OLIGOZOOSPERMIA

Oligospermia, A Low Sperm Count

Semen with a low concentration of sperm and is a common finding in male infertility.

Diagnosis  Male

Related Diagnoses:
Varicocele  Erectile dysfunction  Obesity  Undescended testes  Ejaculatory disorders  Thyroid disorders  Klinefelter syndrome
Sperm autoantibodies  Prostatitis  Asperma  Hypospermia  Cryptozoospermia  Idiopathic male infertility
Y-chromosome deletions  Hypoandrogenism

About Oligozoospermia

The oligozoospermia is a male diagnosis defined as a low sperm in the ejaculate whilst the sexual and ejaculation function is normal. This diagnosis belongs to a group of diagnosis of abnormal sperm quality (Pic. 1).

Sperm concentration (or sperm count) is the number of sperm in the ejaculate. The World Health Organization (WHO) now considers a low sperm count is less than 15 million sperm / ml.

It is important to say, that the sperm count is a relatively sensitive measure of overall health. Oligozoospermia can be the result of many factors; depending on the causing factors, oligozoospermia may be permanent or reversible. Chronic stress and sleeping disorders, work and emotional issues as well as unhealthy lifestyle, obesity, use of alcohol, tobacco or recreational drugs can all lower the sperm count at otherwise healthy men. Generally said, these effects are reversible upon recovery. Notably, pills to improve man erection, such as Viagra, Levitra and Cialis do not cause low sperm count.

Except health issues explained above, the causes of oligozoospermia include:

- An obstruction of the normal flow of sperm – due to such conditions as testicular trauma or vasectomy (surgical procedure for male sterilization). It may also result from scarring due to surgery on the male reproductive system, infection or sexually transmitted disease.
- Decrease of sperm production – due to varicoceles (abnormal enlargement of small veins in scrotum), hormonal disorders or diseases of the testicles.
- According to some researches, a low sperm count can be an indicator of general medical problem or a genetic condition. In few percentages of cases, low sperm count may be due to hormonal imbalances from prolactinoma, rare usually benign pituitary tumor (can be treated with medication). On the other hand, one of the most common causes of low sperm count is a varicocele (as mentioned above).

Increasingly, the genetic abnormalities are being found in men with severe oligozoospermia. These genetic abnormalities consist in missing regions (genes) on the Y chromosome. This abnormality is called microdeletions. These microdeletions are passed on to a male offspring. Other genetic abnormalities include conditions such as Klinefelter syndrome (XXY) or exchange of genetic material in non-sex chromosomes and all these abnormalities are detected by blood test.

Oligozoospermia is usually classified into 3 categories according to level of the low sperm count – mild, moderate and severe oligozoospermia. Table 1 shows how low sperm count is described, also in comparison with other diagnosis - cryptozoospermia and azoospermia.
Associated diseases

- azoospermia
- asthenospermia
- cryptozoospermia
- teratozoospermia

Complications

- infertility

Risk factors

- age (the semen parameters, such as sperm count spontaneously decrease between the ages of 22 and 80 years)
- obesity
- heart disease
- diabetes
- infections
- stress
- smoking
- medications (also antiandrogens, sulfa agents, Ca+ channel blockers, alpha blockers)
- anabolic steroid use
- testicular trauma
- sexually transmitted disease
- varicocele
- genetic abnormalities at the Y chromosome - microdeletions
- abnormal set of chromosomes - Klinefelter syndrome
- ejaculatory duct obstruction
- benign prostatic hyperplasia
- prolactinoma – benign pituitary tumor
- hypogonadism due to various causes
- cryptorchidism
- hydrocele
- mumps
- malaria
- multiple sclerosis
- industrial toxins: Dioxin, PCBs (polychlorinated biphenyl), bisphenol A

Impact on fertility

Oligozoospermia is the abnormality of sperm count in semen. Depending upon the sperm count, the chance of conception can be lower than at a healthy man. The smaller sperm count is, the chance to conceive decreases. However, chances are very good if a female partner is fertile.

Besides, exclusion of other abnormal characteristics of sperm cells, such as shape or motility is necessary, and thus the combination of oligozoospermia with asthenozoospermia or teratozoospermia. The combination of oligozoospermia with other diagnosis of abnormal characteristics of sperm cells may even more decrease the chances for successful conception.
Prevention

- avoiding drugs, alcohol, smoking
- keeping healthy lifestyle
- prevention of sexually transmitted diseases

Symptoms

There are no specific symptoms of oligozoospermia. The patient usually gets to know the diagnosis when having problems with conception.

The secondary symptoms can vary in dependence on underlying condition such as healthy lifestyle, level of stress, anxiety or weakened immune system due to infection or illness. At some risk factors we can observe more symptoms such as those:

- at sexually transmitted diseases – burning with urination, testicular pain
- at varicocele – dilated veins in the scrotum or swelling of the scrotum

Therapies

Self therapy

A conservative regime can improve a semen quality after a transient illness or due to secondary factors. It is recommended to reduce the level of stress, achieve the optimal weight and the attention ought to be paid to healthy lifestyle. It is recommended to limit or avoid the alcohol intake as well as smoking.

