

Opportunities of Endovisual Diagnostic Tools in the Management of Women with Secondary Infertility

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Abstract Infertility is the absence of pregnancy in a woman with regular unprotected intercourse for at least one year and today is not only a medical, but also a social problem. According to the literature data, infertility is the third most common reason for women seeking gynecological care and is observed in 186 million people worldwide. According to various authors, 10-15% of married couples suffer from infertility, 40-45% of which are due to the female factor. At the same time, the most common causes of infertility in women are tubo-peritoneal (40-50%), ovulatory dysfunction (30-40%) and uterine factors (15-20%). **Aim of the study.** Assessment of the role of endovisual diagnostic and treatment methods in the management of women with secondary infertility. **Material and methods of the study.** The study describes the results of examination and treatment of 35 women with secondary infertility. **Results of the study:** Of the 35 women, 19 (54.3%) had a normal hysteroscopic findings. They immediately underwent laparoscopy with chromopertubation during which in 32% cases endometriosis (pelvic adhesions), in 26% cases periadnexal adhesions and in 42% of cases peritubal adhesions were found. All of them underwent simultaneous adhesiolysis surgery. In 16 (45.7%) women out of 35, during diagnostic hysteroscopy, pathologies such as a foreign body of the uterine cavity, intrauterine synechiae, endometrial polyps, submucous uterine fibroids, and isthmocele (uterine niche) were identified and simultaneous hysteroscopic treatment was performed. **Conclusions:** Thus, we can conclude that today the proposed standard methods for diagnosing infertility such as hysterosalpingography and ultrasound are not always fully informative. Hysterolaparoscopy is the most acceptable method for diagnosing infertility. Moreover, these diagnostic methods make it possible to identify so-called “small forms” of lesions such as endometrial polyps, intrauterine synechiae, etc. In addition, the great advantage of this method is the possibility of simultaneous treatment with evaluation of the results ad oculus.

Keywords Hysteroscopy, Laparoscopy, Secondary infertility

1. Introduction

Infertility is the inability to conceive after regular unprotected intercourse for at least one year and today is not only a medical, but also a social problem. It can be subdivided into *primary infertility*, with no prior pregnancies, occurring with a frequency of 57.5% and *secondary infertility*, referring to infertility following at least one prior conception, accounting remaining 42.5% of cases [1]. According to Inhorn M.C. et al. (2015) infertility is the third most common reason for women seeking gynecological care and is observed in 186 million people worldwide [3]. According to various authors, infertility affects 10-15% of married couples, 40-45% of which are due to the female factor [15,20]. At the same time, the most common causes in women are tubo-peritoneal (40-50%), ovulatory dysfunction (30-40%) and uterine factors (15-20%) [6].

Today, practice shows that the proposed routine and non-invasive methods for investigation of infertility such as

ultrasonography, MRT, CT, hysterosalpingography despite having some advantages, do not always satisfy the needs of doctors. These first-line diagnostic tools quite accurately determine the presence of “large lesions” of the uterus, but cannot always determine the presence of so-called “small lesions” such as polyps, synechiae and small myomatous nodules. These pathologies are better visualized using hysteroscopy in an enlarged image. During laparoscopy, in 35-68% of cases, it is possible to detect the presence of tubal pathology, endometriosis, peritubal and periadnexal adhesions, even with normal hysterosalpingogram findings [5]. At the same time, the so-called “small lesions” of the uterine cavity contribute to the disorders of the receptive properties of the endometrium and, as a result, lead to the development of infertility. Therefore, recently endovisual research methods in the diagnosis of infertility have become increasingly popular among clinicians.

The advantages of ultrasound and hysterosalpingography are their non-invasiveness, relative cheapness, and they do not require high-tech equipment and highly qualified specialists. Therefore, they still remain the most widely used diagnostic methods of infertility.

2. Aim of the Study

To evaluate the role of endovisual research and treatment methods in the management of women with secondary infertility.

