



**New Day in Medicine**  
**Новый День в Медицине**

**NDM**



# **TIBBIYOTDA YANGI KUN**

**Ilmiy referativ, marifiy-ma'naviy jurnal**



**AVICENNA-MED.UZ**



ISSN 2181-712X.  
EiSSN 2181-2187

**6 (80) 2025**

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## **ТИББИЁТДА ЯНГИ КУН НОВЫЙ ДЕНЬ В МЕДИЦИНЕ NEW DAY IN MEDICINE**

*Илмий-рефератив, маънавий-маърифий журнал  
Научно-реферативный,  
духовно-просветительский журнал*

**УЧРЕДИТЕЛИ:**

**БУХАРСКИЙ ГОСУДАРСТВЕННЫЙ  
МЕДИЦИНСКИЙ ИНСТИТУТ  
ООО «ТИББИЁТДА ЯНГИ КУН»**

Национальный медицинский  
исследовательский центр хирургии имени  
А.В. Вишневского является генеральным  
научно-практическим  
консультантом редакции

Журнал был включен в список журнальных  
изданий, рецензируемых Высшей  
Аттестационной Комиссией  
Республики Узбекистан  
(Протокол № 201/03 от 30.12.2013 г.)

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**6 (80)**

**2025**

*июнь*

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Received: 20.05.2025, Accepted: 10.06.2025, Published: 15.06.2025

UDC 618.177

## OPPORTUNITIES OF DIFFERENT APPROACHES IN MANAGEMENT OF SECONDARY INFERTILITY IN WOMEN

(Review literature)

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### ✓ Resume

*Every individual has the fundamental right to physical and mental well-being. Couples should have the autonomy to determine the timing of parenthood, the number of children they wish to have, and the intervals between births. Infertility represents not only a medical condition but also a significant social concern, as it often leads to disruptions in family dynamics, reduced social functioning, diminished work productivity, and, consequently, a decline in overall quality of life. To this day, infertility remains one of the three most common complaints among women seeking gynecological care, frequently resulting in psychological distress, heightened anxiety, and depression. The term fertility refers to the natural capacity to conceive, and it differs from fecundability, which denotes the probability of conception within a single menstrual cycle, and fecundity, which refers to the ability to achieve a live birth per cycle. Among couples attempting to conceive, approximately 50% of women become pregnant within three months, 75% within six months, and nearly 90% within one year.*

*This article deals with the etiology, epidemiology, classification and different management options of secondary infertility in women*

*Keywords: secondary infertility, hysteroscopy, laparoscopy, hysterosalpingography*

## IKKILAMCHI BEPUSHTLIK BILAN AYOLLARNI OLIB BORISHDA HAR XIL YONDASHUVLARNING IMKONIYATLARI

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### ✓ Rezyume

*Har bir inson jismoniy va ruhiy jihatdan sog'lom bo'lish huquqiga ega. Er-xotinlar qachon ota-ona bo'lish, qancha bola va ular orasidagi intervalni hal qilish huquqiga ega. Bepushtlik nafaqat tibbiy, balki ijtimoiy tashvish hamdir. Axir, bu oilaviy munosabatlarning beqarorligi, ijtimoiy va mehnat faoliyatining buzilishi va natijada hayot sifatining yomonlashishi bilan bog'liq.*

*Bugungi kunda bepushtlik ginekologik muammolar bilan shug'ullanadigan ayollarning uchta asosiy shikoyatidan biri bo'lib qolmoqda, bu esa psixologik stress, tashvish va depressiyaga olib keladi. Fertillik - bu ko'payish qobiliyati yoki tug'ilish holati. Bu har qanday oyda homilador bo'lish ehtimoli bo'lgan tug'ilishdan va bir hayz davrida tirik tug'ilish qobiliyati bo'lgan tug'ilishdan farq qiladi. Homilador bo'lishga harakat qilayotganlar orasida ayollarning taxminan 50% 3 oy ichida homilador bo'ladi, 75% 6 oy ichida homilador bo'ladi va taxminan 90% 1 yoshga kelib homilador bo'ladi. Mazkur maqolada ayollarda ikkilamchi bepushtlik etiologiyasi, epidemiologiyasi, tasnifi va har xil olib borish imkoniyatlari haqida batafsil ma'lumotlar keltirilgan*

