

Prospects For Infertility Treatment: From Conservative Therapy To IVF

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Abstract: This article explores contemporary approaches to the diagnosis and treatment of infertility in couples, covering both conservative methods and assisted reproductive technologies (ART), such as in vitro fertilization (IVF). It discusses the main causes of infertility, including hormonal disorders, anatomical abnormalities, infectious diseases, and genetic factors. The article also emphasizes diagnostic methods such as laboratory tests, ultrasound imaging, and surgical interventions. Furthermore, it reviews the prospects of infertility treatment using pharmacological therapy, surgical procedures, and new ART technologies, including intrauterine insemination (IUI) and intracytoplasmic sperm injection (ICSI). The article aims to analyze the effectiveness of various treatment approaches and provides recommendations for both healthcare professionals and patients.

Keywords: Infertility, infertility treatment, infertility diagnosis, conservative therapy, in vitro fertilization (IVF), ART, intrauterine insemination (IUI), ICSI, hormonal disorders, reproductive health.

Introduction: Infertility is a serious challenge for many couples, affecting both their emotional and physical well-being. Infertility refers to a condition in which a married couple, who have an active sexual life without using any contraceptive methods (such as pills, condoms, or intrauterine devices), is unable to conceive and carry a pregnancy to term for one full calendar year. It is important to understand that occasional unsuccessful attempts are not considered infertility; it refers to the persistent inability to conceive within the specified time period. The diagnosis of infertility requires a comprehensive examination of both partners, as the causes can vary and impact different aspects of reproductive health[Carson S. A., Kallen A. N. Diagnosis and management of infertility: a review //Jama. – 2021. – T.

326. – №. 1. – C. 65-76.]. To better understand the problem and choose the most effective treatment strategy, it is essential to differentiate between two main types of infertility: primary and secondary, which differ in their nature and potential causes.

Primary Infertility. Primary infertility is a situation where a couple, despite a year of regular attempts to conceive without using any contraceptive methods, has not achieved their goal[Sedlander E. et al. “They destroy the reproductive system”: exploring the belief that modern contraceptive use causes infertility //Studies in family planning. – 2018. – T. 49. – №. 4. – C. 345-365.]. A key factor here is the absence of previous pregnancies in either partner. This means neither partner has ever been a parent and is now facing difficulty conceiving. The causes of primary

infertility can be very diverse and include a wide range of factors that affect both male and female fertility. In women, these factors may include ovarian disorders (such as polycystic ovary syndrome, premature ovarian insufficiency), fallopian tube blockage, uterine anatomical abnormalities, endometriosis, and hormonal imbalances. For men, causes may include poor sperm quality (low sperm count, poor sperm motility, abnormal sperm morphology), varicocele (swelling of the veins in the spermatic cord), genetic factors, or infections of the urogenital system[Vander Borght M., Wyns C. Fertility and infertility: Definition and epidemiology //Clinical biochemistry. – 2018. – T. 62. – C. 2-10.]. Often, the cause is a combination of several factors in both partners, so a thorough examination of both is necessary. For example, a woman may have mild ovulatory issues, while the man may have slightly reduced sperm count. Together, these factors can prevent conception[Mustafa M. et al. Male and female infertility: causes, and management //IOSR Journal of Dental and Medical Sciences. – 2019. – T. 18. – №. 9. – C. 27-32.].

Secondary Infertility. Secondary infertility occurs when a couple has already experienced one or more successful pregnancies in the past but is now facing difficulty conceiving again. In other words, the couple has had children before but is unable to conceive another child despite their desire to do so. Similar to primary infertility, the causes of secondary infertility can be varied and are often linked to changes in the reproductive health of the partners after previous pregnancies and births. In women, these causes may include complications from childbirth (such as pelvic adhesions or scars on the uterus), endometriosis that developed after pregnancy, damage to the fallopian tubes caused by infections transmitted during pregnancy or childbirth, or age-related changes in ovarian function. For men, secondary infertility may be caused by changes in sperm quality due to infections, trauma, or exposure to toxins after having children. For example, male infertility can develop after a previous episode of viral mumps, which affects the testes. Age is also an important factor affecting fertility in both men and women, particularly after a certain age (usually after 35 for women). Therefore, if a couple has already experienced pregnancy but is now unable to conceive, it is crucial to undergo a thorough examination to determine the cause of the changes and develop a course of action.

