

Varicoceles

Male factor infertility occurs in approximately 50% of couples with infertility. Therefore, it is important to identify the cause of the problem. Varicoceles (or enlarged veins filled with extra blood around the testicles) are one of the most common treatable and reversible causes of male factor infertility. A man must be examined to identify whether varicoceles are present.

Varicoceles are present in an estimated 15 percent of all men, whereas approximately 40 percent of men undergoing evaluation for [infertility](#) are diagnosed with this condition. Interestingly, about 60% of couples trying for additional children (secondary infertility) have evidence of a varicocele. No racial or ethnic groups are known to be at higher risk for development of a varicocele.

What are varicoceles?

The spermatic cord is the structure that provides the blood supply to the testicle and contains the [vas deferens](#) which transports sperm from the testicles. The blood supply to the testicle passes through the inguinal canal (groin) and continues into the [scrotum](#). The pampiniform plexus is a group of small veins, which drain the blood from the testicles and lies within the spermatic cord. The pampiniform plexus is believed to have an important functional role in maintaining testicular temperature in the appropriate range for sperm production (approximately 1.5 degree less than the body). The pampiniform plexus cools blood in the testicular artery before it enters the testicles, helping to maintain an ideal testicular temperature, important for optimal sperm production and function.

Varicoceles are abnormal enlargements (dilations) of the veins (called the pampiniform plexus) within the scrotum. They are similar to varicose veins of the leg, and often form during puberty. They can become larger and thus more noticeable with time. Left-sided varicoceles are more common than right-sided varicoceles, likely due to differences in anatomy between the two sides.

What can cause varicoceles and how do they affect fertility?

Several causes of varicoceles have been suggested. Non-working or absent valves within the veins to the testis may lead to pooling of blood and the abnormal enlargement in the veins. This pooling of blood can lead to increased scrotal temperatures and the elevated scrotal temperature can lead to problems with sperm. It is also possible that the pooling of blood causes substances to be released that are toxic to the testis and affect the sperm. A varicocele on one side may have effects on both testicles due to the heat or toxin effect. Additionally, the angle at which the testicular vein enters the renal (kidney) vein may produce relatively high pressure within this venous system, leading to the swelling (dilation) of the veins. This explains why varicoceles are more common on the left side since the testicular vein on the left side enters the renal vein. The right testicular vein is not as long and does not join with the right renal vein.

Rarely, enlarged lymph nodes or other abnormal masses in the retroperitoneum (the space behind the abdominal cavity) will block the gonadal veins, leading to increased pressure in the veins and varicocele formation. This mechanism is only of concern when one develops a new varicocele or a right varicocele is present alone. This situation is quite rare.

What are the symptoms of varicoceles?

Most men diagnosed with a varicocele have no symptoms, but varicoceles are important for several reasons. Varicoceles are thought to cause infertility and testicular atrophy (shrinkage).

Approximately 40 percent of cases of primary male infertility and 60 percent of cases of secondary (history of prior children or pregnancies) male infertility are believed to be due to varicoceles. Varicoceles rarely cause pain. When pain is present, it can vary, but typically causes a dull, heavy discomfort. The associated symptoms may increase with sitting, standing or physical exertion - particularly if any one of these activities occurs over long periods of time. Symptoms often progress over the course of the day, and they are typically relieved when the patient lies on his back, allowing improved drainage of the veins around the testicles.

How are varicoceles diagnosed?

A physical examination of the male is necessary to identify a varicocele or other causes of male factor infertility. Large varicoceles can be discovered through self-examination. They may look or feel like a mass in the scrotum, and they have been described as having a "bag of worms" both because of their appearance and the way they feel. Asymptomatic varicoceles are often diagnosed on physical examination at the time of routine medical evaluation. Physicians typically diagnose varicoceles with the patient in the standing position. The patient may be asked to take in a deep breath, hold it, and bear down while the physician feels the scrotum above the testicle. This technique, known as the Valsalva maneuver, assists the physician in detecting abnormal enlargement or increased fullness of the pampiniform plexus of veins. A physician may order a scrotal [ultrasound](#) test to help make the diagnosis, particularly if the physical examination is difficult or inconclusive. If a varicocele is present, a scrotal ultrasound will identify that veins are greater than 3 millimeters in size with reversal of blood flow within the veins of the testis during the Valsalva maneuver. However, most varicoceles are diagnosed in patients on the basis of physical examination alone. Most physicians do not believe that scrotal ultrasound should be utilized to identify small or subclinical varicoceles since several studies have shown that "subclinical" varicoceles (those detected on the basis of ultrasound or other radiographic study alone) do not as clearly affect male fertility. Thus, routine ultrasound screening for varicoceles in the absence of physical findings is not encouraged. The diagnosis of a varicocele is made primarily by physical examination, and the duplex ultrasound should be used only to corroborate or confirm results of the physical examination. There are currently no standard and clearly defined criteria for diagnosing a varicocele by ultrasound, however.

