OBSTRUCTIVE AZOOSPERMIA

Posttesticular Azoospermia, Excretory Azoospermia

Medical condition where sperm are produced but not ejaculated due to physical obstruction.

About Obstructive azoospermia

Obstructive azoospermia (OA) is defined as the absence of spermatozoa in the ejaculate despite normal spermatogenesis, but either a mechanical blockage exists in the genital tract between the epididymis and the ejaculatory duct or the vasa deferentia are absent. A normal testicular biopsy is pathognomonic for obstruction, and a vasography should be indicated to identify the site of the obstruction.

OA is a common urologic condition and accounts for 6.1% to 13.6% of patients presenting for fertility evaluation. Causes of OA may be either acquired or congenital and include vasectomy, failure of vasectomy reversal, post-infectious diseases, surgical procedures in the scrotal, inguinal, pelvic or abdominal regions, cystic fibrosis, congenital absence of the vas deferens (CAVD), ejaculatory duct or prostatic cysts and Young's syndrome.

While some of these conditions are amenable to curative surgery, others will require sperm retrieval and in-vitro fertilization/intracytoplasmic sperm injection (IVF/ICSI).

Common causes of obstructive azoospermia:
**Vasectomy**

Prevalence of vasectomy varies by country and is influenced by affluence, religion, and culture. Vasal reconstruction is the preferred method for restoration of fertility after a vasectomy, and due to the popularity of vasectomy and frequency of divorce, the demand for this procedure will continue to grow. Reconstruction is less expensive than sperm retrieval paired with IVF/ICSI, avoids the risks associated with IVF/ICSI, and offers the possibility of natural conception and multiple pregnancies over time without additional expense. Sperm retrieval may be a reasonable option in couples likely to require IVF for concomitant female factor due to advanced age or tubal disease. In these cases, sperm can readily be obtained through PESA performed with local anesthetic or sedation. The physical exam should confirm normal testicles bilaterally. Enlarged epididymides are common, and the location and size of the vasectomy defects should be noted.

**Infection**

Epididymitis is a common genitourinary condition, and an infectious etiology should always be considered in men with this diagnosis. Gonorrhea, chlamydia, trichomonas, brucellosis, BCG, ureaplasma, mycoplasma, coliforms bacteria, adenovirus, and enterovirus have all been reported as causes of epididymitis. Regardless of the etiology, epididymitis can cause an intense inflammatory reaction, leading to secondary scarring and obstruction of the epididymis. Physical examination may reveal enlarged or indurated epididymides and a transition point suggesting the site of obstruction. Semen volumes are typically normal, and white cells are not necessarily present in the ejaculate or urine outside of the period of acute infection. In cases of tuberculosis, the vas deferens may be nodular and enlarged, and a low-volume ejaculate may be present when the disease involves the prostate and seminal vesicles. Infection was the proposed etiology for obstructive azoospermia in 8-46% of patients undergoing vasal reconstruction in several large series. Scrotal exploration and microsurgical reconstruction is a viable option for post-infectious epididymal obstruction. A notable exception is genitourinary tuberculosis. Once identified, prompt treatment for genitourinary tuberculosis should be initiated, as early treatment may resolve the inflammation and return sperm to the ejaculate. Sperm retrieval paired with IVF/ICSI should be considered for patients who remain azoospermic despite adequate treatment for tuberculosis.

**Iatrogenic injury**

Injury to the vas during surgical procedures has been well described and presents a unique challenge to fertility specialists. Vasal injury has been attributed to a variety of inguinal, scrotal, and pelvic surgeries, including herniorrhaphy, hydrocelectomy, appendectomy, and renal transplant. Trauma is a rare cause of vasal obstruction. Transection, compression, fibrosis, and ischemic injury are all possible mechanisms for vasal injury.
Surgical reconstruction is possible in many cases of iatrogenic injury to the vas in the scrotum or inguinal canal.

**Wolffian duct anomalies**

Congenital bilateral absence of the vas deferens (CBAVD) is often caused by a mutation in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. This condition is suspected based on the absence of palpable vas deferens at the time of physical exam. CBAVD can also be associated with unilateral renal agenesis in a minority of patients. Unilateral or bilateral vasal hypoplasia or unilateral absence of the vas may be an indicator of obstructive azoospermia, as a high percentage of these patients will have anomalies of the contralateral seminal vesicle. Surgical reconstruction may be a viable treatment for some patients with unilateral vasal agenesis or hypoplasia. CBAVD is not amenable to surgical reconstruction, but sperm is readily retrievable from these patients via percutaneous (PESA) or microsurgical (MESA) epididymal aspiration, testicular sperm aspiration (TESA), or simple open biopsy (TESE).

