

CAUSES OF INFERTILITY AND TREATMENT OPTIONS

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Introduction

Infertility is the failure of a couple to become pregnant after one year of regular, unprotected intercourse. About a third of infertility problems are due to female infertility, and another third are due to male infertility. In the remaining cases, infertility affects both partners or the cause is unclear.

Introduction

- Female infertility results from disease of the female genital tract, age, hormonal imbalances and other conditions preventing conception or maintenance of a full term pregnancy.
- Exposure to radiation or certain chemicals can cause [infertility](#)
- Women who smoke cigarettes can have in their cervical mucus to kill sperm.



The most common Causes of Female Infertility

-AGE

- Age is the single most important factor affecting a woman's fertility. As she ages, the chance for pregnancy decreases and the odds for miscarriage increase. At 25, a woman has a 25% of chances becoming pregnant during unprotected sexual intercourse.
- This percentage begins to decrease between the ages of 32 and 34. After that, the decline is steady .Hence the chance for pregnancy is only 5 to 10% per menstrual cycle after a woman reaches age 40.
- Although older women may be more likely to experience scarring and blockages caused by Endometriosis or other medical conditions, these are not significant contributors to infertility, infertility often is the result of age-related changes occurring in the reproductive hormones that stimulate egg development, trigger ovulation and support pregnancy

The most common Causes of Female Infertility

- . Perhaps most important, is depletion of a woman's ovarian reserve- the eggs she is born with.
- During her reproductive years, some eggs never mature and others are released during her menstrual cycles.
- Those remaining, age with her and the older she is, the more likely they are to have hard shells (zona pellucida)- that keep sperm from penetrating or genetic defects that prevent fertilization or cause miscarriage. When the store of healthy eggs is depleted, menopause occurs.



Female Infertility – Tubal Disease

The fallopian tubes carry eggs from the ovaries to the uterus. When tubes are blocked by scar tissue from Endometriosis, surgery or infection, the egg and/or the sperm cannot travel through. If a fertilized egg is trapped in the fallopian tube, the result is an Ectopic pregnancy, which must be treated with medication or surgery.

Tubal problems include

Infections : Sexually Transmitted Diseases, Gonorrhea and Chlamydia, often go unnoticed and untreated, causing Pelvic Inflammatory Disease (PID). Serious infection can cause scar tissue and damage the CILIA (the small hairs lining the tubes to help the eggs move through). Symptoms of sexually transmitted diseases include inflammation and abnormal discharge. PID can result in pelvic or abdominal pain. Severe, untreated infection has been linked to Cervical and other Cancers, Chronic Hepatitis and Cirrhosis of the liver.



Tubal problems include

Hydrosalpinges : This condition is caused by a severe blockage resulting from infection. It greatly reduces the chance of pregnancy without IVF because it stretches or distorts the fallopian tubes to the extent that they cannot be opened and/or repaired. When the tubes fill with fluid, there is a chance that it can leak back into the uterus. Because this fluid is toxic to embryos placed into the uterus during IVF, physicians often remove or surgically block the tubes before a cycle to improve embryo implantation rates



Tubal problems include

Endometriosis : Tissue lining the uterus (Endometrium) grows and thickens during a menstrual cycle to receive a fertilized egg (implantation). Without a pregnancy, the lining sheds and is discharged with blood during a menstrual period. Endometriosis occurs when this tissue grows outside the uterus and the shedding process deposits blood and tissue in the abdomen. As a result, scar tissue can form in the fallopian tubes, adhere to the ovaries and/or cause misalignment of the organs, preventing natural conception. Although some women have no discomfort even with severe endometriosis, others experience abnormal menstrual bleeding and pain, tenderness in the abdomen and pelvis, and/or painful intercourse.

Tubal Ligation: A form of birth control, this surgical procedure involves tying, clamping off or burning the ends of the fallopian tubes so pregnancy cannot occur.



Causes of Female Infertility -Fibroids and Polyps

These growths (Fibromas, Myomas and Leiomyoma's) are benign tumors made up of thread-like tissue that clumps together to form masses. Usually found inside the uterus, they affect implantation of the fertilized embryo. Symptoms associated with fibroids – especially if they are large – include heavy bleeding, pain and abdominal pressure.