The aim of this research is to review and analyze the clinical and laboratory methods for diagnosing and treating primary and secondary infertility in married couples. The study also addresses factors affecting reproductive function and explores modern

approaches to infertility treatment, including pharmacological and surgical methods, as well as assisted reproductive technologies.

METHODS

This review article is based on data from scientific and medical publications, as well as current guidelines for the diagnosis and treatment of infertility, published in leading medical journals and sources. The study materials include both theoretical data and results from clinical observations related to infertility diagnosis and treatment in married couples.

Methods: Clinical Literature Review: Analyzing the causes and mechanisms of primary and secondary infertility in both women and men.

Evaluation of Factors Affecting Fertility: Assessing various factors that may influence a couple's fertility, such as hormonal imbalances, infections, reproductive system disorders, and age-related changes.

Laboratory Diagnostic Methods: Reviewing the use of laboratory tests for diagnosing infertility, including hormonal analysis, ultrasound diagnostics, semen analysis (spermogram), and bacteriological tests for sexually transmitted infections.

Assisted Reproductive Technologies (ART): Analyzing the application of assisted reproductive technologies, such as in vitro fertilization (IVF) and intrauterine insemination (IUI).

Statistical Analysis Methods:

Comparative Analysis: Conducting a comparative analysis of data on the causes of infertility and the success rates of various treatment methods based on current clinical studies and data on the use of therapeutic and surgical interventions.

Review of Modern Therapeutic Strategies:

Pharmacological Treatment: Examining approaches to infertility treatment, including the use of ovulation-stimulating medications (e.g., clomiphene), surgical methods aimed at correcting anatomical defects, and the application of assisted reproductive technologies (ART).

Surgical Interventions: Reviewing surgical methods for treating infertility, such as corrective surgeries for structural abnormalities in the reproductive organs (e.g., laparoscopic surgery for endometriosis, tubal surgery for obstructions).

Assisted Reproductive Technologies (ART): Analyzing the role of IVF, IUI, and other ART methods in addressing both primary and secondary infertility.

RESULTS

Primary Infertility Diagnosis and Causes

Primary infertility is clinically diagnosed in a couple that, despite having regular sexual intercourse for one year, without using contraceptive methods, has not achieved pregnancy. This condition is a serious reason to seek the help of a reproductive specialist for a thorough examination and identification of the underlying causes of infertility. The causes of primary infertility are extremely diverse and often require a comprehensive approach to diagnosis and treatment. These causes can be divided into several major groups, affecting both the female and male reproductive systems, as well as general factors that influence the fertility of both partners.

Female Factors: Among the most common female factors contributing to infertility are various gynecological conditions. These include menstrual cycle irregularities—such as irregular periods, anovulation (absence of ovulation), or unpredictable ovulation, which makes it difficult to determine the optimal time for conception. Ovarian diseases, such as polycystic ovary syndrome (PCOS), are one of the leading causes of female infertility, as they disrupt the maturation and release of eggs. Uterine anomalies, such as fallopian tube blockages, prevent sperm from meeting the egg. Conditions such as endometriosis, where tissue similar to the uterine lining grows outside the uterus, can also negatively impact embryo implantation and pregnancy development.

Male Factors:

Male infertility is also a significant cause of infertility. The most common issues are related to sperm quality: low sperm count (oligospermia), poor sperm motility (asthenozoospermia), and abnormal sperm morphology. Poor sperm motility means that sperm are unable to efficiently travel through the female reproductive tract to reach the egg. Obstruction of the seminal ducts, often caused by inflammation or injury, can also prevent the release of sperm during ejaculation.

Hormonal Imbalances: Hormonal disorders can affect both female and male fertility. Dysfunction of the pituitary gland, a small gland in the brain that controls many hormones, or thyroid dysfunction, which affects overall metabolism, can lead to problems with ovulation in women and sperm production in men.

Secondary Infertility and Its Causes.

Secondary infertility differs significantly from primary infertility. In this case, the couple has already experienced at least one pregnancy but now faces difficulties in conceiving again. The causes of secondary infertility can overlap with those of primary infertility, but there are also additional, specific factors that may have developed after the previous pregnancy.

One of the key aspects of secondary infertility is recurrent miscarriages. These may indicate problems with the functioning of the female reproductive system, such as luteal phase defect (insufficient corpus luteum), when the corpus luteum does not produce enough progesterone to support pregnancy, or other hormonal imbalances. Changes in overall health after the previous pregnancy may also contribute to secondary infertility. For example, chronic diseases, sexually transmitted infections, development of endometriosis, or uterine fibroids may all play a role.