**Young’s syndrome**

Young's syndrome, also known as azoospermia sinopulmonary infections, sinusitis-infertility syndrome and Barry-Perkins-Young syndrome, is a rare condition that encompasses a combination of syndromes such as bronchiectasis, rhinosinusitis and reduced fertility. In individuals with this syndrome, the functioning of the lungs is usually normal but the mucus is abnormally viscous. The reduced fertility (azoospermia) is due to functional obstruction of sperm transport down the genital tract at the epididymis where the sperms are found in viscous, lipid-rich fluid. Genetic testing should be performed in patients presenting with signs and symptoms of Young’s syndrome. Surgical reconstruction, while technically feasible, has resulted in poor outcomes in traditional cases of Young’s syndrome. Sperm retrieval paired with IVF/ICSI is the best option for these couples.

**Ejaculatory duct obstruction**

Ejaculatory duct obstruction (EDO) is a rare cause of OA. EDO is an evolving topic, and a discussion regarding partial vs. complete EDO and functional vs. anatomic obstruction is beyond the scope of this chapter. The diagnosis of complete EDO should be suspected when the patient has low-volume, acidic semen that contains no sperm. An absence of fructose in the semen supports the diagnosis, as fructose is present in the secretions from the seminal vesicles. Occasionally, pain at the time of ejaculation is reported. Physical examination may reveal enlarged seminal vesicles or a midline nodule in the prostate, but frequently, the rectal exam is unremarkable. Testicular volume is usually normal, and the vasa deferentia are present. Laboratory studies will confirm normal gonadotropin and testosterone levels. Retrograde ejaculation should be rule out by examining post-ejaculatory urine for sperm. Transrectal
ultrasound is a useful tool for confirming the diagnosis and further defining the causative factor.

**Associated diseases**

- epididymitis
- sinopulmonary infection
- Young’s syndrome

**Complications**

Obstructive azoospermia is one cause of male infertility.

**Risk factors**

- vasal reconstruction
- iatrogenic injury
- herniorrhaphy of an omphalocele immediately after birth
- sterilization
- obstructive interval
- granuloma

**Impact on fertility**

Despite being associated with infertility, azoospermia does not necessarily imply sterility because many azoospermic men maintain sperm production at varying levels within the testes. Although selected cases of OA may be surgically correctable, **treatment options for most couples with azoospermia-related infertility will ultimately include assisted**
reproductive techniques (ART), which is a broad term used to define any procedure that involves handling of both sperm and oocytes outside the body, such as in vitro fertilization (IVF) and its variant, intracytoplasmic sperm injection (ICSI).

**Prevention**

Obstructive azoospermia cannot be prevented.

**Symptoms**

- pain
- acidic semen
- enlarged seminal vesicles
- retrograde ejaculation
- absence of palpable vas deferens
- indurated epididymis

**Therapies**

**Self therapy**

For men working to reverse azoospermia, eating a nutrient dense whole food diet is going to be very important. Today’s modern diet often doesn’t nourish the body properly and that is where nutritional supplementation can be useful in improving sperm production.

**Conventional medicine**

**Pharmacotherapy**

Pharmacotherapy has a role in the obstructive azoospermia above all post infection and post inflammatory lesions prevention.
Surgical therapy

The microsurgical approach is the gold standard for vasal reconstruction, as the precise mucosal-to-mucosal anastomosis is believed to result in superior outcomes.

Some of the most prevalent microsurgical procedures include:

Vasovasostomy

Vasovasostomy (literally connection of the vas to the vas) is a surgery by which vasectomies are partially reversed. Another surgery for vasectomy reversal is vasoepididymostomy. In most cases the vas deferens can be reattached but, in many cases, fertility is not achieved. There are several reasons for this, including blockages in the vas deferens, and the presence of autoantibodies which disrupt normal sperm activity. If blockage at the level of the epididymis is suspected, a vasoepididymostomy can be performed. Return of sperm to the ejaculate depends greatly on the length of time from the vasectomy and the skill of the surgeon. Generally, the shorter the interval, the higher the chance of success. The likelihood of pregnancy can depend on female partner factors. Over half of men who have undergone a vasectomy develop anti-sperm antibodies. The effects of anti-sperm antibodies continue to be debated in the medical literature, but there is agreement that antibodies may reduce sperm motility.