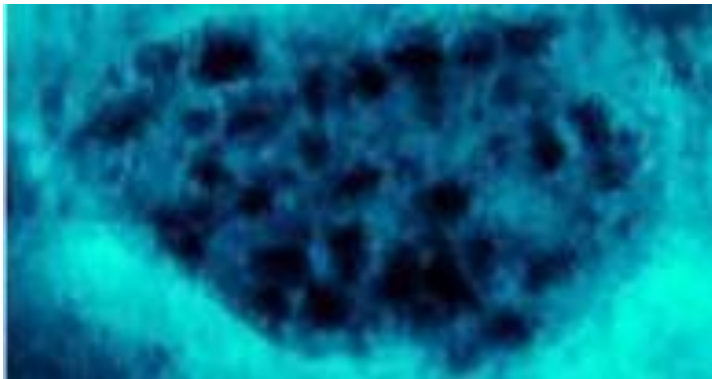
Treatment Options for Fibroids and Polyps

- Medication: Although medications can shrink fibroids in some cases, the result is not permanent. Instead, they can only temporarily reduce symptoms, delay surgery or shrink the fibroid enough to allow for a less invasive surgical procedure.
- Surgery: Required for removal of fibroids and polyps- if they are large enough and are affecting fertilization and/or embryo implantation.

Female Infertility – Ovulatory Dysfunction

Ovulatory Dysfunction results from Congenital Defects, Hormonal Deficiencies and/or the ageing process. Common forms of Ovulatory Dysfunction include:

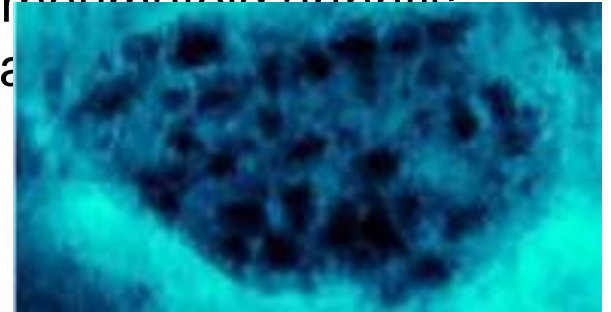
- Some women don't have menstrual periods while others menstruate but don't ovulate. -Women with Amenorrhea have never had a period or had irregular periods that stopped prematurely.
- With Anovulation, eggs aren't released from the follicles.
- Luteal Phase Defects occur when a woman has a menstrual cycle and is ovulating, but the cycle is too short for the uterine lining to thicken properly.



Female Infertility – Ovulatory Dysfunction

Premature Ovarian Failure: Menopause usually occurs after several decades of menstrual cycles and natural depletion of the ovarian reserve. Premature ovarian failure or early menopause can be caused by

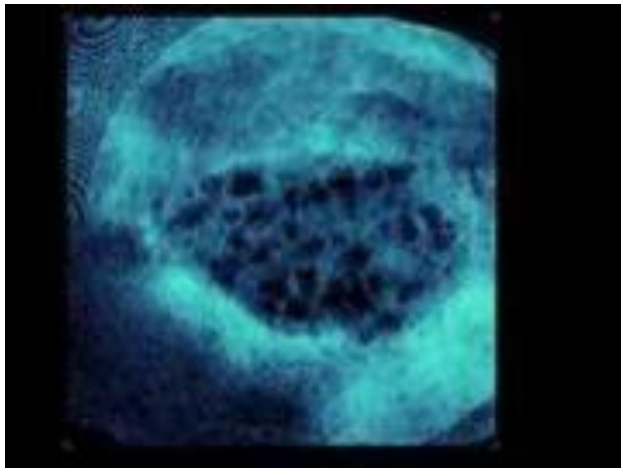
- exposure to certain chemicals
- Chemotherapy and radiation for cancer treatment.
- It also results from other conditions such as genital tuberculosis and endometriosis that affect the cycle-regulating hormones or damage the ovaries so they no longer produce eggs.
- Certain genetic disorders can trigger premature ovarian failure
- as can autoimmune diseases such as lupus or rheumatoid arthritis that cause the body to mistakenly attack the ovaries