Lastly, age plays a critical role in secondary infertility. As both women and men age, their reproductive capabilities gradually decline. For women, ovarian reserve decreases, leading to a reduction in both the quantity and quality of eggs. For men, sperm production and motility tend to decrease as well. Therefore, the age of both partners is an important factor to consider when evaluating the likelihood of conception.

Diagnosis of Infertility in Couples: A Comprehensive Approach

Diagnosing the causes of infertility in a couple requires a comprehensive approach that includes a wide range of clinical and laboratory tests aimed at identifying potential issues with the reproductive health of both partners. Accurate diagnosis helps determine the exact cause or combination of factors that are preventing conception and facilitates the development of the most effective treatment or assisted reproductive technology strategy.

Examination of Women:

The primary goal of the examination is to rule out or confirm gynecological issues that may be preventing pregnancy. The process includes several key stages:

Hormonal Investigations: This stage is fundamental to understanding the functioning of the female reproductive system. It involves measuring levels of several important hormones that play a critical role in egg maturation, preparing the uterus for implantation, and maintaining pregnancy. These hormones include:

FSH (Follicle-Stimulating Hormone): Essential for stimulating follicular growth in the ovaries and egg maturation. A low level may indicate premature ovarian depletion, while a high level may suggest ovulatory dysfunction.

LH (Luteinizing Hormone): Triggers ovulation by causing the mature egg to be released from the follicle and stimulates the formation of the corpus luteum, which produces progesterone.

Prolactin: Elevated prolactin levels (hyperprolactinemia) can suppress ovulation and

hinder conception.

Progesterone Level Test (for Ovulation Phase Assessment): Progesterone is produced by the corpus luteum after ovulation and is essential for pregnancy maintenance. Measuring its level in the second phase of the menstrual cycle helps assess ovulation and its quality. Blood is typically drawn 7-14 days after the start of the cycle. The absence of a progesterone rise may indicate anovulation.

Transvaginal Ultrasound (Pelvic Ultrasound): This imaging technique allows visualization of the uterus, ovaries, and fallopian tubes to identify various anatomical abnormalities and structural changes.

Examples include:

Uterine Fibroids: Benign tumors in the uterus that can affect the ability to conceive and carry a pregnancy to term, depending on their size and location.

Ovarian Cysts: Different types of ovarian cysts that may interfere with normal ovulation. Some may be functional (like follicular cysts), while others may indicate conditions like PCOS.

Endometriosis: A condition in which tissue similar to the uterine lining grows outside the uterus, causing inflammation, pain, and potential fertility problems. Ovarian cysts related to endometriosis (endometriomas) can also be detected.

Hysterosalpingography (HSG): This radiological test is used to assess the shape of the uterus and the patency of the fallopian tubes. During the procedure, a contrast dye is introduced into the uterus, and X-ray imaging is used to observe the contours of the uterus and tubes. Blockages or narrowing of the fallopian tubes will be visible on the images, and this test helps diagnose conditions like hydrosalpinx (fluid-filled fallopian tubes) and pelvic adhesions.

Laparoscopy: This minimally invasive surgical procedure involves inserting a thin tube with a camera (laparoscope) through a small incision in the abdominal wall. Laparoscopy provides direct visualization of the pelvic organs, including the uterus, fallopian tubes, and ovaries. It is used both for diagnostic purposes (to identify the cause of infertility) and for treatment (e.g., removal of endometriosis lesions or ovarian cysts).

In addition to the tests mentioned above, women are also recommended to undergo screening for sexually transmitted infections (STIs) such as chlamydia, gonorrhea, mycoplasma, which can negatively affect fertility. It's important to remember that these diagnostic methods are used in combination, and the selection of specific tests is determined by the physician based on the patient's history and clinical indications.

Examination of Men in Family Planning or Infertility Diagnosis: A Comprehensive Approach to Evaluating Reproductive Health

For a thorough assessment of male reproductive health and the identification of potential causes of reduced fertility, a range of studies are employed. These studies provide detailed information about sperm quality, hormone levels, and the health of the reproductive organs. These evaluations can be initiated by the man himself when planning a family, or by a doctor when there are difficulties in conceiving. Below are the main diagnostic methods used in modern urology and andrology.

1. Spermogram – The Foundation of Male Fertility Diagnosis

The spermogram is the key and most common test for evaluating sperm quality. It is not just a count of sperm but a comprehensive analysis that evaluates various parameters of the semen. The spermogram examines several important indicators [Tanga B. M. et al. Semen evaluation: Methodological advancements in sperm quality-specific fertility assessment—A review //Animal bioscience. – 2021. – T. 34. – №. 8. – C. 1253.].

