagreement with our findings, the study by Zargar et al. [22] reported that 33 cases (61.2%) showed normal hysteroscopic results and 21 cases (38.8%) showed abnormal hysteroscopic results out of 54 women experiencing unexplained infertility.

Furthermore, Kabadi & Harsha [23] reported 52% abnormal laparoscopic findings and 31% abnormal hysteroscopy, Ramesh & Kurkuri [24] reported higher incidence of approximately 75% abnormal hysterolaparoscopy findings, Vaid et al., [25] reported 62% abnormal laparoscopy and 32% abnormal hysteroscopy findings, and Nigam and colleagues found similar laparoscopic abnormalities and less rate of hysteroscopic ones (13%). Nayak et al. [26] found also lower results of approximately 33% abnormal laparoscopy and 20% abnormal hysteroscopy findings.

Regarding abnormal hysteroscopy findings among studied patients, we found that the majority of women have endometrial polyp (30%), then 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%).

The study by Gammo, [21] revealed the following anomalies: atypical polypoid adenomyoma of the endometrial in three patients (3%), and intrauterine adhesion (IUA) synechiae in three patients (3% of all hysteroscopies). Uterus bicornis was found in a patient (1% of all hysteroscopies), submucousmyoma was found in 3 cases (3% of all hysteroscopies), and in 20 patients, there were endometrial polyps (20% of all hysteroscopies).

And also, the study by Al-Bromboly, et al. [15] reported that showed that the commonest reported hysteroscopic abnormality in cases of primary infertility was intrauterine septum, and the commonest reported hysteroscopic abnormality in cases of secondary infertility was intrauterine synechia.

In addition, the study by Gad et al. [19] reported that among the abnormal laparoscopic findings, pelvic adhesions and endometriosis were the most noted (41 and 30%, respectively).

Also, the study by Sharma et al., 2017 reported that hysteroscopic anomalies showed myoma and polyp in 10 (7.7%) of the women with unexplained infertility, as well as synechiae in 5 (3.8%) of the women.

Makled et al. [14] reported also that 7 (7%) had intrauterine synechiae, 6 (6%) had submucous myomas, 15 (15%) had endometrial hyperplasia, 14 (14%) had endometritis, and 31 (31%) patients had endometrial polyps (total 73 patients = endometrial anomalies group); 6 (7%) had cervical stenosis (no anomalies group); and 7 (7%) had congenital uterine anomalies (uterine anomalies group).

Regarding the diagnosis role of hysteroscopy among the studied patients, we found that 87% have Abnormal TVS and 89% have abnormal hysteroscopy, there was highly significant difference between the abnormal and normal Hysteroscopy regarding the TVS findings.

Using the area under the ROC curve, we found that hysteroscopy was significant with a sensitivity of 97.8% and specificity of 100%, a PPV of 100%, an NPV of 84.6%, and an accuracy of 98%.

Our results were supported by the findings by Garuti et al. [27] who reported that hysteroscopy has a good diagnostic accuracy for the detection of endometrial polyps (95.3 percent sensitivity, 95.4 percent specificity, 98.9 percent NPV, and 81.7 percent PPV).

While Makled et al. [14] reported that in 31 (31%) of the infertile individuals, diagnostic hysteroscopy revealed endometrial polyps, only 18 (18%) of those patients were appropriately detected by TVS. Seven of the individuals that were overlooked exhibited hyperplasia, while the other six had no abnormalities. The NPV was 84.1 percent, indicating that endometrial polyps were discovered by hysteroscopy in 15.9% of people who had TVS-negative results. The PPV, on the other hand, was 100 percent, meaning that all patients who had endometrial polyps by TVS also had endometrial polyps by hysteroscopy. As a result, while TVS is an excellent positive testing, it cannot be employed on its own to exclude out endometrial polyps.