Vasoepididymostomy

Vasoepididymostomy or epididymovasostomy is a surgery by which vasectomies are reversed. Vasoepididymostomy is often considered one of the most technically challenging operations in the field of urology. The procedure requires anastomosis of a single epididymal tubule to the lumen of the vas deferens, and is reserved for patients with congenital or acquired epididymal obstruction, or patients who have failed previous attempts at surgical reconstruction of the vas deferens. This surgery attaches the vas deferens directly to the epididymis, the coiled tube on the back of each testicle where sperm matures. A vasectomy can cause blockages or a break in the vas deferens or the epididymis. This surgery is used when a vasovasostomy won’t work because sperm flow is blocked. The vas deferens is connected to the epididymis above the point of blockage.
If conservative medical treatments fail to achieve a full term pregnancy, the physician may suggest the patient undergo assisted reproduction technology (ART). Although selected cases of OA may be surgically correctable, treatment options for most couples with azoospermia-related infertility will ultimately include assisted reproductive techniques (ART), which is a broad term used to define any procedure that involves handling of both sperm and oocytes outside the body, such as in vitro fertilization (IVF) and its variant, intracytoplasmic sperm injection (ICSI). To this end, several sperm retrieval methods have been developed to collect epididymal and testicular sperm to be used in conjunction with ART for men with azoospermia. Briefly, either percutaneous (PESA) or microsurgical epididymal sperm aspiration (MESA) are used to retrieve sperm from the epididymis in men with obstructive azoospermia, and testicular sperm aspiration (TESA) or testicular sperm extraction (TESE) are used to retrieve sperm from the testes both in men with OA who fail PESA.

Intracytoplasmic sperm injection, which is mainly intended to bypass severe male factor infertility, including azoospermia, has become the most used form of ART treatment. Although these treatments improve the chances that a couple become parents, they also carry risks, including multiple gestations and preterm delivery, which carries an increased risk of short- and long-term post-natal complications. Nevertheless, there has been a large number of babies born after ICSI in cases of severe male infertility, including azoospermia, and concerns still exist regarding whether the use of spermatozoa from such individuals might affect the health of offspring.

Find more about related issues

Diagnoses

Azoospermia
Complete absence of sperm in the ejaculate of a man.
Learn more at: [www.fertilitypedia.org/therapy/diag/azoospermia](http://www.fertilitypedia.org/therapy/diag/azoospermia)
Anejaculation
The pathological inability to ejaculate in males, with (orgasmic) or without (anorgasmic) orgasm.
Learn more at: www.fertilitypedia.org/therapy/diag/anejaculation

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

Retrograde ejaculation
The semen, which would normally be ejaculated via the urethra, is redirected to the urinary bladder.
Learn more at: www.fertilitypedia.org/therapy/diag/retrograde-ejaculation

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

Teratospermia
Teratospermia is a condition characterized by the presence of sperm with abnormal morphology that affects fertility in males.
Learn more at: www.fertilitypedia.org/therapy/diag/teratospermia

Organs

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
**Penis**
External male sex organ that additionally serves as the urinal duct.
Learn more at: [www.fertilitypedia.org/edu/organs/penis](http://www.fertilitypedia.org/edu/organs/penis)

**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](http://www.fertilitypedia.org/edu/organs/prostate)

**Scrotum**
Scrotum is an anatomical male reproductive structure that consists of a suspended sack of skin and smooth dual-chamber muscle located under the penis.
Learn more at: [www.fertilitypedia.org/edu/organs/scrotum](http://www.fertilitypedia.org/edu/organs/scrotum)

**Seminal vesicles**
One of two simple tubular glands responsible for the production of about 60 percent of the fluid that ultimately becomes semen.
Learn more at: [www.fertilitypedia.org/edu/organs/seminal-vesicles](http://www.fertilitypedia.org/edu/organs/seminal-vesicles)