3. Material and Methods of Research

We investigated 35 women of reproductive age who applied to the department of gynecology of the Samarkand Regional Multidisciplinary Medical Center in 2022 -2023. The inclusion criteria for patients were: 1) secondary infertility 2) normal hormonal profile 3) normal semen characteristics of the husband (spermogram) 4) normal ovarian reserve 5) normal hysterosalpingography findings 6) no contraindications to hysterolaparoscopy 7) reproductive age (18- 40 years).

After a complete examination and the absence of contraindications, the essence of the procedure was explained to the patients (and their spouses). In particular, patients were given detailed information that diagnostic hysteroscopy and laparoscopy would be performed simultaneously. If an intrauterine pathology is detected, diagnostic hysteroscopy will switch to therapeutic. If there are no changes on hysteroscopy, diagnostic laparoscopy will be performed simultaneously, with transition to therapeutic laparoscopy when pathology is detected. For all this, we received informed written consent with accentuation of all peculiarities of the surgical intervention.

The operation was performed in the early follicular phase of the menstrual cycle under general anesthesia.

4. Results and Discussion

The average age of respondents and the average duration of infertility were 27.8 ± 8 and 5.3 ± 3.6 years, respectively. Of the 35 women with secondary infertility, 20 had a history of cesarean section.

Table 1. General characteristics of the examined women

No.	Indicators	Number	%
1	Age > 25 years	23	65.7
2	Age < 25 years	12	34.3
3	Duration of infertility > 5 years	9	25.7
4	Duration of infertility < 5 years	26	74.3
5	History of cesarean section	20	57.1
6	Vaginal birth	15	42.9
7	History of abortion and uterine curettage	22	62.8

Of the 35 women under investigation 19 (54.3%) had a normal hysteroscopic findings. In these women, the normal hysteroscopic findings were smooth and preserved relief of the walls of the endocervix; normal size and triangular shape of the uterine cavity, the walls of which had an even relief

without deformations; the endometrium was less expressed with a pale pink color and corresponded to the phase of the menstrual cycle, did not have a pronounced vascular pattern; the ostia of the fallopian tubes were accessible for inspection on both sides and were free. These women simultaneously underwent diagnostic laparoscopy with chromopertubation.

Diagnostic hysteroscopy is one of the widely used procedure for diagnosing infertility. In 16 (45.7%) women out of 35, various intrauterine pathologies were detected during diagnostic hysteroscopy (Table 1). According to various authors, in approximately 15% of infertile couples the cause of infertility is intrauterine pathology. Moreover, in almost 50% of women, during a diagnostic investigation, one or another pathology of the uterine cavity is detected [8,10,15]. Our data hardly differed from the literature data, 45.7% and 50%, respectively.

In 5 women with foreign bodies of the uterine cavity, during diagnostic hysteroscopy, ligatures of the uterine cavity were detected in the lower segment in the area of the suspected scar after cesarean section. The ligatures were removed by using hysteroscopic scissors (cold scissors). An interesting fact is that all these women underwent a caesarean section between 2016-2018 in different maternity hospitals of Samarkand region. Apparently, during this period, a long-absorbable synthetic suture – “Kaproag”, was widely used for suturing the uterus. Currently, in the literature cases of foreign bodies in the uterine cavity as a factor of abnormal uterine bleeding and infertility had been described. In these cases, non-absorbable suture material was used to suture the myometrium (after myomectomy) [11]. According to these authors, the causes of infertility in these cases are a local inflammatory process that disrupts the implantation of a fertilized egg.

In 4 women mild and moderate intrauterine synechiae (Asherman syndrome) of varying extent were detected. For these women, adhesions were dissected using hysteroscopic scissors (cold scissors). All of these women had the history of several medical abortions. In three of these women, abortions were complicated by post-abortion infection.

It is believed that intrauterine synechiae are formed as a result of post-traumatic or post-infectious damage of the endometrium, which contribute to the development of endometrial scars and obliteration of the uterine cavity. All this is caused by vigorous intrauterine manipulations (curettage of the uterine cavity, etc.) complicated by infection.

According to various literature data in 16.7-41% of cases of infertility is associated with intrauterine synechiae [2,9,12,14].