*Kalit so'zlar: ikkilamchi bepushtlik, gisteriskopiya, laparoskopiya, gisterosalpingografiya*

# ВОЗМОЖНОСТИ РАЗНЫХ ПОДХОДОВ В ВЕДЕНИИ ЖЕНЩИН С ВТОРИЧНЫМ БЕСПЛОДИЕМ

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## ✓ Резюме

*Каждый человек имеет право быть физически и психически здоровым. Супружеские пары имеют право решать, когда стать родителями, сколько детей и с каким интервалом между ними. Бесплодие - это не только медицинская, но и социальная проблема, вызывающая обеспокоенность. Ведь оно связано с нестабильностью семейных отношений, нарушением социальной и трудовой активности и, как следствие, ухудшением качества жизни. На сегодняшний день бесплодие остается одной из трех основных жалоб женщин, обращающихся с гинекологическими проблемами, что приводит к психологическому стрессу, тревоге и депрессии. Фертильность - это способность к воспроизводству или состояние фертильности. Она отличается от плодovitости, которая представляет собой вероятность забеременеть в любой конкретный месяц, и плодovitости, которая представляет собой способность к живорождению в течение одного менструального цикла. Среди тех, кто пытается зачать ребенка, примерно 50% женщин забеременеют в течение 3 месяцев, 75% достигнут беременности в течение 6 месяцев, и около 90% забеременеют к 1 году. В данной статье представлены последние данные об этиологии, эпидемиологии, классификации и разных подходах при ведении женщин с вторичным бесплодием*

*Ключевые слова: вторичное бесплодие, гистероскопия, лапароскопия, гистеросальпингография*

## Relevance

Every individual has a right of being physically and mentally healthy. Couples have the right of deciding about the timing of being parents, the number of children and spacing between them. Infertility is not only a medical but also a social problem and is a cause for concern. Because it is associated with instabilities in familial relationships, impairment of social and labor activities, and as a result deterioration of quality of life.

To date infertility remains as one of the three main complaints of women presenting with gynecological issues, leading to psychological stress, anxiety, and depression [11].

Fertility refers to the ability to reproduce or the condition of being fertile. It is distinct from fecundability, which is the likelihood of becoming pregnant in any given month, and fecundity, which is the ability to achieve a live birth within one menstrual cycle. Among individuals trying to conceive, approximately 50% of women will become pregnant within 3 months, 75% will achieve pregnancy within 6 months, and about 90% will be pregnant by 1 year [16].

## Materials and methods

According to the World Health Organization (WHO) (1993) infertility is defined as a failure of achievement of pregnancy by woman of childbearing age after 12 months or more of regular, unprotected sexual intercourse [10,23].

In 2023 "American society for reproductive medicine" [6] defined infertility as: "Infertility" is a disease, condition, or status characterized by any of the following:

- The inability to achieve a successful pregnancy based on a patient's medical, sexual, and reproductive history, age, physical findings, diagnostic testing, or any combination of those factors.
- The need for medical intervention, including, but not limited to, the use of donor gametes or donor embryos in order to achieve a successful pregnancy either as an individual or with a partner.

- In patients having regular, unprotected intercourse and without any known etiology for either partner suggestive of impaired reproductive ability, evaluation should be initiated at 12 months when the female partner is under 35 years of age and at 6 months when the female partner is 35 years of age or older.