**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](http://www.fertilitypedia.org/edu/organs/testes)

**Vas deferens**
The duct in the testicle that carries semen from the epididymis to the ejaculatory duct.
Learn more at: [www.fertilitypedia.org/edu/organs/vas-deferens](http://www.fertilitypedia.org/edu/organs/vas-deferens)

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**Reproductive cells**

**Sperm**
A male reproductive cell which is able to fertilize the counterpart female gamete - the oocyte.
Learn more at: [www.fertilitypedia.org/edu/reproductive-cells/sperm](http://www.fertilitypedia.org/edu/reproductive-cells/sperm)

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**Reproductive functions**

**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](http://www.fertilitypedia.org/edu/reproductive-functions/spermatogenesis)
Risk factors

Groin surgery
A surgery, which is performed in inguinal part of the body.
Learn more at: www.fertilitypedia.org/therapy/rfcgroin-surgery

Vasectomy
Vasectomy is a surgical procedure for male sterilization and/or permanent contraception.
Learn more at: www.fertilitypedia.org/therapy/rfcvasectomy

Symptoms

Abnormal semen pH
A pH value outside of the normal range which is harmful to sperm.
Learn more at: www.fertilitypedia.org/edu/symptoms/abnormal-semen-ph

Abnormal sperm morphology
A normal sperm morphology of less than 4% of sperms in an ejaculate.
Learn more at: www.fertilitypedia.org/edu/symptoms/abnormal-sperm-morphology

Absence of sperm in ejaculate
The medical condition of a man whose semen contains no sperm.
Learn more at: www.fertilitypedia.org/edu/symptoms/absence-of-sperm-in-ejaculate

Low semen volume
A condition in which a man has an unusually low ejaculate (or semen) volume, less than 1.5 ml.
Learn more at: www.fertilitypedia.org/edu/symptoms/low-semen-volume

Reduced sperm motility
The decreased ability of sperm cell to move progressively.
Learn more at: www.fertilitypedia.org/edu/symptoms/reduced-sperm-motility

Sexual frustration
A frustration caused by a discrepancy between a person’s desired and achieved sexual activity.
Learn more at: www.fertilitypedia.org/edu/symptoms/sexual-frustration

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](http://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](http://www.fertilitypedia.org/edu/therapies/icsi)

**Laser-assisted immotile sperm selection**
Method, which uses a laser to identify viable sperm cell, recommended in MESA/TESA IVF cycles or in patients diagnosed with sperm immotility.
Learn more at: [www.fertilitypedia.org/edu/therapies/laser-assisted-immotile-sperm-selection-1](http://www.fertilitypedia.org/edu/therapies/laser-assisted-immotile-sperm-selection-1)

**MESA**
A microsurgical procedure to harvest sperm from the single epididymal tubule (epididymis), used in the case of obstructive azoospermia.
Learn more at: [www.fertilitypedia.org/edu/therapies/mesa](http://www.fertilitypedia.org/edu/therapies/mesa)

**Micro TESE**
Microsurgical method used to identify areas of sperm production within the testes with the aid of optical magnification.
Learn more at: [www.fertilitypedia.org/edu/therapies/micro-tese](http://www.fertilitypedia.org/edu/therapies/micro-tese)

**PESA**
Sperm aspiration procedure in which a needle is inserted into the epididymis in order to retrieve sperm.
Learn more at: [www.fertilitypedia.org/edu/therapies/pesa](http://www.fertilitypedia.org/edu/therapies/pesa)

**Preimplantation genetic diagnosis**
Technology that allows couples with a family history of monogenic disorders, x-linked diseases and chromosomal abnormality have a healthy baby.
Learn more at: [www.fertilitypedia.org/edu/therapies/preimplantation-genetic-diagnosis](http://www.fertilitypedia.org/edu/therapies/preimplantation-genetic-diagnosis)

**Preimplantation genetic screening**
The term PGS is used to denote procedures that do not look for a specific disease but to identify embryos at risk of de-novo occurring aneuploidies.
Learn more at: [www.fertilitypedia.org/edu/therapies/preimplantation-genetic-screening-1](http://www.fertilitypedia.org/edu/therapies/preimplantation-genetic-screening-1)
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

TESE
Removal of a small portion of testicular tissue in order to extract a few viable sperm. Learn more at: www.fertilitypedia.org/edu/therapies/tese

Sources

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