Polycystic Ovarian Syndrome

Genetically linked hormonal imbalances can cause Poly Cystic Ovarian Syndrome (PCOS), a condition that prevents ovulation. Without the necessary level of Follicle Stimulating Hormone (FSH), the follicles don't develop properly and the eggs don't mature. An imbalance of Luteinizing Hormone (LH) causes overproduction of Estrogen, abnormal thickening of the uterine lining and very heavy and/or irregular periods. High levels of LH can trigger over production of male hormones including testosterone, which cause acne and facial hair in women. Over time the elevated estrogen levels associated with PCOS

and risk of uterine cancer and diabetes.



Hyperprolactinemia

This condition is associated with the pituitary gland located in the brain, which produces Prolactin to help regulate ovulation and stimulate breast milk production in pregnant women. Overproduction of Prolactin results from -tumors of the pituitary ,an under active thyroid (Hypothyroidism) or an adverse reaction to certain prescription medications(including Antihistamines, Oral Contraceptives, Tranquilizers and Antihypertensive). As a result, women experience irregular or no ovulation, and they may produce breast milk even though they aren't pregnant.



Hypothalamic Amenorrhea

The Hypothalamus gland, also located in the brain, produces Gonadotropin Release Hormone (GnRH). This chemical stimulates the pituitary gland to release Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). When the Hypothalamus stops producing GnRH as a result of this condition, it affects the FSH and LH levels needed for egg development and ovulation.



Medication: Birth control pills can stimulate and regulate the menstrual period if a woman is not trying to get pregnant. Infertility patients with PCOS may start with Clomiphene Citrate, a medication designed to stimulate the ovaries to produce multiple follicles and eggs. Other fertility drugs – Human Chorionic Gonadotropin (HCG) and Human Menopausal Gonadotropin (HMG) – also may be prescribed if Clomiphene Citrate alone is not effective. Finally, Progesterone may be necessary to help thicken the uterine lining and sustain pregnancy.

Medication also is available to suppress overproduction of Prolactin caused by Hyperprolactinemia. In cases of Hypothalamic Amenorrhea, Gonadotropins (LH and FSH) are prescribed to regulate levels of these hormones.

Ovulation Induction (OI): Used alone or with Insemination, OI relies on fertility drugs to stimulate development of the follicles and eggs. For this reason, it can be an effective treatment for various forms of ovulatory dysfunction and Luteal phase defects. As part of an OI cycle, Progesterone may be prescribed alone – or combined with other fertility medications – to stimulate development of the uterine lining to support pregnancy. Human Chorionic Gonadotropin (HCG) also may be prescribed to overcome Luteal phase defects by triggering ovulation.

In Vitro Fertilization (IVF): Recommended as it may offer the best chance for pregnancy when infertility is related to Ovulatory dysfunction. Hormones designed to regulate the reproductive cycle and stimulate the development of multiple eggs will provide more chances for fertilization. Donor In Vitro Fertilization : Required in cases of premature ovarian failure when there are no eggs available. Eggs from a young female donor, whose body has been stimulated by fertility drugs, are retrieved and fertilized in the laboratory with the male partner's sperm. The embryos are transferred into the recipient's uterus, which has been prepared to support pregnancy

Egg freezing/Oocyte freezing/Oocyte vitrification

Indications

Oocyte cryopreservation is aimed at three particular groups of women:

- Those diagnosed with cancer who have not yet begun chemotherapy or radiotherapy;
- Those undergoing treatment with assisted reproductive technologies who do not consider embryo freezing an option.
- And those who would like to preserve their future ability to have children, either because they do not yet have a partner, or for other personal or medical reasons.

Egg freezing/Oocyte freezing/Oocyte vitrification

Hundreds of thousands of women in the reproductive-age women are diagnosed with cancer each year all over the world. Chemotherapy and radiotherapy are toxic for oocytes, leaving few, if any, viable eggs. Egg freezing offers women with cancer the chance to preserve their eggs so that they can have children in the future.

