Information for Patients

English

Male infertility

Patient Information

Table of contents

This information was last updated in March 2018.

This leaflet contains general information about male infertility. If you have any specific questions about your individual medical situation you should consult your doctor or other professional healthcare provider.

The content of this leaflet is in line with the EAU Guidelines on Male Infertility 2017.

This information was produced by the European Association of Urology (EAU) Patient Information Working Group.

Maria F. B. Andersen, M.D.	Roskilde (DK)
Juan Luis Vásquez, M.D.	Roskilde (DK)
Francesco Esperto, M.D.	Rome (IT)

Male infertility

What is male infertility?

Male infertility means not being able to father children. The word *infertility* is used when the female partner in a sexually active couple has not become pregnant after 1 year without the use of contraception. If the cause of the fertility problem is found in the man, this is male infertility. Male infertility is found in approximately half of all childless couples.

Male infertility has several causes:

- Hormonal problems
- Genetic disorder or chromosome defects
- Problems with the testicles and sperm production
- Difficulties with erection or ejaculation
- Some medications
- Trauma
- Cancer

The tests and treatments vary depending on the cause of infertility.

Diagnosis

Your doctor will do an examination and tests to evaluate the possible cause of male infertility.

Medical history

The medical history is a conversation with your doctor. The doctor will try to determine whether any lifestyle factors could affect your fertility. The interview will focus on different known causes:

- Thyroid disease
- Diabetes
- Erectile dysfunction
- Occupational or behavioural hazards such as working with pesticides
- Exposure to extreme heat
- Stress
- Current smoking or exposure to smoke during pregnancy
- The use of cannabis and alcohol, steroids, opioids, or androgens
- Prior surgery in the genital region
- Infections
- Trauma in the genital area
- Descent of the testicles at birth/in childhood

Some medications can also affect male fertility:

- Heart conditions: non selective beta blockers, thiazides, calcium channel blockers, digitalis, antiarrhytmics
- Antidepressants: tricyclic antidepressants, selective serotonin reuptake inhibitors (SSRI)
- Hormonal therapy: antiandrogens
- Painkillers and antipyretics: Nonsteroidal anti-inflammatory drugs (NSAIDs
- Antiepilectics and neuroleptics
- Antihistamine
- Antimycotics

Physical examination

The doctor will examine the male genitalia. This is done by looking at the genitals and then using a hand to feel them. Any abnormalities will be noted, such as lumps in the scrotum. In addition, your height and weight will be measured. Body mass index can affect:

- Erectile function
- Sexual hormone regulation
- Scrotal temperature
- Semen quality

Hormone blood tests

Hormones circulate in the blood stream. They can be taken from a vein with a simple blood sample and can give information about the function of the testicles. Other blood tests can show your doctor other diseases that can affect your fertility. Some typical blood tests may be run:

- Both gonadotropins: follicle-stimulating hormone (FSH) and luteinising hormone (LH)
- Prolactin
- Inhibin B
- Testosterone
- Sexual hormone binding globulin
- Thyroid hormones
- Cholesterol levels
- Blood glucose
- Tests for renal function and liver disease

Semen analysis

Your semen is collected by ejaculating into a sterile container. The semen is then analysed at a laboratory. Not having an ejaculation for 2–5 days before semen collection can provide a better sample for more precise semen analysis. A short time between collection and analysis also helps the accuracy of the test. Semen quality can change dramatically within days.

* The underlined terms are listed in the glossary.

Having at least two (or more) tests will give a clearer result.

The lab will assess the amount of semen and its colour, odor, and thickness. A microscope study will show the number of sperm cells and their health in the semen. Signs of infection can also be seen.

Additional tests

Ultrasound
An ultrasound uses sound waves to create an image of the tissue inside the body. It can be used to evaluate the tissue of the testicles and tubes that carry semen (vas).

Urine sample and urethral swab
A urine test and/or a urethral swab can be done to rule out any infections in the urogenital tract.

Testicular biopsy
Your doctor might want to rule out abnormal cell growth (malignant cells) or the early stages of cancer in the testicle. In this case, tissue from the testicle has to be analysed. Your doctor will numb the testicles (local anaesthesia) and make a small cut in each. A very small amount of tissue is taken from each testicle (biopsy) and sent for analysis.

Causes and treatment
In most cases of male infertility, either the semen is unable to reach the egg (obstructive) or the semen quality is poor (non-obstructive). The most common causes of male infertility and their treatments are discussed.