### **Classification of infertility**

According to gender:

1. **Male infertility**
2. **Female infertility**

Female infertility is further subdivided to:

1. **Primary infertility** - no prior conception.
2. **Congenital** (congenital malformation of reproductive tract organs, congenital disorders of hormonal control of reproductive function)
3. **Acquired** (consequence of the adverse impact of various external and internal causal factors on the reproductive system in the postnatal period)
4. **Secondary infertility** - infertility following at least one prior conception.
5. **Acquired** (consequence of the adverse impact of various external and internal causal factors on the reproductive system)
6. **Cervical:** Stenosis or abnormalities of the mucus-sperm interaction
7. **Uterine:** structural and functional damages of endometrium (hyperplasia, polyps, synechia, adenomyosis), myoma end etc.
8. **Ovarian:** alteration in the frequency and duration of the menstrual cycle (failure to ovulate).
9. **Tubal:** damage to the fallopian tube (adhesions)
10. **Peritoneal:** anatomic defects or physiologic dysfunctions (infection, adhesions, adnexal masses)

### **Epidemiology**

Infertility is common and occurs in almost 10-15% of couples of reproductive ages. The cause of infertility can be male factor or female factor, each accounting for approximately 35% of cases. About 20% of cases of infertility is caused by both male and female factors. Remaining 10% of cases of infertility is unknown [3].

The exact statistics on the ratio of primary to secondary infertility can vary based on region, study methodology, and other factors. However, based on data from the World Health Organization (WHO) and other authoritative sources, the general trends are as follows [3, 7, 10]:

- Primary infertility: approximately 50-60% of cases.
- Secondary infertility: approximately 40-50% of cases.

### **Etiology of secondary infertility**

As we know secondary infertility refers to infertility following at least one prior conception [21]. The etiology of female secondary infertility is always acquired and related with consequence of the adverse impact of various external and internal causal factors on the reproductive system organs.

The main requirement for reproduction in females is uninterrupted interaction of reproductive tract organs:

1. normal ovulation – release of normal ovum
2. normal pick up of ovum by fimbria of fallopian tube and normal transport of sperm to the ampullary part of fallopian tube for fertilization
3. adequate transport of zygote to the uterus

Any malfunction of these processes can lead to female infertility. According to the reproductive tract organ involvement causes of female infertility is classified as:

1. Ovarian
2. Uterine
3. Tubal
4. Peritoneal

According to Abma et al. (1997) and American Society for Reproductive Medicine (2006) all these causes together account for almost 60% of all causes of infertility: ovulatory – 27%, Tubal and uterine 22% and cervical 5-10% [1, 2].

The most common conditions contributing to female infertility include endometriosis, polycystic ovarian syndrome (PCOS), uterine malformations, endometrial polyps, uterine fibroids, and premature ovarian insufficiency [14].

### Results and discussions

**Cervical factor:** it's caused either by stenosis of cervical os or by mucus-sperm interaction disorders. The cervix plays an important role in the transport of the sperm. The production of mucus and its characteristics change along menstrual cycle and depend on estrogen concentration. At the beginning of the menstrual cycle, cervical mucus is scanty, viscous and forms a netlike structure which blocks the passage of sperm. The secretion of mucus increases day by day and reaches its maximum approximately 1-2 days before ovulation. At this time the physical characteristics of cervical mucus change, it becomes watery, thin, and elastic allowing the sperm to pass through it.

Alterations of mucus secretion and in its physical characteristics which impair the passage of sperm are caused by hormonal changes and by some medications.

Cervical stenosis can cause infertility by blocking the passage of sperm from the cervix to the intrauterine cavity. Cervical stenosis can be congenital or acquired in etiology, resulting from surgical procedures, infections, hypoenestrogenism, and radiation therapy.

**Uterine factor:** uterine factor associated with secondary infertility are always acquired and are related with endometrium or myometrium lesions and are cause of 2-5% infertility cases.

Acquired defects associated with endometrium:

- **Intrauterine adhesion:** was first described by Joseph Asherman in 1948 [24] and is a result of endometritis associated with delivery (postpartum endometritis) or any intrauterine procedures (dilatation and curettage, abortions). Contiguous damage to endometrium and subsequent inflammation lead to heal by abnormal fibrous formation. As a result, intrauterine adhesion or so called synechiae (ie, Asherman syndrome) formation is observed. Intrauterine adhesion may obliterate uterine cavity partially or totally.
- **Endometrial polyps:** they are fleshy, soft endometrial protuberances. They have endometrial glands, fibrous tissue, blood vessels and are covered with surface epithelium. Polyps may be solitary or numerous, small or large (from several millimeters to centimeters) sessile or pedunculated. Generally, they are asymptomatic and are occasionally found during gynecological examination. Polyps are common, and according to Dreisler et al (2009) their overall prevalence in the general population is 7,8% [4,9]. Often placental remnants may cause development of polyps. Many researches have indicated high pregnancy rates after polypectomy, although the exact mechanism by which polyps may affect fertility remains unclear. Several potential causes have been suggested. Metalloproteinases associated with implantation and cytokines that affect embryo development have been implicated, both of which are found in higher concentrations with polyps than in their absence. Additionally, polyps located near the tubal ostia is thought to interfere with ostium function and obstruct sperm migration. Due to these factors, many experts recommend removing polyps in women experiencing infertility. In 2005, Pérez-Medina et al. conducted a randomized prospective trial to investigate the impact of polypectomy on pregnancy rates. In this study, 204 women were randomized into two groups. The first group underwent hysteroscopic polypectomy, while the second group underwent only a hysteroscopic biopsy of the polyp for histologic confirmation. Both groups were then managed expectantly for three cycles before proceeding with up to four cycles of intrauterine insemination. The results showed that the pregnancy rate in the polypectomy group was more than twice as high, regardless of the polyp size [18,21].

Acquired defects associated with myometrium:

- **Intrauterine and submucosal leiomyomas** are very common neoplasms of the uterus that affect women of reproductive age and are observed in approximately 1/3 of all gynecological hospitalization [15,20]. The leiomyomas are generally round, pearly white, firm, and rubbery tumors. When cut, they reveal a characteristic whorled pattern and demarcated by a pseudocapsule of areolar tissue. Traditionally leiomyomas according to their location can be categorized as submucosal, intramural, or subserosal. Typically, there are 6-7 tumors of varying size in involved uterus. Mostly leiomyomas are clinically asymptomatic. The number, size, or

location of them within the uterine cavity can cause various symptoms, which are a significant aspect of gynecologic practice. Symptomatic patients typically report issues such as bleeding, pain, a sensation of pressure, or infertility. Generally, the larger the leiomyoma, the more likely it is to cause symptoms. Although the mechanisms are not entirely clear, leiomyomas can be linked with approximately 10% of all infertility cases. It is estimated that leiomyomas are the sole cause of infertility in 2–3% of women [8]. Their potential effects include blocking the tubal ostia and interfering with normal uterine contractions that propel sperm or ova. Additionally, distortion of the endometrial cavity may reduce implantation and impair sperm transport. Notably, leiomyomas are also associated with endometrial inflammation and vascular changes, which can further disrupt implantation. Up to date there are no randomized controlled trials that definitively prove myomectomy enhances fertility, however retrospective researches have indicated that surgical removal of these neoplasms may improve the success rates of both natural and assisted conception, especially if they are large or impinge on the uterine cavity [21].

- **Uterine niche:** it was first described by Poidevin in 1961 who used hystero-graphy for assessment of cesarean section wound defects [13]. In 2001 Monteagudo et al. introduced term “niche” for “a triangular anechoic “filling defect” under the bladder recess, in the region between the uterine body and the cervix, in the typical location where low-transverse cesarean deliveries are performed”. Since then, many researches were performed to describe the niche by using different diagnostic approaches. But none of them wholly described the morphology of the niche, nor they proposed any definition and classification. So, in 2019, the European Niche Taskforce experts reached a consensus definition of the niche and its classification. The consensus defined niche as “an indentation at the site of the caesarean scar with a depth of at least 2 mm. They classified niches to 1. Simple niche; 2. Simple niche with one branch; 3. Complex niche (with more than one branch) [12]. Uterine niches are observed in up to 60% of women after cesarean section and are associated with gynecological symptoms as spotting, pain during uterine bleeding, secondary infertility associated with intrauterine fluid, even with unsuccessful pregnancy after IVF (in vitro fertilization). In 2020 Vissers et al. [19] explained several hypotheses related with intermediate role of niches and secondary infertility. According to them there are 3 main hypotheses: 1) *Detrimental environment for sperm penetration and implantation* (accumulation of fluid and old blood in niche with subsequent inflammatory process impairing sperm activity) 2) *Physical barrier for embryo transfer and implantation* (large niches in retroflexed uterus hinders embryo transfer in IVF) 3) *Psychogenic causes* (gynecological symptoms of niche may interfere with sexual intercourse) [19].