Sperm Concentration: This refers to the number of sperm in one milliliter of semen. A normal count is considered to be over 20 million sperm per milliliter. A low concentration may be associated with various factors such as varicocele, infections, genetic disorders, or exposure to toxins [Ambar R. F., Maziotis E., Simopoulou M. Sperm Concentration and Total Sperm Count //Human Semen Analysis: From the WHO Manual to the Clinical Management of Infertile Men. – Cham : Springer International Publishing, 2024. – C. 31-60.].

Sperm Motility: This evaluates the percentage of sperm capable of moving progressively and effectively to reach the egg. There are three types of movement: progressive (straight-line movement), irregular weak (chaotic movement), and immobile. It is crucial for the majority of sperm to demonstrate progressive motility [Evgeni E., Kothari P. Sperm Motility //Human Semen Analysis: From the WHO Manual to the Clinical Management of Infertile Men. – Cham : Springer International Publishing, 2024. – C. 61-101.].

Sperm Morphology: This assesses the shape and structure of sperm, including the head, neck, and tail. The percentage of normally shaped sperm is compared to the WHO criteria. Abnormal morphology can hinder sperm penetration into the egg and fertilization. For example, often sperm are found with abnormally shaped heads, such as short or deformed heads [Chemes H. E., Rawe V. Y. Sperm pathology: a step beyond descriptive morphology. Origin,

characterization and fertility potential of abnormal sperm phenotypes in infertile men //Human Reproduction Update. – 2003. – T. 9. – №. 5. – C. 405-428.]

Seminal Volume: This measures the amount of semen collected during ejaculation. Deviations from the normal volume can also indicate certain disorders.

Seminal pH: The acidity of semen must fall within a specific range to provide an optimal environment for sperm vitality[Lavanya M. et al. Microenvironment of the male and female reproductive tracts regulate sperm fertility: Impact of viscosity, pH, and osmolality //Andrology. – 2022. – T. 10. – №. 1. – C. 92-104.]

Leukocyte Presence (Indicator of Inflammation): An elevated leukocyte count in semen indicates inflammation in the reproductive tract[Liu K. S. et al. Effect and mechanisms of reproductive tract infection on oxidative stress parameters, sperm DNA fragmentation, and semen quality in infertile males //Reproductive Biology and Endocrinology. – 2021. – T. 19. – №. 1. – C. 97.]

For reliable results, it is recommended to conduct two sperm analyses with a gap of a few days or weeks, as sperm parameters can fluctuate due to factors such as ambient temperature or lifestyle[Verón G. L. et al. Impact of age, clinical conditions, and lifestyle on routine semen parameters and sperm kinematics //Fertility and sterility. – 2018. – T. 110. – №. 1. – C. 68-75. e4.]

2. Hormonal Tests – Evaluating the Endocrine Background

Hormonal tests are essential for determining the levels of hormones that play a critical role in male reproductive health[Griffin J. E. Male reproductive function //Textbook of endocrine physiology. – 2000. – C. 243-264.]. The most significant hormones include:

Testosterone: The primary male sex hormone, responsible for the development of secondary sexual characteristics, libido, spermatogenesis, and overall health. Low testosterone levels can lead to reduced libido, impotence, fertility problems, and other negative consequences[Zirkin B. R., Papadopoulos V. Leydig cells: formation, function, and regulation //Biology of reproduction. – 2018. – T. 99. – №. 1. – C. 101-111.]

Luteinizing Hormone (LH): Stimulates the Leydig cells in the testes to produce testosterone. The level of LH helps evaluate pituitary and testicular function[Wistuba J., Neuhaus N., Nieschlag E. Physiology of testicular function //Andrology: male reproductive health and dysfunction. – Cham : Springer International Publishing, 2023. – C. 15-54.]

Follicle-Stimulating Hormone (FSH): Stimulates the maturation of sperm cells in the testes[Santi D. et al. Follicle-stimulating hormone (FSH) action on spermatogenesis: a focus on physiological and therapeutic roles //Journal of Clinical Medicine. – 2020. – T. 9. – №. 4. – C. 1014.]

Prolactin: Excessive prolactin can suppress testosterone production and degrade sperm quality[Ibrahim H. A., Ramzi Z. S. Impact of serum prolactin and testosterone levels on male infertility in Sulaimanyah City //Mosul J Nursing. – 2021. – T. 9. – №. 2. – C. 207-214.]