Obstructive causes of male infertility
The path of the sperm cells can be obstructed in several places:

- In the testicles, where sperm cells are produced
- In the epididymis, the tube that carries sperm from the testicle to the vas deferens
- In the vas deferens, the tube that transports sperm to the prostate

The most common causes of obstruction are infections (for example, gonorrhoea, chlamydia, prostatitis, tuberculosis), birth defects (congenital disorders), or trauma to the genitalia.

Treatment depends on the amount of obstruction. Semen can be collected by biopsy from the testicle or the epididymis. Surgery on the vas deferens can re-establish the pathway.

Cystic fibrosis
Cystic fibrosis (CF) is the most common genetic disorder in white persons, and a small number of white men have CF mutations. These men might lack the vas deferens on both sides. This means that sperm cells cannot mix with the ejaculate, so the ejaculate will not include any sperm (azoospermia). To achieve pregnancy, sperm must be collected directly from the testicles by a biopsy. In the case of CF as the cause of male infertility, the female partner should also be genetically tested for CF. Two carrier parents have a 50% chance of having a child with CF.

Vasectomy
Vasectomy is a surgical procedure that disconnects the epididymis from the vas deferens to make the man infertile. This procedure is permanent and is considered to be irreversible. In some cases it can be reversed, but the chance of success depends on when the vasectomy has taken place.

Problems with ejaculation
In some cases, the ejaculate cannot reach the urethra. The man might not be able to ejaculate, it might be delayed, or the semen might go into the bladder (retrograde ejaculation). Causes can be psychological, physical (for example, nervous system dysfunction after surgery or trauma), or related to medication use. Treatment options include medication and physical stimulation.

Non-obstructive causes of male infertility

Chromosomal abnormalities
Abnormal sexual chromosomes can cause low levels of testosterone. Klinefelter syndrome is the most common sexual chromosome abnormality. In some patients, this condition can cause characteristic features like long limbs, small firm testicles, and female-type hair distribution.

The treatment for this kind of infertility is to collect sperm cells directly from the testicle if possible (TESE). Sperm cells will be functional in less than half of men with Klinefelter syndrome.

Genetic defects
Low levels of sexual hormones affect male fertility. For example, Kallmann syndrome causes low levels of sexual hormones. Men with this syndrome often have low muscle mass, fatigue, infertility, erectile dysfunction, hot flashes, and enlarged breasts.

The treatment is to supplement male hormones using injections that can restore spermatogenesis completely (hormone therapy).

In addition, an increase in general health—for example, losing weight, stopping smoking, adjusting diet, and exercising regularly—may improve fertility.

Cryptorchidism

When a testicle does not descend into the scrotum, the condition is called *cryptorchidism*. It is a birth defect and is associated with infertility. However, if a man has only one undescended testicle, his ability to father children is almost equal to that of men without cryptorchidism.

When cryptorchidism is diagnosed in early childhood, surgery to move the testicle from the abdomen into the scrotum should be performed within the first year. This can prevent later infertility and reduce the risk of testicular cancer. If an adult has an undescended testicle, surgery can optimise testosterone production.

Cancer

Abnormal cell growth in the testicular tissue affects sperm production. So does cancer treatment. Testicular cancer is mostly seen in younger men and is associated with poor semen quality, cryptorchidism and in families with a history of testicular cancer.

Treatment is surgical removal of the testicle. Sometimes additional chemotherapy will be used, which can also lower semen quality. If a man wants to father children in the future, a semen sample should be collected and preserved before surgery.

Varicocele

Varicocele is enlargement of the veins that drain blood from the testicles. The condition affects about 2 in 10 men and is seen in a quarter of men with abnormal semen analysis. The enlargement of these veins can be uncomfortable and can lower sperm quality. It is not fully understood how varicocele affects fertility.

Infections in the male reproductive organs

Infections in the urethra, prostate, epididymis, and testicles are all potential causes for infertility. The infection creates antibodies that can lower semen quality. This can have a negative effect on fertility.

When the location of the infection and the bacteria are identified, the treatment is mostly antibiotics. Nevertheless, in almost half of cases, it is not possible to find a cause of infertility.

Semen samples and cryopreservation

Sometimes, semen must be collected for fertility treatment. Several procedures are used, depending on the problem.