Oocyte cryopreservation is an option for individuals undergoing IVF who object, either for religious or ethical reasons, to the practice of freezing embryos. Having the option to fertilize only as many eggs as will be utilized in the IVF process, and then freeze any remaining unfertilized eggs can be a solution. In this way, there are no excess embryos created, and there need be no disposition of unused frozen embryos, a practice which can create complex choices for certain individuals.

Egg freezing is also an option for women who, for the purpose of education, career or other reasons, desire to postpone childbearing. Some top Corporates such as Google and facebook have now come forward and offered egg freezing options for their workforce as it may ensure a chance for a future pregnancy.

Egg freezing/Oocyte freezing/Oocyte vitrification

Additionally, women with a family history of early menopause have an interest in fertility preservation. With egg freezing, they will have a frozen store of eggs, in the likelihood that their eggs are depleted at an early age.

Method

- The egg retrieval process for oocyte cryopreservation is the same as that for in vitro fertilization. This includes two weeks of hormone injections that stimulate ovaries to ripen multiple eggs. When the eggs are mature, final maturation induction is performed, by using human chorionic gonadotrophin. The eggs are subsequently removed from the body by transvaginal oocyte retrieval. The procedure is usually conducted under general Anaesthesia. The eggs are immediately frozen.
- Eggs (oocytes) are frozen using vitrification. Vitrification is much faster but requires higher concentrations of cryoprotectants to be added. The result of vitrification is a solid glass-like cell, free of ice crystals. Vitrification is associated with higher survival rates and better development compared to slow-cooling when applied to oocytes in metaphase II (MII).

Egg freezing/Oocyte freezing/Oocyte vitrification

When you are ready for pregnancy and wish to use the eggs for fertilization then the Embryologist will thaw the eggs and fertilise with the sperm from the male partner and the embryos will be grown in an incubator for 5 days and transferred at Blastocyst stage

Success rates

- The positive pregnancy rates with frozen eggs are slightly lower than frozen embryos
studies showed that the rate of birth defects and chromosomal defects when using cryopreserved oocytes is consistent with that of natural conception
- Recent modifications in protocol regarding cryoprotectant composition, temperature and storage methods have had a large impact on the technology and has very rapidly transformed it from an experimental procedure to a fairly widely used option by women.

Causes of Male Infertility

More than 90% of male infertility cases are due to low sperm counts, poor sperm quality, or both. The remaining cases of male infertility can be caused by a range of conditions including anatomical problems, hormonal imbalances, and genetic defects.

Sperm Abnormalities

- Sperm abnormalities are a critical factor in male infertility. These abnormalities include:
 - Low sperm count
 - Poor sperm motility (movement)
 - Abnormal sperm shape

Causes of Male Infertility

Risk Factors

- Risk factors for male infertility include:
- Varicocele, an enlarged varicose vein in the spermatic cord that connects to the testicle
- Aging, which can reduce sperm counts and motility and decrease the genetic quality of sperm
- Sexually transmitted diseases, which can cause scarring in the male reproductive system or impair sperm function
- Lifestyle factors such as smoking and substance abuse
- Long-term or intensive exposure to certain types of chemicals, toxins, or medications

Causes of Male Infertility

Diagnosis

- In addition to a medical history and physical exam, specific tests for male infertility include:
- Semen analysis to evaluate the quantity and quality of sperm
- Blood tests to evaluate hormone levels
- Imaging tests to look for structural problems
- Genetic testing to identify sperm DNA fragmentation, chromosomal defects, or genetic diseases

Causes of Male Infertility

Treatment

- Treatment for male infertility should first address any underlying medical conditions that may be contributing to fertility problems. Drug therapy may be used to treat hormonal disorders. Surgery may be used to repair varicoceles and correct any obstructions in the reproductive tract.
- If fertility issues remain unresolved, intracytoplasmic sperm injection (ICSI) is commonly used in combination with in vitro fertilization (IVF) to achieve pregnancy when male infertility is a factor. ICSI involves injecting a single sperm into an egg obtained through IVF. The fertilized egg is then implanted back into the woman.