Nowadays, hysteroscopy is the only method for diagnosing so-called “small lesions” of the endometrium such as a polyp, due to its ability to permit the direct visualization of the endocervical canal, uterine cavity, endometrium, and tubal ostia as well as to enlarge the picture several times. In our study, we diagnosed endometrial polyps in 4 cases. All of them underwent hysteroscopic resection of the polyps.

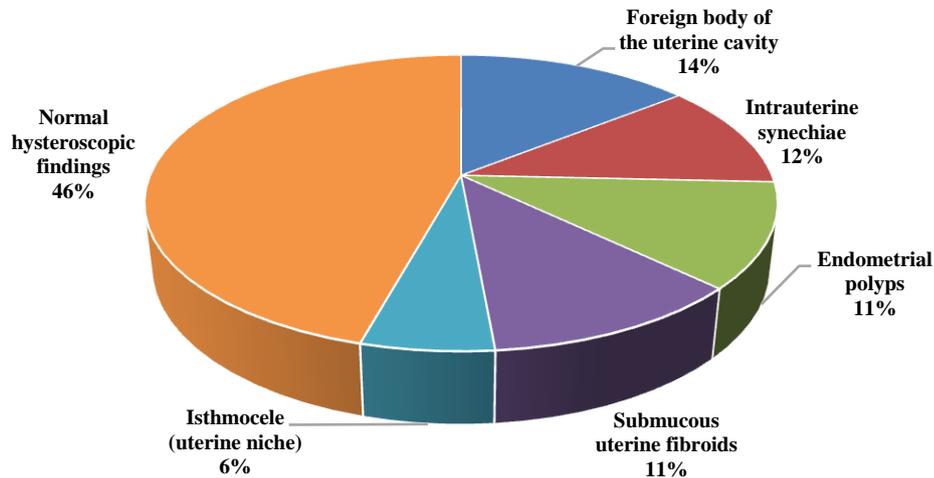


Figure 1. Pathological findings during hysteroscopy

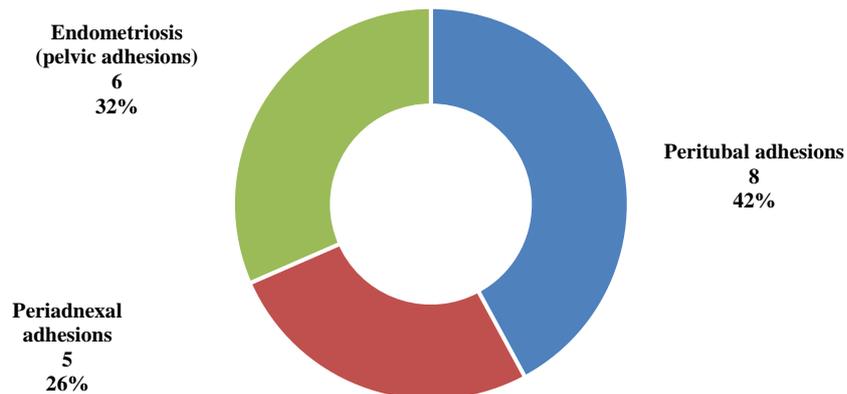


Figure 2. Pathologies identified during laparoscopy

A literature search revealed that 68.4% cases of infertility are related with the presence of polyps. Moreover, various authors believe that in 9.76-20% of cases the direct cause of female infertility is polyps [4,14,19]. According to them the presence of polyps prevents the implantation of the zygote by impairing the receptivity of the endometrium. This theory has been proven by numerous studies such as meta-analysis and systematic reviews, where after polypectomy the pregnancy rate increased 4 times [21].

In 2 women with isthmocele simultaneous laparoscopic excision of isthmocele with subsequent approximation of wound edges with vicryl sutures.

In recent decades, the increase in the number of cesarean sections has undoubtedly led to an increase in iatrogenic complications of this operation. These complications include placenta accreta syndrome, scar pregnancy and a relatively new complication that is increasingly being described in the literature - isthmocele. Isthmocele is a consequence of defective wound healing on the uterus in which the scar takes the form of a sac - a niche. One of the complications of the niche is secondary infertility.