Chinese medicine

Several studies have proven that Traditional Chinese herb medicine may increase sperm parameters and thus to increase the sperm concentration besides the others. Usually, the treatment of Chinese herb medicine was combined by vitamin E. It has been also proven that acupuncture, as a ancient form of Chinese medicine may notably increase sperm quality.

Conventional medicine

The sperm count may be increased by several treatments, depending upon the patient health and other complications.

Pharmacotherapy

Hormonal therapy
Clinical trials have shown that hormonal therapy has no value at oligozoospermia. However, rarely the severe oligozoospermia is due to isolated deficiency of FSH (follicle-stimulating hormone), which responds to replacement therapy.

Antioxidants
Low levels of free radicals (ROS) can initiate sperm activation, thus the ROS levels are regulated by natural antioxidants in seminal plasma: vitamin C and vitamin E, zinc, catalase, superoxide dismutase, glutathione peroxidase.
Surgical therapy

Surgical therapy of varicoceles
Varicoceles are one of the most frequent specified diagnoses at oligozoospermia. They occur in about 20 % of fertile men but were found in 40 % of subfertile men with oligozoospermia. In oligozoospermic men with varicoceles there are often more additional features appeared such as gland infection, unilateral obstruction or anti-sperm antibodies.

Varicocele surgery contains supra-inguinal ligation, open ligation is usually reserved for 5 % of recurrences that occur. Bilateral varicocele may be treated laparoscopically. Most couples may prefer assisted conception however obliteration of internal spermatic veins by interventional radiology is also often accepted (especially if the female partner is younger than 30 years).

Assisted reproduction

Assisted reproductive technology (ART) is the technology used to achieve pregnancy in procedures such as fertility medication, artificial insemination, in vitro fertilization and surrogacy. It is reproductive technology used primarily for infertility treatments, and is also known as fertility treatment. It mainly belongs to the field of reproductive endocrinology and infertility, and may also include intracytoplasmic sperm injection (ICSI) and cryopreservation. Some forms of ART are also used with regard to fertile couples for genetic reasons (preimplantation genetic diagnosis). ART is also used for couples who are discordant for certain communicable diseases; for example, HIV to reduce the risk of infection when a pregnancy is desired.

If conservative medical treatments fail to achieve a full term pregnancy, the physician may suggest the patient undergo in vitro fertilization (IVF). IVF and ART generally start with stimulating the ovaries to increase egg production. Most fertility medications are agents that stimulate the development of follicles in the ovary. Examples are gonadotropins and gonadotropin releasing hormone. After stimulation, the physician surgically extracts one or more eggs from the ovaries, and unites them with sperm in a laboratory setting, with the intent of producing one or more embryos. Fertilization takes place outside the body, and the fertilized egg is reinserted into the woman's reproductive tract, in a procedure called embryo transfer.

Intracytoplasmic sperm injection (ICSI) is beneficial in the case of male factor infertility where sperm counts are very low or failed fertilization occurred with previous IVF attempt(s). The ICSI procedure involves a single sperm carefully injected into the center of an egg using a microneedle. With ICSI, only one sperm per egg is needed. Without ICSI, you need between 50,000 and 100,000.

Find more about related issues

Diagnoses

Varicocele
An abnormal enlargement of the pampiniform venous plexus in the scrotum.
Learn more at: www.fertilypedia.org/therapy/diag/varicocele

Erectile dysfunction
The inability (that lasts more than 6 months) to develop or maintain an erection of the penis during sexual activity.
Learn more at: www.fertilypedia.org/therapy/diag/erectile-dysfunction

Obesity
A disease of excess body fat that can have a negative effect on health, leading to reduced life expectancy and other health problems.
Learn more at: www.fertilypedia.org/therapy/diag/obesity
Undescended testes
In the case of cryptorchidism one or both testes are absent from the scrotum. It is the most common etiologic factor of azoospermy in the adult.
Learn more at: www.fertilitypedia.org/therapy/diag/undescended-testes

Ejaculatory disorders
A class of sexual disorders defined as the subjective lack of normal ejaculation.
Learn more at: www.fertilitypedia.org/therapy/diag/ejaculatory-disorders

Thyroid disorders
A medical condition impairing the function of the thyroid.
Learn more at: www.fertilitypedia.org/therapy/diag/thyroid-disorders

Klinefelter syndrome
The set of symptoms that result from two or more X chromosome in males.
Learn more at: www.fertilitypedia.org/therapy/diag/klinefelter-syndrome

Sperm autoantibodies
Antibodies that bind to sperm, inhibiting their movement, stopping recognition and entry into the egg.
Learn more at: www.fertilitypedia.org/therapy/diag/sperm-autoantibodies