Makled et al. [14] also reported that the NPV was 71.1 percent, indicating that 28.9% of individuals who'd been endometrial negative via hysteroscopy had endometrial polyps. The PPV, on the other hand, was 100%, meaning that all individuals identified with endometrial polyps via EB had an endometrial polyp found via hysteroscopy. The NPV was 100 percent, which means that none of the people who had a negative hysteroscopic result had endometrial hyperplasia when histological examinations were done. Furthermore, the PPV was 93.3 percent (meaning that every woman with hysteroscope-based hyperplasia has a 74.2 percent chance of developing endometrial hyperplasia via EB). The NPV was 98.8%, meaning that EB detected endometritis in 1.2 percent of hysteroscopy-negative individuals. The PPV, on the other hand, was 100 percent (That is, all women who had endometritis via hysteroscopy also had endometritis via EB).

Hauge et al. [28] found that the results of hysteroscopy and TVS were identical in 90.9 percent of patients. Oliveira et al. [29] discovered a link between IVF and ET failure and previously undetected intrauterine anomalies.

Our findings were backed up by those of Draz et al. [30] who found that hysteroscopy was more sensitive (100 versus 85%), had the same specificity (100 versus 100%), and was more accurate (100 versus

94%) than saline infusion sonography. During the evaluation of individuals with unexplained infertility, hysteroscopy had a better predictive value (100 versus 100 percent PPV, 100 versus 90 percent NPV) than saline infusion sonography (100 vs. 90 percent negative predictive value).

In contrast to our findings, Zargar et al. [22] found that hysterographic and sonographic sensitivities were 48.9% and 48 percent, respectively, while false negative rates were 51.1 percent and 52 percent. As a result, sonography and hysterography were insufficient for evaluating the uterine cavity.

Furthermore, Preutthipan & Linasmita [31] conducted a prospective comparison research of hysterosalpingography and hysteroscopy in the identification of intrauterine disease in infertile women and found that HSG had a sensitivity of 98.0 percent but only 34.6 percent specificity. In this study, HSG had a high sensitivity but a poor specificity rate when it came to detecting intrauterine abnormalities. As a result, while HSG is a helpful screening test for intrauterine lesions because it shows the filling defects, the filling defects obtained by HSG are non-specific. Only hysteroscopy was able to accurately reveal the nature of the intrauterine filling abnormalities. When an HSG reveals any lesions, hysteroscopy is recommended to confirm the lesions' location and extent.

Failure to complete the surgery, cervical laceration, uterine perforation, infection, haemorrhage, anesthesia-related issues, and a very rare syndrome called carbon dioxide embolism are all possible risks of diagnostic hysteroscopy. There were no procedure failures or significant complications among our 336 patients 31 in this study. Three RCTs revealed no problems [34,35,36]; four trials quantified adverse events [32,33].

CONCLUSION

Before a final diagnosis of unexplained infertility, a hysteroscopy must be scheduled as one of the standard measures in the reproductive work-up programme. Because of the significant enhancement in pregnancy outcomes after the hysteroscopic operation, this method is deemed not only an optimal gold standard for finding numerous intrauterine problems that are undetected with other standard techniques, but it also supports the previously mentioned recommendation. In addition, it is suggested that future study be conducted to back up this statement.