**Tubal and peritoneal factor:** the fallopian tubes are the most important part of reproductive tract in women. As we mentioned above one of the requirements of normal reproduction is normal pick up of the ovum by fimbria of fallopian tubes and normal transport of sperm to the ampullary part of fallopian tube for fertilization and adequate transport of zygote to the uterus. In normal conditions, after the ovulation has been occurred the ovum is picked up by the fimbriae of fallopian tubes from the liquid that is accumulated in the pouch of Douglas after ovulation. Entire part of fallopian tubes is covered with epithelial cilia which then transport the ovum to the ampullary part of tubes. At the same time these epithelial cilia transport the capacitated sperm cells from the endometrium through the cornual section down to the ampullary part of the tubes to fertilize an oocyte which is already in place. After that the fertilized egg is transported back to endometrial cavity. Abnormalities of fallopian tubes like obstruction of its distal end and accumulation of tubal secrete (hydrosalpinx) with subsequent damage to its epithelial cilia compromise the motility of the fallopian tubes, prevents normal ovum pickup, and transport of the fertilized egg into the uterus. Of acquired etiologies contributing to tubal diseases (dysfunction) are pelvic infection, endometriosis, and prior pelvic surgery. Pelvic inflammatory diseases (PID) are the main contributors to pelvic adhesions or damage to the fallopian tubes. The most common causes PID leading to tubal damage and adhesions *C. trachomatis* and *N. gonorrhoeae* infections.

According to last literature data up to 30% of all infertile women have tubal disease leading to infertility [5].

As we mentioned above the main requirement for reproduction in females is uninterruptible interaction of reproductive tract organs. The uterus, ovaries, and fallopian tubes occupy the same space within the peritoneal cavity (lesser pelvis). In normal conditions after ovulation mature ovum is released into peritoneal cavity. After that fimbria of fallopian tube picks the ovum and tubal cilia transports it to ampullary portion of fallopian tubes. Any anatomical defects or dysfunctions of these processes due to infections, adhesions may cause infertility.

The main causes of peritoneal factor infertility are adhesions due to endometriosis, PID and prior surgical interventions in abdominal cavity. Chronic infection and inflammation lead to development of severe pelvic adhesions. Periovarian adhesions prevent normal release of ovum into posterior Douglas pouch after ovulation. Ovum is lost between adhesions. Peritubal adhesions limits tubal motility, obstruct tubal ostia which lead to tubal dysfunction.

**Ovarian factor:** ovarian factor in secondary infertility is related with acquired alteration in ovarian function which clinically manifest with irregular menses. Beside this hypothalamus-pituitary-ovarian axis dysfunction is the most common ovulatory disorder associated with infertility.

**Diagnosis:** there are several diagnostic approaches for evaluation of reproductive tract organs anatomy. They are:

1. Sonography
2. Hysterosalpingography HSG)
3. Hysteroscopy
4. Laparoscopy
5. Magnetic resonance (MR) imaging.

The standard diagnostic approach in evaluation of secondary infertility in women begins with gynecological examination and complete gynecological history taking which include frequency, duration, recent change in interval or duration of menstruation, presence of hot flashes, and dysmenorrhea, prior contraceptive use, and duration of infertility. At this stage ovarian factor infertility can be excluded. Physical examination can reveal presence of vaginal symptoms such as irritation, malodorous vaginal discharge – infectious diseases.

Nowadays first line diagnostic standard techniques for secondary infertility are sonography and hysterosalpingography.