Prostatitis
An inflammation of the prostate gland.
Learn more at: www.fertilitypedia.org/therapy/diag/prostatitis

Aspermia
Male diagnosis connected with male infertility characterised by the complete absence of semen.
Learn more at: www.fertilitypedia.org/therapy/diag/aspermia

Hypospermia
A condition in which a man has an unusually low ejaculate (or semen) volume.
Learn more at: www.fertilitypedia.org/therapy/diag/hypospermia

Cryptozoospermia
Male infertility diagnosis characterized by extremely low concentration of sperm in semen.
Learn more at: www.fertilitypedia.org/therapy/diag/cryptozoospermia

Idiopathic male infertility
A condition in which fertility impairment occurs spontaneously or due to an unknown cause.
Learn more at: www.fertilitypedia.org/therapy/diag/idiopathic-male-infertility

Y-chromosome deletions
A family of genetic disorders caused by missing gene(s) in the Y chromosome.
Learn more at: www.fertilitypedia.org/therapy/diag/y-chromosome-deletions

Hypoandrogenism
A medical condition characterized by not enough androgenic activity in the body.
Learn more at: www.fertilitypedia.org/therapy/diag/hypoandrogenism

Organ

Bulbourethral gland
Bulbourethral gland is one of two small exocrine glands in the reproductive system of male.
Learn more at: www.fertilitypedia.org/edu/organs/bulbourethral-gland
Epididymis
The epididymis is a tube that connects a testicle to a vas deferens in the male reproductive system. Learn more at: www.fertilitypedia.org/edu/organs/epididymis

Hypothalamus
A region of the forebrain that regulates body temperature, some metabolic processes and governs the autonomic nervous system. Learn more at: www.fertilitypedia.org/edu/organs/hypothalamus

Pituitary gland
An endocrine gland, about the size of a pea, whose secretions control the other endocrine glands and influence growth, metabolism, and maturation. Learn more at: www.fertilitypedia.org/edu/organs/pituitary-gland

Prostate
A walnut-sized structure that is located below the urinary bladder in front of the rectum. Learn more at: www.fertilitypedia.org/edu/organs/prostate

Testes
Male gonads which produce both sperm and androgens, such as testosterone, and are active throughout the reproductive lifespan of the male. Learn more at: www.fertilitypedia.org/edu/organs/testes

Reproductive cells

Spermatogonium
An undifferentiated male germ cell with self-renewing capacity representing the first stage of spermatogenesis. Learn more at: www.fertilitypedia.org/edu/reproductive-cells/spermatogonium

Biological control

Follicle-stimulating hormone
FSH is a hormone secreted by the anterior pituitary gland. It regulates the development, growth, pubertal matur and reproductive functions of the body. Learn more at: www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone

Progesterone
Steroid hormone, secreted by the ovaries, whose function is to prepare the uterus for the implantation of a fertilized ovum and to maintain pregnancy. Learn more at: www.fertilitypedia.org/edu/biological-control/progesterone

Testosterone
Steroid hormone produced primarily in the testes of the male; responsible for the development of secondary sex characteristics in the male. Learn more at: www.fertilitypedia.org/edu/biological-control/testosterone

Reproductive functions

Fertilization
The fusion of an ovum with a sperm to initiate the development of a new individual organism. Learn more at: www.fertilitypedia.org/edu/reproductive-functions/fertilization

Spermatogenesis
Process in which spermatozoa are produced from male primordial germ cells in testicles by way of mitosis and meiosis. Learn more at: www.fertilitypedia.org/edu/reproductive-functions/spermatogenesis
Risk factors

Low level of testosterone
An abnormally low testosterone production which may occur because of testicular or hypothalamic-pituitary dysfunction.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-testosterone

Symptoms

Low concentration of sperm
A condition refers to semen with a low concentration of sperm.
Learn more at: www.fertilitypedia.org/edu/symptoms/low-concentration-of-sperm

Therapies

Egg donation
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: www.fertilitypedia.org/edu/therapies/egg-donation

ICSI
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: www.fertilitypedia.org/edu/therapies/icsi

Sperm donation
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.
Learn more at: www.fertilitypedia.org/edu/therapies/sperm-donation

Standard IVF
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: www.fertilitypedia.org/edu/therapies/standard-ivf

Gallery

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sperm concentration in ejaculate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild oligospermia</td>
<td>10 million to 20 million sperm/ml</td>
</tr>
<tr>
<td>Moderate oligospermia</td>
<td>5 million to 10 million sperm/ml</td>
</tr>
<tr>
<td>Severe oligospermia</td>
<td>0 to 5 million sperm/ml</td>
</tr>
<tr>
<td>Cryptozoospermia</td>
<td>0 - rare sperm</td>
</tr>
<tr>
<td>Azoospermia</td>
<td>0 sperm</td>
</tr>
</tbody>
</table>

The picture presents the sperm cells characteristics which are analyzed and which disease is diagnosed.

Sources

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