- Testicular sperm extraction (TESE): a surgical biopsy of the testicle. Sperm cells can be retrieved and used for fertility treatment. TESE is performed using either local or general anaesthesia.
- Testicular sperm aspiration (TESA): a syringe and a needle are used to collect sperm cells from the testicular tissue by creating a negative pressure. TESA is performed using local anaesthesia.
- Micro-TESE: this technique is more complicated because it needs an operating microscope. Micro-TESE is used for men with very low sperm counts because it is better at finding sperm cells. It is performed using general anaesthesia.
- Microsurgical epididymal sperm aspiration (MESA): the sperm cells are extracted directly from the epididymis using a microscope. They can be examined right after collection. The procedure is performed using local or general anaesthesia.

If none of the procedures are an option for you, semen from donors can be used to achieve pregnancy. However, regulations regarding sperm donation vary between countries.

Chemotherapy and radiation therapy can affect a cell's DNA and damage sperm. If a man is waiting for chemotherapy or radiation therapy for any cancer, it is possible to store semen for later use.

Cryopreservation is used to postpone cell aging and cell death. This process stops cell metabolism by freezing. The semen sample is collected in a sterile container. The cryopreservation process starts immediately after the sample is made. When the sample is needed, the sample is thawed in a water bath at 37 degrees Celsius for 10 minutes. Not all semen samples survive thawing.

For more information please visit: patients.uroweb.org

Glossary of terms

Azoospermia
The absence of sperm in a semen sample

Biopsy
Removal of a small piece of tissue from the body

Chemotherapy
Use of chemicals or drugs to treat disease

Chlamydia
A sexually transmitted disease that, if untreated, can damage a woman's reproductive system

Congenital disorder
A malformation existing at birth

Cryptorchidism
A condition in which one or both testicles do not descend into the scrotum

Cryopreservation
Preservation of cells by freezing at extremely low temperatures

Cystic fibrosis
A congenital disorder that, among other things, can affect development of the vas deferens

Epididymis
The tube that carries sperm from the testicle to the vas deferens

Follicle-stimulating hormone (FSH)
A hormone that stimulates the growth and sexual development of the body, including the reproductive system (for example, sperm cells and eggs)

General anaesthesia
Use of drugs to suppress sensation while asleep

Gonorrhoea
A sexual transmitted disease caused by bacteria creating discharge from the urethra

Hormones
Proteins that stimulate specific functions of an organ or tissue

Hormone therapy
Supplementation of sex hormones using pills, injections, or topical applications

Infertility
The inability to cause pregnancy

Local anaesthesia
Use of drugs to suppress sensation in a specific body part while awake

Luteinizing hormone (LH)
A hormone that stimulates egg production in women and sexual hormone production in men

Male infertility
The inability of a man to father children

Malignant cells
Cells that grow in an abnormally fast, uncontrolled way, suggesting cancer

Obstructive infertility
Infertility caused by the semen being unable to reach the egg

Non-obstructive infertility
Infertility caused by poor semen quality

Prostate
A gland that produces ejaculatory fluid in men

Prostatitis
An (painful) inflammation of the prostate gland

Radiation therapy
Treatment with x-rays or radioactive materials

Retrograde ejaculation
Ejaculate goes into the bladder rather than out the urethra

Scrotum
The sack that hangs below the penis and contains the testicles

Semen
The penile ejaculate that carries sperm cells

Glossary of terms

Semen analysis
A test that evaluates the quality of the semen

Testicle
The male sexual gland contained in the scrotum. It produces male sexual hormones and sperm, the male reproductive cells.

Testicular sperm extraction (TESE)
Biopsy of the testicles to retrieve sperm cells

Tuberculosis
A bacterial infection that can affect all tissues and is characterised by creating nodules

Ultrasound
A test that uses high-frequency sound waves to capture live images from inside the body. It is performed outside the body (non-invasive) and does not require any preparation.

Urethra
In men, the tube that carries urine and semen out of the penis.

Varicocele
Enlargement of the veins that drain blood from the scrotum, similar to varicose veins in the legs

Vas deferens
The duct where the sperm cells are mixed with the semen for ejaculation

Vasectomy
A surgical procedure that interrupts the pathway of the sperm from the testicle to the vas deferens, causing infertility

European Association of Urology
PO Box 30016
NL-6803 AA ARNHEM
The Netherlands

e-Mail: info@uroweb.org
Website: patients.uroweb.org

Patient Information