Literature data points that, isthmocele complicates up to 70% of all cesarean sections, 30% of which are symptomatic [16]. Various authors believe that a possible cause of secondary infertility in isthmocele is chronic inflammation due to the accumulation of blood in the niche, which disrupts sperm migration and implantation processes, as with hydrosalpinx [17,18].

In 4 patients submucous uterine fibroids were diagnosed and hysteroscopic myomectomy was performed.

Submucous uterine fibroids account for 5-10% of all uterine fibroids and are associated with a decrease in the reproductive potential of women, such as secondary infertility and recurrent miscarriage [13]. Today it is believed that the presence of submucosal myomatous nodes, disrupting the surface anatomy of the endometrium, can lower implantation ability of the zygote as well as lead to miscarriage.

Recent literatures show that, there is currently no reliable data on the benefits of myomectomy for pregnancy. Metwally et al. (2020) who analyzed all available systematic reviews and meta-analyses concluded that this issue deserves further study [7].

In 19 women with a normal hysteroscopic findings, diagnostic laparoscopy was simultaneously performed, during which various pathologies were identified (Figure 2).

In 8 out of 19 patients, during laparoscopy, peritubal adhesions were detected that blocked access to the tubal fimbriae, and in 5 patients periadnexal adhesions that blocked access to the ovaries were found. All of them underwent peritubal and periadnexal adhesiolysis followed by chromopertubation. Tubal patency was restored in all patients.

Several studies show that about 30% of cases of infertility are caused by tubal pathology, of which peritubal adhesions account 12% and hydrosalpinx 7%. The main causes of the development of peritubal adhesions are endometriosis and infectious processes (chlamydia, gonorrhea). Up to now, the main two causes of infertility are considered to be endometriosis and pelvic inflammatory processes which according to various authors, account up to 90% of all cases [1,6].

In addition, postpartum inflammatory processes can also lead to the formation of adhesions in the pelvis. Thus, of the 19 women who underwent diagnostic laparoscopy, 9 had a history of cesarean section. From the anamnesis of these women, it was revealed that their postoperation was complicated by postpartum infections. These women before admission repeatedly took anti-inflammatory treatment on an outpatient basis with no positive result.

In 6 (32%) patients who underwent diagnostic laparoscopy, pelvic endometriosis was detected. All of these women had endometriosis grades I and II according to the 1985 American society of reproductive medicine classification of endometriosis. This classification fairly fully reflects the prevalence of superficial endometriosis (adhesions, endometriosis lesions) and is widely used by reproductologists.

Various studies show that more than 10% of all women of reproductive age suffer from endometriosis, which manifests itself as chronic pelvic pain and infertility. And among women suffering from infertility, endometriosis accounts 20-50%.

Nowadays there is no specific information about the relationship between endometriosis and infertility. Although, some authors point that severe forms of endometriosis contribute to occlusion of the fallopian tubes and obstruction of the tubo-ovarian relationship (egg capture) [1,10]. In addition, endometriosis is related with pronounced adhesive process in the lesser pelvis, disrupting the process of egg and ovum interrelation. However, the role of a chronic inflammatory process affecting ovarian function cannot be ruled out.

The role of severe pain syndrome (dyspareunia) in endometriosis which affects the sexual function of women cannot be excluded, as these women are not sexually active enough (rare sexual intercourse with a partner), which sharply reduces the chance of getting pregnant in these women.

5. Conclusions

Thus, we can conclude that today the proposed standard methods for diagnostics of infertility such as hysterosalpingography and ultrasonography are not always fully informative. Hysterolaparoscopy is the most acceptable method for diagnosing infertility. Today, despite the fact that hystero- and laparoscopy are invasive interventions, the greatest advantage of these methods is the simultaneous implementation of both diagnostic and therapeutic interventions. Moreover, these invasive procedures are considered safe and the percentage of complications according to the literature does not exceed 1.65% [2] and are moderate abdominal pain. And most importantly, unlike traditional diagnostic methods, endovisual diagnostic methods help to identify so-called “small forms” of lesions such as endometrial polyps, synechia, etc.

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