Gonadotropin-Releasing Hormone (GnRH): Stimulates the secretion of LH and FSH[Stamatiades G. A., Carroll R. S., Kaiser U. B. GnRH—a key regulator of FSH //Endocrinology. – 2019. – T. 160. – №. 1. – C. 57-67.]

Measuring these hormones helps detect endocrine disorders that can affect male reproductive health and fertility.

3. Ultrasound Examination of the Scrotum and Prostate Gland – Visualizing the Condition of the Reproductive Organs

Ultrasound (US) of the scrotum and prostate gland is a safe and painless diagnostic method that allows visualization of the internal structures of these organs.

Scrotal Ultrasound: This exam can detect pathologies such as varicocele (enlargement of veins in the spermatic cord), hydrocele (fluid accumulation around the testicle), testicular tumors, and other developmental anomalies.

Transrectal Ultrasound of the Prostate: Used to diagnose prostate diseases such as benign prostatic hyperplasia, signs of prostate cancer, and to assess the patency of the seminal ducts. In this procedure, the ultrasound probe is inserted through the rectum to obtain a clearer image of the prostate.

Additional Aspects of the Male Examination

In addition to the tests listed above, a comprehensive male fertility evaluation includes:

Medical History (Anamnesis): A detailed medical history is crucial for understanding past health issues, surgeries, or trauma that could affect fertility.

Physical Examination: The doctor will examine the external and internal reproductive organs for any physical abnormalities, such as varicocele, testicular atrophy, or enlargement of the prostate.

Other Diagnostic Methods: Depending on the results of the initial evaluations, additional tests may be recommended, such as genetic testing, semen culture for infections, or more advanced imaging techniques.

A comprehensive male fertility evaluation includes not

only the mentioned diagnostic tests but also a thorough medical history and physical examination. Only with all the necessary data can a doctor make an accurate diagnosis and develop a treatment plan to restore the male reproductive health.

Approaches to the Treatment of Infertility

The treatment of infertility is a complex process that requires thorough diagnosis and an individualized approach. The choice of specific treatment methods depends directly on the identified cause of infertility in both partners, their overall health, and their age. In general, therapy can range from conservative approaches aimed at correcting identified disorders and preparing the body for natural conception to more active interventions, including surgical operations and assisted reproductive technologies (ART), which are directly aimed at restoring or creating opportunities for successful pregnancy. It is important to understand that often a combination of various methods is used to achieve the optimal result.

Pharmacological Treatment: Pharmacological support plays an important role in correcting many reproductive issues. For women experiencing difficulties with regular ovulation (e.g., in conditions such as polycystic ovary syndrome - PCOS, hyperprolactinemia, or other menstrual cycle disorders), medications that stimulate egg maturation and ovulation are widely used. These include:

Clomiphene Citrate: The first-line drug for stimulating the release of gonadotropins necessary for ovulation. It is commonly prescribed for women with irregular ovulation or anovulation.

Gonadotropins: These injectable medications mimic the action of the body's natural pituitary hormones to induce ovulation. Gonadotropins are highly effective but require careful monitoring of ovarian response to prevent ovarian hyperstimulation syndrome (OHSS).

Additionally, drugs that normalize prolactin levels, thyroid function, and other hormonal treatments are used based on the diagnosis.

For men with reduced sperm quality (low sperm count, poor motility, or abnormal morphology), pharmacological therapy is aimed at improving these parameters. Treatment options include:

Antioxidants (e.g., Vitamin E, Coenzyme Q10): These protect sperm from damage caused by free radicals and improve sperm function.

Testosterone-Boosting Medications: These help increase testosterone production and improve spermatogenesis.

Vitamin and Mineral Supplements: These are essential for the proper formation of healthy gametes, such as L-

carnitine, which improves sperm metabolism and motility.

It is also essential to address underlying health issues, such as infections of the urogenital system or varicocele, which may negatively impact sperm quality.

Surgical Intervention: In some cases, when the cause of infertility is structural, surgical treatment is necessary and can significantly increase the chances of pregnancy. Surgical intervention may be required for women with anatomical defects that prevent normal fertilization and embryo implantation. Such defects include:

Uterine Fibroids: Benign tumors in the uterus that distort the uterine cavity and can impede implantation.

Endometriosis: The growth of uterine-like tissue outside the uterus, causing inflammation, scarring, and disruptions in fertility.