What are the treatment options for varicoceles?

Treatment of varicoceles is an appropriate consideration in some patients with infertility, pain or testicular atrophy. No medical therapies are available for either treatment or prevention; however analgesic agents may alleviate associated pain when present.

There are two main approaches to the treatment of a varicocele:

Surgical Repair: This approach involves a variety of specific techniques, but all involve ligation (or blocking) the veins to the testicles thus interrupting blood flow in the vessels of the pampiniform plexus. The surgical approaches include open surgical repairs performed through a small single incision with or without the use of an operating microscope. Laparoscopic varicocele repair which utilizes telescopes passed through the abdominal wall are not generally used since they are thought by most to have greater potential for serious complications than standard surgical techniques without significant advantage. The open procedures are performed under a variety of anesthetics, from local to general anesthesia, whereas the laparoscopic approach is uniformly performed under a general anesthetic agent. With the advent of smaller [incisions](#), which avoid muscle transection, the open procedures are becoming closer to the laparoscopic

techniques in both speed of recovery and postoperative pain with virtually no risks of serious complications. Complications are uncommon, but include varicocele persistence/recurrence, hydrocele formation and injury to the testicular artery. The rates of these complications are highly contingent upon the surgical approach and a surgeon's skills. The complication rates after a varicocele repair have declined significantly since the introduction of the microscope and intraoperative Doppler ultrasound.

Percutaneous Embolization: This procedure is performed by radiologists using a special tube that is inserted into a vein in either the groin or neck. After x-rays of the enlarged veins of the testes, coils or balloons are released to create an obstruction (blockage) in the veins. This obstruction then typically leads to interruption of blood flow within the veins and disappearance of the varicocele. Percutaneous embolization is typically performed with intravenous sedation anesthesia and usually takes several hours to complete. Success rates of percutaneous embolization of varicoceles typically are very dependent upon the skill and experience of the interventional radiologist and range from equal to surgical repair to much lower based on individual results. One study found that the overall success rate, taking into account failed primary attempts and the recurrence rate, was 68%. Percutaneous varicocele embolization is usually the procedure of choice for recurrent or persistent varicoceles when the anatomy causing the varicocele needs to be radiographically defined. Complications may include varicocele persistence/recurrence, coil migration and complications at the venous access site. This has not been widely employed in most centers. In addition, embolization allows access to only some of the veins to the testis and does not allow treatment of the pelvic veins which may contribute to persistence or recurrence of the enlarged veins.

Who should be treated for a varicocele?

The Male Infertility Best Practice Policy Committee of the American Urological Association and the American Society of Reproductive Medicine (see website reference below) recommended that a varicocele repair should be offered to the male partner of a couple attempting to conceive when all four of the following conditions are present:

1. The female partner has normal fertility or a potentially correctable cause of infertility
2. The couple has documented infertility
3. A varicocele is palpable or, if suspected, is corroborated by ultrasound
4. The male partner has one or more abnormal semen parameters or sperm function test results

Adult men who have a varicocele and abnormal semen parameters and do not wish to conceive currently but might in the future could be considered for a varicocele repair. Adolescent boys with varicoceles should be considered for a varicocele repair if there is testicular pain or a reduction in the size of the testes where the varicocele is present. If there is no identifiable reduction in ipsilateral testicular volume, these young men can be followed with annual physical examinations or a semen analysis.

What can I expect in terms of improvement in quality of sperm and pregnancy rates after treatment?

Generally speaking, the quality of sperm improves in approximately 70% of cases. This may be reflected in improvements in the # of sperm, movement of sperm (both % of moving sperm and its speed of forward progression), sperm shape and ability to function as measured by things like DNA quality. Studies are variable, but men do not see improvement in semen quality for 3 months. Most

instances of improvement tend to occur 6-12 months after treatment.

Pregnancy rates are variable and are typically based on the quality of the sperm prior to treatment.

Most studies suggest that treatment of clinical varicoceles (those that can be identified by a physical examination) result in pregnancy rates between 25-50%.

What can be expected after treatment?