In managing infertility cases sonography is employed for 4 main purposes [21]:

1. Identification of abnormal pelvic anatomy;
2. Detection of underlying pathology contributing to infertility;
3. Evaluation of cyclic physiologic uterine and ovarian changes;
4. Surveillance and visual guidance during infertility treatment

Sonography is commonly the initial and often the only imaging procedure performed in the evaluation of pelvic and tuboovarian masses (hydrosalpinx, endometriotic cysts). Several examination techniques are used for the sonographic examination of female reproductive organs. They are transabdominal, transvaginal, transrectal and transperineal techniques. Of these for diagnosis of gynecologic diseases including infertility cases transvaginal technique is mostly preferred. Beside its non-invasiveness and wide accessibility this technique is more accurate for diagnosing leiomyomas, adenomyosis and evaluation of endometrial thickness and appearance (uterine defects that may affect transport of sperm and zygote implantation). It plays an important role in managing endometrial disorders like polyps [21]. By the introduction of sonography as a supplementary tool for gynecological examination polyps are diagnosed more frequently.

The advantages of this method over other diagnostic tools are quality of images, non-invasiveness, capability of real – time imaging, and of course accessibility and safety.

Modern sonographic tools can provide high-resolution images. This allows to get more detailed and accurate images of pelvic organs even the structural anomalies of endometrium (appearance, thickness, presence of polyps).

Unlike other diagnostic modalities like laparoscopy, hysteroscopy and hysterosalpingography this method is non-invasive, and does not require anesthesia and surgical intervention. This advantage of sonography reduces the risks and discomfort associated with intervention.

Capability of dynamic evaluation (real – time imaging) of sonography allows dynamic assessment of the state of pelvic organs, such as development of follicle, state of ovulation and so on.

Absence of any medical intervention makes sonography safe and its widespread availability in any healthcare facilities makes it accessible.

Disadvantages of sonography is related with skill and experience of operator, and related with letter subjectivity of obtained information. Subjectivity of obtained information directly related with skill and experience of operator that said different operators give different diagnosis and variable assessment of conditions.

Along with this there are patient related factors that influence the quality of sonographic imaging. The increased tissue thickness in obese patients can impair the results of imaging. In another hand intestinal gas can interfere with the visualization of pelvic structures.

Transvaginal sonography has limitations in directly evaluating tubal patency and may overlook subtle abnormalities.

**Hysterosalpingography** is a radiographic imaging technique used in gynecological practice. In this technique contrast medium is infused through a catheter placed in the cervical canal to evaluate the endocervical canal, the shape and size of uterine cavity, and the status of fallopian tubes. Under fluoroscopy, the dye is tracked as it fills the uterine cavity, flows into the tubal lumen, and eventually spills out of the tubal fimbriae into the pelvic cavity. Thus, a radiographic image is obtained. By the fulfilling of endocervical canal, the endometrial cavity, and the fallopian tube lumina by medium contrast agent a clear outline of their cavity and lumina is obtained. In normal condition spill of contrast from the tubes into the peritoneal cavity is seen.

**Tubal status:** a large metaanalysis studied the role of HSG in evaluation of tubal status. It showed 65-percent sensitivity and 83-percent specificity for tubal obstruction [21].

Contractions of fallopian tubes, especially spasm of their cornual part, often can mistakenly suggest proximal tubal obstruction, leading to a false-positive result. Far less commonly, a false-negative result may occur when HSG shows patent fallopian tubes, but it is later found to be blocked. Since many causes of tubal disease affect both tubes, unilateral disease is uncommon. When unilateral obstruction is observed with a normal contralateral tube, it is likely due to the dye following the path of least resistance during the HSG procedure.

Sometimes loculations of medium contrast around the tubes are seen in HSG images, which are suggestive of peritubal or pelvic adhesions, but despite this HSG is not reliable in detecting them.

Therefore, while HSG is an excellent tool for predicting tubal patency, it is less effective at assessing normal tubal function or detecting the presence of pelvic adhesions.

**Uterine status:** HSG is reliable for the evaluation of the intrauterine cavity's pathology. A polyp, leiomyoma, or intrauterine adhesions can limit medium diffusion, creating an intrauterine "defect" in dye opacity on HSG image. However often false positive results are obtained due to blood clots, mucus plugs, or shearing of the endometrium during placement of the intrauterine catheter. According to literature data HSG was to be 98% sensitive and 35% specific, with a positive predictive value of 70% and a negative predictive value of 8 % [21].