Fallopian Tube Obstruction: Complete or partial blockage of the fallopian tubes, preventing sperm from reaching the egg.

Pelvic Adhesions: Scarring in the pelvic region, often caused by infections or surgeries, which can obstruct the reproductive organs.

For example, laparoscopic myomectomy (removal of uterine fibroids) can restore the normal anatomy of the uterus, improving the chances of embryo implantation.

For men, surgery may be required to correct varicocele, an enlargement of veins in the spermatic cord that leads to increased scrotal temperature and reduced sperm quality. Surgical correction of varicocele typically improves sperm parameters and increases the likelihood of conception. Additionally, surgery can be used to restore the patency of the ejaculatory ducts in cases of obstruction.

Assisted Reproductive Technologies (ART): When conservative treatments and surgical interventions are insufficient, or when there are severe infertility factors in both partners, assisted reproductive technologies (ART) are considered. ARTs bypass certain physiological barriers and increase the likelihood of fertilization and subsequent pregnancy.

Intrauterine Insemination (IUI): A relatively simple and less invasive ART method in which sperm (either from the partner or a donor) is artificially introduced into the woman's uterus during ovulation. This increases the number of sperm reaching the egg and facilitates fertilization. IUI is often used when there are mild ovulatory problems or a mild male factor infertility.

In Vitro Fertilization (IVF): The most complex and expensive ART technique, IVF involves the collection of eggs and sperm, their fertilization outside the body (in

vitro), and then transferring the resulting embryo into the uterus. IVF is indicated in cases of severe female and/or male infertility, such as:

Fallopian Tube Blockage

Low Ovarian Reserve

Severe Male Infertility (low sperm count, no sperm in the ejaculate, etc.)

Failed Conception Attempts with Other Treatments

There are different modifications of IVF, such as ICSI (Intracytoplasmic Sperm Injection), in which a single sperm is directly injected into the egg, often used in cases of male infertility with very low sperm count or poor sperm motility.

Treatment for infertility is a multi-faceted process that requires careful consideration of each partner's health, diagnosis, and unique circumstances. Often, a combination of pharmacological therapy, surgery, and ART is used to optimize the chances of achieving a successful pregnancy. The key to success lies in personalized care that addresses the underlying causes of infertility, provides targeted treatments, and maximizes the couple's chances of conception.

CONCLUSION

Primary and secondary infertility are complex and multifaceted conditions that deeply affect the emotional and physical well-being of a couple. These challenges require a profound understanding and a strict adherence to the principles of individualized care both in diagnosing and developing a treatment plan. It is essential to emphasize that infertility is not just a medical problem but a serious trial for the relationship, requiring mutual support and active participation from both partners throughout the diagnostic and therapeutic process.

To assign effective treatment, thorough diagnostics must be conducted, which includes a broad spectrum of laboratory and clinical tests. Laboratory tests involve blood tests to assess hormonal levels (FSH, LH, estradiol, progesterone, testosterone, and others), semen analysis in men to evaluate sperm motility and morphology, tests to assess the phases of the menstrual cycle and ovulation in women, and various immunological tests to identify antisperm antibodies or other factors hindering embryo implantation. Clinical tests include consultations with both a gynecologist and andrologist, pelvic ultrasound in women, and, in some cases, prostate and sperm duct ultrasounds in men. Only the combination of these data can accurately determine the cause of infertility, whether it be hormonal disorders, anatomical anomalies, infectious diseases, genetic factors, or unexplained infertility, where the cause remains undetermined

even after extensive testing.

Based on the results of the diagnostic process, the doctor will develop an optimal treatment strategy, which can range from conservative therapies aimed at correcting hormonal imbalances or treating infections to surgical interventions to restore fallopian tube patency or correct anatomical defects. In cases where natural conception is not possible, assisted reproductive technologies (ART) such as artificial insemination, in vitro fertilization (IVF), or intracytoplasmic sperm injection (ICSI) may be considered. Each of these methods has its advantages and disadvantages, and the choice of a specific approach depends on the cause of infertility, the patients' age, and their overall health condition.

Fortunately, with the advancement of medical science and technological innovations, the likelihood of successful infertility treatment has significantly increased over the past decades. Diagnostic methods are constantly improving, new medications are being developed, and ART protocols are continually enhanced. Thanks to these advancements, many couples who once thought they were unable to have children now have a real chance of successful conception and the birth of a healthy child. Therefore, it is important to remain optimistic and believe in a positive outcome, actively collaborate with the healthcare provider, and follow all treatment recommendations.

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