Conflict of interest : none

REFERENCES

1. Zegers-Hochschild, Fernando, G, David Adamson, Jacques de Mouzon, Osamu Ishihara, Ragaa Mansour, Karl Nygren, Elisabeth Sullivan, and Sheryl Van der Poel. "The international committee for monitoring assisted reproductive technology (ICMART) and the world health organization (WHO) revised glossary on ART terminology. *Human Reproduction*. 2009;dep343.
3. Crosignani, P.G., Collins, J., Cooke, I.D., Diczfalusy, E., Rubin, B, Recommendations of the ESHRE workshop on 'Unexplained Infertility'. Anacapri. *Hum Reprod*. 1992;Jun;8(6):977–80.
2. NICE clinical guideline 156, Fertility assessment and treatment for people with fertility problems, February 2013. Available: guidance. 2014; nice.org.uk/cg156. Accessed 20 May.
4. Hamada, A., Esteves, S.C., Agarwal, A, The role of contemporary andrology in unraveling the mystery of unexplained male infertility. *Open Reprod Sci J*. 2011; 4:27–41.
5. Cates, W., Farley, TM., Rowe, P.J, Worldwide patterns of infertility: is Africa different? *Lancet*. 1985;2:596–8.
6. Fatemi, HM., Kasius J.C., Timmermans, A, Prevalence of unsuspected uterine cavity abnormalities diagnosed by office hysteroscopy prior to in vitro fertilization. *Hum Reprod*. 2010; 25:1959–65
7. Ludwin, A., Ludwin, I., Banas, T., Knafel, A., Miedzyblocki, M., & Basta, A, Diagnostic accuracy of sonohysterography, hysterosalpingography and diagnostic hysteroscopy in diagnosis of arcuate, septate and bicornuate uterus. *Journal of Obstetrics and Gynaecology Research*. 2011; 37(3), 178-86.
8. Taylor E and Gomel V, "The uterus and fertility," *Fertility and Sterility*. 2008; 89(1): 1–16.
9. Filogônio S, de Ávila I, Gouvea P and Carneiro M, "Accuracy of hysteroscopic view in the diagnosis of intrauterine pathology: a Brazilian experience," *Journal of Gynecologic Surgery*. 2010; 26(1): 23–30.
10. Practice Committee of the American Society for Reproductive Medicine (ASRM), Endometriosis and Infertility. *Fertil Steril*. 2006; 14:S156–60.
11. Benkaddour Y, Gervaise A and Fernandez H, "Which is the method of choice for evaluating uterine cavity in infertility workup?" *Journal de Gynecologie Obstetrique et Biologie de la Reproduction*. 2010; 39(8): 606–13.
12. Saravelos S, Cocksedge K and Li T, "Prevalence and diagnosis of congenital uterine anomalies in women with reproductive failure: a critical appraisal," *Human Reproduction Update*. 2008; 14(5): 415–29.
13. Fergusson, R. J., Rodriguez, M. B., Lethaby, A., & Farquhar, C, Endometrial resection and ablation versus hysterectomy for heavy menstrual bleeding. *Cochrane Database of Systematic Reviews*. 2019; (8).
14. Makled, A. K., Farghali, M. M., & Shenouda, D. S,.Role of hysteroscopy and endometrial biopsy in women with unexplained infertility. *Archives of gynecology and obstetrics.* 2014; 289(1), 187-92.
15. Al-Bromboly, W. H., Abdel-Dayem, H. M., Abdel-Rahman, A. A., & Gamal El-Din, B. R. A, Role of Hysterolaparoscopy in The Evaluation and

Management of Female Infertility. *The Egyptian Journal of Hospital Medicine*. 2020; 81(5), 1931-6.

16. Abdelazim IA, Elezz AA, Complementary roles of hysteroscopy and saline infusion hysterosonography in uterine cavity assessment before in vitro fertilization. *Asian Pac J Reprod* . 2012; 1(1):13–6

17. Di Spiezio Sardo, A., Di Carlo, C., Minozzi, S., Spinelli, M., Pistotti, V., Alviggi, C., ...& Bifulco, G, Efficacy of hysteroscopy in improving reproductive outcomes of infertile couples: a systematic review and meta-analysis. *Human reproduction update*. 2016; 22(4), 479-96.

18. NICE. Fertility: Assessment and Treatment for People with Fertility Problems. *National Institute for Health and Clinical Excellence*. 2013; Available at: http://guidance.nice.org.uk/CG156.

19. Gad, M. S., Dawood, R. M., Antar, M. S., & Ali, S. E, Role of hysteroscopy and laparoscopy in evaluation of unexplained infertility. *Menoufia Medical Journal.* 2019; 32(4), 1401.