Although HSG offers several advantages, including widespread availability and extensive practitioner experience, the inherent subjectivity in performing the procedure and interpreting the images can reduce the reliability and accuracy of it.

More over HSG utilizes X-rays and a contrast dye, exposing the patient to ionizing radiation, which is concern for women of reproductive age. Additionally, a contrast dye used in HSG in some patients can cause allergic reactions.

### **Hysteroscopy**

Hysteroscopy is a medical tool that allows direct visualization of the endometrial cavity and ostia of fallopian tubes for both diagnostic and treatment purposes. This procedure is performed by inserting an optic endoscope which is 3 to 5 mm in diameter into uterine cavity and then letter is distended with saline or another medium for inspection of endometrial cavity. It is considered a minimally invasive surgery for diagnosing intrauterine pathology and treatment of them. The primary advantage of hysteroscopy is its ability to detect endometrial lesions, such as leiomyomas, polyps, uterine niche and adhesions that might be overlooked with transvaginal sonography or endometrial sampling [21]. Additionally, diagnostic hysteroscopy can be converted to therapeutic hysteroscopy that said it allows immediate surgical treatment of pathologies diagnosed. It makes hysteroscopy time and cost effective than other methods. One of main advantages of hysteroscopy is that it can be performed in an outpatient setting without anesthesia.

Unlike HSG hysteroscopy is appropriate in diagnosing small lesions of endometrium. The disadvantages of hysteroscopy are its invasiveness, cost and the need of anesthesia for the procedure. But simultaneous treatment of pathology in cases of their detection undoubtedly, makes it less invasive and cost-effective procedure.

**Laparoscopy:** is a minimally invasive surgery which allows direct inspection of abdominal cavity i.e. pelvic cavity for pathology like pelvic adhesions, endometriosis. This method is thought "gold standard" in diagnostic approach for secondary infertility. During laparoscopy chromotubation may be performed for evaluation of tubal status. For this diluted die is injected through a canula placed in the endometrial cavity. After that spill of a die from fallopian tubes is evaluated. Laparoscopy like hysteroscopy enables both the

diagnosis and immediate surgical treatment of conditions like endometriosis or pelvic adhesions. Performing laparoscopic ablation of endometriotic lesions or adhesions may enhance the chances of pregnancy afterward.

### Conclusion

Exploration of the female genital tract is a crucial aspect of infertility assessment as up to 30-40% of infertility cases are related with tubal and peritoneal factors [21]. Laparoscopy offers a thorough examination of the pelvic reproductive anatomy, providing a magnified view of the pelvic organs and peritoneal surfaces.

The disadvantages of laparoscopy are similar to hysteroscopy. But simultaneous treatment of detected pathology of pelvic cavity and fallopian tubes gives it a big advantage, making laparoscopy less invasive and cost-effective procedure.

Additionally, as we mentioned above about 40% of secondary infertility is due to tuboperitoneal pathology. So according to Ngowa et al. (2015) the hysterolaparoscopic approach is considered more effective than HSG and should be recommended as the sole procedure for selected infertile women. The efficacy between these two methods in diagnosing tubal patency was 74%. HSG demonstrated a sensitivity of 34.6% for detecting unilateral tubal blockage and 80.6% for bilateral blockage, with a specificity of 89.8% for unilateral blockage and 81.5% for bilateral blockage [17]. In 2019 Agrawal et al. conducted a prospective study of 103 women and concluded that hysterolaparoscopy followed by a dye test could be a reliable alternative to HSG because it permits a simultaneous surgery for the found gynecologic conditions, especially of tubal etiology.

There is no definitive sequence for using any diagnostic modality for evaluation of secondary infertility. Every diagnostic tool has its advantages and disadvantages. However, hysterolaparoscopy seems to be the most reliable management approach as its main advantage is possibility of resolving the gynecologic conditions in the same surgery procedure.

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Entered 20.05.2025