Recovery time after surgical repair is usually rapid. Pain is usually mild, and patients are asked to avoid strenuous activity for 5 to 10 days. Office work can typically be done within 24-48 hours after surgery. A follow-up semen analysis is obtained three to four months later if the procedure was performed to treat associated infertility. Open procedures performed with the operating microscope has a low recurrence rate of approximately one percent.

Recovery time after embolization is also relatively short. Again, pain is typically mild, and patients are asked to avoid strenuous physical activity for 3 to 7 days after the procedure. Patients may return to office work one to two days postoperatively. The recurrence rate with embolization is generally thought to be higher than that achievable with surgery with the operating microscope. Nevertheless, there are circumstances when embolization may be preferable.

The impact of varicocele correction on fertility is not entirely clear. Semen quality is improved in approximately 70 percent of infertile men undergoing correction of a varicocele at the end of one year. Correction of varicoceles has been shown to improve not only sperm motility, density, and morphology but also specific functional sperm defects. Improvements in the sperm penetration assay, oxidant determination (ROS), and DNA fragmentation have been achieved after a varicocele repair. A varicocele repair also has been shown to improve serum follicle-stimulating hormone and serum testosterone levels in some patients.

Frequently asked questions:

What will happen if I choose to observe my varicocele, rather than undergo treatment?

Failure to treat a varicocele may result in testicular atrophy and/or a decline in semen quality. This may lead to infertility. In most cases, if a varicocele is not treated, no major general health issues will develop.

I have pain with my varicocele. What can I do to help alleviate the pain?

Pain associated with a varicocele is uncommon. The use of adequate scrotal support (e.g., athletic supporter, briefs style underwear, etc.) can help the pain associated with a varicocele. Lying on your back facilitates varicocele drainage and often improves episodic discomfort as well. Use of analgesic agents (e.g., acetaminophen, ibuprofen, etc.) may be of benefit in treating the pain associated with a varicocele. Additionally, many patients obtain lasting relief of symptoms with varicocele correction through the above-mentioned techniques. Patients with pain that is not typical of "varicocele pain" (as described earlier) are less likely to be helped with surgical repair.

I am considering having my varicocele corrected for fertility reasons. How long will I have to wait to see improvement in semen parameters?

Semen analyses are typically obtained at three to four month intervals after the procedure. Improvement is often seen within six months, but may not be observed until one year

postoperatively.

My adolescent son was recently diagnosed with a varicocele. Should this be corrected?

Indications for correction of a varicocele in an adolescent include difference in testicular size, with the affected side being smaller than the unaffected side. Additionally, correction is a consideration in patients with pain. Treatment of adolescents is highly individualized, and consultation with a urologist to further discuss the appropriateness of treatment for a particular patient is highly recommended. Often patients or families will choose to repair varicoceles to minimize the potential risk for future fertility or minimize the concerns about this complication.

I am not interested in fertility and have no symptoms. Should I have my varicocele repaired?

Generally, asymptomatic varicoceles are not repaired. Most physicians do not believe there are health consequences of untreated asymptomatic varicoceles unless fertility issues are present.

Have there been any advances in the surgical treatment of varicoceles?

Two major advances in the surgical repair of the varicocele have been the surgical microscope and use of the intraoperative Doppler ultrasound. The main advantage of microsurgical (microscopic) repair over nonmicrosurgical (nonmicroscopic) repair is the significant reduction in postoperative complications, such as testicular artery injury, hydrocele formation, and varicocele recurrence. The complication rates for hydrocele formation with nonmicrosurgical technique range from 3% to 39%, whereas hydrocele formation is rarely reported with a microsurgical technique. These improved results are thought to be caused by the greater ability to identify and preserve individual lymphatics. The recurrence rate for microscopic varicocelectomy has been reported between 1% and 2% compared with 9% and 16% for nonmicroscopic inguinal varicocele repair.

The micro Doppler is another advance that has improved the outcomes in varicocele repair. Studies have found that microsurgical varicocelectomy combined with intraoperative Doppler ultrasound improved preservation of the testicular artery and increased the number of veins ligated.

Resources for further information:

[http://www.asrm.org/uploadedFiles/ASRM_Content/News_and_Publications/Practice_Guidelines/Joint_Reports/Report_on_varicocele\(1\).pdf](http://www.asrm.org/uploadedFiles/ASRM_Content/News_and_Publications/Practice_Guidelines/Joint_Reports/Report_on_varicocele(1).pdf)

www.varicocelespecialists.com

www.ssmr.org

<http://www.fertilitylifelines.com/intheknow/index.jsp#top>

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