20. Sharma, N., Singh, A., Radhakrishnan, G., Aggarwal, R., & Radhika, A. G, A Retrospective Analysis of Hysterolaparoscopy findings of Unexplained infertility patients in a Tertiary Care Hospital. *International Journal of Scientific Study*. 2017; 5(1), 27-9.

21. Gammo, R, 2021; Pregnancy outcome after hysteroscopy in women with unexplained infertility.

22. Zargar, M., Masihi, S., Borzou, L., Cheraghian, B., & Javadi, S, Office hysteroscopy in infertility. *Infertility*. 2009; 215-8.

23. Kabadi, Y. M., & Harsha, B, Hysterolaparoscopy in the evaluation and management of female infertility. *The Journal of Obstetrics and Gynecology of India*. 2016; 66(1), 478-81.

24. Ramesh, B., & Kurkuri, S, Role of combined hystero-laparoscopy in the evaluation of female infertility as one step procedure. *Int J Reprod Contracept Obstet Gynecol*. 2016; 5, 396-401.

25. Vaid, K., Mehra, S., Verma, M., Jain, S., Sharma, A., & Bhaskaran, S, Pan endoscopic approach "hysterolaparoscopy" as an initial procedure in selected infertile women. *Journal of clinical and diagnostic research.* 2014; JCDR, 8(2), 95.

26. Nayak, P. K., Mahapatra, P. C., Mallick, J. J., Swain, S., Mitra, S., & Sahoo, J, Role of diagnostic hysterolaparoscopy in the evaluation of infertility: A retrospective study of 300 patients. *Journal of human reproductive sciences.* 2013; 6(1), 32.

27. Garuti, G., Sambruni, I., Colonnelli, M., & Luerti, M, Accuracy of hysteroscopy in predicting histopathology of endometrium in 1500 women. *The Journal of the American Association of Gynecologic Laparoscopists.* 2001; 8(2), 207-13.

29. Oliveira, F. G., Abdelmassih, V. G., Diamond, M. P., Dozortsev, D., Nagy, Z. P., & Abdelmassih, R, Uterine cavity findings and hysteroscopic interventions in patients undergoing in vitro fertilization–embryo transfer who repeatedly cannot conceive. *Fertility and sterility*. 2003; 80(6), 1371-5.

30. Draz, M. H., El-Sabaa, T. M., & El Shorbagy, S. H, Saline infusion sonography versus hysteroscopy in the evaluation of uterine cavity in women with unexplained infertility.*Tanta Medical Journal*. 2017; 45(3), 155.

31. Preutthipan, S., & Linasmita, V, A prospective comparative study between hysterosalpingography and hysteroscopy in the detection of intrauterine pathology in patients with infertility. *Journal of Obstetrics and Gynaecology Research*. 2003; 29(1), 33-7.

32. Elsetohy, K. A. A. A., Askalany, A. H., Hassan, M., & Dawood, Z, Routine office hysteroscopy prior to ICSI vs. ICSI alone in patients with normal transvaginal ultrasound: a randomized controlled trial. *Archives of gynecology and obstetrics*. 2015; 291(1), 193-9.

33. El-Toukhy, T., Campo, R., Khalaf, Y., Tabanelli, C., Gianaroli, L., Gordts, S. S., ...& Coomarasamy, A, Hysteroscopy in recurrent in-vitro fertilisation failure (TROPHY): a multicentre, randomised controlled trial. *The lancet*.2016; 387(10038), 2614-21.

35. Smit, J. G., Kasius, J. C., Eijkemans, M. J., Koks, C. A., Van Golde, R., Nap, A. W., ... & Torrance, H. L, Hysteroscopy before in-vitro fertilisation (inSIGHT): a multicentre, randomised controlled trial. *The Lancet.* 2016; 387(10038), 2622-9.

36. Kamath, M. S., Rikken, J. F., & Bosteels, J, Does Laparoscopy and Hysteroscopy Have a Place in the Diagnosis of Unexplained Infertility?.In Seminars in Reproductive Medicine.*Thieme Medical Publishers*. 2020.